



Towards a multifaceted understanding of the evolution of an Information System Ecosystem: The case of a mobile payment systems implementation and its contextual impact in South Africa.

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degree of Doctor of Philosophy in Business Administration in the
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DECLARATION

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.....

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Date: 30 June 2020

TITLE

Towards a multifaceted understanding of the evolution of an Information System Ecosystem:
The case of a mobile payment systems implementation and its contextual impact in South Africa.

ABSTRACT

The concept of IS ecosystem has grown beyond the organisational confines. Whilst the expansion of the IS ecosystems concept looked promising for the developing world the nature of its impact is not clearly understood in broader society. Most of the research available on implementation studies that involved IS ecosystems, past and present, have been in developed countries. A need arose to conduct studies in developing countries, especially those with an almost equal balance between formal and informal economies coined hybrid economies, shifting focus to the interplay between ICT4D and mainstream IS governed by a continuously changing context. A gap arose to understand the evolution of the IS ecosystem beyond the organisational confines, its impact on society its context, and how it is being influenced by society and its context. The aim of the study is to enlighten academia and industry on the IS ecosystems evolution through the theoretical lenses of Actor Network Theory (ANT), Structuration Theory (ST) and the Knowledge Creation Theory, especially the concept of Ba, by exploring the emergent and designed associations that impact it and how it influenced these associations. This study deploys a qualitative research strategy with an interpretive theme using inductive reasoning as the main method of enquiry with some elements of abductive reasoning. The case study approach is chosen with the focus on selecting data during a mobile payment implementation project in South Africa via interviews and observation, supported by internal and external documentation.

The interpretation of the data collected led to discovering how different a mobile payment IS ecosystem evolved in the organisational, business and consumer environments. The results indicate that, although the implementation was successful in some settings like the organisational environment where more control can be exercised, when the implementation extends beyond the borders of the organisation the power dynamics change. The research further highlights how the mobile payment IS ecosystem influences and is being influenced by society and its context. It also highlights how context (time and space) “is both constitutive of social action and itself the outcome of social action. Social action reinforced the notion that context is a social structure which is identical to Giddens duality of structure theorem. This led to the understanding that the IS ecosystem is a never constant but constantly evolving and dynamic. Since social structures was evaluation in this study it also highlights the impact on IS ecosystem pre and post pandemic conditions. Additionally, traditional contextual analyses focus on the environment, this study proposes a different view on contextual analysis that may benefit future contextual analysis. Given this consideration, future research may consider focusing on the phronetic research approach to extract more detailed contextual data and how it impacts the value and well-being of the actors participating in the evolution of an IS ecosystem. This study will also contribute to the development or conception of new methods to aid similar IS ecosystems evolution and research studies in a pre and post pandemic environment.

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A childhood friend gave me the nickname "Professor" in Grade 5 (old Standard 3). Never in a million years could he have chosen a more fitting nickname since my desire to seek knowledge and ultimately wisdom in later years send me on a quest of deep thought, introspection, and renewal. Like many journeys this one was riddled with obstacles. When the going got tough my first point of call was always GOD, through our Lord JESUS Christ for my blessings, protection, and guidance throughout this. I was blessed to be associated with some of the most incredible human beings, people that I never could have imagine will cross my path. My mom, my biggest supporter, and my dad, I will be forever grateful for your sacrifice, love, and support and guidance, you were the best and the greatest of parents.

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Childhood friends and mentors from Valhalla Park and surroundings... you kept me mental and grounded. Not forgetting my neighbourhood watch, running, football, off-road and gym allies, and their families.

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"If your efforts amounted to zero at the first few attempts... don't feel bad... it's your first effort... the results will come." Anthony Dean Dick.

"If you can measure it... you can manage it" Clive Julius.

"We all stand shoulders giants... we would not have a gotten where are without them. One day we hope to provide the shoulders for others to stand on and reach their dreams" Darryl Jacobs

"Let's take a walk mate..." Evan Jones

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I dedicate this thesis to my family, South Africa, and Africa. Special dedication to the those who are no longer around to share this moment, those who passed on because of this dreaded pandemic, may your souls rest in peace. To Valhalla Park, especially Edmund Street... and Vrygrond where it all begun. To every woman and child to whom this world had forgotten and every single person that truly want to make a positive impact to this world.

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PUBLICATIONS

The research study yielded two papers, one conference paper and one journal paper. The conference paper addressed the impact of introducing a mobile payment system to an emerging economy's mobile phone subscriber market. The purpose of this conference paper was to introduce the intended research to the academic community and to explain the intended focus areas. The research article was a precursor for the primary research study and focused mainly on the intended areas that produced the data to discuss the emergent consequences. A case study approach was adopted. The paper was presented at the Proceedings of the IFIP Working Group 9.4, 12th International Conference on Social Implications of Computers in Developing Countries, Sunset Jamaica Grande, Ocho Rios, Jamaica, May 19 - 22, 2013. The conference publication details of this paper are as follows:

Harry, R., Sewchurran, K. & Brown, I., (2013), The impact of introducing a mobile payment system to an emerging economy's mobile phone subscriber market. IFIP Working Group 9.4, 12th International Conference on Social Implications of Computers in Developing Countries, Sunset Jamaica Grande, Ocho Rios, Jamaica, May 19 - 22, 2013

The second paper, a journal paper, was produced to present Actor-Network Theory as a theoretical lens to explore the intricate relationship amongst actors that gave rise to the understanding of the networks of relations formed amongst these actors affected by the mobile payment system's introduction. The journal publication details of this paper are as follows:

Harry, R., Sewchurran, K., & Brown, I. (2014). Introducing a mobile payment system to an emerging economy's mobile phone subscriber market. An actor-network perspective. *The Electronic Journal of Information Systems in Developing Countries*, 62(1), 1-26.

This acceptance by the scholarly community has given direction, encouragement and impetus to the production of this thesis. In all cases, the published works have been reformatted, updated and synthesized into this thesis.

KEYWORDS

IS ecosystem

Mobile Payments System

Hybrid economy

Inductive Research

Abductive research

Information Systems

Context

Structuration Theory

Actor-Network Theory

Success or Failure

Systems implementation

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CHAPTER 1

Introduction

Economic change, growth or regression, does not occur in a silo. It is often accompanied by technological advances coupled with the societal change that prompt Information Systems (IS) researchers to find a better explanation to understand the impact on the Information Systems (IS) phenomena when economic transitions occur. During these transitional periods, developmental progress varies from country to country. Some countries have holistic growth, at macro, micro or meso levels, while others might only experience it at the micro-level. The introduction of mobile telecommunication technology in the 1990s on the African continent has led to exponential growth in the adoption of mobile communications technology (Asongu, Boateng & Akamavi, 2016). These conditions have given rise to partnerships between multinational mobile network operators, governments and local companies, to take advantage of the potential that the African continent has to offer. These partnerships have given rise to the introduction of the IS “*ecosystem*”. The term ecosystem, borrowed from biology, generally refers to a group of interacting firms that depend on each other’s activities and is defines as a “*set of actors with varying degrees of multilateral, nongeneric complementarities that are not fully hierarchically controlled*” (Jacobides et al., 2018). The ecosystem consists of a multitude of different stakeholders, systems and processes that combine to support the core IT artefact. Due to its enormous nature the IS ecosystem cannot otherwise be achieved without the involvement of government, businesses, consumers and multiple other stakeholders. This new innovative collaboration allows modern and dated technologies to broaden their current capabilities and to morph into large-scale IS systems. Popular amongst these innovative collaborations is the introduction of bandwidth and the mobile frequency spectrum, regulated by a country's government, which allows telecommunication infrastructure capabilities to reach far beyond what fixed-line telecommunication technology has achieved. This concept has been and still is appealing for many organisations, since it requires minimal investment in physical infrastructure (Forge & Blackman, 2006) especially in regions of Africa where infrastructure is lagging behind the rest of the world (Thukani, 2017). The lack of infrastructure can be attributed to a multitude of factors which include the developing and emerging economic status of the continent.

Conditions on the African continent have been favourable for mobile operating companies, a growing market, adequate investor interest, loosely regulated competitive environments and a magnitude of prospective subscribers. As the mobile industry evolved throughout the nineties, it

became more regulated, and more competition was introduced. This aspect, coupled with the prospect of accessing new markets, provided a platform for Mobile Network Operators (MNO's) to diversify their product and service offerings. New products and services were introduced to compete in new markets. Partnerships, such as the one between the South African government and European telecommunications providers in the 1990's, led to the evolution of innovative mobile phone concepts such as prepaid airtime (pay first and then use what you paid for) and call sponsor (sponsor airtime to some to use on a mobile phone) that were both introduced to the world by South Africa. The introduction of 4G or LTE in Angola in 2012 was followed by South Africa in 2013 (Jurkevic, 2016). Now MNO's can provide video streaming services that directly compete with the pay-TV and video rental market. Mobile phone adoption has occurred on an almost equal footing throughout the African continent. Although many studies have been conducted on mobile phone and services adoption on the African continent, a lot of these focused on the least developed to emerging economies in the ICT 4D research stream. As the economic prosperity of a country improves or worsens, so do its economic systems and processes.

The first three sections of this chapter outline the background, the context of the research, and its purposes, followed by the significance and scope of the research. Definitions of terms used are provided. Finally, the last section includes an outline of the remaining chapters of the thesis.

1.1 Background

Countries do not develop on an equal footing when it comes to economic development. According to a United Nations report on economic development (UNCTAD, 2011), economic development in Africa has occurred in three phases. The Import Substitution Industrialisation (ISI) phase occurred between the 60s and 70s. It was the catalyst for domestic production of consumer goods that were previously imported and coincided with the period when several African countries gained political independence that allowed them to implement their economic reforms. The Structural Adjustment Programme (SAP) phase began during the early 80s and ended in the late 1990s. During this period, African countries experienced a financial crisis, and many sought financial assistance from the International Monetary Fund (IMF) and the World Bank (UNCTAD, 2011). Africa was placed on a low-growth path; economic diversification efforts were undermined and led to an erosion of the industrial base in the regions that adopted SAP (UNCTAD, 2011). The Poverty Reduction Strategy Papers (PRSP) phase began in 2000 when a series of poverty alleviating initiatives were implemented to overcome economic

constraints that African countries experienced at the time, as a result of the second half of the 1990s (UNCTAD, 2011). Economic prosperity on the African continent varies according to the results of these economic reforms and as innovation renewal trends occur.

The advent of the 4th Industrial Revolution saw the introduction of large-scale Information Technology (IT) systems or IS ecosystems. In recent years research in Information Systems (IS) has drawn considerable attention to the implementation concerns of large-scale Information and Communication Technology (ICT) projects that extend beyond the organisational boundaries, especially in growing economies. Northrop, Feiler, Gabriel, Goodenough, Linger, Longstaff, Kazman, Klein, Schmidt, Sullivan and Wallnau (2006) have argued that large-scale systems would place unprecedented demands on software acquisition, production, deployment, management, documentation, usage, and evolution practices. They have further stated that the inability of current practices to meet these demands calls for breakthrough research in concepts, methods, and tools. They heed a call to shift the perspective to the concept of ecosystems or what they have defined as socio-technical ecosystems. The economic systems of a country or region and a country's societal make up add to the complexity of these large-scale ICT initiatives.

What had become evident through ICT research over the years, is how ICT initiatives have impacted different aspects of society in economic systems which either favour a developed or developing perspective. However, this is not the case with hybrid economic systems, an economic system that can operate with an almost equal balance of a developed and developing economic component where the ICT impact is vaguely documented or where there is a lack of evidence. It is often in the hybrid economic systems, where there is interplay and convergence of Information and Communication Technology for Development field (ICT4D) and mainstream IS, the two main branches in IS research. Scholars like Sahay, Sein, & Urquhart (2017) argue that the maturity of the ICT4D field can aid the understanding of the IS phenomenon in mainstream IS through reverse innovation. The same can be argued about the relevance of mainstream IS field and its application in ICT4D initiatives.

South Africa, defined as a newly industrialised country in a UNCTAD report (2011), operates with two economic systems, one formal/industrialised and one informal/developing economic system which is often referred by scholars as a dual or hybrid economy. There are many theories as to what gave rise to hybrid economic activity and often it is directly related to a country's implementation of its economic policies over long periods. For the purpose of explaining South

Africa's hybrid economic activity we will draw from colonialism and its segregated past.. Economic systems of developing countries can range from an underdeveloped economic system under authoritarian rule to newly industrialised economic systems that have competing or multiple economic systems. Hybrid economic conditions add to the complexity of the evolution of these IS phenomena, since the context in which these IS phenomena have evolved is continuously changing and seldom remains constant.

The most common and constantly evolving IS ecosystem in recent years is the mobile application environment which includes telephony applications and transactional applications like mobile payments. The adoption of mobile technology applications has been growing rapidly over the past ten years since the introduction of the smartphone. Gurbaxani and Whang (1991) stated as far back as 1991 that "*the use of technology has evolved from the automation of structured processes to systems that are truly revolutionary in that they introduce change into fundamental business procedures*". They have argued that organisations are changing their organisational structures and strategies to accommodate new information technology developments. This rapid adoption of ICT has continued throughout the nineties and into the new millennium, morphing into fully operational business and IS ecosystems. Fuelling this adoption is the rapid adoption and flexibility of the mobile phone and its numerous applications, based on text, voice, data and multi-media. The transcendence into a fully operational ecosystem has resulted in new technological developments impacting organisations beyond their borders and into society. The type of applications that were previously only available to a select group of individuals and organisations has extended into broader society. Extending beyond the borders of the organisation has created new opportunities and challenges for both organisations and society.

While the importance of the relationship between Information and Communication Technology (ICT) and organisational change is evidenced by the considerable literature on the subject (Gurbaxani and Whang, 1991), there is a lack of comprehensive understanding of the ICT relationships, where information systems transcend organisational borders into society, especially in countries with hybrid economic systems, such as South Africa. A variety of ICT initiatives have been implemented over the years that have impacted both organisational and societal levels, in developing and emerging economies, which include ERP systems and Health information systems. Most of these implementations only impact a small proportion of society.

The African continent has experienced phenomenal growth in ICT in recent years especially with the introduction of the mobile phone industry (Holzinger, Nischelwitzer & Meisenberger, 2005; Varshney, Vetter & Kalakota, 2000; Momo, 2005). This growth has occurred in (various) African countries with varying levels of economic development (Asongu et al, 2016). In these countries, which include Kenya, Tanzania, and South Africa, economic status ranges from least developed to newly industrialised. Since countries like South Africa have dual or hybrid economic systems, the introduction of mobile services has impacted the economic systems differently. While part of the country's economic systems can compete with systems that currently exist in industrialised countries, the other parts are on a par with those of a developing country. This scenario has created institutional and societal challenges, coupled with the complexity of the different levels of the economy, for countries with developing and hybrid economies. The challenges faced by organisations during the implementation of these large-scale ICT systems remain a growing concern amongst scholars and practitioners (Momoh et al., 2010). If one component of the ecosystem fails, the whole ecosystem could collapse. Despite numerous studies focusing on critical success and failure factors impacting large-scale systems implementations, the views remain divergent on what contributes to these critical success or failure factors (Ngai et al., 2008; Ram & Corkindale, 2014) with some arguing that these factors can be attributed to the vast contextual differences from which the research was derived. There is also no uniform method amongst scholars to determine these contextual differences adding to the complexity of understanding these large-scale IS ecosystems. Avgerou (2001) argues that the focus should be on studying the way such innovation is related to processes of socio-organisational change to understand the real potential of ICT innovation. Each ICT implementation is situated in a particular context or contexts. A recent study of context (Avgerou, 2019) indicates that mechanisms through which contextual conditions in IS research are understood to contribute to the formation of IS phenomena fall into three main categories which are functional, behavioural and power-related. The context in hybrid economic conditions varies, and contextual conditions are often ignored to focus on the static characteristics of context rather than the dynamic.

ICT initiatives have been at the forefront of many innovations over the last fifty years. ICT are present in almost every aspect of human life from remote surveillance to automated farming technology. This thesis will explore the multi-faceted influence that an IS ecosystem's evolution can have on a mobile payment service in a newly industrialised/emerging or hybrid economic system.

1.2 The impact of economic prosperity on the African continent

African countries have been differently impacted by these phases. Some countries have stayed in the least developed state. In contrast, others have moved to emerging economies, and some became newly industrialised as their economic conditions have improved. As a result, some of these countries have ended up with hybrid or dual economic systems, since economic development has not been equally distributed within the borders of the country. This scenario is also evident in transitional economies where a certain part of the country has moved to an improved economic system first and the rest of the country follows gradually as and when economic conditions improve.

In addition to these economic changes, the introduction and development of ICT has forced a change in traditional consumerism and introduced new business models and initiatives that continuously evolve (Hanssen & Dybå, 2012). Organisations have moved on from the traditional static view of an information system, towards a more dynamic global economy focus that has brought a multitude of actors impacting the development and implementation of ICT. This notion holds true for ICT initiatives that transcend the original organisational boundaries and are exposed to various actors with different requirements that need to be satisfied. The development and implementation of ICT initiatives occur in a broad environment where complex relationships exist. This scenario has given rise to the large-scale IS ecosystem (Northrop et al. 2006), where multiple sub-ecosystems can exist within an ecosystem. These include the consumer, organisational and business ecosystems. The complexity of the ecosystem is compounded by the actors that participate in it and the structures that they are exposed to (Northrop et al., 2006).

1.3 Problem Statement

Most of the current research literature available on the implementation studies that involved large scale IS ecosystems have been undertaken in developed countries with homogenous economic systems and are focused on mainstream IS concerns. This situation warrants the need to conduct studies in developing and hybrid economic countries and shift the focus to the interplay between ICT4D and mainstream IS with a continuously changing context (Ngai et al., 2008). Currently little or no research or literature exists that emphasises how the IS ecosystem evolves during the implementation of these large-scale IS systems, how the IS ecosystem's evolution influences society and its context and how it, in turn, is being influenced by these elements.

Little or no literature or research material exists that describes the interplay between ICT4D and mainstream IS and its impact on the implementation of the IT artefact and its evolving ecosystem when transitions in an economy occur, especially in hybrid economies. In hybrid economic systems IS ecosystems are deployed on multiple levels which include macro, meso and micro level. Current research focuses on exploring the contextual nature in which these implementation successes or failures occur, or adoption trends are being analysed, yet the ecosystem, as a whole, remains unexplored, and this situation justifies the drive to gather further insight into these evolving phenomena. Avgerou (2001) argues that the focus should be on studying the way such innovation is related to processes of socio-organisational change to understand the real potential of ICT innovation. She indicated that contextual analysis is an appropriate approach for academic research aiming at explaining complex situations, success or failures of IS innovation, and also reiterates its importance as a necessary competence for professional practice

“General IS research has developed mainly universalistic and narrowly situated perspectives of innovation, paying relatively little attention to developing a theory on the interplay between IS innovation and its socio-economic context” (Avgerou, 2008). She, (Avgerou, 2019) further posits that contextual driven factors and mechanisms have been under scrutiny by the academic community for some time.

This study aids in gaining insight into understanding the evolution of the IS ecosystem, how it impacts society and its contexts as it evolves, and how it is being impacted by contextual mechanisms which according to Avgerou (2019) can fall into three main categories which include functional, behavioural and power-related. . If these theoretically relevant insights are adopted, it is possible to better explain the evolution of the IS ecosystem and elaborate on the reframing of its context to gain a different understanding of such an evolution. Gaining insights into the IS ecosystems evolution will challenge conventional views that try to explain why IS ecosystems are successful or fail in multiple environments and may allow for the development and conception of new methods to aid the evolution of such an IS ecosystem.

1.4 Research Purposes underpinning theory

The purpose of this research project is to explore and create an understanding or a better explanation of the impact that the hybrid economic conditions in South African have on an evolving IS ecosystem, the mobile payment ecosystem, by examining how the network evolves,

exploring the emergent and designed associations that impact the evolving IS ecosystem and how it influences and is being influenced by society and its context.

As stated by Gregor (2006) theory for explaining “*provides an explanation of how, why, and when things happened, relying on varying views of causality and methods for argumentation. This explanation will usually be intended to promote greater understanding or insights by others into the phenomena of interest.*” As labelled by Gregor as a theory for understanding, this theory will be used as a "sensitising device" to understand the "inanimate objects and material systems", popularised by the use of Actor-network theory in the IS field, that is embedded in the evolving phenomena. The elements, factors or mechanisms that are responsible for producing the state of the regularities in the phenomenon and for developing a description or possible understanding of some phenomena, thus prompting the researcher to opt for an explanatory and partial exploratory research purpose (Blaikie, 2000). The original intention of the research was to start with an inductive approach. As time progressed, the researcher reverted to an abductive research approach to comprehend how the interactions between human and non-human actors evolve in an IS ecosystem. The abductive research approach, according to Blaikie (2000), incorporates what the inductive and deductive approaches ignore, the meanings and interpretations, the motives and intentions that occur and the directions they take to influence the behaviour of the actors that impact the phenomenon. The researcher's task in the abductive view is to discover and describe the inside view and not impose the outside view (Blaikie, 2000) on the phenomenon, which is critical in studying the impact that introducing a mobile payment service to a hybrid economy's mobile subscriber market.

The aim is to gather and generate meaningful empirical data that will allow the academic community and other interested parties to understand how an IS ecosystem, in this case, a mobile payment ecosystem, impacts an emerging or hybrid economy's mobile subscriber market. The theoretical lens deployed to deepen and guide the understanding of the phenomena will be Actor-Network Theory (ANT) (Callon, 1986b; Latour, 1987, 1992; Law, 1991) that will allow the creation of a deeper understanding of how the phenomena came about and evolved over a period of time. ANT has a non-discriminatory view of human and non-human actors and was chosen as the theoretical lens to generate a deeper understanding of the phenomena and to facilitate both the sensitising and enlightening aspects of the research. It should be noted that the focus of the research does not seek to develop a generalised view on theoretical analysis of ANT. Structuration Theory (ST) has been used to determine the impact on societal structures and

concludes with the role context through the concept of "Ba" (shared space/context). ST, for this study, will provide a valuable encompassing perspective of multi-level engagement amongst actors from the different environments and will point to meaningful insight for future interventions (Ogden & Rose, 2005).

1.5 Research objectives

The research project will be rooted in both mainstream IS and ICT4D. The IS ecosystems have evolved from a hybrid economic country context where the mobile payment system was deployed successfully as an ICT4D solution in the mainstream IS environment. This study will seek to develop a deeper understanding of the relationship between the mobile payment system and its environment. This study will explore how the ecosystem evolves in the organisational (micro), business (macro) and user/consumer (meso) environment and how it impacts and is being impacted by the context as it evolves throughout society.

The research objectives are as follows:

Firstly, the researcher identified an apparent theoretical gap in the prior research relating to the evolving IS ecosystems. The previous research has addressed several aspects of large-scale systems implementation which include: (1) critical success and failure factors ((Ngai et al., 2008; Ram & Corkindale, 2014), (2) some have focused on the adaptiveness, adaptability and regulation of large-scale systems ((Northrop et al., 2006; Herold, Klus, Niebuhr & Rausch, 2008), and (3) the implementation and management of IS ecosystems (Knauss, Borici, Knauss, & Damian, 2012; Rausch, Müller, Niebuhr, Herold & Goltz, 2012). This study intends to highlight the relationship between human and non-human actors in the IS ecosystem, how the IS ecosystems are impacted and are being impacted by the social world context, thus re-contextualising the way theories about context in the IS domain are built. Simply, this study describes how the IS ecosystem has evolved in dual or hybrid economic systems, such as South Africa.

Secondly, based on the review of the prior research, it became apparent that IS ecosystems have been under-researched (in prior IS literature). Most of the literature is from an engineering perspective. This study intends to broaden the knowledge on IS ecosystems for research

purposes by exploring its evolution in multiple environments which include the organisational, business and consumer environments.

Thirdly, the researcher identified an apparent knowledge gap in prior research relating to the implementation of IS initiatives in hybrid economic conditions. In addition, there are conflicting and contradictory findings of the prior studies that were conducted in developed country context compared to the ones that were conducted in developing country context. An investigation of these issues is important since it will highlight similarities and contradictions in the prior research. Thus, this study aims to gain an understanding of how the evolving IS ecosystem is influencing and is being influenced by the contextual environment or context.

Fourthly, based on the review of the prior research, there is a methodological gap. In recent years most IS researchers have deployed the inductive or deductive approaches of qualitative or quantitative research methods to generate insight into the IS phenomena. This study has explored the contribution that the inductive research, combined with elements of abductive research method, can have to generate new insights or to avoid distorted findings through the utilisation of a multidimensional theoretical framework to explore the evolution of the IS ecosystem. This is a way of re-contextualising the way in which theories about the context of the IS domain are built.

Lastly, the researcher identified an empirical gap in prior research. There is a lack of rigorous research in the prior literature on IS ecosystems phenomena as a whole. Previous research has focused primarily on either the mainstream IS component of the IT artefact or the ICT4D components (Sahay, Sein, & Urquhart (2017). Very little research has been done on highlighting the empirical evidence that supports ICT4D research, and mainstream IS research to evaluate the phenomena properly. In this study, another aim is to examine afresh the IS ecosystem as it evolves in the macro, meso and microenvironments by addressing the impact on the consumer, organisational and business environments. And finally, the researcher makes some reflections and elaborations on the research journey that was undertaken.

1.6 Research Questions

The research questions will be exploratory in nature. The discourse in IS ecosystem evolution has been lacking in recent literature, and for current ecosystems, like mobile payments systems/services, there is a lack of depth, and many gaps exist in current mainstream and ICT4D research (Duncombe & Boateng (2009), Dahlberg et al. (2008)). The research questions relevant to this study are:

1.6.1 How does the mobile payment IS ecosystem evolve over time in the hybrid economic conditions in South Africa? (**RQ1**)

1.6.1.1 How does an organisational environment influence an evolving mobile payment IS ecosystem? (**RQ1A**)

1.6.1.2 How does a business environment influence an evolving mobile payment IS ecosystem? (**RQ1B**)

1.6.1.3 How does a consumer environment influence an evolving mobile payment IS ecosystem? (**RQ1C**)

1.6.2 How is the mobile payment IS ecosystem influencing or being influenced by contextual conditions? (**RQ2**)

1.7 Significance, Scope, and Definitions

The study elaborates on the emergence of the IS ecosystem that evolved from the introduction of a mobile payment service, in a hybrid economic system. It explores the interconnected nature of actors and the contextual mechanisms that aid the evolving IS ecosystems.

Although attempts have been made to theorise a business ecosystem, very little or no literature exists to explain the holistic emergence of the IS ecosystem, its success or failure. Most of the current literature uses a one-dimensional perspective, either from the view of the organisation or the view of the user/consumer. This study will highlight the current state of the IS ecosystem, how it evolves, and will describe how context is reframed to influence the evolving IS ecosystem.

Previous research, done by Duncombe & Boateng (2009), Dahlberg et al. (2008) describes the lack of depth in mobile payment research in ICT4D. Although their focus is on ICT4D, the same could apply for mainstream IS since it is often the case that the research occurs in a homogenous rather than a heterogeneous environment. In recent years there has been an increase in the number of commercial deals and partnerships in the ICT environment on the

African continent that have resulted in the continent being exposed to various ICT innovations and initiatives. The recent pandemic that started in 2019 also necessitate further enquiry into large-scale ICT environments.

The significant undertaking in this study is to provide a lens for the academic community, through empirical scrutiny, to see how hybrid economic environments impact the IS ecosystem as it evolves. It will shed light on how to undertake mainstream IS and ICT4D exploratory studies in mix economic environments as well as highlight the impact on pre and post pandemic IS ecosystem studies. This may also provide industry practitioners with some focused ideas and thoughts on how to adjust the role they are playing in a heterogeneous economic environment when introducing ICT initiatives. The study will be conducted in South Africa, which employs multiple forms of economic systems.

1.8 Thesis Outline

This thesis will be divided into seven chapters:

- Chapter One – Introductory chapter.
- Chapter Two will discuss the literature reviewed for this study.
- Chapter Three will discuss the Research Philosophy & Strategy.
- Chapter Four will discuss the Theoretical Framework
- Chapter Five will present the data analysis for the Organisational Environment Case.
- Chapter Six will discuss the data analysis for the Business Environment Case (Analysis).
- Chapter Seven will discuss the data analysis for Consumer Environment Case (Analysis).
- Chapter Eight will discuss the Findings (Chapter will discuss the results) and feedback.
- Chapter Nine will discuss the Theoretical Integration.
- A comprehensive reference list is attached.
- The Appendices contain an overview of the interviews, a copy of the interview guide used to gather information for the case studies and the responses to the questionnaire.

CHAPTER 2

Literature Review and Contextualisation

2.1 Introduction

This chapter describes how the existing research has contributed to the formulation of the theoretical basis that underpins this study, the literature that was reviewed and its relation to the central phenomena, the IS ecosystem, and the introduction of mobile payment services to the emerging economies mobile subscriber market. This chapter explores current research that has been done around the introduction and adoption of mobile payment services, how the IS ecosystem emerges when new technology is introduced and how the IS ecosystem impacts hybrid economic countries, the gaps that exist, how these will be addressed by this study and what can be addressed in future research. This chapter contains two main sections. The first section will explore the concept of the ecosystem, how it evolves and how it impacts IS phenomena. It will further elaborate on the contextual mechanisms or elements and how these can be reframed as a sensitising device to explain their influence on the evolving ecosystem and how these can be influenced by the ecosystem as it evolves. The second section will focus on the introduction of mobile payment services in emerging economic countries.

2.2 Economic change

More than two hundred years after the industrial revolution dramatically changed the established world order; the world is once again in the midst of a sharp transformation. The likely effects of this will be a period of dislocation, followed by a period of prosperity, according to Hope and Hope (1997). The only uncertainty regarding transformation is how long the process will take (Hope & Hope, 1997). Peter Drucker, according to Hope and Hope (1997), They quoted that Peter Drucker, renowned in academia for his influential thinking on management and innovation, who posits that believed that the global economy is entering a post-capitalist society in which capitalists and proletarians will be replaced by knowledge and service workers. This prediction has held true. Since 2000 more efficient tools and machinery have been introduced, that can be directly related to the better management of information that organisations have at their disposal. Within a few short decades, society rearranges itself – its worldview; its basic values; its social and political structure; its arts; its key institutions to form a new world (Hope &

Hope, 1997). This view is supported by Neufeld (2021) who indicated that the waves are shortening as it enters the digital age.

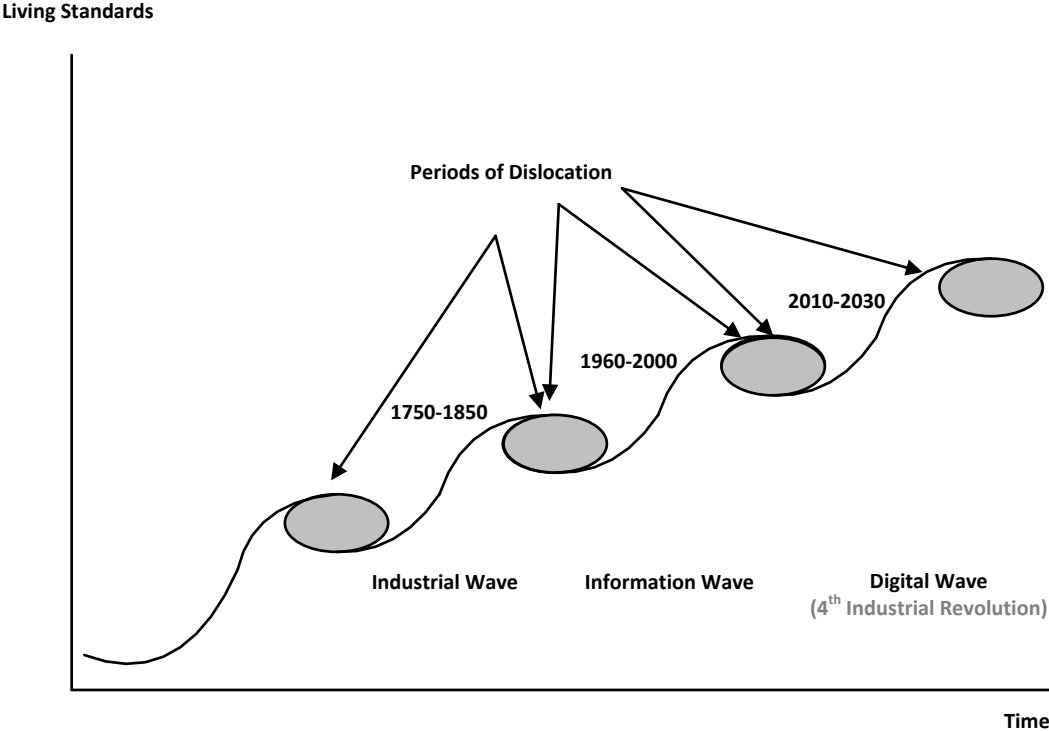


Figure 2.1: The Waves of Economic Change
 (Source: adapted from Hope & Hope, 1997)

2.2.1 The Three waves of Economic Change

The transitional periods between these waves of change have been anything but smooth. In the figure above each wave is represented by an "S" curve that shows an early period of dislocation, followed by a long spell of maturity, and then its eventual demise as new technologies take over.

The first wave (see Figure 2.1) was driven by physical labour and the second wave by machines and blue-collar workers, and the third wave by information technology and knowledge workers (Hope & Hope 1997). Jalali & Mahmoodi (2009) stated that the next wave will be in the virtual age. They argue that this wave will create a new era in which most aspects of everyday life and world affairs will become virtual or digitised.

The business organisation, as we know it today, has evolved during the second and third wave, but many of the accepted management principles and practices that brought success throughout the period are not aligned with the fourth wave which represents the 4th industrial revolution.

Virtual currencies like BitCoin (Böhme, Christin, Edelman & Moore, 2015) derived from the blockchain concept, are quickly gaining the trust of a virtual society and deep learning and artificial intelligence are gaining more prominence in industry.

With each wave of change, the Information and Communication Technology (ICT) landscape is put through a series of stringent tests for a short period of time before stability is achieved. Giddens (1984) posits that society renews itself through the production and reproduction of social practices over time and space. Each renewal is driven by innovation in almost all aspects of society, evidenced by the multiple (ICT) related products and services introduced over the past thirty years. Some environments allow for a quicker renewal of these social practices impacted by ICT than others. Every other year the stable economic climate of the developed world introduces ICT innovations to the rest of the world. ICT implementations in homogenous environments are generally more stable than those in heterogeneous environments. The level of ICT implementation success and stability can be attributed to many factors, including the complexity brought on by the heterogeneity of an environment. If countries are not equally prepared when a new wave occurs, there will be trendsetters, and there will be followers. As the wave progresses to the next level, as indicated by the figure 2.1 above, an early period of dislocation is followed by a long spell of maturity, and then its eventual demise as new technologies take over. Old jobs become obsolete, vast retraining programs are needed, and education formats have to be adapted as new wave businesses demand more appropriate skills and relevant knowledge (Hope & Hope 1997). These waves impact all economic systems, and some are more stable than others during the transition period. These waves may be more favourable to homogenous economies, like a pure industrialised environment or a developed economic system but can cause considerable disruptions in heterogeneous economic systems like hybrid or newly industrialised systems. These hybrid or newly industrialised economies give rise to more complex interconnected environments or ecosystems, to support the economic activity, and can be regarded as the biggest contributor to the economy's success or failure.

2.3 Ecosystem

The renewal of society brought on by the economic evolution, as new consumer goods, business models and initiatives are introduced, have a direct impact on the introduction, development and continuous evolvement of ICT (Hanssen & Dybå, 2012). Organisations have moved on from the traditional static view of an IS system towards a more dynamic global economic focus that has brought a multitude of stakeholders, impacting the development and implementation of ICT.

This notion holds true for ICT initiatives that extend past the organisational boundaries where they are exposed to various stakeholders with different requirements that need to be satisfied. The development and implementation of the ICT initiative occurs in a broad environment where complex relationships are brought to fruition. This scenario has given rise to the ecosystem. Ecosystems differ from industry to industry, e.g., a software ecosystem (SECO), according to Yu & Deng (2011), refers to the set of businesses and their interrelationships in a common software product or service market. Jacobides, Cennamo & Gawer (2018) has added that the term ecosystem, borrowed from biology, generally refers to a group of interacting firms that depend on each other's activities and define it as a "*set of actors with varying degrees of multilateral, nongeneric complementarities that are not fully hierarchically controlled*". Multiple sub-ecosystems can exist within an ecosystem and may include consumer, organisational and business ecosystems. The complexity of the ecosystem is compounded by the stakeholders that participate in it and the structures that they are exposed too. Jacobides et al. (2018) state that scholars have emphasized different aspects of an ecosystem that depend on the unit of analysis and have identified three broad groups of ecosystems. These include:

- Business ecosystem stream which centres on a firm and its environment.
- Innovation ecosystem stream which focuses on a particular innovation or new value proposition and the constellation of actors that support it.
- Platform ecosystem stream which considers how actors organize around a platform.

2.3.1 Business Ecosystem

A business ecosystem is comprised of a "community of organisations, institutions, and individuals that impact the enterprise and the enterprise's customers and suppliers" from an individual firm or new venture perspective (Jacobides et al., 2018). The ecosystem is conceived as an economic community of interacting actors that all affect each other through their activities, considering all relevant actors beyond the boundaries of a single industry. The ecosystem represents the environment that the firm must monitor and react to, which affects its dynamic capabilities, and thus its ability to build a sustainable competitive advantage. The members of the business ecosystem community share the same fate. No one is exempt from what the fate of the ecosystems might be, thus tying individual members' performance to the overall performance of the ecosystem.

2.3.2 Innovation Ecosystems

Innovation ecosystems focus on innovation and have a set of components (upstream) and complement (downstream) that support it. Here the ecosystem is regarded as "the collaborative arrangements through which firms combine their offerings into a coherent, customer-facing solution" (Jacobides et al. (2018)). The focus of the ecosystem is the innovation itself and not the organisation that introduced the innovation. The anchoring point is the system of innovations that allows customers to use the end product. The intention is to capture the link between a core product, its components, and its complementary products/services ("complements"), which jointly add value for customers. The organisation that introduced the innovation may or may not be a complimentary provider. Multiple arrangements thus exist to which the organisation aligns itself to the innovation, and these will affect, depending on the arrangement, its capacity to create value for the end customer (Jacobides et al. (2018)). The focus understands how the different independent actors interact to operationalise the innovations to benefit the customer and should these actors fail in their coordinated efforts, the ecosystems that support the innovation will not be established. Although past research indicates how knowledge sharing affects the strength of inter-firm relationships, and thus, the development, health and survival of the ecosystem and its commercialisation, innovations ecosystems remain challenging especially with the number of arrangements that exists for organisations or key actors to align themselves to the innovation.

2.3.3 Platform Ecosystems

Platform ecosystems, according to Jacobides et al. (2018), followed a "hub and spoke" approach where the ecosystems are comprised of platform sponsors, providers, and complementaries that add value to the customer's interaction with the ecosystem. Technology platforms such as Apple's iTunes or App Store or Sony's and Microsoft's gaming consoles allow access to the platform to create products and services, thus making the platform more attractive to customers. Some complementary products are produced to serve multiple platform ecosystems. The platform sponsor, in this case, the organisation, regulates the interaction with the ecosystem and dictates who can have access to the platform.

2.3.4 Summary of Characteristics

Ecosystems still present academia and industry with challenges in the modern age. Jacobides et al. (2018) state that "despite the emphasis on co-evolution of firm's capabilities, there is little explanation of how firms mutually adapt". Some academics argue that the hub or focal actor/organisation should provide direction and stability for the ecosystems while others argue

that the hub should shift its focus towards the management of knowledge mobility, innovation appropriability, and network stability. These authors further argue that this mechanism has rarely been studied and empirical support remains limited.

What compounds these challenges is the number of contextual driven factors and mechanisms that either support or negate the sustainability of the ecosystem. These contextual driven factors and mechanisms have been under scrutiny by the academic community for some time (Avgerou, 2019).

2.4 Context

Ecosystem environments vary in size, the elements and actors involved, and the time and space at in which they occur. These factors all add to the persistent concern about the variable success rate of ICT implementations. Over the past thirty years, several studies have focused on finding answers to the poor success rate of numerous types of ICT implementation initiatives. Some have focused on critical success factors, while others have focused on failure factors. In the case of ERP systems implementation, the views remain divergent, and no consensus has been reached on the set of factors that are deemed critical to the success of these implementations (Ngai, Law & Wat, 2008; Ram & Corkindale, 2014). One plausible reason relates to the fact that the studies have been contextually driven within particular research settings and specific countries and have resulted in the emphasis being placed on different sub-sets of critical success and failure factors (Ngai et al., 2008).

ICT implementations are commonly constructed around the interplay of people, activities and technology. Avgerou (2001) argues that the focus should be on studying the way such innovation is related to processes of socio-organisational change to understand the real potential of ICT innovation. Each ICT implementation is situated in a particular context or contexts. Contextual factors in an ecosystem environment are not consistent but continuously evolving, thus making it almost impossible to predefine the context and its key characteristics that the ICT implementation will encounter. Actors in the ecosystem come with various characteristics and requirements to justify their position in the ecosystem. When actors are removed or added a new set of characteristics and requirements are imposed onto the ecosystem. This notion is supported by Augier, Shariq, & Vendelø (2001) who argues that context is not "just there" as static entities but is composed of emergent phenomena. This notion is further supported by Erickson and

Schultz's (1997) argument that describes context as a mutually constituted and constantly shifting, a situation definition that emerges through the interaction of the involved individuals. Augier et al. (2001) further argue that contexts are not merely given in the physical setting nor in combinations of personnel but are rather constituted by what people do, where they do it and when they do it. They state that McDermott (1976) puts it succinctly “*people in interaction become environments for each other*”. Avgerou (2001) further posits that “*contextualist analysis is not only an appropriate approach for academic research aiming at explaining complex situations, failures, or successes of IS innovation, it is also a necessary competence for professional practice*”. Although multiple definitions of context exist, chapter 4 discusses context in broader detail as it pertains to this (research) study.

2.5 Mobile Payments as an IS Ecosystems

With the introduction and exponential growth of mobile phone services in the 1990s in developing countries and emerging economies, an increasing variety of stakeholders was exposed to the impact that the IT artefact could have on organisations and society. One such IT implementation is the mobile payments system that has revolutionised societal change in some developing countries like Kenya and Tanzania. As a result of this impact several research studies had been conducted in the mobile payments environment focusing on the African environment. These research studies include economic and social impact, adoption, usage, implementation studies and design (Aker and Mbiti, 2010; Donner and Tellez, 2008; Porteous, 2006; Mas and Morawczynski, 2009; Morawczynski, 2008; Mbiti and Weil, 2011; Jack and Suri, 2011).

In a mobile payment environment, there is a direct relationship between the individual and the mobile payment system, both are interacting in an IS environment. Allen Lee (as cited by Harry, 2005) states that to understand Information Technology (IT), one should understand the concept of an Information System (IS) first. Lee defines an Information System as “*a system that includes all processes and components used to capture data, process it and produce the output*” and can be a computer-based or a manual system.

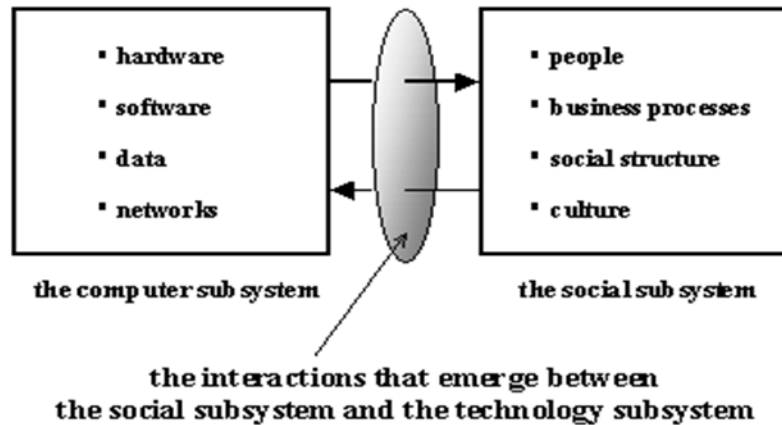


Figure 2.2: A way of conceptualising an Information System (Harry, 2005)

Research on mobile phone related services has been highlighted extensively in the academic community since their introduction in the early 90s with the primary focus of research being on development studies. Since the introduction of the IS discipline in 1960's the main focus of IS researchers has been in the mainstream IS area followed by the introduction of Information and Communication Technology for Development (ICT4D) in the 1980's (Sahay, Sein, & Urquhart, 2017) that prompted the research to shift towards mobile applications in developing countries.

Development, adoption and use of mobile phone-related applications and services have been some of the emphasised critical research areas. Renteria (2015) focuses on how transformational mobile banking optimises household expenditures in rural Mexico with a focus on the use of mobile banking services. Shaikh and Karjaluo (2015) focus their study on the adoption of mobile payments by reviewing 55 articles from 2009 to 2014. They argue that most of the research is polarised around the use of TAM as a theoretical framework and excludes economic and demographic factors about adoption. The second most popular theoretical framework is the innovation of the diffusion theory that emphasises the characteristics of innovations that influence the adoption rate but limits the explanation and understanding of attitudes that lead to rejection or adoption of the technology. Dacombe's 2015 review focuses on literature that elaborates on the potential and limitations of mobile phones in the delivery of rural services for agricultural and rural development in developing countries (Dacombe, 2015). Dacombe highlights that some of the gaps that exist after the review of 46 research articles include a lack of a broader focus that may include the impact on households, community and welfare, and the

expansion of qualitative approaches and experimental designs that could form the basis for theorising.

Jack and Suri (2011) provide a description of the mobile payment service that M-Pesa, (M meaning mobile and Pesa for the currency or money in Kenya) introduced in Kenya in 2007 followed by Tanzania, supplies and review the potential economic effects at a household level in Kenya. They also provide insight in terms of macroeconomic and monetary aggregates of M-Pesa in Kenya as well as a detailed portrayal of patterns of use across urban and rural populations. Jack and Suri (2011) establish that the users expressed preferences suggesting that M-Pesa is valued more by individuals than it costs, and that a number of potential effects were identified for M-Pesa which range from the impact on saving and investment, to risk spreading and insurance from a potential loss of currency. Their research was from an economic perspective focusing on the microenvironment.

In a survey conducted by Njenga (2009), several issues emerged from the usage of mobile payments in Kenya. These issues included the reduction of banking cost, access to finance, ease of opening a mobile payment account, and convenient distribution channels. The primary usage of the service is for money transfer, and fund storage or savings are encouraged. Most banks opt for international remittance services rather than cash transfers and bills, and third-party payments are still evolving. Respondents of the survey also concluded that the service does not favour higher-income earners due to the limitation on the amount of currency that is allowed to be managed by the mobile payment service. A lack of face-to-face interaction makes the service anti-social, and the efficiency of service, reliability assurance and consumer protection need to be addressed (Njenga, 2009).

Comminos, Esselaar, Ndiwalana, Stork (2009) state that the unbanked only consistently transact electronically if the systems environment is convenient and secure to use. They argue that a paradigm shift needs to occur to determine how the unbanked can be included in the banking sector and state that “airtime-cash convertibility or mobile wallets have the potential to provide an urgently needed breakthrough”. They argue that mobile banking and payments will force the convergence of the financial and telecommunications sectors.

The perceptions of mobile payment makers have been measured in a study conducted in 2009 in Kenya. Munyoki and Mutua (2011) determine that the customer perception of the use of M-Pesa

is very positive amongst the users of the service. It coincides with the findings of Njenga (2009) and Comminos et al. (2009). However, they reiterate in the findings that more training, in the form of workshops and seminars, are required for employees at the agent networks to improve the level of customer service and customer interaction. They also conclude that the MNO should increase the amount of float available to the Agents to avoid shortages when customers come to withdraw. Figure 2.3 depicts the factors that impact the mobile payment environment.

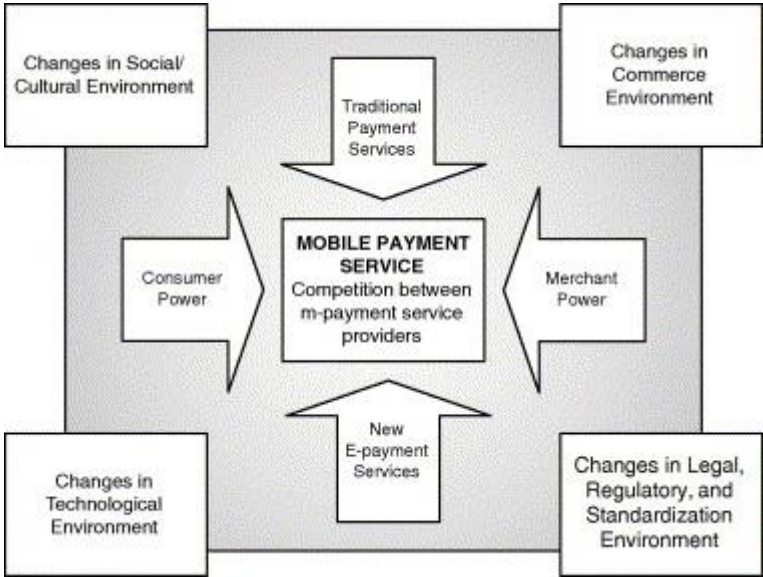


Figure 2.3: Factors impacting the mobile payment environment.

Source: Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008).

In recent years more and more published research articles and papers have focused on the economic and social impact of mobile payments in developing countries (Mas and Morawczynski, 2009; Morawczynski, 2009; Mbiti and Weil, 2011). It has been argued that most of these research projects are concerned with needs assessment, design of systems and areas of application, adoption and adaptation and impact assessment (Duncombe and Boateng, 2009). Although most of these studies have been conducted in developing countries, they often exclude important role players that impact the IT artefact and often exhibit diluted comparisons with the developed world. It is often the case that these research studies only focus on one or two aspects of the mobile payment system, e.g., adoption and use, designing the system or economic benefit and may result in a limitation for both academia and industry to develop a unified understanding of the multiple perspectives of the environment. These studies seldom live up to the expectation of developing a deeper understanding of the IS phenomena as they evolve in their entirety in emerging economies with their hybrid economic systems. The South African economic landscape, with its dual economic system, where former president Thabo Mbeki distinguished

the developing component of the economy by referring to it as the second economy (Mbeki, 2003; Temple, 2005), can be of great significance in the exploration and understanding of an IS ecosystem as it evolves in specific context. The interplay between formal and informal economy will provide valuable insight into a more in-depth understanding of why and how IS ecosystem are deployed in hybrid economic environments.

2.6 Contextualization of mobile payments in hybrid economic systems.

Substantial evidence exists that organisations in different economies react differently to similar challenges (Knetter, 1989). Although the study by Knetter focuses on developed economies, the same can be envisaged for developing countries and transition economies. Africa's economic development did not happen in tandem with the rest of the world since the inception of colonialism.

The next section will discuss South Africa's economic development and elaborate on the status of mobile payment applications and systems. It will provide an overview of the current mobile payment environment.

2.6.1 South Africa's economic landscape

South Africa has one of the most progressive economic systems and infrastructures on the African continent. This can partially be attributed to the knowledge of economic systems that the European settlers brought to the continent and the discovery and evolution of mining precious commodities dating back to the establishment of the first commercial mine in Namaqualand, Northern Cape province in 1852 in South Africa (Davenport, 2013).

Although South Africa is regarded as an emerging economy or developing country by the international community, the reality is that South Africa's progressive economic systems can compete with most of the developed world.

Roux (2016) argues that there are three types of economic systems:

- The traditional system, which is the oldest economic system that is still followed in parts of South Africa and other African countries where economic decisions are made based on habit, and the traditions or customs that have been carried down over centuries. Very little economic growth occurs in traditional systems. Since growth is not the objective, it

does not mean that this economic system does not serve its purpose.

- The command system, which includes various forms of communism, advocates that economic decisions are made on behalf of the broader population by a minority, in this case, the state, whose management of the economic systems is synonymous with those of authoritarian regimes. Economic growth may vary in these types of economies and might be subjected to trade relations with other countries ..
- The free-market or capitalist system is founded on the idea that households and business are entitled to improve their welfare or profits by participating in economic systems that are based on a legal framework that advocates free trade and profit maximization.

Lipsey (1975) states that no economy has ever existed that can operate as a single economic system, e.g., free market or command system, without elements of the other economic system being present. This is evident in the United States (US) that professes to be a free market system. After the market crash in 2008, the US government intervened to save the economy. The South African economy has significant elements that support the traditional system, the free market system and, the communist systems, where the government plays a significant role in the decision-making process and the initiation of poverty alleviation programs, like the case of Broadband Black Economic empowerment, thus making SA a mixed economic state. The mixed economic state was advocated by the South African Freedom Charter, a manifesto implemented in a democratic South Africa, which advocated the creation of a type of mixed economy where the people of South Africa will share in the country's wealth (Cling, 2001)

However, Aliber, Kirsten, Maharajh, Nhlapo-Hlope, & Nkoane, (2006) posit that “*the breakdown of apartheid did not immediately translate into improved economic conditions for all South Africans*”. They state centuries of colonialism had hard wired a duality into the economic system that allowed for the coexistence of two economic domains. This is further evidenced by Turpin's (2018) description of the South African socio-economic landscape, one that is burdened with severe socio-economic challenges such as extreme inequality and one with well-established ICT infrastructure covering large parts of the country and a high rate of mobile phone uptake.

2.6.2 Mobile services

The mobile network operators (MNOs), as part of the ICT sector, introduced text, voice, data communications and many other applications through its mobile networks to mobile subscribers. Various mobile payment and banking business models exist. These models include bank-centric initiatives that utilise the internet (mobile internet banking) or partnerships between banks and mobile network operators (MNOs), with the bank being the dominant partner. In 2010, an MNO partnered with a bank to launch a mobile payment system in South Africa that was aimed at the MNO's subscriber base as an extension of its current mobile services. The partnership with the bank was necessary since National Payment Systems licences were required by the network operator, QUNU, as a regulatory requirement imposed by the South African Reserve bank. At the time, it was the first mobile payment initiative of its kind in South Africa driven by an MNO rather than a commercial bank. The mobile payment system in question was similar to M-Pesa that was introduced in Kenya in 2007 and Tanzania in 2009.

Managing and maintaining a mobile payment system requires multiple components to work in tandem. Management of the mobile payment subscribers and the users of the mobile payment application adds a different dimension to the mobile payment service. Mobile phone subscribers are highly diverse in South Africa and include those who have bank accounts and those who do not, those who are literate and those that are illiterate, those who are prepaid subscribers (pay-as-you-go model) and those who are postpaid (use and then pay). South Africa's dual or hybrid economic environment only adds complexity, as it is characterized by traits of both a developing and an industrialized economic system.

2.6.3 What are mobile payments?

To start answering the research questions, indicated in section 1.7, it is important to distinguish between mobile banking, as a subset of banking, and mobile payments. Mobile banking is an extension of banking services and does not require the physical presence of a bank or automated teller machine (ATM) to conduct transactions. Banking services can be accessed via a mobile device. Mobile payments or m-payments are a subset of mobile banking. Mobile banking or m-banking consists of a broad range of services that commercial banks offer to their clients, such as overdraft adjustments, loan applications and others, such as account-based savings or transactions products offered by banks and may include m-payment services that can be accessed via a mobile device (Porteous, 2006). Mobile Payments centre on information in the sense that the payer needs to know who is being paid, for what reason are they paid, when they are paid and

how much are they paid (Mobile Banking Conference, 2011). Physical money is paid to a mobile payments account, and the mobile payments subscriber can move the money from his/her account to another account.

In the case of M-Pesa, the physical money can be transferred via a bank account into the M-Pesa bank account through m-banking or internet/online banking referencing the mobile number of the registered subscriber or deposited at an agent who will deposit it in a bank account that is referenced back to the mobile payment subscriber's mobile phone number. The physical money stays in the bank, and a series of transactions occur that impact that particular account. This can result in reducing or increasing the monetary value of the account. The mobile payment process will be discussed in further detail in section 2.6.10. Mobile payments can be enabled through several technology platforms for a mobile device.

2.6.4 Applicable technology platforms for the mobile payment system

Mobile telecommunication service providers have a multitude of products and services that they offer to prospective customers. Most of these products and services are governed by the Global System for Mobile (GSM) communication digital standard, which was introduced in 1991. GSM is an open-source standard and that supports voice, fax, data and SMS services.

2.6.4.1 Voice Channel

The most popular technology that is supported by the GSM standard is the voice channel. This channel is used daily and is currently the main contributor to network traffic on the cellular or mobile network. The portability and mobility of the mobile device, one can argue, attributed greatly to the adoption of mobile technology and the voice channel has provided an opportunity for users to switch from a fixed-line environment and be less restricted.

2.6.4.2 Interactive Voice Response (IVR)

IVR is derived from the voice channel. It is an automated response system that allows humans to interact with machines, in this case, a computer that returns a computer-generated voice response based on the option that the human chooses on the keypad of the mobile device. In South Africa, it is a very popular self-service mechanism that is deployed by the bank. The MNO, for example, assists customers with issues, queries and transactions.

2.6.4.3 Short Message Service (SMS or text message)

The Short Message Service (SMS), as stated by Le Bodic (2005), is a basic service allowing the exchange of short text messages between subscribers. The SMS allows mobile stations and other network-connected devices to exchange short text messages via the GSM network or mobile networks that support the SMS standard globally. SMS is a very mature technology supported by all GSM handsets or mobile devices and includes Internet hosts, telex, and facsimile. The SMS service is used in a variety of industries as an information or alert service to customers. These services include (Le Bodic, 2005):

- Person-to-Person Messaging,
- Information Services,
- Voice Message and Fax Notifications,
- Internet Email Alerts,
- Download Services,
- Chat Applications,
- Smart Messaging,

2.6.4.4 SIM Application Toolkit (SAT)

The GSM Subscriber Identity Module or SIM is something that is inserted in the mobile or GSM device, that stores personal subscriber data that allows the mobile device to communicate with the GSM or mobile network. The SIM can also be in the form of a smart card, also known as a SIM card. It can contain a SIM toolkit which will allow it to interact and control the way mobile devices interact with the GSM network or other devices. It is very popular in certain mobile payment environments where the SAT is used to create Short Message Service (SMS) based mobile payment applications. In SAT-based systems, the communication between the mobile client and the payment server occurs using SMS to initiate and authorise payments (Nambiar, Lu, & Liang, 2004).

2.6.4.5 Unstructured Supplementary Service Data (USSD)

Unstructured Supplementary Service Data or USSD for short is a mobile telecommunication protocol that supports mobile communication services including purchasing channels for mobile services, location-based services, reservation and booking solutions, mobile payment services and many other mobile related services. USSD are generally transacted by dialling a short code, which

includes alphanumeric and special characters, on the mobile phone keypad. Once the code is dialled, the transaction allows for synchronous real-time connection between sender and receiver on the GSM network. In contrast to other mobile services like SMS (short message services) USSD allows for quick direct and immediate (real-time) exchange between sender and receiver on a GSM network and supports an array of different mobile operating system platforms. USSD communication is limited to 182 alphanumeric character sets per communication session. It can be integrated with an SMS and WAP systems environment, thus extending the functionality of the USSD platform to communicate with multiple other systems in the MNO environment, e.g., purchasing broadband data bundles via the USSD platform and receiving a confirmation SMS when the purchase is successful. The level of stability on the mobile network may impact the use of USSD and may result in delayed or timed out transactions. USSD are commonly used in developing country mobile services solutions (Lerner, 2013).

A further enhancement to the GSM standard is General Packet Radio Service (GPRS) which allows for the transfers of packet-switched data over the GSM network via the GPRS platform. This system is less expensive, quicker and more cost-effective than circuit switch data transfer, which occurs directly in the GSM network (Carlsson, Hyvönen, Repo & Walden, 2005). The evolution of GPRS, since its introduction in the GSM environment, has been quite significant and has supported several different technical standards and protocols that play a key role in the development and deployment of online mobile services and applications. These technologies include:

2.6.4.6 Wireless Application Protocol or WAP

WAP resulted from collaborative work between many wireless industry players, carried out in the scope of the WAP Forum. During the forum, technical specifications were produced that enable the support of applications over various wireless platforms (Le Bodic, 2005). A set of protocols and content formats were identified and defined that will support the development and deployment of applications in the mobile environment. These protocols and content formats include the ability to support interoperability, scalability, efficiency, reliability, and security (Le Bodic, 2005).

2.6.4.7 Multimedia Messaging Service (MMS)

Le Bodic (2005) states that the WAP model leverages the web model, by adding several improvements that include MMS. The MMS standards were designed by the WAP Forum. MMS allows for the exchange of messages containing multimedia contents including text, images, as well as video and audio elements. MMSs can be sent from person to person or from a machine that supports MMS to a person or vice versa.

2.6.4.8 Near field communication (NFC)

Near Field Communication (NFC) is a wireless technology standard that allows for contactless short-range communication between mobile devices and other electronic devices which contain NFC tags (Sharma, Gusain & Kumar, 2013). NFC tags are in the form of a sticker that is attached to the electronic device, thus allowing it to be used as an NFC enabled device (Agrawal & Bhuraria, 2012). NFC is a wireless technology which provides communication between two mobile phones which contain NFC tags, using short-range radio waves. Similar to Radio Frequency Identification (RFID) communication is enabled via magnetic field induction between NFC enabled electronic devices. The short-range communication that is enabled by NFC between electronic devices allows for several opportunities. Some of these opportunities include:

- Payment and deposit services,
- Electronic ticketing,
- Exchange of information,
- Verification services,
- Multi-media download

2.6.4.9 QR (Quick Response) Codes

QR codes are matrix codes that can be read by a mobile phone with an integrated camera. A QR code application reader must be installed on the mobile device before it can read the QR Code. QR codes have multiple applications. After being scanned with the mobile device, the code can prompt various functions or application software on the mobile device to act, e.g., it can open a browser to display the URL that was embedded in the QR code, call a telephone or mobile phone number, start a text message or pay for goods and services via a payment application installed on the mobile device (Walsh, 2010).

2.6.4.10 Bluetooth

Bluetooth is a universal radio interface in the 2.45 GHz frequency band that enables electronic devices to connect and communicate wirelessly via short-range, ad hoc networks. Bluetooth devices can have multiple connections or communicate with multiple devices simultaneously. Bluetooth eliminates the need for wires, cables and connectors that would otherwise provide communication between multiple devices. Unlike NFC, Bluetooth does not require the use of tags for it to communicate with other devices. The Bluetooth standard is embedded in the device (Haartsen, 1998).

2.6.5 The Banking landscape in South

Banking, as stated at the Mobile Banking Conference (2 & 3 March 2013, Emperors Palace, Kempton Park, Johannesburg) can be defined as the storing of money in different account types, pushing payments to individuals and businesses via established banking payment systems in batch processes or individual or multiple online transactions where the bank client or consumer defines the recipient details and cash/credit account management, e.g., balance enquiries, transfers and credit applications.

Redlinghuis & Rensleigh (2010) state that banking in South Africa can be traced back to Cape Town in the 1860s, where it was influenced by both British and Dutch traditions. The banking system in South Africa is well developed and is regarded as one of the best in the world. It can compete with well-established banking systems in developed countries such as the United States of America (USA) and the Eurozone countries, and it can be considered superior to most banking systems in emerging market countries. South Africa was one of the few countries whose banking system did not collapse as a result of the credit crunch that started in 2007. This could be attributed to a banking industry that has developed into a mature sector, with a moderate level of private-sector indebtedness, a first-rate regulatory and legal framework and well-managed banking businesses that utilize sophisticated risk-management systems and corporate governance structures when conducting business (Mboweni, 2004 and Redlinghuis & Rensleigh, 2010).

The South African banking sphere consists of four major industry players, namely the Amalgamated Banks of South Africa (ABSA), Standard Bank, Nedcor and First National Bank (FNB). The core focus of these major players is the economically active individuals and businesses in the formal sector of the South African economy. There are also several smaller banks such as African Bank, Investec, Old Mutual, Bank of Athens and Capitec. These banks

focus more on niche markets such as corporate banking, the informal economic sector and the un-banked.

Since their inception, South African banks have always been very innovative when it comes to service delivery and the introduction of new products and services. Customers, at present, have online, real-time and nationwide access to banking products and services 24 hours a day throughout the year. South Africa's relaxation of exchange controls has resulted in South Africa becoming an increasingly important financial centre with well-developed foreign exchange control policies and regulations (Redlinghuis & Rensleigh, 2010).

Since the inception of banking services in the 1800s, they have continually evolved, and during the 1990s, some banking services were extended to the online environment in South Africa. This gave rise to the Internet banker that prefers the online environment due to its convenience and ease of access and use. Banking can be done during leisure times and information about services and products can be obtained without going to the physical bank (Redlinghuis & Rensleigh, 2010).

The Mzansi account, introduced by South African commercial banks, was designed to provide banking service access to low-income groups in South Africa. This initiative resulted in the banked adult population rising from 46% to 63% between 2004 and 2008. The current number of 3,5 million Mzansi account holders had dropped from 4,5 million in December 2010, a drop which can be attributed to the expensive fee structures that exist to service these accounts. About 12% of the 3.7 million are inactive (Lefifi, 2011). With less than 70% of the adult population banked an opportunity arises to exploit the remaining market share.

2.6.6 The Rise of the Mobile Network Operator in South Africa

Towards the end of the 20th Century, South Africa had long been hindered by its fixed-line telephone network infrastructure that had been operated by the partially state-owned telecommunications company, Telkom. Over several decades, Telkom was unsuccessful in its quest to roll out its fixed-line network to certain rural and sometimes uninhabitable places. This led to the exploration of alternative methods to build infrastructure in these areas. During the same period (1990 - 1994) as the introduction of Internet banking, the feasibility of GSM (Global System for Mobile Communications) was explored in South Africa. This resulted in the establishment of two Mobile Network Operators (MNO), namely MTN and Vodacom. These MNOs were established to aid in delivering telecommunications infrastructure in South Africa. Between 1994 and 1996 Vodacom introduced the first pre-paid service in the world. This resulted in the number of mobile subscribers increasing almost tenfold during the early years.

2.6.7 The emergence of mobile payments in developing countries

Richard (2010) states that international migrants sent an estimated \$440 billion in remittances worldwide, during 2010. In 2020 this amounted to a total of \$702 billion, down from the \$719 billion recorded in 2019 (McCarthy, 2021). These include cross-border person-to-person payments of relatively low value that were sent to family members in developing countries. He argues that the sending of remittance can result in poverty alleviation, entrepreneurial support, and fostering the development of financial systems. He predicts that in "*five to ten years, the remittance industry will change greatly because of increases in the variation of service providers and transfer business models, the expansion of mobile phone ownership, and the extension of mobile signal availability*" and that "*these changes will further fuel the beneficial role that remittances play in international economic development*". He argues that the mobile phone may provide the critical determinant for the direction in which the industry evolves. By using a mobile phone for sending and receiving remittance the customer or client will engage with one or many electronic services.

Brown, Licker and Kashora K (2010) identify eight factors that influence customer satisfaction with electronic services. These factors include service quality, information quality, systems quality, transaction and payment quality, perceived usefulness, innovativeness, trust and security. It is apparent that these factors will have an influence on the customer's satisfaction with a mobile payment system on a micro level and will have a significant impact on the South African mobile subscriber market.

Jack and Suri (2011) provide a detailed portrayal of patterns of mobile payment usage across urban and rural populations. They argue that “M-Pesa is an innovation that dominates (seen as the preferred mobile payment application in Kenya) its money-transfer predecessors in virtually all dimensions”. They state that Kenyan users of the mobile application experience faster, cheaper, more reliable, and safer usage in comparison to other existing methods available for sending remittance at the time. As an established service in the Kenyan market, M-Pesa will have a detrimental impact if the delivery of the service is interrupted on the mobile network.

Additional adoption and impact studies are sure to follow, but the research community should also pursue studies of the context and use of m-banking/m-payments systems in other parts of the developing world (Donner and Tellez, 2008). Standalone or singular studies provide an impartial view of how the mobile payment system ecosystem is impacted, at the same time very few studies describe how ecosystems are partially impacted in other environments like SECO. To date, no study exists that provides a deeper understanding of how IS ecosystems fail by tracing the implementation failure throughout the whole ecosystem and its subsystems.

The next section will introduce the evolution of the mobile payment system on the African continent.

2.6.8 The African mobile payment environment

Between 2000 and 2010 several mobile payment initiatives were undertaken on the African continent (Hughes and Lonie, 2009; Porteous 2006) and included an initiative that was introduced in 2007 in Kenya and 2009 in Tanzania. The former was a major success with more than 13 million M-Pesa M-Pesa subscribers to date where the latter struggled to gain subscribers with less than 400 000 m-payment subscribers recorded during its infancy stage. In 2011 the Vodacom Tanzania M-Pesa M-Pesa subscriber base reached its two millionth mark (Camner, Pulver & Sjoblom, 2009).

The next section will describe the implementation and adoption of mobile payment services in Kenya and Tanzania and will draw comparisons on the similarities and differences that these countries encountered.

The introduction of M-Pesa in Kenya by Safaricom in March 2007 led to it becoming “*the most famous and probably the most successful implementation of a mobile money service to date*” in which it registered almost 3 million active users and 3000 agents during the first fourteen months of

operation (Camner et .al, 2009). By 2011, over four years after its launch, M-Pesa had gained 7 million registered customers and had 10000 agents spread across the country. As of 2020 that figure stood at 283 000 agents and 34 000 000 registered customers (Communications Authority of Kenya, 2020). This exceeds the reach of any other financial service in Kenya.

2.6.9 Mobile Payments: The Kenyan story

Kenya is located on the mid-east side of the African continent, with a population of 52 million people in 2020. During 2007 M-Pesa, which stand for Mobile Pesa (Pesa being currency or money in Kiswahili) was introduced to the Kenyan market at which point the Kenyan population was just above 36 million people. During the introduction of M-Pesa, the Kenyan economy was dominated by agriculture, with about 78% of the population residing in rural areas (Lerner, 2013). Morawczynski (2008) states that, during colonialism, there was an influx of migrants from the rural areas into larger cities such as Nairobi. These migrant workers were only allowed to stay in the city for as long as they were economically active, due to policies that were implemented by the colonial government which discouraged the permanent establishment of Kenyans in urban areas. Thus, as a result of the fluctuation in employment opportunities, migrant workers would oscillate between the urban and rural areas of Kenya throughout their working lives (Morawczynski, 2008). Since the emphasis was placed on urban economic development, rather than rural, there were few opportunities outside the cities for formal employment (Morawczynski, 2008 & Camner et .al, 2009). The migration between urban and rural Kenya also resulted in migrant workers sending money and goods home to family members who lived in rural areas. The remittances were sent via a variety of channels between urban centres and rural areas prior to the introduction of M-Pesa. These channels included depositing money in someone else's bank account which would later be withdrawn and given to the intended person by means of, money transfer services, direct deposits, cheque, Post office money order, also by asking someone who will visit the rural area or by asking the bus operator/driver to hand it to the intended person (Morawczynski, 2008 & Camner et .al, 2009). These methods could be costly and were not always secure and resulted in many losses.

In 2005 the Department of International Development (DFID) in the United Kingdom and Vodafone started a joint venture to create a microfinance platform that could be accessed via a mobile phone to reduce poverty in developing countries with each party contributing 50% towards the financing of the project (Hughes and Lonie, 2009; Lerner, 2013). M-Pesa went into

operation on 6 March 2007 as a pilot that was introduced to the Kenyan market by Safaricom, a subsidiary of Vodafone and the Kenyan government. Due to its popularity and potential the ownership of M-Pesa shifted multiple times. In 2020 Vodacom South Africa and Safaricom bought the M-Pesa platform from Vodafone UK which will allow them to take ownership of M-PESA's brand and intellectual property (Delpont, 2020). Originally developed as a micro financed platform, M-Pesa soon grew into a mobile payment platform that had more than one million registered users in its first few months of operation.

2.6.10 How does M-Pesa work:

M-Pesa has three types of users that interact with the mobile payment system. These users are the (Figure 2.4):

1. Agent - that controls the e-money float in the mobile payment systems,
2. Customer - that deposits and sends e-money or withdraws physical money from the system.
3. Unregistered user - that does not have an e-money account, they only withdraw physical money if e-money has been sent to them.

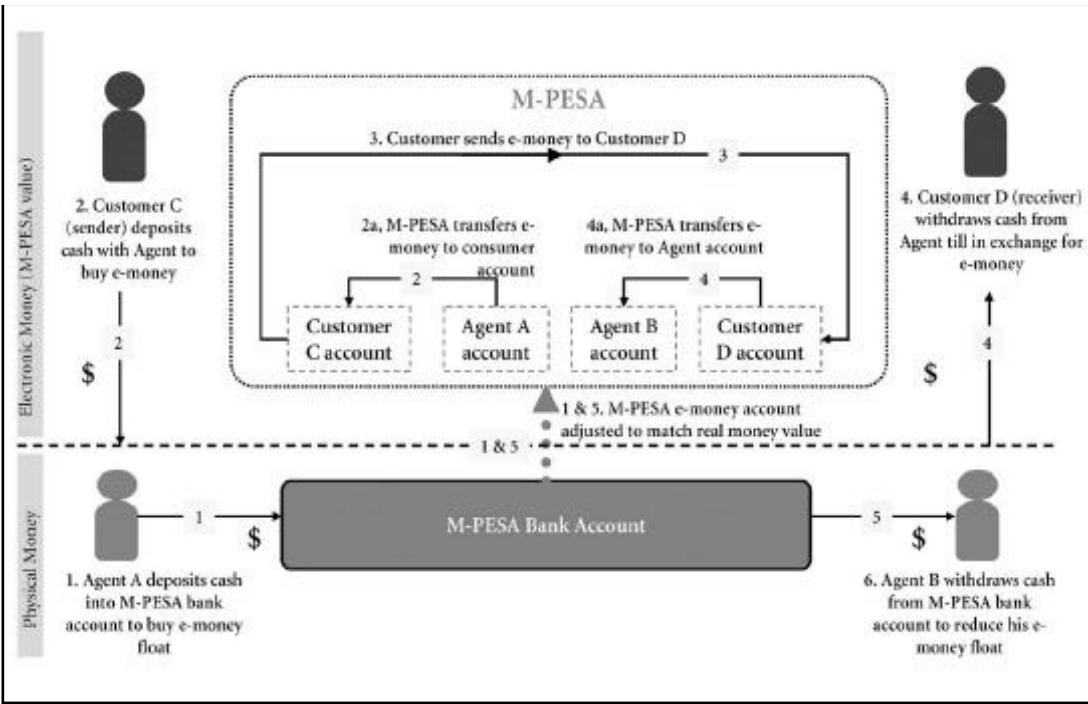


Figure 2.4: Overview of the M-Pesa service

(Source: Hughes N, Lonie S, 2009)

As a result of the Kenyan mobile payment success story, several mobile payment initiatives were undertaken in developing countries. This includes the introduction of mobile payment systems in Tanzania about a year after the Kenyan success story (Camner et .al, 2009). However, the success

of the Kenyan mobile payment systems implementation could not be emulated in Tanzania due to several factors which include pricing, registration, product, marketing and agent networks (Camner et .al, 2009). Looking at South Africa, one may ask what the significance of introducing a mobile payment system to the South African environment is. **Table 2.1** compares factors that were key to the successful implementation of a mobile payment system in Kenya and Tanzania, with South Africa as a possible new user of M-Pesa style services. These factors are categorized for the countries in which the M-Pesa mobile payment systems have been introduced and displayed in Table 2.1.

(**Table 2.1** below lists the factors (Camner and Sjöblom, 2010) that have influenced the popularity of the M-Pesa mobile payment systems in Kenya and Tanzania.) South Africa is added as an additional country by the author.

Country	Kenya	Tanzania	South Africa
Mobile Network Operator	Safaricom	Vodacom	Vodacom
Market share of the MNO	79%	45%	53%
Marketing	Effective “send money home” campaign	Not so effective, lack of education	Too soon to assess.
Geography/Demography	40 million people, mostly major cities.	40 million people distributed evenly	49 million people in urban and rural areas
Economy	Double the GDP of Tanzania	Smaller economy than Kenya	Bigger than Kenya and Tanzania
Existing Banking infrastructure	17-19 % of people are formally banked	8-10 % of people are formally banked	About 63% of people are formally banked
Competitors to M-Pesa	Benchmarking M-Pesa	Airtime top-ups, buses	Banks, MNOs and WIZZIT
Pricing	3.6% of the amount sent	4.5% of the amount sent	Up to 10% depending on the amount sent.
Technical platform	Sim ToolKit	USSD	USSD/SMS
Identification	National ID systems	Absence of National ID	National ID systems

Table 2.1: Factors that have influenced the popularity of the M-Pesa mobile payment system.

(Source: Camner and Sjöblom, 2010)

Morawczynski (2009) has conducted extensive research on the impact that a mobile payment system (M-Pesa) has on the farming and rural/slum community in Kenya's Nairobi region. She has been quoted by Reuters, the news agency, in 2009 as saying that *"villages are getting up to 30 percent more in remittances due to M-Pesa, allowing farmers to diversify out of subsistence agriculture into small businesses such as furniture making or running a small roadside kiosk. M-Pesa allows money to penetrate more easily into rural areas where it is needed."*

South Africa shares many of the favourable factors that contribute to the Kenyan success. It remains to be seen if it will have the necessary impact when the mobile payment system is introduced. South Africa has a bigger and more diverse mobile subscriber base than Kenya, as well as a more sophisticated financial/banking system and national ICT infrastructure.

Prior to the implementation of M-Pesa, where a mobile payment system that is solely the MNOs initiative (although partnered with the bank for access to a National Payment License), has never occurred in a South African context, although other MNOs have claimed that they had introduced it to the SA market, their initiatives are administered by the bank involved.

2.7 The Main Mobile Payment Ecosystem and its stakeholders

The mobile payment market in South Africa has various industry players which include Wizzit, MTN Mobile Banking, Capitec in partnership with the Checkers/ Shoprite Chain, African Bank as well as the big four banks, namely ABSA, First National Bank, Nedbank and Standard Bank. Unlike the mobile banking offered by FNB, ABSA, Nedbank and MTN, Wizzit does not require users to have a bank account. The Wizzit service is compatible with early generation cell phones popular in low-income segments. In addition to being able to conduct mobile phone to mobile phone transactions, Wizzit account holders are issued Maestro debit cards that can be used at any ATM or retailer. Wizzit charges per-transaction and does not charge a monthly fee nor require a minimum balance (Nyerwanire, 2010).

Mobile Payment Systems, according to Chaix and Torre (2010) and Sikander (Mobile Banking Conference, 2011), can be defined by the following types of mobile payment system models:

- **Bank centric model** where the bank is the central node of the model, manages the transactions and distributes the property rights.
- **Operator centric model** where the same scenario exists as above, but in this regard, the operator is in the strategic role.

- **A collaborative model** where financial intermediaries and MNOs collaborate in managing tasks and share the proprietary rights cooperatively.
- **Independent service provider (ISP) model** where a third party operates as an independent and "neutral" intermediary between financial agents and operators. Google or Paypal, Apple Itunes etc., are the ISPs most frequently associated with this model in recent times.

2.8 The South African mobile payment environment

South Africa operates in a mix economic system, part of it that is comparable to industrialized nations and another comparable to developing countries. The developed component of South Africa's economy was evident during the hosting of the FIFA World Cup 2010, yet many South Africans still live in slums and informal settlements with their basic human needs barely met on a daily basis. This can be attributed to the pre-democratic state system of apartheid. Due to this characteristic of the South African economy, an environment was eventually created by which the banked and the unbanked could interact when a mobile payment system was introduced.

Although South Africa has a highly sophisticated banking system that can compete with the best in the world, it has not been conducive for an informal economy. Most of the banks in South Africa have extended their banking infrastructure to their existing client base through mobile initiatives such as mobile banking and prepaid airtime purchases. Electronic wallets are primarily for current banking clients, thus allowing them to send money from their bank accounts, via a mobile device, to other individuals who will be able to access the funds at an automated teller machine (ATM), bank branch or store. Examples of current initiatives are: Standard Bank of South Africa and MTN (an MNO) run MTN banking, that is specifically for the standard bank and MNO's client base; the independent vendor Wizzit, whose focus is on the unbanked market due to MNOs that lack the distribution channels necessary to access the unbanked market.

One of the mobile network operators, for which the pseudonym "QUNU" is used, extended its mobile services in 2010 by introducing a mobile payment service to the South African economy. Qunu, one of South Africa's largest mobile networks, with approximately 27 million active SIM cards for the financial year 2009 (Vodacom, 2009), introduced a mobile payment service to its subscriber base in South Africa during August 2010. After the relevant regulatory requirements were met, a deal was concluded with a commercial bank as part of the legal requirement for operating a mobile payment system since the mobile operator did not possess a National Payment Systems license. This payment system will primarily be administered and managed by

the MNO and will work similarly to that of a recharge voucher used to purchase airtime. This partnership will extend the reach of the electronic wallet concept to individuals who did not previously have a bank account, thus capitalizing on the MNO's distribution channel to access the unbanked market.

Before the introduction of the mobile payments system, there were numerous regulatory requirements that the MNO needed to adhere to. To make payments with a monetary value, the MNO required a National Payments Systems License from the South African Reserve Bank. Since the MNO is not a financial institution, it was deemed difficult to justify granting a National Payments Systems License to the MNO. In the end, the MNO partnered with a commercial bank, which by law must operate with a National Payments License.

The mobile payment users interact with other mobile payment users and non-users in the mobile payment environment. Some of these users are required to adhere to legal and regulatory requirements, such as registering with a valid South African identification document (SA ID). These users also have different economic statuses within their immediate environments while interacting with other environments. They are also subject to certain rules and behaviours when using the mobile payment system to transact.

The financial service market structures will be impacted by the sudden arrival of a platform where the banked and unbanked users can interact with each other on a meso level. Opportunities will also arrive for the MNO who can suddenly exploit the mobile payment platform to sell more of its products and services to a bigger market. All these opportunities to explore will also present some challenges that may have organisational and structural impacts on the MNOs and the banks.

The dual South African economic system (Industrialized and developing) will impact the mobile payment environment. This impact can result in legislative and regulatory changes to the South African economic environment. As the popularity of mobile payments increase, a need may arise to use the service for international payments, and with South Africa's strict foreign exchange controls this may pose a big challenge for the mobile payment systems environment.

2.9 Mobile Payment Nomonological net

As indicated in figure 2.5, the mobile payment system consists of electronic money and physical money. The physical money is either deposited into the M-Pesa bank account by an agent to buy electronic money, called the float (step 1 and 2) or withdrawn from the M-Pesa bank account to reduce their M-Pesa float (step 4 and 5).

Steps 2a, 3 and 4a indicate the interaction the agent and the user have in the mobile payment system. These steps are as follows:

- Customer C deposits cash with the agent to buy e-money. Since the agent has already purchased e-money from the bank for his/her M-Pesa account in step 1, the e-money stays in the system. It moves from the agent's account to the customer's account when cash is exchanged.
- The customer C sends money to another customer D or an unregistered user

Customer D will either withdraw the money from an agent or leave the e-money in his/her m-payment account. An unregistered user will withdraw it from the agent since they have no m-payment account into which to deposit the e-money. The agent will exchange physical money for e-money when a withdrawal is requested.

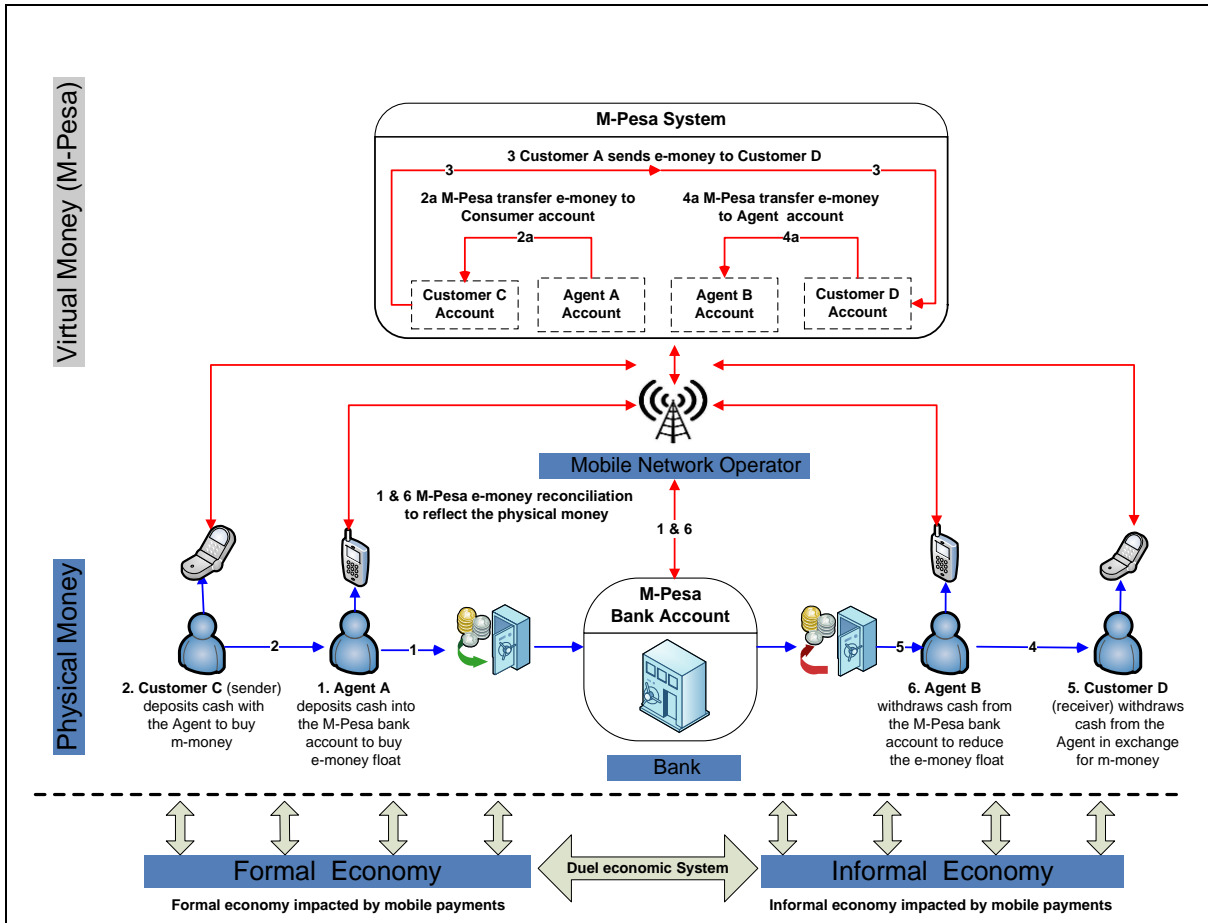


Figure 2.5: Conceptual Framework of the Mobile Payment ecosystems.

(Adapted from Hughes N, Lonie S, 2009)

CHAPTER 3

Research Methodology

3.1 Introduction

This chapter outlines the philosophical approach undertaken during the study. The section will elaborate on the chosen philosophical foundation. Therefore, this chapter is concerned with the philosophical assumptions (ontological, epistemological and methodological considerations) guiding this study and the method of enquiry that led to the research outcome.

The chapter is structured as follows; section 3.2 begins with a discussion on the two dominant research paradigms in information systems (positivism, interpretivism) followed by a brief discussion on the limitations of these two approaches within the context of this study. Section 3.4 introduces an alternative paradigm and discusses its appropriateness for this study. The final section summarises this chapter.

Section 3.7 elaborates on the chosen methodology and its associated elements. The data collection method, sample selection, as well as validity and reliability issues, are presented. This section introduces the data collection process, the unit of analysis, and concludes with a graphical overview of the research methodology.

3.2 Research paradigms in IS research

The term research philosophy or research paradigm is attributed to a multitude of definitions over the past thirty years in the IS field. Philosophers, according to Nijland (2004), are often concerned about answering the following three types of questions when trying to understand how we come to know what we know:

1. The ontological question: What is there that can be known? What is the nature of reality? What is the truth?
2. The epistemological question: What is the relationship between the knower and the known (or the knowable)? What kind of knowledge can be obtained, and what are the limits of knowledge?
3. The methodological question: What are the ways of finding out knowledge? How can we go about finding out things?

However, answering the above three questions can result in researchers and philosophers giving preference to what they deem as the more important question/s that will aid them in the best possible manner to gain deeper insight into the phenomena under scrutiny.

Hesse-Biber & Leavy (2010) state that ontological assumptions made by the researcher impacts the topic selection, how the research question is formulated and what research strategies will be used to conduct the research. Approaches focusing on ontology may have less focus on the method of enquiry and focus on what there is to be known about the phenomena or the nature of its existence. Ontology, according to Saunder et.al (2011, 2003) and Hesse-Biber & Leavy (2010), is a philosophical belief system about the nature of social reality, what can be known and how. It raises questions on the assumptions that the researchers have about the way the world operates, and their commitment to hold to particular views e.g., do the world operates in a patterned and predictable way or is the world socially constructed by human actions or rituals (Hesse-Biber & Leavy, 2010). These assumptions represent two very different ontological perspectives, objectivism, which portrays the position that social entities exist in reality external to social actors and subjectivism which is of the view that social phenomena are created from the perceptions and consequent actions of social actors (Saunder et al., 2011: Hesse-Biber & Leavy, 2010).

An epistemological focus aims at discovering the relationship of what is there that needs to be known with the sources of knowledge, type of knowledge and its availability and limits. It is concerned with what constitutes acceptable knowledge in a field of study and which criteria, according to the need, must be constructs to evaluate the knowledge (Nijland, 2004: Saunder et al., 2011).

A focus on methodology will seek methods of enquiry that may be suitable to study the phenomena. Methodology, as defined by Hesse-Biber & Leavy (2010), is *“a theory of how knowledge building should ensure”* it *“is the bridge that brings our philosophical framework together with our methods practice”*. They state that it *“is an account of social reality or some components of it that extends further than what has been empirically investigated”*.

Saunders et al. (2011) state that the type of research philosophy that is being adopted contains important assumptions about the way in which the world is viewed and will underpin the research strategy and methods that will be chosen as part of that research strategy. For this research, the author will adopt the Orlikowski and Baroudi (1991) categorisation of a research philosophy or paradigm, which proposes three primary research paradigms underpinning IS research which are: positivist, interpretive and the critical view, since this categorisation has been widely accepted within the IS research community (Iivari, 1991; Klein & Myers, 1999; Ngwenyama & Lee, 1997).

The next section will elaborate on these research paradigms, which are defined as basic belief systems that are rooted in the philosophical assumptions about ontology, epistemology and methodology being exercised in a qualitative research environment.

3.3 Philosophical views

Qualitative research can be positivist, interpretive, or critical, depending upon the underlying philosophical assumptions of the researcher (Klein and Myers, 2001).

3.3.1 Positivism

Positivists generally assume that reality is objectively given and can be described by measurable properties, which are independent of the observer. Positivist studies are generally used in research when theories are tested to increase the predictive understanding of a phenomenon (Myers and Avison, 1997).

3.3.2 Interpretivism

The Interpretivist view of reality is that it is socially constructed using language, consciousness, shared meanings, documents, tools and other artefacts (Klein and Myers, 2001). Interpretive studies evolve around understanding phenomena through the meaning that people attach to them (Myers and Avison, 1997). When engaging an interpretive view, the research focus is aimed at producing an understanding and/or making sense of the phenomenon under study and is not intended to engage in activities that will falsify a theory but rather as a sensitising device to view the world in a certain way (Klein and Meyers 1999). The researcher engagement in fact-finding and sense-making activities, will allow them to create a deeper understanding of the structures of the studied phenomenon (Orlikowski and Baroudi 1991, Walsham 1993). The phenomenon is being studied in its current context, and the process whereby the phenomenon influences and is influenced is scrutinised by the researcher/s to generate a deeper understanding (Walsham 1993).

3.3.3 Critical research

The critical view of research assumes that the social reality of research is historically constituted and that it is produced and reproduced by people. Although people can voluntarily act to change their social or economic circumstances, the critical viewpoint recognises factors that may prohibit people from doing so due to forms of social, cultural and political domination. When the critical view is applied the researcher's main task is to engage in the social critique that highlights restrictive and alienating conditions of the status quo (Myers and Avison, 1997).

3.4 Critique of the interpretivist paradigm

Some scholars argue that the interpretivist paradigm advocates a flat ontology and limits it to implicitly assuming that the only things that can be known are those that make sense to humans, or things that can be expressed within the subjective perception processes of humans (Archer et al., 2013; Wynn & Williams, 2012). As a result of this limited perception and human sense-making, a restriction is placed on what can or cannot be conceptualised about things that potentially exist but cannot be readily observed (Mingers, Mutch & Willcocks, 2013; Sayer, 2000). Despite the critique aimed at interpretivism, it is the nature of its ontological assumption of multiple realities, which is time and context-dependent, that allow for new knowledge to emerge (Goldkuhl, 2012) that, given this research objective, makes it the most suitable candidate for this research study.

3.5 Research philosophy underpinning theory

The author identified the interpretivist research philosophy as the preferred research philosophy for this study. The study is explorative, and somewhat descriptive, in nature and the interpretivist stance allows for the understanding of how failure or success occurs in the Information systems ecosystem, and how social practices in these ecosystems, leads to multiple contextual settings in which the successes or failures occur. It allows the researcher to subjectively observe and interpret how the phenomena evolve in various social environments and steer the focus on understanding of the ways through which the research subjects, including the researcher, experience the social world that plays host to the phenomena under scrutiny. Ngwenyama & Lee (1997) argue that an interpretive paradigm gives explicit recognition to the world of consciousness and humanly created meanings. This notion is critical to this study's attempt to understand how ecosystems success and failure evolve and how the ecosystems influence or are influenced by the contextual conditions as it emerge.

This paradigm has the potential to pay attention to not only what factors affect information systems ecosystems success and failure, but also to how it evolves and how social practices and contextual setting are influencing or are being influenced by the ecosystem. Actor-Network Theory (ANT) will be the primary guiding lens, supported by elements of Structuration theory (ST) and the Knowledge creation theory.

3.5.1 Interpretive philosophy and Information systems

Klein and Myers (2001) posit that interpretive research in the Information Systems (IS) field has two main categories, the foundation of the interpretive research and the application of the interpretive research to the IS field that is further divided into five principal types (See Table 3.1).

FOUNDATIONS OF INTERPRETIVE RESEARCH	<p>1. Establishing the Philosophical Foundations of Interpretive Research Constructs the conceptual foundations of interpretivism, e.g. by defining its most fundamental assumptions such as its epistemological and ethical premises. Mostly pursued by philosophers. Examples: (Gadamer, 1975; Gadamer, 1976; Husserl, 1970; Husserl, 1982; Ricoeur, 1974; Ricoeur, 1981).</p>
	<p>2. Building Interpretive Social Theories Uses the literature on the philosophical foundations of interpretivism to create theories about social phenomena. The influence is often eclectic in that social thinkers in their theories typically try to bridge more than one philosophical tradition. Their influence may not always be explicit, but often can be discerned in bibliographical citations. Mostly pursued by social scientists. Example: Giddens (1984) proposed structuration theory as an integrative perspective which recognizes both subjective and objective dimensions of social reality.</p>
	<p>3. Advancing Interpretive Research Methods Clarifies the nature of interpretive research methods, formulates methodological standards, or advises others how to properly employ interpretive methods. This kind of work tends to draw directly on the philosophical foundations of interpretive research and the scholarly discussion in the philosophy of science. In principle these methodological advances could apply to any discipline with an interpretive research interest, but here we focus only on the work done by information systems researchers. Example: Boland (1985) explained hermeneutics and phenomenology for an audience with applied research interests and established their relevance for IS research. This paper was a contribution to advancing interpretive research methods in IS.</p>
APPLICATIONS OF INTERPRETIVE RESEARCH TO IS	<p>4. Applying Interpretive Concepts to Advance our Understanding of an IS Research Area Applies and adapts theories and concepts from categories 1 and 2 to advance our understanding of a substantive area or identifiable body of knowledge of IS research. For example, interpretive theories and concepts may help to (re)define a specialization (such as groupware or computer supported cooperative work), critique the thrust of prior work in IS, or point out new directions for IS research. Examples: Lyytinen and Ngwenyama (1992) used structuration theory to coin a new definition of the nature of CSCW. Lee (1994) used hermeneutics to theorize about email use and to critique prior work in IS which uses information richness theory.</p>
	<p>5. Applying an Interpretive Frame of Reference in Empirical Investigations and Interventions Applies the concepts and methods from any or all of the above to guide field studies (e.g. interpretive case studies, ethnographies), interpretive experiments, or practical interventions (e.g. action research) within the domain of information systems. Examples: Orlikowski (1991) used the ethnographic research method to study a large, multinational software consulting firm. Bentley et al. (1992) used the ethnographic method to gain an understanding of human cooperation in air traffic control. Ytterstad et al.'s (1996) action research project developed a communication system for local politicians.</p>

Table 3.1: Principal Categories of Interpretive Research.

(Source: Klein and Myers, 2001)

3.5.2 Evaluating the Interpretive contribution

Klein and Myers (1999) propose a set of principles (Table 3.2) for conducting and evaluating interpretive field studies. Although the original intention was to use the set of principles as a guide, many researchers in interpretive field studies used it as a checklist to guide their research.

Principle	Explanation
Principle of the Hermeneutic Circle	This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles.
Principle of Contextualization	Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged
Principle of Interaction Between the Researchers and the Subjects	Requires critical reflection on how the research materials (or “data”) were socially constructed through the interaction between the researchers and participants.
Principle of Abstraction and Generalization	Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action
Principle of Dialogical Reasoning	Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings (“the story which the data tell”) with subsequent cycles of revision
Principle of Multiple Interpretations	Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.
Principle of Suspicion	Requires sensitivity to possible “biases” and systematic “distortions” in the narratives collected from the participants

Table 3.2: Summary of principles for interpretive field research.

(Source: Klein & Myers, 1999, 73)

Barrett and Walsham (2004), however, have examined how contributions are established in interpretive case studies and conclude by providing some suggestions as to how IS researchers can make better contributions from interpretive case studies. Their proposed framework consists of the following key concepts for evaluating contributions which were derived from previous work done by Locke and Golden-Biddle (1997), Latour 1987 and Walsham 1995b:

- Structuring intertextual coherence,
- Problematizing context for contribution,
- Positioning as translating interests, and
- Qualitative generalizations as content contributions

Chapter 9 will elaborate on the Barret and Walsham’s framework and its application to this research study.

3.6 Research Questions

Research questions, according to Blaikie (2000), are required to define the nature and scope of the research. It allows the researcher, after selecting the question/s, to determine what is to be studied and to what degree it should or will be explored. The words utilised in the construction of a research question can have a significant impact on the research strategy that the researcher will employ (Blaikie, 2000). Blaikie further states that, for simplicity, research questions come in three different categories as follows:

- What questions, require a descriptive answer and are directed at discovering and describing the characteristics of some social phenomena.
- Why questions, focus on either the cause of or reasons for the existence of characteristics or regularities in a particular phenomenon and are directed at understanding or explaining the relationship between events, social activities and processes.
- How questions are concerned with bringing about change with practical outcomes and interventions.

As indicated in section 1.7, the primary research questions are:

- How does the mobile payment IS ecosystem evolve over a period of time in the hybrid economic conditions in South Africa? RQ1)
- How is the mobile payment IS ecosystem influencing or are being influenced by contextual conditions? (RQ2)

With the following sub-questions for RQ1:

- How does an organisational environment influence an evolving mobile payment IS ecosystem? (RQ1A)
- How does a business environment influence an evolving mobile payment IS ecosystem? (RQ1B)
- How does a consumer environment influence an evolving mobile payment IS ecosystem? (RQ1C)

3.7 Research Purpose

The research questions, depending on what research question/s the researcher wants to investigate, will produce different types of knowledge. The research purposes, as defined by Blaikie (2000), are concerned with the type of knowledge the researcher wants to produce in a basic or applied research environment. Given the research questions, the research purpose identified for this research is to explore and explain, and in some instances, describe what the mobile payment IS ecosystems phenomena include. This research is exploratory since it attempts to develop an initial rough description or possible understanding of an evolving mobile payment IS ecosystem. It is also explanatory since it focuses on establishing the elements, factors or mechanisms that are responsible for producing the state of the regularities in the evolving mobile payment IS ecosystem phenomenon and somewhat descriptive since it describes in detail the characteristics of the elements that impact the evolving mobile payment IS ecosystem.

3.8 Strategies

Once the philosophical view had been determined the researcher reverted to finding strategies for answering research questions. Once the research question/s and purpose are defined by the researcher, the focus shifts towards devising a strategy or approach to find answer/s to the research question/s. Neuman (1997) elaborates and defines the two approaches as follows:

- Deductive approaches begin with an abstract logical relationship among concepts and moves towards concrete empirical evidence. In a deductive scenario, an idea of how the world operates can be tested against concrete or hard data. The idea could be a theory or a concept that may prescribe the type of evidence required to prove that the findings support the theory or concepts, thus establishing that a relationship exists between the empirical evidence and the theory or concept after analysing the evidence. The deductive approach is typically favoured when “Why” questions need to be answered.
- Inductive approaches focus on detailed observations of the world and move towards abstract generalizations and ideas. Researchers start with a topic and a few vague concepts, as the observations are progressed, the concepts are being refined, empirical generalizations are developed, and preliminary relationships are identified. Theoretical generalization is built from the ground up, commonly known as grounded theory. The inductive approach is typically favoured when “What” questions need to be answered.

In addition to the above-mentioned approaches, retroduction and abduction can also be considered as viable research approaches (Blaikie, 2000).

- Retroductive research, according to Blaikie, aims to discover the underlying mechanisms that explain observed regularities in a particular context where the research process focuses on building hypothetical models of structures and mechanisms that are assumed to produce empirical phenomena. Blaikie further state that the central problem in retroductive research is how to discover the structures and mechanisms that are proposed to explain observed regularities.
- Abductive research focuses on answering both what and why questions. The abductive approach incorporates what the inductive and deductive approaches ignore, the meanings and interpretations, the motives and intentions that people use in their everyday lives, and which direct their behaviour and elevate them to a central place in social theory and research. Consequently, the social world is the world perceived and experienced by its members from the inside. The task of the researcher is to discover and describe the inside view and not impose the outside view. The abductive approach concentrates on why people do what they do by uncovering the largely tacit, mutual knowledge, symbolic meanings, intentions and rules which provide the orientation of their actions. Mutual knowledge is background knowledge that is largely unarticulated, but which is constantly used and modified by social actors as they interact with each other.

The deductive and inductive methods are limiting on the exploration of the research phenomena, mobile payment IS ecosystem. The interplay between the two methods, while tracing the evolving mobile payment IS ecosystem, could lead to the unearthing of relationships and characteristics that would not be possible to explain using just one method. Hence the abductive approach will be deployed.

3.8.1 Underlying theories

The underlying theoretical framework that was chosen for this (research) study was Actor-Network Theory followed by Structuration Theory and the concept of Ba (Knowledge Creation Theory). The theoretical framework is discussed in broader detail in chapter 4.

3.8.2 Research Strategy

There are several different ways in which social science research can be conducted. Yin (1994) lists five primary research strategies: Experiments, surveys, histories, analysis of archival information and case studies. Each of these strategies has certain advantages and disadvantages. However, these advantages and disadvantages depend upon three conditions:

- the type of research questions asked
- the control an investigator has over actual behavioural events
- the focus on contemporary as opposed to historical phenomena

This study investigated how the mobile payment IS ecosystem evolves in hybrid economic conditions in South Africa and how it influences or is being influenced by the contextual environment. Given the research purpose, the focus was on recent developments within the chosen area and included the *historical* strategy. Given the research questions and objectives, the case study approach was chosen as the most appropriate method for this research. In general, case studies are the preferred strategy when “how” or “why” questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin, 1994). This fits neatly with the above-mentioned nature of this exploratory study. Dubois & Gadde (2002) posit that a case study should have a “case” which is the object of study, it should be a complex functioning unit that should be investigated in its natural context with a multitude of methods and be contemporary. A case study approach is particularly useful because it permits the collection and presentation of full details and soft data.

3.9 Data Collection

The data collection process for case studies is more complex than that used in other research strategies (Yin, 1994, 2000). If the researcher chooses to conduct a case study, he needs to maintain, what Yin (1994) refers to as, a methodological versatility. This versatility is not necessarily required when using other strategies. The researcher further needs to follow certain formal procedures to assure quality control during the data collection process. Data for case studies may and will be collected from the following five sources:

- documentation
- archival records

- interviews
- direct observations
- physical artefacts

Yin (1994) proposes that no single source of evidence has a complete advantage over the others and states that “a *major strength of case study data collection is the opportunity to use multiple sources of evidence*”. However, he does emphasise the fact that interviews are one of the most important sources of case study information. Walsham (1995) supports this notion stating that the researcher, as an outside observer, is dependent on gathering data primarily through interviews since they can best access the views of individuals and draw together interpretations. Walsham further argues that all interviewers should find a balance between excessive passivity and over-direction. Excessive passivity may result in the interviewees questioning the integrity of the researcher's interest in the topic, on the other hand tightly directed interviews may result in the loss of interpretive richness which can impact on the integrity of the actual meaning of the data. Yin further distinguishes three different types of interviews; these are:

- Open-ended interviews allow the researcher to ask key respondents for the facts of a matter as well as for the respondents’ opinion about events.
- Focused interviews cater for short periods of interview sessions with respondents and may remain open-ended and assume a conversational manner, but the interviewer is more likely to be following a certain set of questions derived from the case study protocol.
- Survey interviews entail more structured questions, along the lines of a formal survey.

Yin (1994, 2000) concludes that overall, interviews are an essential source of case study evidence because most case studies are about human affairs. These human affairs should be reported and interpreted through the eyes of specific interviewees, and well-informed respondents can provide important insights into a certain issue.

The interview method was chosen as the main source of evidence. The type of interview that was deemed to be most appropriate might be an *open-ended* interview with occasional focused interviews. This is since only a limited amount of time with the interviewees might be allowed and that the researcher is tracing the evolution of a mobile payments service using Actor-network theory. The researcher used an interview guide, Appendixes A, it is semi-structured and

did not limit the respondents to only answering the questions, but they were able to share their experiences.

The interviews were supported by documentary information that was relevant to the specific case study topic. This type of information can take many forms and should be the object of explicit data collection plans. The different types of documentation are (Yin, 1994 & 2000) that had relevance to this case study were:

- Letters, memoranda
- Agendas, announcements and other written reports of events
- Administrative documents
- Formal studies

For case studies, the most important use of documents is to confirm and augment evidence from other sources (Yin 1994). As mentioned above, he discusses the importance of maintaining a methodological versatility to gain a better quality case study. Yin (1994, 2000) emphasises the importance of multiple sources that contribute to the strengths of the case study.

3.9.1 Sample Selection

Selective sampling is used in qualitative case studies and can involve purposive sampling. Purposive sampling implies that the information units should be selected based on theoretical purpose and relevance. This implies that it must be assumed that the phenomenon or problem exists within the sample of information units.

For this study, the research questions provided the researcher with considerable complexity for each case. To focus effectively and to fulfil the exploratory purpose of the research, it was decided that multiple cases were to be included in the sample. The sampling of these multiple case studies involved four phases. These were:

- The selection of an industry
- The selection of a Mobile Network Operator
- The selection of subscribers/users
- The selection of appropriate persons to interview

For this research it was necessary to research multiple environments, this was to find out whether each environment could facilitate and act as an enabler for the mobile payments process through the implementation of new initiatives and technology and to find a relevant sample size suitable for this study.

3.9.2 Industry Sector

The decision to choose multiple organisations and institutions can contribute to in-depth knowledge about this study that was conducted in the Information and Communication (ICT) industry sector in South Africa, especially the mobile subscriber market. This market has witnessed exponential growth in the last decade; and technologically, it is regarded as a very sophisticated and knowledge-intensive industry. Consequently, organisations in this market are expected to operate in a highly saturated market, thus allowing the researcher to explore a wealth of information sources.

3.9.3 Data Analysis

Yin (1994) writes that the ultimate goal of analysing data is to treat the evidence fairly, to produce compelling analytic conclusions and to rule out alternative interpretations. Yin (1994) writes that before data may be analysed, a researcher using case studies may choose from two general analytical strategies, relying on theoretical propositions or developing a case description. Relying on theoretical propositions is, according to Yin (1994), the most common strategy. This means that the researcher explores previous research done by Avgerou (2019), Duncombe & Boateng (2009) and Dahlberg et al. (2008) and Walsham and Sahay (1999) to guide the relevance and persistence of the research questions by focusing on the ICT4d and complimented by the mainstream IS view (Sahay, Sein, & Urquhart, 2017) on the phenomena. The other strategy, developing a case description, entails the development of a descriptive framework for organizing the case study. A lot of emphasis was placed on collecting data for the descriptive framework and this data had to be collected prior to finalising the research questions.

In addition to the development of a descriptive framework to guide the data collection Priest, Roberts and Woods (2002) elaborate on three methods for data analysis which include grounded theory, qualitative content analysis and negative analysis. Although this research does not follow the grounded theory method primarily, it does make use of a coding mechanism similar to open coding and axial coding. Using open coding allows for the identification of discrete concepts and

categories related to the theoretical framework (Priest et al. 2002). Once completed, this researcher employed an axial coding analysis technique to highlight the connections and relationships that emerged from the different categories and sub-categories. The first phase of the analysis was to extract the data to inform the ANT themes. The second phase of the analysis identified the ST themes that emerged from the data in the first phase. The final phase of analysis allowed for a deeper interrogation of the data to determine and describe the conditions that gave rise to the mobile payment IS phenomenon and its contextual embeddedness. The constant comparative method was also applied during the analysis.

The data collected was then compared to the findings of previous studies. This strategy helped the researcher to focus on relevant data and to ignore irrelevant data. Developing a case description is, according to Yin (1994), less preferable than the use of theoretical propositions and is an alternative approach when little previous research has been done (Yin, 1994).

This case study primarily relies on theoretical propositions and partially on developing a case description where the research material is not adequately suitable to support the findings. A possible explanation for this may be due to the richness of the data collected. The data highlighted concepts and relationships not previously explored in the IS domain.

3.9.4 Quality Standards: Validity and Reliability

Since a research design is supposed to represent a logical set of statements, one can also judge the quality of any given design according to certain logical tests (Yin, 1994). According to Yin (1994), four tests exist when judging the quality of the design of the research. These four tests are:

- Construct validity
- Internal validity
- External validity
- Reliability

Construct validity includes the establishment of correct operational measures for the concepts being studied. Yin (1994) writes that there are three tactics available to increase construct validity. The first is to use multiple sources of evidence during the data collection. The second tactic is to establish a chain of evidence. This should also be done throughout the data collection. The third

and final tactic is, according to Yin (1994), to construct a case study report, which is reviewed by the key-informants.

For this research, various sources were used to collect evidence. the reason for establishing a chain of evidence, according to Yin, is *“to allow an external observer - the reader of the case study, for example - to follow the derivation of any evidence from initial research questions to ultimate case study conclusions.”*

Internal validity is used for establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from false relationships. It should be noted that internal validity is a concern only for causal or explanatory studies, where an investigator is trying to determine whether event x led to event y (Yin, 1994).

To increase external validity, Yin (1994) emphasizes the importance of using replication logic in multiple-case studies. He further states that a theory must be tested through replication of the findings in similar surroundings, where the theory has specified that the same results should occur. Once such replication has been made, the findings can be generalised to a greater number of surroundings.

Yin (1994) states that reliability demonstrates that the operations of a study, such as the data collection procedures, can be repeated. Yin (1994) further states that the objective should be to make sure that, if a later investigator followed the same procedures as described by an earlier investigator and conducted the same case study all over again, the later investigator should arrive at the same findings and conclusions. It is concluded by Yin (1994) that the goal of reliability is to minimise the errors and biases in a study.

3.10 Selection of the case

The purpose of this research was, as indicated in section 1.4, to explore and create an understanding of the impact that hybrid economic conditions in South Africa have on an evolving mobile paymentIS ecosystem and how it is influenced and is being influenced by society and its context. The resulting study will examine how the different components of the mobile payment IS ecosystem are impacted when a new mobile service, in this case, a mobile payment service, is introduced. As the research progressed, multiple components emerged that were impacted by the introduction of the new service in the South African mobile subscriber market. As a result, the initial inductive approach that was originally identified to support the study was,

in the end, combined with elements of the abductive approach (Blaikie, 2000). These components emerged from the range of economic environments identified during the analysis process. These economic environments were identified as micro, meso and macro environments and will be represented by the consumer, organisational and the business cases, respectively.

The case selection was based on a gap that exists in the current literature and the availability of the environments that will source the respective data to fill this gap. The focus for this case was a mobile payment service that was introduced into the South African mobile subscriber market, that consists of almost 60 million prospective subscribers in a hybrid economic environment. The introduction of the telecommunications led mobile payment service was in its infancy/planning stage when this research project started. It was a feasible option for the researcher to choose this particular South African mobile subscriber market since the researcher was affiliated to one of the largest mobile network operators in the country, thus allowing the researcher immediate access to required data sources. Although this strategy might seem like a convenient option for the data collection process itself was very challenging since the researcher only had access to organisational data sources and had to organize his own access to the consumer and business data sources.

3.10.1 Units of Analysis

This research is based on data collected from multiple environments that were impacted by the introduction of the mobile payment systems. As a result of the inductive approach, and so what abductive approach, the following major environments were identified:

3.10.1.1 The Organisation

QUNU was identified as a source for the organisational data collection environment since it was the only MNO at the time to which the researcher had access, and it was the first MNO to introduce a telco-led mobile payments system in South Africa.

3.10.1.2 The Business environment:

When the mobile payment service was introduced, it had to comply with certain regulatory and legislative frameworks before it could be commercially launched as a service. QUNU partnered and negotiated with several business partners to build an environment that could become custodians of the mobile payment system.

3.10.1.3 The Consumer environment:

QUNU has more than 60 million subscribers that make use of its mobile services. Part of this subscriber base was also identified as prospective mobile payment users. Other prospective users include outlet owners, banking partners and dealerships.

3.10.2 Sample population

As previously indicated ANT will be used as the theoretical framework. This infers that data collection and data interpretation is not a predefined process since ANT, as discussed in the next chapter, examines the evolving nature of an actor-network, thus providing a platform for an undefined data collection environment that can be very exhaustive or used until repetition of gathered data occurs. In this research scenario, the mobile payment subscriber market is very large and widespread, thus supporting the case to focus on 3 main environments or cases from which the respondents can be selected. Due to the anonymity that respondents want to maintain the designations and roles in the three cases were not revealed for this research. The number of respondents that contributed to the data that was collected is indicated in Table 5.1 below.

Case/environment	Designation level							
	Executive (EM)	Management (MM)	Project manager (PM)	Business Analyst (BA)	Fieldworker (FW)	Registered User (RU)	Unregistered User (UU)	
Organisation	5	6	5	6	8	10		40
Business	2			2	2	6		12
Consumer						10	4	14
TOTAL								64

Table 3.3: Unit of Analysis.

3.10.3 Coding the respondents and data

Coding, the process of organising and sorting data and data sources, occurred on two levels for this study. First, the respondents were coded to identify the source of the data (table 3.4) and then the data was coded to conform to the ANT, ST and Ba themes that were identified in Appendixes C, D and E for this research.

Designation level	Organisational (OE)	Business (BE)	Consumer (CE)
Executive (EM)	OE_EM1 to n	BE_EM1 to n	-
Management (MM)	OE_MM1 to n	-	-
Project manager (PM)	OE_PM1 to n	-	-
Business Analyst (BA)	OE_BA1 to n	BE_BA1 to n	-
Fieldworker (FW)	OE_FW1 to n	-	-
Registered User (RU)	OE_RU1 to n	BE_RU1 to n	CE_RU1 to n
Unregistered User (UU)	-	-	CE_UU1 to n
Other (OT)	OE_OT1 to n	BE_OT1 to n	CE_OT1 to n

Table 3.4: Project and designation codes.

3.10.4 Data Collection Period

The data collection period consisted of four sessions of fieldwork between 2011 -2018 (Table 3.5). The first session revolved around data collected in the organisation, followed by a second and third session that focused on the consumer and business environments, respectively. The final session was a consolidation phase where all three environments were re consulted to fill gaps in the gathered data.

Fieldwork	Focus	Time period	Duration
Session 01	Organisational environment	December 2011 to December 2015	48 months

Session 02	Consumer environment	July 2013 to June 2015	24 months
Session 03	Business environment	December 2013- May 2015	18 months
Session 04	Combination of all environments	July to December 2015	6 months
Session 05	Combination of all environments	September to December 2018	3 months

Table 3.5: Field-work time frames.

Since the research followed the inductive method, with some elements of abduction, the enquiry was followed by time periods during the fieldwork session that overlapped to cater to the interrelated nature of the information collected in the different environments.

3.10.5 Sample selection

The sample size was determined by the nature and depth of the research. Initially, the research started as an inductive, however, due to the interrelatedness of the data that was gathered from different sources elements of abductive reasoning was borrowed . This is congruent with Dubois & Gadde’s (2002) view on the interrelated nature of case study research. They argue that the *“main difficulty of the case study is handling the interrelatedness of the various elements in the research work”*. The sample started within the organisation and quickly moved into the external organisational environment. More than one sampling strategy was employed to ensure information richness. These strategies included maximum variation, snowballing and opportunistic and emergent sampling. To fulfil the exploratory and somewhat descriptive purpose of the research, it was decided that multiple cases were to be included in the sample. The sampling of these multiple case studies involved four phases as introduced and explained in 3.9.1.

- The selection of an industry
- The selection of a Mobile Network Operator
- The selection of a subscriber/user
- The selection of appropriate persons to interview

3.10.6 The Interviews view process

The type of interview used to engage interviewees were both open-ended and focused in nature. For this research, a semi-structured interview approach was followed to allow for a conversational approach to trace the events that occurred in the network formation and followed

a certain set of questions derived from the case study protocol (Yin, 2000). This type of interview creates the opportunity to probe for clarity and more information. Thus, in this research, the semi-structured interviews as a technique gave the respondents freedom to respond and the researcher the opportunity to obtain all the information required. This type of interview assisted in tracing the network of interactions, alliances, power structures and relationships that existed. In addition, documents such as minutes, policy documents, and programmes of action were consulted for data collection.

At the start of the interview process, all relevant documentation and permissions were obtained by and from the identified authorities. Participants were identified, a letter of consent was given to each intended participant, and each decided if they want to participate in the interview session. Once the participants had agreed, the researcher briefly discussed the interview method with the participants to alleviate boredom and possible distractions that might impact the interview. Interviews were conducted in English, Afrikaans, isiXhosa and isiZulu and sometimes in another local language. The researcher made use of an interpreter for certain interview sessions. The researcher made use of a notebook and a smartphone to record data during the interview process. In certain instances, non-verbal communication was recorded, especially in environments unfamiliar to the researcher. Individual and group interviews were conducted and included ad-hoc conversations with interviewees known to the researcher, since they were easily accessible to the researcher and these interviews were easily scheduled.

3.10.7 Managing and recording data

As stated in the previous section, a smartphone with dictaphone capability was used to record some interviews. Only if the interviewee was agreeable, was the smartphone used as a recording device. This allowed the researcher to make an in-depth analysis of the data to uncover the actual interpreted meaning derived from the recorded interview statements. All recorded interviews were transcribed into English text after each interview. In certain instances, students were employed to transcribe some interviews. All data collection material was documented in a spreadsheet that allowed for easy access to the datasets if clarity about the source was required. A coding structure was used as indicated in Appendix B. The confidentiality of the data was strictly adhered to.

3.10.8 Data analysis

Data were analyzed using a coding system based on the ANT framework (See Appendixes C). Themes were derived from the ANT framework and reworked into coding systems that were entered into the qualitative data analysis software. After the interviews had been transcribed,

notes and transcripts were analyzed using the qualitative data analysis software tool, AtlasTi. The transcripts were loaded for analysis and the researcher started the coding process. After completion of the coding process, the researcher categorized the extracts and started re-analysing the data for validity and reliability purposes, before discussing the findings. All data that were gathered were as a result of the evolving actor-network of the mobile payment service.

The analysis was done on three levels, the first ANT was to extract the data related to the evolving mobile payment IS ecosystem, followed by ST analysis to extract the data related to the social conditions that impacted phenomena, and lastly the contextual data highlighted by the concept of Ba. These three theoretical lenses combined provided basis to gather the necessary data to answer the research questions.

3.10.9 Ethical Considerations

All ethical considerations were adhered to as stipulated by the University of Cape Town and the organisation in question. Confidentiality was maintained throughout the research project, and only consensual interviews were recorded. The Ethics Committee of the faculty of the University of Cape Town's Commerce Faculty approved the intended data collection schedule and the targeted sources before the start of the data collection. Data collection within the organisation was also permitted on the condition that the organisation would remain anonymous for this study.

3.11 Summary

This chapter outlined the philosophical approach and research methods adopted for operationalising the study. The study uses a qualitative approach, interpretivism, to explain the evolution of the mobile payment IS ecosystem phenomena and examined an alternative approach to explore the impact of context on its evolution. The study draws strongly on the inductive approach, with elements of abductive approach, thus enhancing the validity and understanding of the findings through a triangulation process. For this process several data sources were utilised, but to gain a deeper understanding of what these sources portray, the researcher chose the interpretive approach. Thus, the rationale for the varying data sources was not to focus on a specific approach but on varying approaches that are best suited to capture the detail in the environments that the mobile payment IS phenomena evolved from, and to shed light on the context that influences such an evolution.

Consistent with the exploratory nature of this study and the 'how' and 'why' research questions posed; a case study research methodology was adopted. This methodology enabled the collection and presentation of more substantial details in relation to the subject's media choice. As with all research studies, there are limitations, but the use of the interview questionnaire approach to collect the data and the systematic, detailed presentation of the analysis, hopefully, would nonetheless enrich peoples understanding of the chosen research (method) to replicate for similar future studies.

This chapter has given the underlying assumptions about what constitutes valid research. The philosophical stance adopted by this study is interpretive, which implies that reality is socially constructed. The research is qualitative in nature and has been conducted throughout South Africa. The type of research instrument used was the questionnaire, which was used as a guide in collecting data. Various data collection techniques have also been used, such as project documentation, interviews, etc. The details of how data was managed and recorded, and strategies that were followed in analysing the data, have formed part of the discussion in this chapter. The chapter ends with ethical issues which indicate some of the ethical steps taken to address ethics-related matters. Figure 3.1 provides a graphical overview of the research design. The theoretical framework will be discussed in the following chapter.

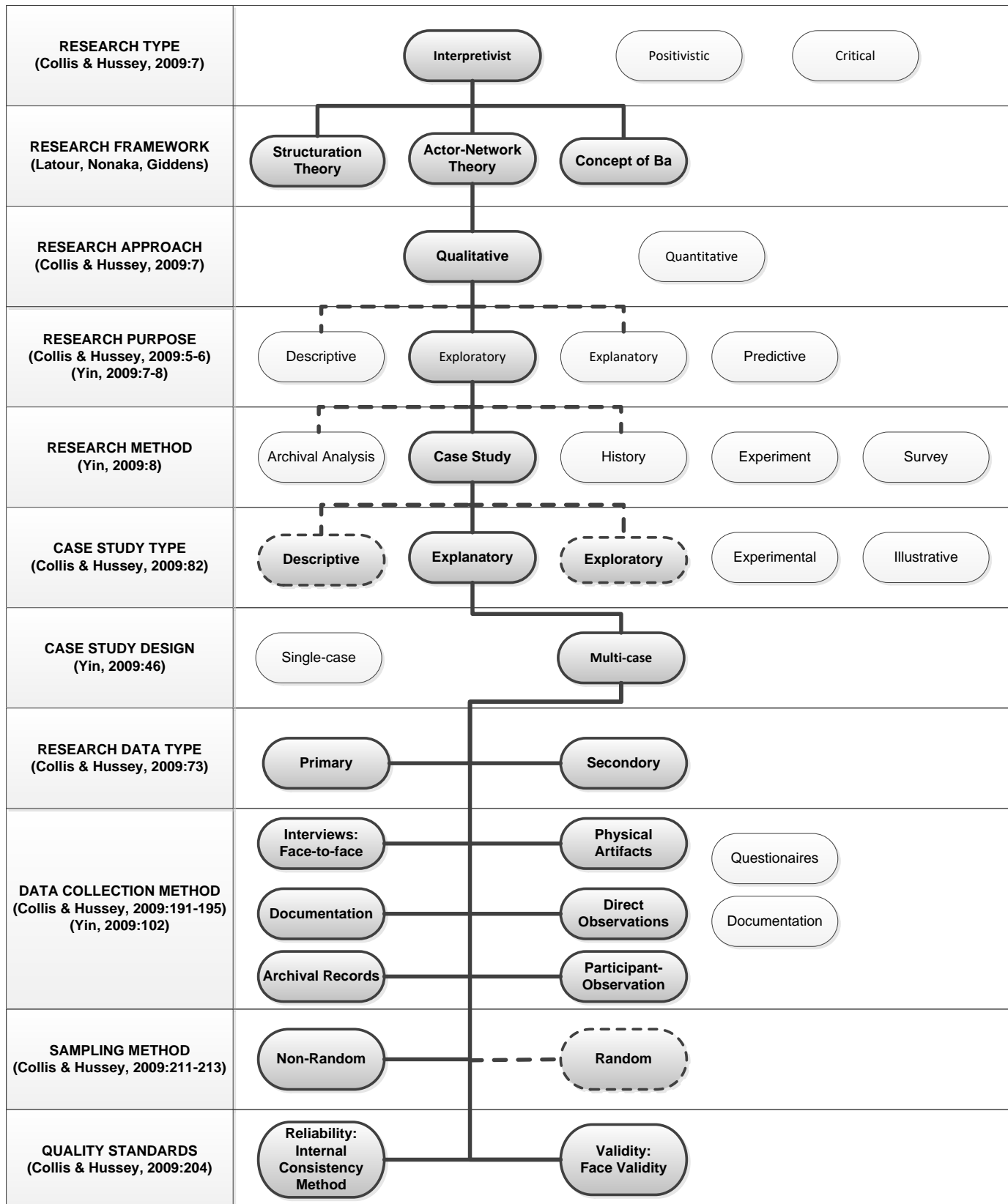


Figure 3.1: Author's construction of the Research Methodology Framework.

CHAPTER 4

Theoretical Framework

4.1 Introduction

This chapter will discuss the chosen theoretical framework and how it applies to this study. Barrett and Walsham (2004) noted that the relevance of research is a key debate in the IS literature. Staying relevant is always a challenge for researchers who often borrow from theories and concepts grounded in non-IS related disciplines to explore and unearth new theories and methodologies or test existing ones in the IS discipline.

Gregor (2006) argues that theory and theoretical knowledge are a human invention rather than discovery and states that concepts, models, and schemes are invented by humans to make sense of experience and are continually tested and modified if a new experience occurs in the real world. Neuman (2000, 2014) describes social theory as “*a system of interconnected ideas. It condenses and organizes knowledge about the social world and can be thought of as a type of systematic “storytelling” that explains how some aspect of the social world works and why.*” He further states that all theories contain built-in assumptions, which are statements about the nature of things that we cannot observe or do not empirically evaluate and are necessary to build a theoretical explanation, using *concepts*, the building blocks of theory, and how these concepts are related.

There are different dimensions to theory. Neuman (2009, 2014) argues that five aspects of theory exist that include:

- **Direction of theorising.** Either deductive or inductive
- **Level of analysis.** Either micro, macro, or meso
- **Theoretical focus.** Either substantive or formal theory
- **Form of explanation.** Either causal, structural, or interpretative
- **Range of a theory.** Either an empirical generalization, a middle-range theory, or a framework

Gregor’s (2006) categorisation of theory depends on the primary purpose that the theory under consideration is to serve, which in turn depends on the focal question of any research undertaken. She describes five different types of theories that are seen as relevant to Information Systems field which are:

- **Theory for analysing and describing** focus on “what is” scenarios in research and are the most basic type of theory and normally focus on classifying specific dimensions or characteristics of individuals, groups, situations, or events by summarizing the commonalities found in discrete observations. It is suitable for research scenarios where nothing or very little is known about the phenomenon in question. Research approaches include analysis of existing evidence or data, philosophical and historical enquiry and empirical observation.
- **Theory for understanding** explains “how” and “why” something occurred. This approach to theory can be split into two distinctive approaches, one where the theory is used as a “sensitising device” to view the world in a certain way and the other where theory is used as a device of sudden enlightenment and includes theories such as ANT and ST. Research approaches include case studies surveys, ethnographic, phenomenological and hermeneutic approaches and interpretive field studies.
- **Theory for predicting** aims at prediction that say “what will be”, thus predicting outcomes from a set of explanatory factors, without necessarily understanding or explaining the causal connections between the dependent and independent variables.
- **Theory for explaining and predicting** aims at answering “what is”, “how”, “why” and “what will be” type of research scenarios and applies to both prediction and understanding of underlying causes, as well as a good description of theoretical constructs. It is viewed as the traditional theory method by many. Almost all research approaches are able to use this type of theory.
- **Theory for design and action** aims to answer “how” something should or can be done and focus on methodologies and tools used in the development of information systems. This may include aspects of methodological design or new tool discoveries and soft systems methodology. Research approaches include Action research.

The relevance of theory contribution is a contentious subject in the academic environment. Barrett and Walsham (2004) note that the relevance of research contributions is a key debate in the IS literature.

Gregor (2006) categorises the following as contributions depending on the type of theory employed:

- **Theory for analysing and describing** is valuable, as stated above when little is known about some phenomena. Any empirical evidence gathered would be expected to have credibility. Descriptions presented should correspond as far as possible to “what is”.
- **Theory for understanding** developed, or conjectures, need to be new and interesting or explain something that was poorly or imperfectly understood beforehand. The expectation is on plausibility and credibility of any accounts given of events in the real world. Explanation should focus on how and why events happened as they did, and any ascriptions of causality need to be made very carefully. The identification of a cause is subject to the same set of difficulties as with other research approaches. Possible alternative explanations as to what caused a particular outcome should be examined and eliminated (internal validity).
- **Theory for predicting** contribution could be made through the discovery of regularities that allow prediction to be of interest if these were unknown before.
- **Theory for explaining and predicting** contribute to either theory building or theory testing.
- **Theory for design and action**, in essence, does not have a straightforward contribution since designs and action theoretical focus is still at its infancy stage and not much has transpired over the past ten years other than its contribution to methodological and tool design and redesign.

Emphasising the relevance of the research outcome to the academic community requires careful consideration when deciding on the theoretical framework that will aid in answering the research questions. Theoretical frameworks, according to Neuman (2014), are at the widest range at the opposite extreme from empirical generalisations and are more than a formal or substantive theory and include many specific formal and substantive theories that may have basic assumptions and general concepts in common. Formal theory focuses on general processes or structures that operate across multiple topic areas and is more general and abstract, whereas substantive theory focuses on a particular content or topic area in social reality (Neuman, 2014).

This study aims to explain and, to some extent, explore the impact that the introduction of mobile payment systems will have on a mobile subscriber market. In particular, the study

attempts to deepen the understanding of introducing technology, in this case, mobile technology, in newly industrialised or hybrid economies. The research objective is synonymous with the objective of the theory for understanding, and as such, this theory was deemed relevant to build the contribution to theory. The chosen theoretical framework includes both formal and substantive theories. This study employs an innovation and social science theory perspective. Actor-Network Theory (ANT) and Structuration Theory (ST) are used to describe how the actor-network evolved and identifies the social conditions associated with the evolving network. This chapter justifies the multiple theoretical perspectives to understand how a hybrid economic system is impacted by the introduction of a mobile payment system to an existing mobile operator's market, as well as the appropriateness of ANT and ST. Also, the ST component of this study will draw on the work of Nonaka and Takeuchi (1995) in the area of knowledge creation to investigate the contextual impact. The next sections will discuss the rationale to employ the multiple theoretical perspectives to gain an understanding of how the mobile payment network evolves and explain how intended and unintended consequences arose.

4.2 Introducing Actor-Network Theory

The use of ANT to theoretically frame IS research is not new. Trist and Bamforth (1951), as quoted by Elbanna (2016), have highlighted that the relationship between the social and the technical aspects in organisations has been the concern of IS research since the very early days of the sociotechnical approach. Over the past 40 years, researchers have developed and employed several theoretical approaches as sensitising mechanisms to highlight these concerns. ANT has been widely adopted in the IS discipline since the 1990s. Its philosophical stance and methods of inquiry are seen to facilitate its practical application, as well as having much to offer, IS researchers have adopted it to study the implementation, design and development of IS, project management, infrastructure evolution and development and notions of IS success and failure, as indicated in the previous chapter (Elbanna, 2016; Law 1992; Law, 1991). More recently ANT has been used to highlight strategies for development and integration of health information systems (Aanestad, Monteir, Kimaro, Macombe, Macueve, Mukama, Muquingue, Nhampossa. & Lungo, 2018; Muhammad & Wickramasinghe, 2018; Sheikh & Nyella, 2017), to analyse crisis response during crisis management (Thapa, Budhathoki & Munkvold, 2017), and Paledi & Alexander (2017) have explored context-sensitive m-learning readiness in South African higher education institutions. They have provided evidence that ANT can be used to complement traditional technology readiness and adoption and Muchinguri (2016) has used it as a framework

for investigating implementation failure of Near Field Communication (NFC) payment systems in South Africa. At its most ambitious, ANT is the basis for an alternative approach to all of social science. Walsham and Sahay (1999) have conducted a research study in India, between 1993 and 1995, that focused on the development and use of Geographical Information Systems (GIS) to aid district-level administration in India. They argue that they *“were influenced in the earlier part of”* their study by both Giddens Structuration Theory (ST) and the literature on the *“social construction of technology”*. ST, according to Jones and Karstens (2008), has become very popular amongst IS researchers to study the social impact of technology innovations on society. However, Walsham and Sahay have chosen to employ an ANT perspective that allows them to build a deeper understanding of how the GIS network evolved over a period of time. Walsham and Sahay (1999) argue that ANT *“examines the motivations and actions of actors who form elements, linked by associations, of heterogeneous networks of aligned interests”* and that actors or actants, which are core to ANT, *“are taken to include both human beings and nonhuman actors such as technological artefacts”*. More recently Sage, Vitry & Dainty (2020) explore the role of affective encounters between human and non-human bodies in the proliferation of new technologies within and across work organizations through an ANT lens. Using ANT as a lens, as argued by Gregor (2006) and Llewelyn (2003) allows a richer and deeper contribution to the IS knowledge domain.

Field	Author/s	Year
Health Information systems	Aanestad et. al.	2018
Health Information systems	Muhammad & Wickramasinghe	2018
Health Information systems	Sheikh & Nyella	2017
M-learning	Paledi & Alexander	2017
Near Field Communication (NFC) payment systems	Muchinguri	2016

Table 4.1: Summary of recent research that utilizes ANT as part of a framework.

ANT, according to Heeks (2013), offers a new perspective on all aspects of development. Heeks argues that ANT disputes linear and objectivist visions of development and its concepts, structures, and processes. He states that ANT moves beyond the dualities of technology vs society, macro vs micro and instead offers a more complex and emergent view that adheres more closely to the lived experiences of development projects and processes. He further argues that

ANT can also provide new insights into the following:

- Instead of just describing the structure and explaining processes, ANT offers an opposing view by describing processes in detail to explain the emergence of actor-network structures.
- Instead of sidelining the non-human aspects (technology, texts, objects, plants, animals) of development, ANT allows for active materiality that exposes the role they play in development.
- ANT brings to light inscribed assumptions that are taken for granted, and people who are assumed to be marginalised and powerless.
- ANT delves deeper into the detail of a network's importance in development environments by constantly probing the interactions and relationships of the elements of the network and provides an insightful understanding of how all aspects of the network have evolved.

ANT explores the ways that the networks of relationships are composed, how they emerge and come into being, how they are constructed and maintained, how they compete with other networks and how they are made more durable over time (Law, 2001; Tatnall and Gilding 1999, Nijland, 2004). Being regarded "*as a constructivist theory*" ANT is also seen as "*being effective for describing how technical design solutions are interwoven with organisational issues*" (Mitev, 2000). ANT has two methodological approaches, "*to follow or trace the actor*" through ethnographic research and doing interviews, and the other is via inscription (Van House, 1999). When tracing an actor-network, the researcher starts at a certain point, in most cases with the main actor, and traces the heterogeneous elements that impact the actor's environment. The heterogeneous elements can include anything from human to non-human elements.

One key characteristic of ANT is the treatment of human and non-human actors. Human and non-human actors are treated equally; none is more important than the other. ANT achieves this through the concept of generalised agnosticism, generalised symmetry and free association (Callon 1986b). Generalised agnosticism refers to the ANT principle of preventing researchers from censoring or pre-judging human or non-human actors or, as Tatnall and Lepa (2003) describe it, "*analytical impartiality is demanded towards all actors involved in the project under consideration*". Generalized symmetry refers to the use of a single repertoire when describing human and non-human actors by the researcher/s, meaning that all actors will be treated with the same vocabulary when references are made to them and the environment they occupy, thus eliminating

favouritism. The concept of free association “*requires the elimination and abandonment of all a priori distinctions between the technological, the natural and the social*” (Tatnall and Lepa, 2003; Callon, 1986b)

This study will trace the network that impacts the main actors to a certain point of interest, based on the research intentions that were indicated earlier in this chapter. Walsham and Sahay (1999) note that “*successful networks of aligned interests are created through the enrolment of a sufficient body of allies and the translation of their interests so that they are willing to participate in particular ways of thinking and acting that maintain the network.*”. The process for aligning these interests is called, in ANT terms, the translation process. The next section will discuss the translation process and the associated ANT concepts that will form part of this research.

4.2.1 Translation

Translation is the process of aligning the interests of a diverse set of actors with that of the focal actor (Callon, 1986b). Callon (1986b) argues that translation is never a completed accomplishment and may not be successful. The creation of the actor-network consists of four translation processes, also called moments of translation and regarded by Callon as the significant building blocks for ensuring a network's stability. The processes include the following major stages: problematisation, intersement, enrolment and mobilisation. Translation, in ANT, denotes a process where two actors become related in such a way that one actor borrows from the other's strength, in this instance the first actor ends up speaking or acting on behalf of the other actor (Blok and Jensen, 2011). Numerous actors within an organisation may be involved in different processes of translation, each with its unique characteristics and outcomes. Callon (1986b) outlines four moments of translation, that can help researchers understand how technologies emerge, and networks are established or fail to be established in a heterogeneous environment.

4.2.1.1 Moments of Translation

An actor, who Latour (1996b) describes as anything that is granted to be the source of an action, in a network is independent and can resist influence from other actors (Williams-Jones & Graham, 2003). For the network to exist the actors should be encouraged to exercise their ability to act and be involved in the network. This encouragement is not a straightforward process but rather a series of processes or moments collectively called the translation process. All actors may have a similar or independent interest. The translation of these independent interests can result in the establishment of a potentially stable network. As a consequence of the negotiations of

common interest between actors, motivations and goals can be transferred from one actor to another (Callon, 1986b), thus resulting further in the transformation of networks.

When organisations adopt new technology, in ANT terms, they go through moments of translation. These moments of translation also occur when the organisation presents the new technology to external stakeholders who may have an interest in adopting the technology. This study will explore how these relations evolve and how they impact the newly established actor-network that emerges as a result of the introduction of the new technology.

For a network to be stable and prosper, it must go through the four moments of translation. Williams-Jones and Graham (2003) state that there may be resistance during the development of relations in actor networks and counter-claims may arise, and these have the potential to hinder network stability. If the key actors manage to align the interests of the other actors to that of the focal actor, then enrolment into the network will occur, which means that consensus has been reached and there is buy-in from the actors. It means that key actors have been successful in convincing the other actors to align their interests to that of the focal actor.

4.2.1.2 Problematisation

According to Mpazanje et al. (2013), the stage of problematisation is where the focal actor may want to change the way things are done by revealing their interests and sharing them with potential actors that may have aligned their interests or create alliances with other actors with similar objectives.

The Obligatory Passage Point (OPP) forms part of the Problematisation phase. The OPP refers broadly to a situation that must occur for all the actors to satisfy the interests that have been attributed to them by the focal actor. The focal actor defines the OPP through which the other actors must pass and by which the focal actor becomes indispensable (Sarker, Sarker & Sidorova, 2006). The OPP helps the focal actor align the interests of the other actors with those of the focal actor, for example in this study it could be that the focal actor wants to encourage adoption and active usage of the mobile payment service and by doing so, it will require the interest of the consumer/user of the service to be aligned closely to the OPP of the focal actor.

4.2.1.3 Interessement

Once problematisation is in process, the next phase in the ANT translation process is interessement. At this stage, the focal actor tries to impose its identity on other actors that have become part of the alliance thus far (Callon, 1986a). During the Interessement phase actors that

have been identified during the problematisation phase are exposed to the interessement strategies which can involve some compromise, persuasion and seduction to get actors interested in the roles proposed to them. These strategies are aimed at convincing actors to accept the identity and role that has been imposed on them by the focal actor. Once the actors accept their imposed roles, they will act as intermediaries whose primary focus will be the growth of the actor-network. Since ANT supports a heterogeneous environment, these actors or intermediaries will not adhere to the same interessement strategy. They may have diversified levels of interest, e.g., a non-human actor may respond differently to an interessement strategy aimed at human actors. Callon (1990) acknowledges the heterogeneous nature of ANT and states that four main types of intermediaries exist in an ANT environment. These are:

- literary inscription or text which includes reports, books, articles, patents, notes, and other textual media;
- technical artefacts which include consumer goods, electronic equipment, machines, scientific instruments, ICT, etc.;
- human beings including their skills, knowledge and know-how;
- money and all its different forms like reward systems.

4.2.1.4 Enrolment

This is the third stage of the translation phase. The actors accept the roles proposed to them or imposed on them by the focal actor and begin to align their interests with those of the focal actor. The success of the process of enrolment depends on the ability of the focal or main actor to capture the other actors through a series of strategies that will result in accepting being part of the network. Each time an actor accepts a role an inscription occurs.

4.2.1.4.1 Inscription

Sarker et al. (2006) argue that inscription occurs during the enrolment process. Inscription, as defined by Latour (1992), is “*a process of creation of artefacts that would ensure the protection of certain interests*”, which, in the case of ANT, is to protect the interests of the focal actor. These artefacts include text, images, databases, branding, etc. and in this research scenario, explicit processes, shared memories and mobile devices. An inscription can also be referred to by any process that entails a material substance being transformed into an explicit form (Blok and Jensen, 2011). This may include directions, in the form of

text, images or graphs, to a venue or a food menu that is printed on a piece of paper or a STOP.

4.2.1.5 Mobilisation

Mobilisation is the final stage of translation. The focal actor tries to influence other actors to act according to what has been agreed on and is thus maintaining the course of action. The objective is to stabilise the network and maintain relationships. The focal actor needs to continually convince the actors that their interests are still the same. Controversy, at this stage, no longer exists if there is support from the actors (Mähring, Holmström, Keil & Montealegre, 2004).

Concept	Definition
Actor	Any element, which bends space around itself, makes other elements dependent upon itself and translates their will into the language of its own. Common examples of actors include humans, collectives of humans, texts, graphical representations, and technical artefacts. Actors, all of which have interests, try to convince other actors to create an alignment of the other actors' interests with their interests. When this persuasive process becomes effective, it results in the creation of an actor-network.
Actor-Network	A heterogeneous network of aligned interests, including people, organisations and standards.
Translation	The process of the alignment of the interests of a diverse set of actors with the interests of the focal actor. The creation of an actor-network. This process consists of four major stages: problematization, intersement, enrolment and mobilisation. Numerous actors within an organisation may be involved in a different processes of translation, each with its ownunique characteristics and outcomes. For purposes of clarity, it is useful to focus on a single actor, from whose vantage point we wish to see the process of translation.
Problematization	The first moment of translation during which a focal actor defines identities and interests of other actors that are consistent with its interests and establishes itself as an obligatory passage point (OPP), thus 'rendering itself indispensable'.
OPP	The obligatory passage point, refers to a situation that must occur for all the actors to satisfy the interests that have been attributed to them by the focal actor. The focal actor defines the OPP through which the other actors must pass and by which the focal actor becomes indispensable.
Intersement	The second moment of translation which involves a process of convincing other actors to accept the definition of the focal actor
Enrollment	The third moment of translation, wherein other actors in the network accept (or get aligned to) interests defined for them by the focal actor
Inscription	A process of creation of artefacts that will ensure the protection of certain interests.
Mobilisation	The final translation stage. The focal actor tries to influence other actors to act according to what has been agreed on and is thus maintaining the course of action
Speaker/delegate/Representative/ Intermediaries	An actor that speaks on behalf of (or stands in for), other actors. They often act as a link between other actors to try and bring about an agreement.

Betrayal	A situation where actors do not abide by the agreements arising from the enrolment of their representatives
Irreversibility	The degree to which it is subsequently impossible to go back to a point where alternative possibilities exist

Table 4.2: Working Definitions of Some of the Central Concepts of ANT.

Source: Adapted from Sarker et al., 2006, p.6

4.2.2 Critique of ANT

Heeks (2013) states that ANT can be “*difficult to put into practice methodologically*” and that a “*good ANT research account is a book-length thick description of a particular initiative that was gathered by long-term ethnographic research that traced closely network development over time*”. He noted that research that is conducted by organising devices such as the moments of translation or the local/global networks frames runs the risk of betraying the intended richness and inductivism of ANT since the focus is on the relative simplicity of using these devices. He further argues that “*ANT stands accused of not simply following its actors but of imposing the worldview of the researcher*” for example “*in attributing agency to non-human actors, ANT does something that most humans involved in networks do not; likewise in seeing the relativism of claims to knowledge*”.

ANT, according to Orlikowski & Scott (2008), does not come without criticism. Orlikowski & Scott (2008) argue that there are some difficulties in using ANT as a theoretical lens. These difficulties are highlighted as follows:

- It does not account very well for the role and influence of institutions, in particular, for example, how institutional conditions shape recurrent action, even as they are constituted by them.
- The nature of intentions and how they are treated is quite ambiguous within ANT. The principle of symmetry would require attributing intentionality to technological artefacts, a move that some critics find problematic.
- While ANT research claims that it treats technological and social actors equally, many of the studies claim to privilege one form of agency over the other, thus defeating their founding goal.
- There are non-trivial methodological difficulties with attempting an ANT analysis. It often proves challenging to turn the methodological aim of tracing ties between social groups into a workable fieldwork design. What defines the formation of the network? Where does it start

and finish? As a consequence, we are presented with narratives from a subset of actors that the researcher may or may not define in scope, e.g. Identifying delegates that represent technological agents take us into a less well-charted territory. The credibility of such data sets tends to be hard-won.

Crawford ((2020) posits that well into the 21st century, practitioners have both embraced and critiqued ANT, but it remains a useful form of inquiry.

4.2.3 Summary of ANT

Actor-Network Theory (ANT) was chosen as the theoretical lens to generate a deeper understanding of the phenomena, and ANT will facilitate the answering of the first main research question (RQ1). The study intends to contribute to knowledge by deepening the understanding of the intricate relationships that emerge as the mobile payment ecosystem evolves in hybrid economic conditions as society and industries move towards large or mega-scale IS systems or an IS ecosystem. Opting to use ANT for this study facilitated both the sensitising and enlightening aspects of the research. Below is an illustration of the use of ANT as it applies to this thesis.

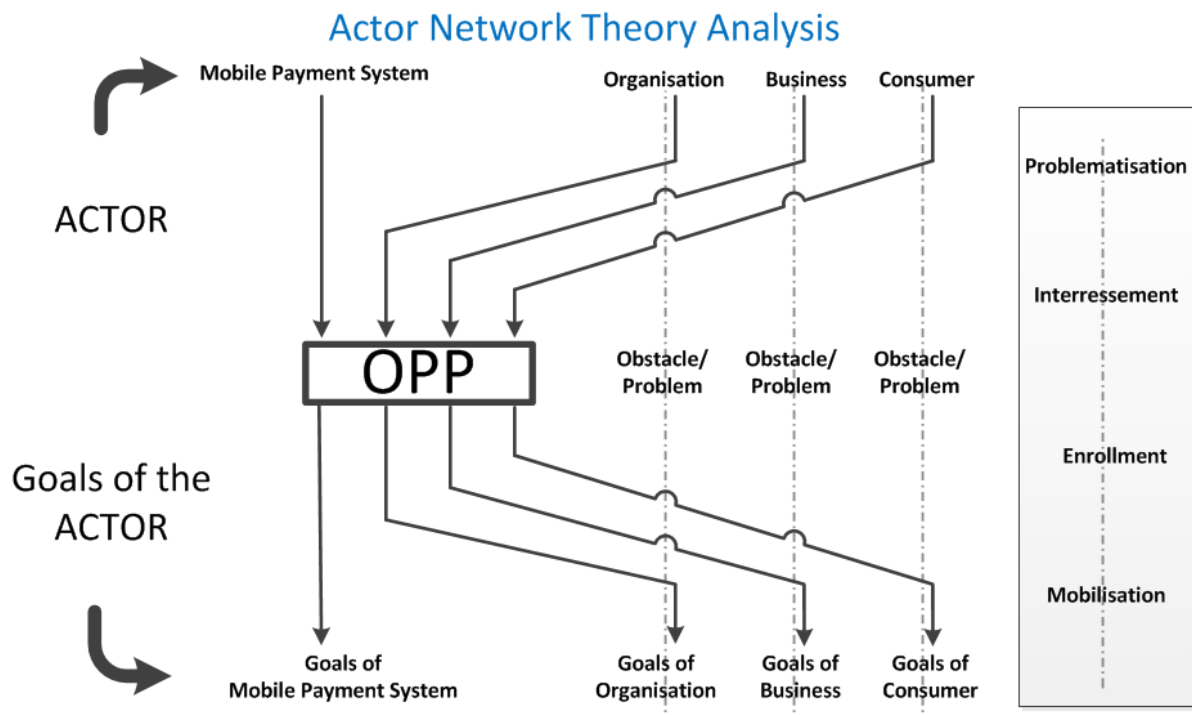


Figure 4.1: ANT analysis.

Source: Adapted from Callon (1984, p. 196-233)

The next section will discuss the relevance of choosing ST in support of ANT to enhance the relevance of this study.

4.3 Introducing Structuration Theory (ST)

In recent years, Structuration Theory (ST) has become very popular amongst IS researchers to study the social impact of technology innovations on society (Iyamu & Roode, 2010). More recently, Bernardi (2017) analyse how health information systems influence the emergence of local accountability and its consequence for health provisioning by deploying ST as the theoretical lens. Jones and Karsten (2008) state that Anthony Giddens developed structuration theory as a way of overcoming what he saw as deficiencies in the two approaches dominating social analysis in the late 1970s and early 1980s. One of these was positivism, or “naturalistic” sociology. Jones and Karsten state” that *by identifying functionalist and structural approaches as examples of positivism, Giddens argued that they were strong on structure, but weak on action, thus seeing human agents as inert and inept, and emphasizing the pre-eminence of the social whole over its parts*”. Joas (1993) argues that, although Giddens shares with the interpretative approaches and their emphasis on the subjectivity of social actors, he is best known for his notion of the double hermeneutic, in which he characterises the circumstances that the social sciences are not only confronted with the problem of interpretation within the community of scientists, but are also faced with the problem of interpreting the actions and utterance of their object of investigation, which gave rise to the formation of Structuration Theory (ST). ST focuses on the social construction of a social structure (Goa, 2007).

Three concepts are central to Giddens' work on ST (van Veenstra & Axelson, 2014). These concepts are:

- the duality of structure - which refers to structure and agency being mutually constitutive;
- actor's/Agent's knowledgeability - which means that actors are knowledgeable about their actions, which they execute according to goals of which they are aware, and;
- time-space relations - which refer to the notion that social activities are situated in a specific time and space, and they cannot be easily disconnected from their context and placed into another situation.

ST, as stated by Orlikowski (1992), holds that human actions are enabled and constrained by structures, but emphasizes that these structures are the result of previous actions and are only manifested in the structural properties of social systems. Social Integration, which is composed of reciprocal interactions between agents in the contexts of co-presence allows for the individual understandings on the structure to be exchanged so that a common insight of the structure can be achieved (Goa, 2007). As a result of the popularity of ST amongst scholars a variety of ST derivatives were introduced to the academic world in recent years. These derivatives include Strong Structuration, Adaptive Structuration and the Duality of Technology introduced by Orlikowski (Jones and Karsten, 2008). Jones and Karsten, (2008) summarize ST as follows:

“The central concern of structuration theory is the relationship between individuals and society. Rejecting traditional dualistic views that see social phenomena as determined either by objective social structures, which are properties of society as a whole or by autonomous human agents, Giddens proposes that structure and agency are a mutually constitutive duality. Thus, social phenomena are not the product of either structure or agency, but both. Social structure is not independent of agency, nor is agency independent of structure. Rather, human agents draw on social structures in their actions, and at the same time, these actions serve to produce and reproduce social structure.”

4.3.1 Concepts in Structuration Theory

Figure 4.2 below illustrates how the ST concepts are related. The following section will discuss how these concepts are related.

4.3.1.1 Structure

Structure consists of the rules and resources that human agents use in their everyday interactions and do not exist independently of human action, nor are they material entities. Structure is described by Giddens as traces in the mind that exist only through the action of human beings (Iyamu, & Roode, 2010). Gao (2007) concurs with this view by stating that in ST, a structure exists as a set of properties within the minds of individuals. Structure mediates human action, while at the same time, these actions are reaffirmed through being used by human agents (Orlikowski, 1992). Organisations, as argued by Boucaut (2001), abide by the rules of the society in which they are located, and each organisation has its own rules, e.g., complying with legislative requirements, and resources that it uses to facilitate the organisation to get things done.

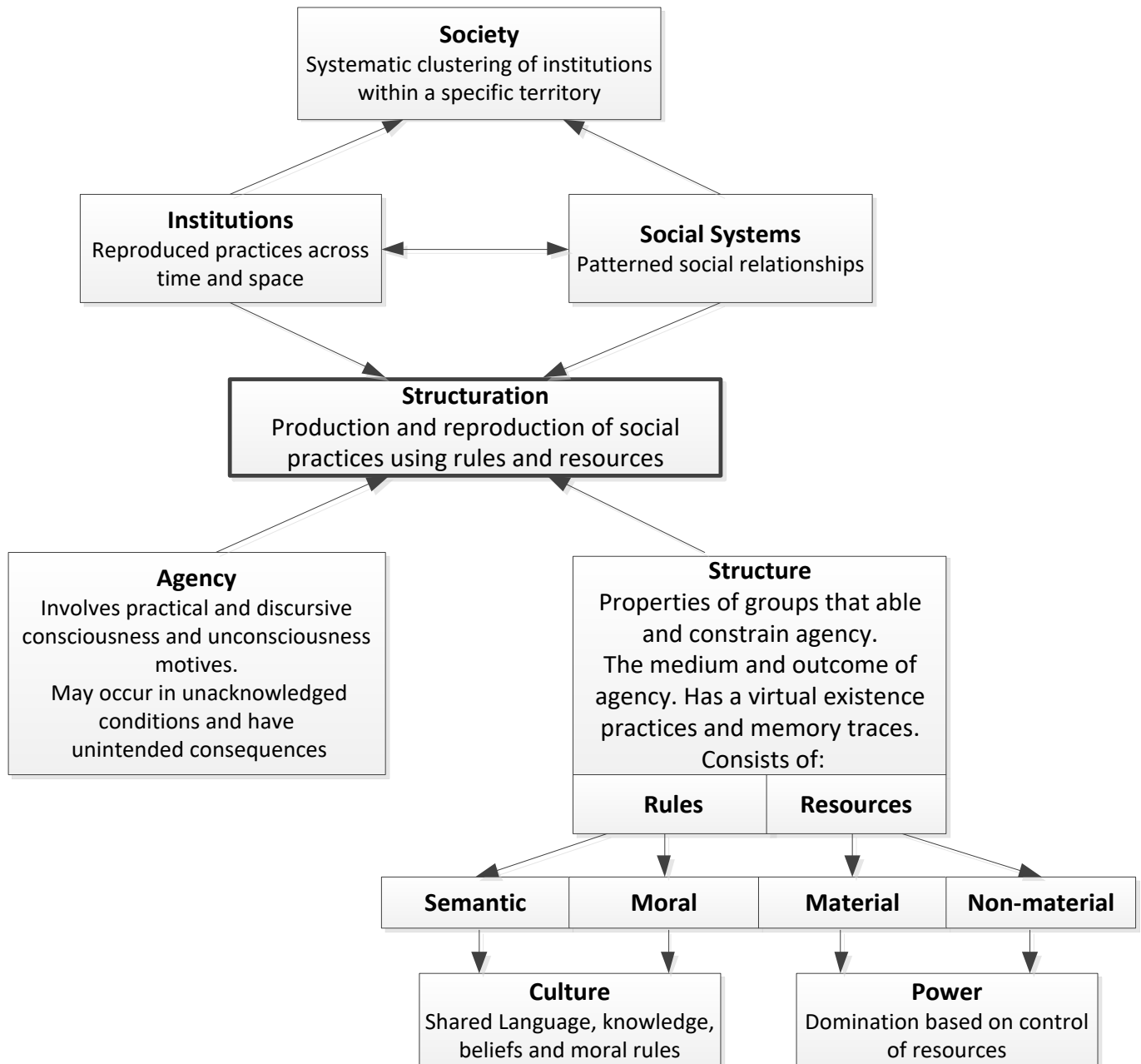


Figure 4.2: Key Concepts of Structuration
 (Source: Blaikie (2009))

4.3.1.2 Type of Structures

In ST, three types of structures are identified by Giddens in a social system, (Fig 4.2 above) which are structures of signification, legitimation and domination (Lamsal, 2012).

- Signification, as stated by Lamsal (2012), *“produces meaning through organized webs of language (semantic codes, interpretive schemes and discursive practices)”*. At a zoo, we draw on structures of signification that will inform our understanding of the type of animal (enclosures) that is hosted at the zoo. Signage (text/words) on the enclosures and the zoo guide’s description (speech/language) of the animal occupying the enclosure might inform us what type of animal occupies the enclosure. Alternatively, we may derive this from more in-depth scrutiny of the enclosure based on experience, e.g., enclosures with lots of water may inform us those aquatic animals are being hosted, whereas enclosures with rocky terrain may host land-based animals.
- Legitimation, as stated by Lamsal (2012), *“produces a moral order via naturalization of societal norms, values and standards”*. In the case of the zoo example above legitimation allow us to draw on the appropriateness of the enclosure to host particular animals and also the rules and regulations for viewing, feeding and handling these animals. Human agents exhibit consciously, subconsciously, or unconsciously meanings of their behaviour, as stated by Lamsal (2012). They are sanctioned by the environment on how to act and interact, e.g., knowing that an enclosure is occupied by lions or chickens will sanction what action the human agent will take. It would not be morally fit for a human agent to enter a lion enclosure where they might become prey to the animal. Structures of legitimation may include concepts such as culture, social influence, values, principles, morals and moral codes, ethics, beliefs, traditions and customs.
- Domination, focuses on the production and exercise of power, originating from the control of resources as stated by Lamsal (2012). This control can be exercised over authoritative or allocative resources. When human agents or organisations engage the structure of domination, they may use resources as a form of authority. This can be illustrated by a zookeeper withholding information from the public on the breeding patterns of certain endangered animals, like rhinos or birds, to protect the animal or deciding on which employee will work and interact with these animals, thus using the endangered animal as a resource for certain employees to gain knowledge about the animals living conditions. Donors can also use funds as a domination structure to indicate what type of animals they are willing to sponsor at the zoo. Domination can also

include power or authority over people or resources, coercion, control, command, management and dominance.

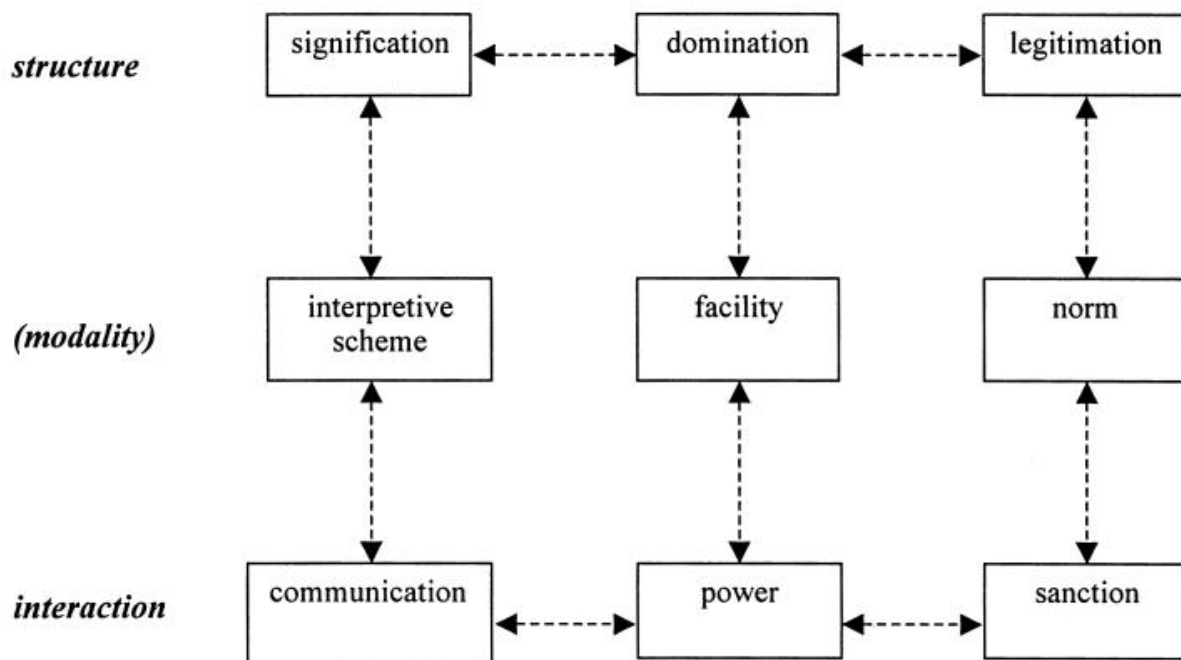


Figure 4.3:: Types of structures (Giddens, 1984)

4.3.1.3 Agency

Lamsal (2012) states that the “*basic human actions and the outcome of those actions, in this case, the activities, are seen as two defining capabilities by Giddens which he termed agency*”. Giddens, according to Lamsal (2012), argues that acts should be distinguished from action as a separate progression. Giddens further argues that “action is a continuous flow of involvement by autonomous human agents” and (can be stimulated by a self-examination process, referred to as reflexive monitoring, that allows human agents to examine their actions. This reflexive monitoring process is part of Giddens model for action, which includes rationalization and motivation of action (Lamsal, 2012).

4.3.1.4 Actor’s/Agents knowledgeability

Giddens argues that agents enact their actions through practical and discursive consciousness daily. Discursive consciousness allows agents to be more rational in their actions and refers to a more conscious and explicit nature of their knowing, whereas practical consciousness refers to the things in life that the agent does not really think or theorise about (Giddens 1982).

Knowledgeability of the agent, as argued by Giddens (1979, 1982), is the ability of the agent to engage with the structure/s through action or actions. Giddens (1984) states that all humans are knowledgeable agents and know a great deal about the conditions and consequences of what they do in their day-to-day lives. Knowledge provides the basis on which agents both understand and transform the rules around them.

Knowledgeability is a useful concept in ST to understand the ways agents draw from their consciousness to make sense of the context or strategic terrain that they found themselves (Stones, 2005). It allows the agent to act and interpret its actions in multiple contexts to produce a similar action or reproduces a new action or refrain from acting. Stone (2005) reiterates that the emphasis Giddens places on knowledgeability and stocks of knowledge is linked, not only to agents' transposable and generalisable knowledge but also to the specific circumstances of their action, and that of others, and he also questions the bounds of agent's knowledgeability in the shifting context of time and space. Ideas and insights generated by agents can be challenging to communicate since they have been conceived in a specific context that mirrors the agent's situations and perspectives and requires reflection before being shared with others in a different context, for these ideas to be kept meaningful and relevant (Nonaka & Takeuchi, 2007). The agent is often confronted with unintended consequences and unacknowledged conditions when sharing these ideas in a different context. Giddens emphasises that any study of the unintended consequences and unacknowledged conditions of actions would require reference to the knowledgeability of the relevant agent (Stone, 2005).

There is no dominant set of instruments and methods concerning the analysis of knowledgeability as the individuals' knowledge to understand their actions, the rules they follow and the context that gave rise to it (den Hond, Boersma, Heres, Kroes & van Oirschot, 2012). Part of this study will include studying the intended and unintended consequences and conditions that are brought about by the multiple contexts that the agents operate in or are exposed to, thus placing emphasis on the need to include the concept of "Knowledgeability of the Agent" borrowed from Structuration theory.

4.3.1.5 Structuration

The interplay between agency and structure, the foundation concepts of ST, leads to the process of structuration that allows for the production and reproduction of social practices using rules and resources (Blaikie, 2009). Structuration, as stated by Meneklis & Douligieris (2009), "is realized

as new structures are produced, existing structures are modified (elements of change), or existing structures are reproduced (element of stability) through the practices of knowledgeable human agents". The Structuration process occurs over time and space. Social acts do not take place in isolation, but in subsequent replications over time in recursive behaviour (den Hond et al. 2012). Time and space constitute context or contextual conditions as posited by Nonaka and Takeuchi (1995)

The notion, as indicated in section 2.4 by Augier et al. 2001, that context is not "just there" as static entities but it composed of emergent phenomena is supported by Nonaka & Nishiguchi, (2001) who proposed that contexts are not confined to a physical space but are constituted by what people do, where they do it and when they do it. This notion is further supported by Dilley (1999) who argues that *"Context is both constitutive of social action and itself the outcome of social action, it is both a generative principle and a resulting outcome"*. Giddens (1984) posits that structures are the medium and outcome of social actions (duality of structure theorem) and both enable and constrain. This idea corresponds with Dilley's statement above that context is constitutive, and the outcome of social action reinforces the notion that context is a social structure in itself.

4.3.1.6 Duality of Structure

Social structures are produced and re-produced by continuous human action, and at the same time they enable or constrain human action, a scenario referred to as the *"duality of structure"* in ST (van Veenstra & Axelson, 2014). Jones and Karstens (2008) state that *"social structure is not independent of agency, nor is agency independent of structure"*, hence Giddens's proposal *"that structure and agency are a mutually constitutive duality"*.

Table 4.3: Working Definitions of Some of the Central Concepts of ST that will be utilised in this study

Concept	Definition
Structure	Consists of (1) two aspects of rules, and (2) two kinds of resources (p. xxxi). ⁵ These rules and resources are "recursively implicated in the reproduction of social systems" (p. 377). It is structure which allows "the binding of time-space in social systems" (p. 17). However, structure is not external to individuals (p. 25). Instead, it "exists only as memory traces, the organic basis of human knowledgeability, and as instantiated in action" (p. 377). Thus, structure is always a "virtual order," i.e., social systems "do not have 'structures' but rather exhibit 'structural properties'" (p. 17). Finally, structure "is not to be equated with constraint but is always both constraining and enabling" (p. 25). ⁶ The most important aspect of structure, those practices with the greatest time-space extension, ⁷ are institutions, defined as "the more enduring feature of social life" (p. 24).

Rules	Are “generalizable procedures applied in the enactment/reproduction of social practices” (p. 21). Awareness of social rules is the “very core of that ‘knowledgeability’ which specifically characterizes human agents” (pp. 21-22). The most significant rules are those which are “locked into the reproduction of institutionalized practices, that is practices most deeply sedimented in time-space” (p. 22). Rules can be distinguished along five dimensions (see figure on p. 22). By contrast, formulated rules are codified interpretations of rules, not rules as such (p. 21). "The discursive formulation of a rule is already an interpretation of it" (pp. 23).
Resources	Authoritative resources are non-material sources of power resulting in the dominion of some actors over others, i.e., command over the coordination of the activity of human agents (p. 33, 373). Allocative resources are material sources of power, i.e., natural and physical materials and artefacts (p. 33, 373). Both are related to domination structures (vs signification or legitimation structures; see figure on p. 33). Phenomena only become resources when incorporated within processes of structuration.
Action	Is not a combination of acts. “Acts are constituted only by a discursive moment of attention to the of lived-through experience” (p. 3). Action cannot be discussed separately from the body, its mediations with the surrounding world and the coherence of the acting self.
Agents	Continuously monitor the flow of their activities, expect others to do the same, and routinely monitor aspects of their contexts (i.e., reflexive monitoring; p. 5). Giddens differentiates between reflexive monitoring, rationalization and motivation as embedded sets of processes (p. 3). “While competent actors can nearly always report discursively about their intentions in, and reasons for, acting as they do, they cannot necessarily do so of their motives” (p. 6). This leads him to differentiate between practical consciousness (i.e., what can be done), discursive consciousness (i.e., what can be said), and unconscious motives and cognition (p. 7). Human agents know how (i.e., practical consciousness) to “go on” in a wide variety of contexts (p. 26).
System	Refers to “the patterning of social relations across time-space, understood as reproduced practices. Social systems should be regarded as widely variable in terms of the degree of ‘systemness’ they display and rarely have the sort of internal unity which may be found in physical and biological systems” (p. 377; see figure on p. 25).
Duality of structure	Refers to “structure as the medium and outcome of the conduct it recursively organizes; the structural properties of social systems do not exist outside of action but are chronically implicated in its production and reproduction” (p. 376; see figure on p. 25).

Table 4.3: Working Definitions of Some of the Central Concepts of ST.

Source: Adopted from Gehman, Structuration Theory Summary, (Gehman J., 2008, available at

<http://www.joelgehman.com/resources/Giddens1984StructurationTheorySummary.pdf>)

4.3.2 Critique of Structuration Theory

Some authors, like Archer (1996), as quoted by Rose & Scheepers (2001), argue that conflating structure and agency weakens their analytical power. They state that it is necessary to maintain an analytical distinction to deepen the understanding of why certain things occur, emergent and designed consequences, between the different societal settings and its people. Monteiro and Hanseth (1995) acknowledge the insights of ST, they argue that it does deepen the understanding of how organisations relate to information systems. They argue that ST lacks precision regarding the specifics of the information system and that the ST concepts fail to highlight appropriate explanations to build a basis for understanding the information systems component.

Orlikowski (2000) argues that ST does not adequately explain changes in the use of technology and critiques the following points: the stabilisation of technology after development is provisional, technology implementations never reach full completion thus neglecting the empirical evidence, and they “embody” structures within artefacts which (re)present various social rules and political interests. She then proposes a practice lens to examine how people, as they interact with technology in their ongoing practices, enact structures that shape their emergent and situated use of that technology; technology structures are emergent, not embodied. Such a practice lens more easily accommodates people’s situated use of dynamic technologies because it makes no assumptions about the stability, predictability, or relative completeness of the technologies. Instead, the focus is on what structures emerge as people interact recurrently with whatever properties of the technology are at hand, whether these were built-in, added on, modified, or invented on the fly.

Some academics combine ST with other theories to overcome some of its limitations. *Structur-ANTion*, a proprietary synthesis of ST and ANT proposed by Brooks and Atkinson (Kaplan, Truex III, Wastell & Wood-Harper, 2004) symbolizes the complementary aspects of ST and ANT in a research environment. Brooks and Atkinson argue that “*whereas structuration theory provides an account of the interactive dynamics whereby social structures are held together (through the recursive enactment of socially constructed rules) and thus emphasizes stability, ANT provides a complementary narrative addressing the dialectics of socio-technical transformation in terms of the reconfiguration of networks of human and nonhuman actants*”.

4.3.3 Summary

ST, for this study, will provide a valuable encompassing perspective of multi-level engagement amongst actors from the different environments and will point to meaningful insight for future interventions (Ogden & Rose, 2005). ANT set the basis for the data that was generated to analyse how structuration occurred during the formation of the actor-network. Structuration occurs in a context. The next section will elaborate on how context was re-framed for the purpose of this thesis.

4.4 Reframing Context (Time-Space).

Giddens identifies two forms of methodological bracketing, institutional analysis and strategic conduct analysis, that can be instituted when empirical research is conducted using ST. Systems analysis, which facilitates the analysis of the social world through the application of ST, has been added as a third bracketing method (Cohen, 1989:206). Giddens (1984) states that the study of context, or the contextualities of interaction, is inherent in the investigation of social reproduction and involves the following:

- (a) the time-space boundaries around interaction strips,
- (b) the co-presence of actors, making possible the diversity of facial expressions, bodily gestures, linguistic and other media of communication,
- (c) awareness and use of these phenomena.

Stones (1991) concurs with the view that context is very much an area of importance in ST but argues that strategic conduct analysis is not adequate and proposes that a fourth bracket, strategic context analysis, be added to aid strategic conduct analysis in enhancing the utility of ST for empirical research. Strategic conduct analysis is applied when the researcher studies how actors draw upon structural elements, rules and resources, when exercising social relations, whereas strategic context analysis (SCA) is similar to what Giddens coined as knowledgeability which is *“everything the actors know or believe about their action and that of others, drawn upon the production and reproduction of that action, including tacit as well as discursively available knowledge”* (Stones, 1991).

Knowledgeability is implicated in both strategic conduct analysis and strategic context analysis with the *“main difference being that the former tends to lead us back to the agent itself, its reflective monitoring, motives and desires while the latter “leads outwards into a social nexus of interdependencies, rights and obligations, and asymmetries of power”* (Stones, 1991). When the phenomena under investigation call for an explanation of any of the motives, knowledgeability, skills (beliefs, purposes, intentions, etc.) of

given actors, then strategic conduct analysis can be applied, whereas strategic context analysis can be applied where the problem being addressed focuses on the knowledge of the strategic terrain that the agent interacts with or is being exposed to (Stones, 1991). Phipps (2001) posits that, *“strategic context analysis emphasizes awareness about the potential courses of action, choices, alternative strategies, other present and absent actors in the environment, and the probable consequences of such courses of action”*.

This scrutiny of the IS ecosystems environment led the author to explore the role that context play in IS ecosystems' success or failure. Contextual conditions have been a persistent concern for many years in the IS implementation arena. As indicated 2.5 and further elaborated in section 4.3.1.5 a number of scholars posits that context are constituted by what people do, where they do it and when they do it and that it is both constitutive of social action and itself the outcome of social action, thus emphasising the notion that context is socially constructed which rendering it a social structure.

A recent study of context (Avgerou, 2019) indicates that mechanisms through which contextual conditions in IS research are understood to contribute to the formation of IS phenomena fall into three main categories which include functional, behavioural and power-related. Functionally, information systems fulfil functions required by their context or the context provides resources for their construction. Where context shapes the cognitive and affective state of human agents and actors it has a behavioural impact, and a power-related impact where IS phenomena are formed in conditions of asymmetric distribution of material resources and authority and are subject to coercive pressures of policy and regulation. These mechanisms are often individually undertaken and seldom as a cohesive approach to present a more holistic view of the context. Following on from Avgerou (2019) it can further be argued that functional, behavioural and power-related mechanisms equate to the structural categories as identified by Giddens. Signification structures are derived from the description of the function of elements, legitimation focuses on morality and how society behaves, and domination is impacted by power-related mechanisms. As indicated by Stones and Phipps above, human agents are aware or can become aware *of the potential courses of action, choices, alternative strategies, other present and absent actors in the environment, and the probable consequences of such courses of action that may impact the IS phenomena*.

ST is very well positioned to illuminate the structuration process via strategic conduct analysis or institutional analysis but as indicated by Stones (1991), falls short of illuminating the more detailed impact of context and how it aids or constrains failure or success of the IS phenomena,

topics that are poorly understood in current research. den Hond et al. (2012) posits that Giddens has placed the analysis of time and space at the very heart of contemporary social theory. However, he does not interrogate the concepts sufficiently, leaving a potential gap to apply possible theories and methods in empirical studies that operationalise the time-space concept. Gao's (2007) argument is that ST can be used, similarly to the knowledge creation theory (Nonaka and Takeuchi, 1994), to analyse knowledge and process management, and provides an alternative to operationalise the time-space concept.

Stones (1991) notion that ST can also be used to illuminate knowledge of the strategic terrain that the agent interacts with or is being exposed to, supports Gao's argument that ST can be used similarly to the knowledge creation theory (Nonaka & Takeuchi, 1994; Nonaka and Toyama, 2015). McLean (2004) critically evaluates the knowledge creation theory using Lynham's (2002) General Method of Theory-building in Applied disciplines and Patterson's (1986) criteria for a good theory as the assessment criteria and concludes that the knowledge creation theory put forth by Nonaka and Takeuchi (1995) is indeed a proper theory that, as it emerges, will grow robust over time. This chapter will further explore the knowledge creation process or elements of it, in particular the concept of Ba, that can illuminate how contextual mechanisms impact structuration through function physicality and practicality) and behaviour (emotions) and how power relations emerge (Avgerou, 2019).

The concept of Ba (Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998; Nonaka & Toyama, 2003; Nonaka & Takeuchi 2007; Nonaka & Toyama, 2015) can be drawn upon to provide a more detailed illumination of structuration as it is impacted by the contextual mechanisms. These authors argue that knowledge creation and structuration process are similar and for it to occur, there must be a context or place/environment to facilitate it. This context or place/environment will be discussed in the section 4.4.1.2.

4.4.1.1 The similarities between Giddens and Nonaka's work on structuration

Knowledge plays a key role in structuration. Gao (2007) states that Giddens's ST and Nonaka and Takeuchi's Knowledge creating theory (1995) are similar and can be supplementary to each other since both argue that knowledge creation is a social process, and both focus on the social construction of a social structure. Gao reiterates Giddens's notion of knowledgeability by stating

that a structure is not a group of disparate or unrelated factors but exists as a set of properties within the minds of individuals. Gao (2007) further argues that the connection between Nonaka and Takeuchi's theory of knowledge creation and Giddens's ST can be drawn from the fact that knowledge can be thought of as a type of structure and that knowledge creation is a structuration process. The focus of both is on the interaction between structure and action.

Theory of organizational knowledge creation	<i>Knowledge:</i> Tacit knowledge has two elements. The technical element covers know-how and skills. The cognitive element refers to a person's image of reality and visions for the future: what is and what ought to be	<i>Organizational knowledge creation:</i> It is process of conceptualizing new perspectives from shared tacit knowledge. It involves socialization. An organization needs to institutionalize reflection-in-action in the working process and organizational form
Structuration theory	<i>Structure:</i> Structure is specific types of rules and resources. It has three dimensions. Signification is the meaning and characteristics of a social structure. Legitimation is the generally accepted opinion of what the structure should be. Domination is the economic and administrative ability and technological rationale to change or maintain a structure	<i>Structuration:</i> Structure and action is a duality. The structure is constructed by people through the action of interaction, communications and setting up suitable organizational context, which in turn shapes their future action and forms the basis of next stage of structure change
Linking two theories	The three dimensions of structure are a type of categorization on knowledge	Organizational knowledge creation is a structuration process

Table 4. 4: Linking theory of organisational knowledge creation and Structuration Theory.

(Source: Gao, 2007)

Nonaka and Takeuchi (1994) argue that knowledge creation consists of three elements:

- the knowledge process (SECI) which is similar to structuration,
- shared context or place (Ba) where creation occurs similar to Giddens time and space element and
- the resultant knowledge assets or in Giddens case structures.

Nonaka & Toyama (2015) draw a comparison to Giddens's concept of Knowledgeability of the agent in ST by arguing that that tacit knowledge is produced by the agent's practical consciousness and explicit knowledge is produced by the agent's discursive consciousness. They argue that for the knowledge conversion process, or structuration process, to occur, there must be a context or place/environment to facilitate it. The concept of Ba (Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998; Nonaka & Toyama, 2003; Nonaka & Takeuchi, 2007; Nonaka & Toyama 2015) can be drawn upon to provide a more detailed illumination of structuration as the contextual mechanisms impact it.

The SECI (socialization, externalization, combination, internalization) process, according to Nonaka and Takeuchi (1995), are the creation of knowledge through the interactions between explicit knowledge and tacit knowledge, two different types of knowledge, to form different knowledge conversions. There are four modes of knowledge conversions that is created as a result of the interaction.

The four modes of knowledge conversion are:

- socialization - from tacit knowledge to tacit knowledge;
- externalization – from tacit knowledge to explicit knowledge;
- combination – from explicit knowledge to explicit knowledge;
- internalization – from explicit knowledge to tacit knowledge.

For the SECI process to occur there must be a context or place that facilitates the knowledge creation process which will be discussed in the following section.

4.4.1.2 *Ba*: The shared context facilitates the structuration process or creates knowledge.

Ba is the Japanese word for place or field. Here the word *ba* will be used when we to refer to a context or place in which the structuration process occurs, or knowledge can be created. Nonaka and Teece (2001), state that knowledge must have a context to be created, as opposed to the Cartesian belief of knowledge, which emphasizes the absolute and context-free nature of knowledge. The process of creating knowledge is necessarily context-specific, based on who participates and how they participate.

The concept of *ba* is useful to understand how the organic concentration of resources in a given space, which may be physical, virtual, or mental, and a specific time frame, affects knowledge creation. Put differently knowledge is created through real-time interaction in specific contexts, not just human interaction (Nonaka & Teece, 2001).

These contexts can be physical (e.g., office, dispersed business space), virtual (e.g., e-mail, teleconference), mental, (e.g., shared experiences, ideas, ideals), or any combination of these. It can be a shared space and time (from face-to-face to virtual) for a project team, a space for informal dialogues, a space to share experiences with customers, a space for interdivisional cooperation, or space shared by virtual companies (Nonaka & Teece, 2001).

Knowledge is embedded in *ba*, where it is then acquired through one's own experience or reflections on the experiences of others. If knowledge is separated from *ba*, it turns into information, which can then be communicated independently from the *ba*. The information resides in media and networks, while knowledge resides in *ba* (Nonaka & Teece, 2001).

Moreover, *ba* exists at many ontological levels, and these levels may be connected to form a greater *ba*. Individuals form the *ba* of teams, which in turn form the *ba* of organisations. Then the market environment becomes the *ba* for the organisation. The organic interactions among these different levels of *ba* can amplify the knowledge-creating or structuration process (Nonaka & Teece, 2001).

However, building or finding *ba* is not enough for a firm to manage the dynamic knowledge-creating process. *Ba* should be “energised” so that the individuals or the organisation can create and amplify knowledge through the SECI process. For that, the management has to supply necessary conditions to energise *ba*, such as autonomy; creative chaos; redundancy; requisite variety; and love, care, trust, and commitment (Nonaka & Teece, 2001).

Nonaka and Teece argue that knowledge needs a physical context if it is to be created and that there is no creation without place or space and time. *Ba* offers such a context. In other words, *ba* is a shared context in cognition and action (Nonaka and Teece, 2001).

This means that to create knowledge in the context of *ba*, it needs to be connected with thinking or a conscious mental or cognitive process that together produces knowledge. Knowledge should be the product of cognition and action to understand it, otherwise it cannot be understood if it does not form part of a cognitive process. Giddens (1986) states that a good deal of what we do is organised knowledgeably in and through practical consciousness; it follows how we make sense of our actions and the actions of others, and how we generate meaning in the world. The intervention between the unconscious and the conscious is practical consciousness, the underlined centre of human practical activity (Nonaka & Teece, 2001).

“In knowledge creation, generation and regeneration the ba concept is the key, because ba provides the energy, quality and places to perform the individual conversions and move along the knowledge spiral” (Nonaka and Teece, 2001).

One can never be free in the creation of knowledge. Social, cultural and historical contexts are important because such contexts are the basis on which one interprets information to create meanings. There are certain specific characteristics of *ba*. It is a place where information is interpreted to become knowledge. It does not necessarily mean a physical space. The Japanese word '*ba*' does not just mean a physical space, but a specific time and space (Nonaka & Teece, 2001).

Nomura (2002) states that '*the resource of the most important competitive advantage for an organisation is social capital formed by networks and communities where people collaborate based on their trust*'. Nomura concurs with Nonaka and Teece (2002) by stating that the key elements of *ba* are said to be space and time and argues that the establishment of *ba*, to support important communities, is one of the most important strategies for an organisation to maintain its future competitive advantage.

Ba (figure 4.4 allows participants to share time and space, yet it goes beyond time and space. Sharing time and space is very important in the structuration process or creation of knowledge - especially in socialization and externalization. *Ba* has a complicated and ever-changing nature. It sets a boundary for interactions among individuals where participants with their context can come and go, and the shared context *ba* can evolve continuously. Because knowledge is difficult to explain completely, it has no boundaries, it is dynamic, making it difficult to remain static for too long, *ba* operates as the platform on which structuration occurs, or knowledge is created by collecting the applied knowledge of the area into a certain time and space and integrating it (Nonaka & Teece, 2001).

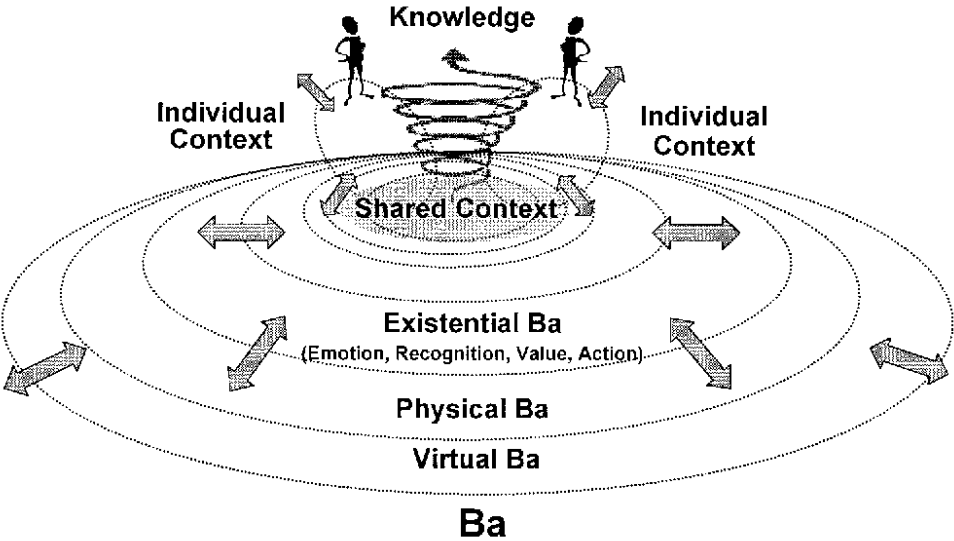


Figure 4.4: The concept of *ba*

(Source: Nonaka, Konno & Toyama, 1998)

The following section will elaborate on the interaction as depicted by Figure 4.4 and 4.5.

4.4.2 Typology of Ba: The following types of Ba exist

4.4.2.1 Originating or Existential *ba*

This is defined by individual and face-to-face interactions. Originating *ba* is the world where an individual rises above the boundary between himself and others by either sympathising or empathising with others. From this type of *ba* emerge care, love, trust and commitment that are the basis for the conversion of knowledge among individuals (Nonaka and Konno, 1998). Care, love, trust, commitment, freedom, and safety emerge out of originating *ba*.

4.4.2.2 Dialoguing or Interacting *ba*

*“Dialoguing *ba* is defined by collective and face-to-face interactions. It offers mainly a context for externalisation and is more consciously constructed than originating *ba*. The key to controlling and organizing the creation of knowledge in dialoguing *ba* is selecting individuals who have the right mix of specific knowledge and capabilities”* (Nonaka and Konno, 1998). Selecting people with the right mix of specific knowledge and capabilities for a project team, task force, or cross-functional team is critical. Through dialogue, individuals’ mental models and skills are converted to common terms and concepts. Two processes are operating in concert. Individuals share the mental model of others but also reflect and analyse their own.

4.4.2.3 Systemising *ba* or Cyber *ba*

This type of *ba* is defined by collective and virtual interactions and offers mainly a context for the combination of existing explicit knowledge, which Giddens (1986) refers to as consciousness. The latter can quite easily be transmitted to a large number of people in written form. Here, combining new explicit knowledge with existing information and knowledge, generates and systematizes explicit knowledge through justifying the concept throughout the organisation. Information technology such as online networks, groupware, documentation and databases offer a virtual collaborative environment for the creation of Systemising *ba*. These possibilities to construct and support systematizing *ba* through the use of technology have been growing rapidly

over the last decade. Things such as electronic mailing lists and newsgroups, that are these days used by many organisations, in which participants can answer questions, can collect and disseminate knowledge and information, or exchange information (Nonaka and Konno, 1998). The combining of explicit knowledge is most efficiently supported in collaborative environments utilizing information technology. This technological shift enhances the importance of this conversion mode.

4.4.2.4 Exercising or Synthetic *ba*

The main function exercising *ba* is to offer a context for internalization. Exercising *ba* supports internalization by facilitating the conversion of explicit knowledge to tacit knowledge. Individuals accept and internalise explicit knowledge that is given through virtual media (written manuals or simulation programs). Exercising *ba* synthesizes the transcendence and reflection that comes in action, while dialoguing *ba* achieves this through thought (Nonaka and Konno, 1998). Focused training with senior mentors and colleagues consists primarily of continued exercises that stress certain patterns and the working out of such patterns. Through such self-refinement, knowledge is continuously enhanced using explicit knowledge in real-life or simulated applications. The interaction that takes place in exercising *ba* is on-the-site, which means that it shares time and space. Rather than teaching based on analysis, learning by continuous self-refinement through on-the-job training or peripheral and active participation (Lave and Wenger 1991) is stressed in such *ba*. There are two dimensions of interactions: firstly, the type of interaction and secondly, the media used in such interactions. Exercising *ba* synthesizes the transcendence and reflection through action while dialoguing *ba* achieves this through thought.

Figure 4.5 provide an overview of how the different *ba* interact with each other.

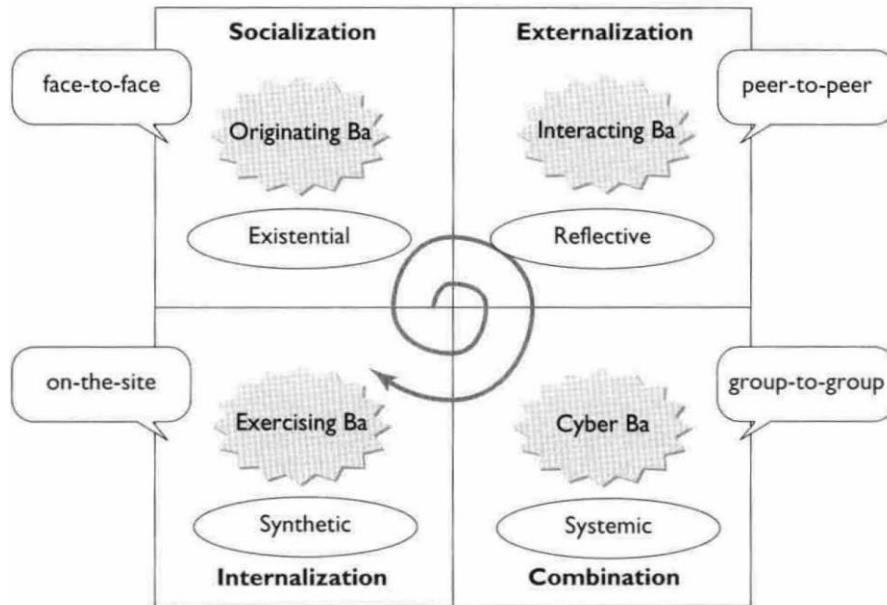


Figure 4.5: Types of *ba* and how they interact with each other

(Source: Nonaka, Konno & Toyama, 1998)

Applying the concept of *Ba* is still new as a theoretical lens to study context in Information systems. Antonczak (2020) applied Nonaka and Konno’s concept of *Ba* (1998) to define how mobile technology enables collaboration between workers, practices and systems.

4.4.3 Summary

The theoretical framework forms the foundation for answering the research questions in this study. The first question, (RQ1), “*How does the mobile payment IS ecosystem evolve over time in the hybrid economic conditions in South Africa?*” will be explored using an ANT approach. The ANT framework provides the boundary themes that will be guiding data collection for the organisational, business and consumer environments. ANT will explain how the mobile payment IS ecosystem has evolved. Once the boundary or limit for data collection is reach through the application of the ANT translation process the data set for the ANT analysis will be used to analysis the ST analysis, thus the ST analysis will immediately follow the conclusion of the ANT analysis. ANT analysis will also act as a guide for the ST data collection. The premise for deploying this method is based on the notion that the tracing of the actor network, that will be confined to mobile payment system and the environments that impact it, will lay the foundation for the ST analysis thus focusing only on the elements of structuration that was impacted by the data collected through the ANT analysis. The ST analysis for this research will elaborate on the structuration processes that occurred as the mobile payment IS ecosystem evolved. Only structures that were formed during the ANT analysis will be considered. As argued earlier in the chapter, for structuration to occur there must be a context that exist. The contextual analysis will follow the

ST analysis. The contextual analysis is based on the concept of ba and the four spheres or shared spaces as they emerged from the structuration process. First, the agent or actors will be exposed to a structuration process that they experience in a given context or space or combination of contexts. E.g., dialoguing ba allows for face-to-face interactions, but the same can be achieved through the use of technology, e.g., video conferencing with the difference being the lack of sympathizing or empathizing in the systemic ba. The purpose of the study is not to detail the type of structures that were created during the structuration process but rather the context that was prevalent during its formation.

ST with the support of the concept of ba will answer the question, "How is the mobile payment IS ecosystem influencing or is being influenced by contextual conditions? (RQ2)", by elaborating on the actors' awareness of the context where the structuration process has occurred (knowledgeability of the agent). Each *ba* offers a context towards a specific step in the knowledge-creating / structuration process, and therefore the analysis will elaborate on how the context played a role in the process.

Figure 4.6, consolidated theoretical framework, combines all the frameworks that have been discussed and will form the consolidated theoretical framework for this study. The interviews, gathered while using the interview guide, form the basis of the data collection. Interview transcripts were analysed in relation to the framework discussed in this chapter (Fig 4.6 Consolidated Theoretical Framework). The results are documented in the next three chapters, chapter five, six and seven, in the format of a case study. Chapter five will document the results of the organisational case followed by the business and consumer cases.

Potential bias that may have arisen from the collected data is mitigated by the systematic documentation and presentation of the data collected and analysed in these three chapters. The design of the study, chapter 3, and the theoretical framework, together provide support for the theoretical generalisation in this study.

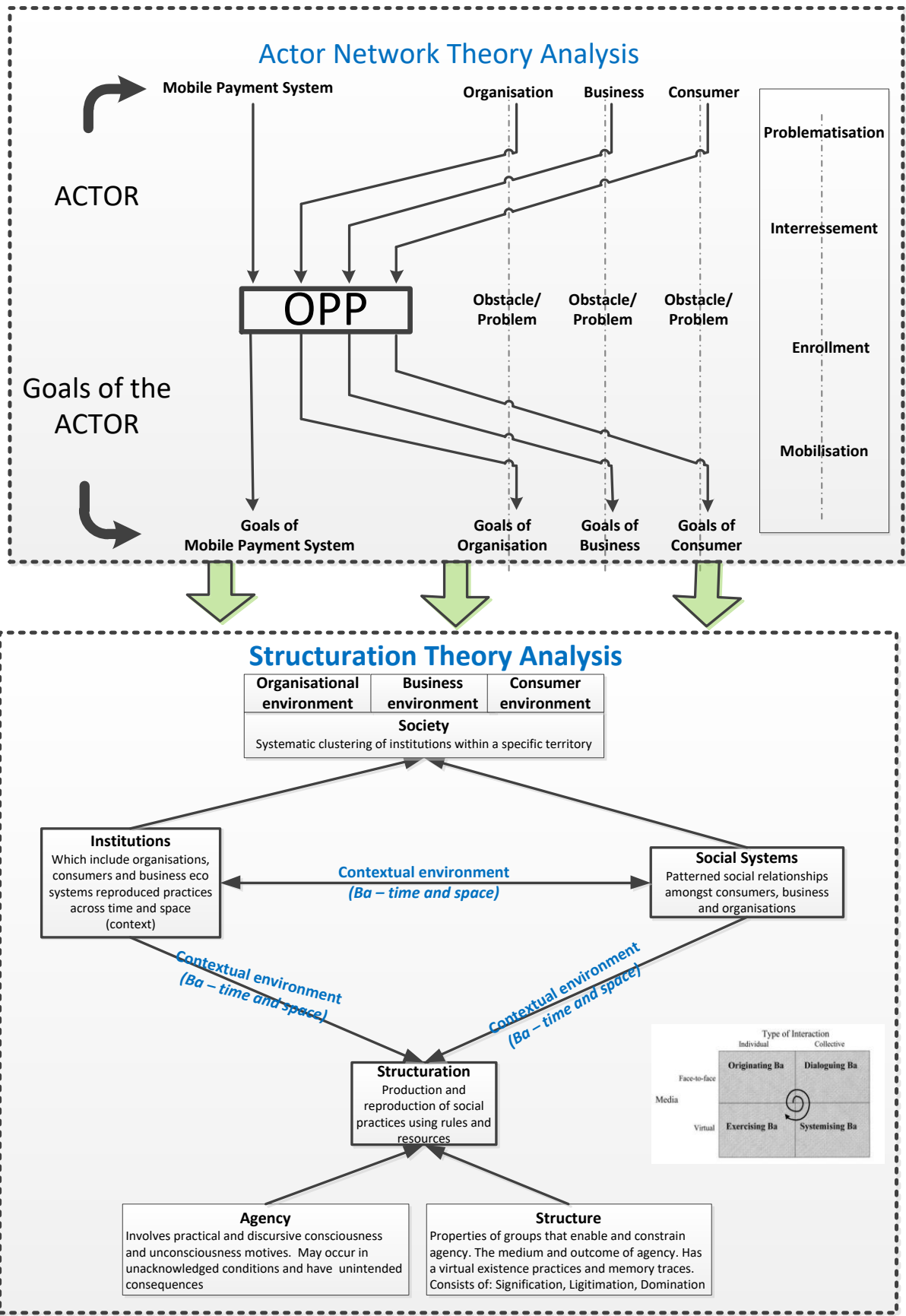


Figure 4.6: Consolidated Theoretical Framework

CHAPTER 5

Data Analysis: Organisational Environment

5.1 Introduction

This chapter describes briefly how the organisational environment sub-cases were analysed. The chapter is divided in four main sections. Section 5.2 introduces the organisational case, section 5.3 focuses on the ANT analysis of the organisational case, section 5.4 pertains to the ST analysis and section 5.5 conclude the contextual analyses of the case studies. Sections 5.3 to 5.5 analyses the organisational case study from an ANT perspective by drawing on the framework described in Chapter 4. The focus is on how a mobile payment IS ecosystem evolves in a hybrid economy.

Section 5.3 discusses the ANT analysis of the organisational case as it has been impacted by the implementation of the mobile payment system. This is analysed mainly by the translation process that has been discussed in section 4.2. The data that was gathered for the analysis came from a variety of sources, as indicated in Table 5.1.

Case Name	Organisational environment sub-case	
Period for data collection	4 year period. September 2011 to September 2015	
Data sources	Interviews (semi-structured and open-ended), marketing material, Internal procedural documents,	
Number of Group Interviews	<u>1 Group Interview</u> 1 x Group Mobile Implementation team Interview: 6 People, length more than an hour	
Number of Individual Interviews	<u>23 Individual Interviews</u> Interviews (individuals include business analyst, project managers, managers, administrators of the systems, regional managers, executives) Interviews vary from 15 minutes to an hour.	
Actors	<u>Human Actors</u> Aggregator Owner Outlet Owner MNO business unit representative Current MNO service subscribers Prospective MNO service subscribers Community	<u>Non-human Actors</u> Bank MNO business unit Location of consumers Type of services - Power/Electricity Mobile Device Reward/loyalty initiatives Registration process Money Starter packs

Table 5.1: Data Sources for the organisational environment case.

5.2 Mobile Network Operator Case

At the time of this research project, there were three major mobile network operators (MNO's), two virtual private networks (VMO's) and two fixed-line networks operating in South Africa. This section introduces the impacted MNO and its operating environment.

5.2.1 Introducing mobile networks to the emerging economy

Prior to 1993, South Africa was primarily dependent on a state-owned fixed-line network operator for its telecommunications infrastructure. This state-owned fixed-line network was the sole contributor to telecommunication services in South Africa. With the advent of democracy, a growing economy and population boom in South Africa, a tremendous strain was put on the fixed-line network and its ability to provide and keep up with telecommunication services.

In 1993 the South African government explored the option of introducing mobile network technology to the South African consumer market. In 1993 the first two mobile network operating licences were awarded, which resulted in the establishment of the two new entities that were funded by a combination of local and foreign investors. One of these MNO's, QUNU, was part state and part foreign owned.

QUNU started in South Africa in 1994 and is presently one of the largest mobile network operators by market share and revenue in South Africa. QUNU's parent company's international footprint of operations spans Tanzania, DRC, Mozambique and Lesotho. QUNU's mobile footprint covers a population of more than 180 million people in mostly sub-Saharan Africa. The QUNU Group also provides carrier and business services to customers through its operations in Gateway Carrier Services and QUNU Business Africa (QUNU, 2011a). QUNU provides mobile voice and data services that are available to prepaid, contract and corporate consumers. In addition, converged services are available to businesses ranging from small-office-home-office to corporates and multinationals. The total customer base was almost 60 million as of 31 March 2017 (QUNU annual report, 2017).

5.2.2 The mobile network organisational environment

QUNU is the leading mobile network operator in four of the five countries of its mobile operations. A significant 73% of a total of 7 267 employees of the QUNU Group work in South Africa and only 27% in international operations. Vodafone, one of the world's largest mobile communications companies by revenue, owns a majority 65% shareholding in the QUNU Group

Limited (QUNU, 2010). QUNU Group Limited is based in Midrand, South Africa with an employee compliment of 214 people. Non-public shareholders hold 80% of the issued share capital and the public shareholders account for the remaining 20%. The South African government has a direct shareholding of 14% in the QUNU Group Limited (QUNU, 2011a). The QUNU Group owns 93.75% of the South African mobile network operator, 65% of the Tanzanian mobile operations, 51% in the DRC (operation), 85% in Mozambique and 80% in Lesotho.

QUNU, South African operations, had the following product segments at the time of the mobile payment system launch:

- Core services
- Managing services
- Media services
- Individual value services

QUNU classified the mobile payment systems as an individual value service incorporated into the financial services portfolio.

5.2.3 Introducing the Mobile Payment Service

The mobile payment service introduced by QUNU is an electronic (e-money) account that allows the consumer to convert real currency into electronic money and to then use this electronic money to transact in various ways. Subscribers of the mobile payment service would be allowed to purchase e-money and sell e-money in exchange for cash at an approved outlet, thus enabling the outlet and subscriber to engage in transacting with the mobile device. The mobile payment system was initially developed to assist developing countries by giving citizens a means to manage micro-financing and was jointly funded by the parent company and a foreign governmental institution from a developed country. The scope changed, and the mobile payment system was incubated and launched in developing and emerging and hybrid economic countries on the African continent and in Asia.

Once registered customers have purchased e-money, they are able to send it to any other mobile customer who is then able to convert the e-money back into cash. This allows registered subscribers to send and receive e-money. The mobile payment system has been developed by

QUNU's parent company and, since 2007, has been launched in several developing and emerging economies in which the parent company operated. The product, with its related services, has been well received in some of the markets in which it was launched, and reached more than 4 million registered customers within 18 months of launch in one developing country.

QUNU was commissioned by its parent company to implement the mobile payment service in the South African market. QUNU entered into a licensing agreement with its parent company for the mobile payment system. The plan was for this mobile payment service to be incorporated under QUNU's managed services portfolio. Hosting and support services for the mobile payment system were to be done remotely from a foreign location. This service, according to respondent OE_MM1, brings differentiation to QUNU's product and services portfolio. The original objective of the service was (OE_MM1 & former OE_PM4) to:

- deliver a cost-effective e-money solution (with associated services) which meets the needs of the majority of the South Africans who are not serviced by conventional banking;
- increase loyalty to QUNU;
- provide a compelling incentive for customers to join QUNU from competitor networks;
- generate a new revenue stream for QUNU;
- increase SMS and USSD bearer revenue;
- increase voice revenues through increased access to the ability to recharge airtime accounts;

QUNU integrated the Mobile payment system with its systems and with those of the parent company and the bank. Section 5.3 will discuss how the mobile payment network evolved within QUNU's organisational environment from an ANT perspective.

5.3 ANT - Translation process of the organisational environment

5.3.1 Problematisation

Before 2008, QUNU's ownership was split between a South African based and a foreign-based organisation, each owning 50%. In 2008 the foreign company became the dominant investor in QUNU after acquiring an additional percentage share from the South African investment partner. This meant that the foreign company increased its ownership in QUNU to more than 50%, thus becoming the dominant decision-maker in the way QUNU was managed and operated. This resulted in a change in strategic direction for QUNU, who became more diversified in its product and service offerings.

On 1 October 2008, it was announced in the media that QUNU would replace its then CEO with a new CEO. Part of the new CEO's responsibility was "to explore new opportunities to ensure sustained revenue growth, especially with an increasingly competitive telecoms environment and mounting pressure on voice revenues" (mybroadband.co.za 1 October 2008). During an employee meeting chaired by the incumbent CEO of QUNU, it was stated that, and reiterated in its 2009 annual report (QUNU annual report 2009), "QUNU is becoming a total solution provider and will not just focus on mobile telecommunication products and services". The incumbent CEO stated that:

"QUNU has seen some significant changes over the past few months. As we evolve, we have increased the non-voice share of our business and increased the portion of our business, coming from high growth markets outside South Africa. With the intended acquisitions of other businesses as announced in August, we have opened up further opportunities in servicing the total communications needs of corporate clients, and we have gained footholds in important new markets across Africa." (OE_EM1, QUNU Press Release 17 November 2008).

The new strategic direction and ownership resulted in QUNU introducing a variety of different non-telecoms related products to its emerging and hybrid economy markets. QUNU had to adapt to new methods and ways, which were imposed on it by the parent company in a short period. The initiatives included a product that was introduced to the South African mobile subscriber market as a mobile payment service. QUNU agreed to lease the mobile payment systems proprietary software from its parent company. The change in strategic direction and ownership shaped the platform for mobile payment services to incubate, to be realized and to

make an entrance into the portfolio of products and services that QUNU was able to offer to current and prospective subscribers.

Problematisation, as defined in ANT by the focal actor, in this case, QUNU, is to adapt to the new strategic direction that is aimed at generating and entering new markets by introducing and deploying a more diverse product and service range, such as the mobile payment system, to the South African consumers, that may result in new revenue streams, encourage loyalty, and increase current revenue streams (respondent OE_EM5). QUNU's South African operations and business partners have been encouraged to introduce and deploy new non-telecommunication related products and services such as the mobile payment service. To achieve this, the QUNU encouraged its South African operations to adapt to the new types of non-telecommunications related products and services incorporated in its new strategy. Introducing and deploying new types of products and services required various actors with a variety of skill sets and experience in the specific environments that impacted the new product or service, in this case, mobile payment services. The primary actors were identified and will be discussed in the following section.

5.3.1.1 Identification of the relevant actors

The change in strategic direction meant that new and established markets would be entered and would require the necessary expertise and investment. QUNU's requirement from its South African operations was to implement and deploy the mobile payment service and allow current and prospective subscribers access to the service via their mobile devices on its mobile network. The mobile payment service consisted of both telecommunication elements and non-telecommunication elements. This posed a concern for QUNU, since most of its operations were aimed at mobile telecommunications-related products and services. QUNU required the skills and expertise that was lacking at that point, in the non-telecommunications environment that impacted mobile payment systems, such as banking, regulatory and the payments systems environments. QUNU also realized that although it was leasing the mobile payment platform from its parent company, this platform had to be customized or configured to suit the market it was to be operated in, a market which consisted of both formal and informal systems.

During the data analysis process, a number of actors were identified in the organisational environment. The actors that were identified as prominent in establishing the mobile payment

network during the data collection and analysis phase of the organisational case, will be discussed in greater detail throughout the translation process, as to what role they played in the establishment of the actor-network. These actors are the following:

- The parent company (**Org_Act01**)
- The CEO (**Org_Act02**)
- Leadership ideologies (**Org_Act03**)
- Organisational management (**Org_Act04**)
- QUNU business units (e.g., Finance, Fraud and Risk, Marketing etc.) (**Org_Act05**)
- Call Centre/Customer Care (**Org_Act06**)
- Regional Field Workers (**Org_Act07**)
- Network Engineering departments (**Org_Act08**)
- Business Analysts from the different divisions within QUNU (**Org_Act09**)
- Project managers from the different divisions within QUNU (**Org_Act010**)
- External consultants (**Org_Act011**)
- Development and Support team (both external and internal) (**Org_Act012**)
- Payment devices (**Org_Act013**)
- Mobile handsets (**Org_Act014**)
- SIM cards (**Org_Act015**)
- Mobile payment system (**Org_Act016**)
- SMS (**Org_Act017**)
- USSD (**Org_Act018**)

5.3.1.2 Defining the Obligatory Passage Point (OPP) for the organisation

The OPP for the focal actor was to encourage the South African operations to adapt to the new types of non-telecommunications related products and services incorporated in its new strategy, and to implement and deploy these products and services on the mobile network. As indicated by the CEO:

“QUNU had to recruit industry experts and external consultants to gain insight into the operating environment of the new products and services, such as the mobile payment service and to encourage adoption and active usage of the product or service” (respondent OE_EM1).

Employees and stakeholders could choose not to participate in the new strategy, or they could renegotiate their roles with the focal actor. Doing the latter would be a favourable position for QUNU to be in since the eagerness of employees to adapt to the new types of products and services would expedite the introduction and deployment of the mobile payment service. This would create a situation where interests would be perfectly aligned for the focal actor and other actors which could result in a quicker pace of adjusting to the new operating environment. However, if the stakeholders and employees decided to rebel against the introduction and deployment of the mobile payment service, then this might result in the focal actor needing to explore alternative options to align interests, so that passing through the OPP could be accomplished without complications.

5.3.1.3 A summary of problematisation

Aligning interest was not a straightforward process for the focal actor since challenges were particularly prevalent in the areas where the focal actor could have misinterpreted the possible role that some actors would need to play in the network. Thus, the main objectives of the problematisation, which are the identification of actors and alignment of interests to those of the focal actor so that it can render itself indispensable, by establishing or defining the obligatory passage point (OPP), may be erroneous especially in the case of identifying actors in non-mobile related products and services which were new to the QUNU environment. During the implementation period of the mobile payment service which started in between 2008 and 2009, the same period that QUNU had an ownership and strategic direction change, communication challenges were prevalent between local and foreign project teams collaborating on the project (respondent OE_PM4). The mobile payment service was a licensed product from the parent company, and this meant that numerous other licenses existed for the same system, adding to the complexity of the deployment, since a standard version needed additional development and configuration to suit the legal and regulatory requirements specific to each country. Dealing with an international development and support team, in South Africa, posed a different set of location and time zone challenges for all teams involved with the mobile payment system. This resulted in a vaguely defined problematisation process that led to numerous actors choosing to abort their participation in the implementation of the mobile payment service. Alignment of interest, via the OPP, was a challenge to establish and resulted in an extended problematisation process. This meant that the focal actor was re-defining interest outside of the initial problematisation phase, which eventually resulted in the actors being displaced, due to the organisational restructuring, or

aborting the mobile project environment. Not all the identified actors were keen to participate or to allow the focal actor to define their roles and some opted not to participate in the actor-network, e.g., some of the QUNU team members left the project to pursue other interest while the project was in progress (respondent OE_PM2).

5.3.2 Interessement

Interessement follows the problematisation phase. During this phase, the identified actors are exposed to the interessement strategies that may or may not result in them taking up the offer that the focal actor has presented to them. The identified actors must decide if they want to accept the identity and role that has been imposed on them/it by the focal actor. The heterogeneity of the actors participating in the ANT environment does not allow for the same interessement strategies since actors have different interests, e.g., non-human actors may respond differently from human actors to an interessement strategy aimed at human actors.

5.3.2.1 Different strategies for interessement

Before the change in ownership in 2008 most of QUNU's decision making resided with the then CEO, since the local and foreign owners both owned 50% of the QUNU group (QUNU: Executive Billing). If the board of directors could not agree on a decision, it was up to the CEO to make the major decisions. The executive stated that the "CEO had an almost free reign in decision making" if agreements could not be reached. After the change in ownership, the foreign investor gained the majority shareholding, and the decision-making process was simplified with the parent company and the board of directors of QUNU making the major strategic decision, including the portfolio of products that should be released in the developed and developing countries (respondent OE_MM2). After receiving the mandate from the parent company to introduce a mobile payment service in the South African environment, the next step for QUNU was to implement and deploy the mobile payment system. This required enrolling several actors, internal and external, to QUNU.

As stated earlier, QUNU has a range of different products and services that are incorporated in either Core services, Managing Services, Media Services, or Individual Value services portfolios. Depending on the nature of the product, since products can be aimed at a postpaid or prepaid or

hybrid subscriber markets, many different departments and divisions got involved. These business units included the commercial, engineering, billing, regulatory divisions etc.

The next section will discuss how each of these business units contributed to the implementation and deployment process of the mobile payment service, as stated by respondents OE_EM1, OE_EM2, OE_MM1, OE_MM2, OE_MM3, OE_MM4, OE_MM5, OE_MM6.

- **Business Units**

QUNU utilised its current operating environment to implement and deploy the mobile payment service. The operating environment was remotely dispersed in the different provinces of South Africa. Once a series of high-level meetings had been concluded with the executive team, and the decision had been made to implement the specific product or service, then the next step was to determine the impact on the business units and make provision for the necessary resources to implement the product or service. The project was initiated, and a project management methodology was followed. All the relevant business units participated in the project, depending on the product or service. The project teams consisted of business analysts, project managers, portfolio managers, testing teams, managers and executives within QUNU and external business partners. Projects often competed for resources from different business units. Since business units were governed by policy and strategic objectives when it comes to playing their part in achieving objectives, it was a seamless task for QUNU to involve and interest the relevant business units. The business units required for the mobile payment service were (OE_PM1):

- **Product Development**

The Products and Services department is responsible for liaising with internal and external stakeholders on new or enhanced products and services that will be introduced to the network. They are responsible for providing the other business units with the specifications and business expectation of the products and services and the feasibility of implementing them. They are the QUNU business owners of the product or service.

- **Billing and Rating division**

Since the mobile payment system was a stand-alone system within QUNU, no billing or rating related data were passed on to any of the QUNU's existing billing systems. Billing and rating division needed to ensure that no cost was incurred for using the IVR, USSD or SMSs for

mobile payment-related enquiries and transactions.

- **Finance division**

The mobile payment service was created as a separate standalone entity within QUNU (respondent OE_PM2), this meant that it would be treated as a separate business venture and required a different set of processes than those that are currently in place for QUNU's core business. As part of the financial services portfolio, a different financial Institution identifier/code was required to identify the channel in which the airtime sales and recharges occurred, for financial reporting to adhere to the South African regulatory environment. Policies and procedures were established in QUNU to manage the financial reporting and integrity of the data between QUNU and its parent company. The finance division had to make special provisions, because records emanating from the transactions recorded in the mobile payment system's environment, by law, must be stored for a certain number of years, in this case, five years. The finance division would be responsible for the revenue model between QUNU and its parent company. The financial team would perform manual reconciliations on the mobile payment transaction accounts since the mobile payment system is a stand-alone system and does not allow for automated reconciliation.

- **Engineering**

The Mobile payment service added to the USSD and SMS messages traffic on the mobile network, which in turn impacted the capacity levels that would be required to handle the additional traffic. The engineering division was responsible for upgrading and managing possible capacity deficiencies that resulted from the extra traffic. They were also responsible for maintaining the interface USSD, SMSC and the mobile payment system to ensure that mobile payment customers were not exposed to frequent system failures or downtime. The engineering division was also responsible for ensuring that the types of SIM cards that were required for the payment devices and mobile phones would have access to the mobile payment service on the QUNU network.

- **Marketing**

The marketing division was responsible for promoting, advertising and branding the product or service. The mobile payment service, which deviated from QUNU's existing traditional product and service offering, required a different marketing approach to reach its intended target market.

This was achieved through print media, radio and television adverts.

- **Sales and distribution**

Distribution was deemed critical for the success of the mobile payment service. In each region, QUNU had a dedicated team of employees that were actively promoting the service and growing the distribution network. These employees included regional managers and field workers in the mobile payments' environment. QUNU also made use of aggregators and outlets; these will be discussed in more detail in the Consumer and the Business environment case.

- **Customer Relationship Management**

During the growth period of the mobile payment network, QUNU introduced a series of promotional activities that were aimed at building customer loyalty for using the mobile payment service. These include getting loyalty points whenever deposits were made. These initiatives were managed by the customer relationship teams within QUNU.

- **Customer Service**

Service and product queries related to the mobile payment service were dealt with by the Customer Service unit. They provided feedback and support to customers who experience concerns while using the product, or who requested information about the service.

- **Legal and Regulatory environment**

At the time the mobile payment system was implemented, QUNU was in the process of familiarising itself with the regulations of the financial and banking service sector pertaining to payment systems, and appointed a consultant to help them comply with the requirements stipulated by the South African Reserve Bank (SARB) (respondent OE_BA7). This helped QUNU to implement the necessary regulatory requirements for the mobile payment service such, as the FICA (The Financial Intelligence Centre Act, 38 of 2001 in South Africa) and establish a partnership to access a National Payments Licence that was required to operate a payment system in South Africa. QUNU liaised with the South African Reserve, Competition Commission and the payments systems environment to enable it to establish processes internally to adhere to the relevant legal requirements necessary to operate the mobile payments service. This included making provision to manage fraudulent activities, like money laundering, in the

mobile payments' environment. QUNU needed to comply with the relevant regulatory requirements so that the legal institutions would allow it to operate a payments system, and thus these institutions were included as stakeholders in the mobile payment network.

- **Fraud and Risk**

Concerns regarding fraud and risk that stem from the mobile payment environment are dealt with by the Fraud and Risk department within QUNU. Since QUNU incorporated deposit-taking activities in the mobile payments' environment, it is partly governed by section 1 of the Banks Act of 1990 and FIAS (Financial Advisory and Intermediary Services Act).

- **The development and support teams**

The development team consisted of external consultants and internal employees. Each impacted business unit division was responsible for assigning resources to the implementation of the mobile payment system. These resources included human as well as non-human resources, such as technical equipment. The human resources included business analysts, portfolio and project managers, testing teams and managerial employees of QUNU. The team also included external human resources such as vendor appointed human resources and those of the parent company. The responsibility of these teams was to fulfil their respective tasks, each of which would form part of the broader objective of implementing the mobile payment system.

5.3.2.2 Pre -Negotiations with QUNU's staff

During August 2010 (the) QUNU's CEO communicated information regarding the intended introduction of the mobile payment service into QUNU environments. The CEO expressed his excitement about the service and explained the prospective benefits to the employees via the formal communication channel within QUNU. The CEO also encouraged the employees to adopt the service. The process of registering interested staff members will be discussed in the Consumer Environment Case.

5.3.2.3 Intention to negotiate with predefined business partners

The communication from the CEO (respondent EO01) to the staff also highlighted prospective business partners, whose products and services might be integrated with the mobile payment service. The CEO emphasised that these negotiations were soon to commence with the relevant business partners. This aspect will be discussed in the Business environment case.

5.3.2.4 Negotiating with the foreign partner

QUNU leased the mobile payment system from its parent company (QUNU: Financial services Manager). The system itself did not reside in South Africa but a foreign country (respondent OE_MM4). This meant that the mobile payment systems were a standalone system that interfaced with QUNU and its partner's systems. The foreign partner, who is a sister company of QUNU, was responsible for the configuration of the system according to QUNU's specifications. During the development phase, the foreign partner sent some of its consultants to South Africa to assist with the deployment in the South African environment. These consultants assisted with the development and integration of the mobile payment systems in QUNU's South African environment. The foreign partner was also responsible for maintenance, support and further development of the mobile payment system. QUNU's development team liaised with the foreign partner on issues pertaining to the mobile payment systems on a weekly (and at times daily) basis during the implementation and deployment phase (respondent OE_BA1).

In 2012 QUNU replaced the parent-owned mobile payment system with one that they had developed themselves. They upgraded the parent-owned system with a newly developed in-house system to closely serve their needs and allow for seamless integration with the rest of their South African-based systems. The parent company approved the upgrade on (the) condition that it would retain the same commercial name and some of the original agreements.

5.3.2.5 Negotiating and integrating the Banking Partner Systems

As part of a regulatory and legal requirement for implementing a mobile payment system in the South African environment, QUNU required a National Payments License (QUNU: Financial services Manager). QUNU needed to partner with a commercial bank to obtain a banking

license. An agreement was reached with a commercial bank before launch in September 2010. The commercial bank became an active partner in the mobile payment service, by allowing subscribers access to the bank's automated teller machine network to withdraw money. This partnership required systems integration with the bank and financial reporting requirements between QUNU and the bank (respondent OE_PM1, OE_PM2 & OE_BA2). The 2012 upgrade meant that the banking partner's integration needs were addressed in the newly developed in-house system.

5.3.2.6 Hardware and software

All mobile payment transactions required a physical SIM card in a mobile device for their successful completion. The mobile payment environment included mobile devices that allowed for the electronic registration of subscribers to use the mobile payment service and to perform transactions. These devices were located in the banks, aggregators and outlets. QUNU was responsible for sourcing these devices for all outlets and for ensuring that the devices were connected to the mobile payment systems. The mobile devices required a different SIM card from the standard issue one for prepaid or postpaid subscribers. This SIM had more storage capacity than the average issued SIMs. This was required to store software to interface with the mobile payment systems and mobile network elements. Before the change of ownership, QUNU had a division dedicated to producing its own SIM cards, but after the change in ownership QUNU no longer produced its own smart cards or SIMs. This function was outsourced to an international company. This meant that QUNU did not have the flexibility of immediate feedback on how the newly requested SIM would perform on its mobile network. The production and testing of the SIMs added to the delivery time of the system (respondents OE_PM3 & OE_BA4).

5.3.2.7 The Regulatory environment

QUNU entered a market which was unrelated to its current environment. QUNU's decision to join the mobile payments environment required them to adhere to legal and regulatory requirements. QUNU hired industry experts, with an understanding of regulatory issues, to fill the knowledge gap (respondent OE_BA5). These experts advised QUNU on how to incorporate its current environment with that of the banking sector. This was partially achieved by partnering with a commercial venture, as mentioned by the QUNU Financial services business analyst (OE_BA5) and incorporated into processes and systems that interact with the mobile payment

environment. QUNU updated their systems and policies to include the new regulatory requirement (respondents OE_EM2, OE_PM1 & OE_MM1).

5.3.2.8 Opportunistic/ Unintended Negotiations

During the data collection period in the business/consumer environments, it became evident that the interessement process was an evolving one. QUNU discovered that some outlets perform multiple transactions daily, depositing small amounts of money into their mobile payments' accounts. As observed, this resulted in QUNU intervening and adjusting the deposit process with specific outlets. Some of these outlets were not convinced that QUNU's adjustments were a fair reflection of each outlet's mobile payment operations. The QUNU Regional Manager intervened and negotiated with QUNU to establish a new process for both the outlet and QUNU, to counter excessive deposits from the outlet via the mobile payment service. (respondents OE_MM3 & CE_OT1)

5.3.2.9 Interessement strategies have different impacts on actors and the level of success varies.

QUNU have various internal policies in place that govern its internal and external processes and procedures. To get the business and divisions involved was a seamless process. As mentioned by the Project manager, "it was business as usual". Although the focus was to have an operational mobile payment system, QUNU did experience some interessement challenges from business units. The biggest challenge was the lack of skill that is available in the mobile payment environment. The challenge for QUNU was to get the business units and divisions interested by employing the relevant skills to assist them. The foreign partner also played a role in this venture by transferring knowledge to QUNU staff. This was achieved through a series of training sessions with some technical teams, e.g., the engineering team responsible for USSD. The knowledge transfer only targeted certain groups in the project team and thus created a situation where different groups had multiple interpretations of what was expected from their respective areas. The project leader stated that:

" Training was only arranged with the technical teams. This was a concern for us because we were not all on the same page on what the solution entails" (OE_PM3).

and this interviewee further added that

"We get a requirement from the payment team, and in the end, we ended up drafting their requirements to clarify it. This takes time and is a daunting task doing their work" (OE_PM3).

What was also evident was that during the development of the mobile payment system multiple delays occurred, which included the freezing of development and maintenance cycles on the mobile payment system that impacted the development on QUNU's billing system (respondent PO022). The 2012 replacement of the mobile payment system with an in-house system added to the delays but significantly improved operations internal and external to QUNU. QUNU's billing division did not incorporate all of its systems in the overall design of the mobile payment system.

These delays also had a ripple effect on the rest of the project teams. The project manager claims that either the foreign partner did not communicate properly, or certain facts were withheld from the rest of the project team and caused frustration amongst project members (respondent PO02). The regional managers and field workers also argued that feedback from customers did not reach the relevant stakeholder within QUNU, which might have helped to improve the system. What was also concerning was the difference in time zones. The work environment was impacted by the time zone difference (respondents OE_EM1, OE_MM1, OE_MM3, OE_FW1, OE_FW2, OE_FW3, OE_FW4).

" The foreign Partner expected us to be available at certain times which were outside our normal working hours" (respondents OE_BA1, OE_BA2 & OE_PM1).

This caused confusion since neither the foreign team nor QUNU had a procedure in place for meetings and discussions to occur.

The intersement process was hindered by a lack of skills, communication, appreciation of time zone differences and a comprehensive understanding of responsibility areas. Most of these lacks were eventually resolved. Although multiple interpretations of the functionality and responsibilities areas continued throughout the implementation phase, QUNU managed to deploy an operational mobile payment system despite it being in an organisational transitional phase.

At the Mobile Banking conference in Southern Africa in 2013, the Consultant that was contracted by QUNU to manage the mobile payment implementation elaborated on the complexity of implementing a mobile payment system in environments that have dual economic systems (BE_EM1).

5.3.2.10 Summary of Interessement

The interessement strategies for QUNU were very successful internal to the organisation. This can be attributed to the level of control that QUNU could exercise internally. QUNU was able to attract interest from the foreign partner, the bank and the hardware providers. Although challenges arose with the external partners, QUNU managed to integrate the mobile payment systems with its systems as well as the partners' systems.

5.3.3 Enrolment

QUNU's internal operations were governed by policies and procedures that contributed to the success of enrolling the internal actors. Most of the business units played their part in the deployment process with few or no issues arising. This situation can be partially attributed to QUNU's coherent organisational structure. Enrollment was constantly evolving in the QUNU environment, and like interessement it was an ongoing process. Although QUNU did have some success with external systems integration into the mobile payment environment, challenges did arise. These challenges included:

- Conjuring integration points during the system upgrade period. A project manager (QUNU: integration environment) stated: "We tried to negotiate a time frame with 'the foreign partner' to complete the configuration, but they were unwilling to comply with the time frame due to them upgrading their systems during that period".
- Scheduling meetings to discuss important project delivery dates was also a challenge since the foreign partner-operated on a different time zone from QUNU who was based on the African continent (OE_PM2). This contributed to delays in important delivery decisions.
- Although QUNU's business units received training from the foreign partner on the mobile payment system, not all the relevant business units were included, and this caused confusion amongst QUNU's mobile payment project team members on what was expected in different environments. Business Analyst (respondent OE_BA6, USSD environment) stated, "We received training from the foreign partner on the mobile payment system" whereas a project leader in the QUNU integration environment argued that it was difficult to provide feedback or explain to the foreign partner how the QUNU systems were integrated since they did not understand the environment.

5.3.3.1 Inscription

Inscription, as mentioned previously, occurs when enrolment takes place. When agreements between actors are successful during enrolment, it allows the actor-network to stabilise. When actors agree to a role, they commit to stabilising and growing the actor-network. These commitments are recorded in the shared memory of the social systems through inscriptions (Sarker et al., 2006). Mpazanje et al. (2013) state that inscription is informed by various aspects which include, "Identification of explicit anticipations or scenarios or objectives from which inscriptions start, depends on how these anticipations are inscribed to interest actors, the focal actors undertaking the inscriptions and the strength of the inscriptions and their capability to form irreversible networks."

The next section will analyse and discuss how the inscriptions, which were identified during the analysis of the mobile network operator case, impacted on the identified objectives for the mobile operator. The focal actors' role in engaging these inscriptions and moulding them to interest other actors is also scrutinised and documented in this section. Each inscription contributed differently to the translation process, some being more influential than others in achieving the objectives.

During the analysis of the organisational case study, the following inscriptions were identified:

- **Mobile Payment System (Org_Ins01)**

The registration process requires a series of steps that can be seen as an inscription process since the interests of the various actors are addressed. Since the registration process needs to occur first before a subscriber can use the mobile payment service, it can be regarded as a very strong inscription. During this process, multiple agreements are established amongst actors that together help achieve the objective, as stated in the problematisation phase.

- **Parent Company's strategic mandate (Org_Ins02)**

Since the change of shareholder interest, the parent company of QUNU played a more prominent role in deciding in which direction to steer the organisation. Strategic objectives established by the parent company formed the mandate for QUNU's focused areas.

- **The Product and service concept document (Org_Ins03)**

The product and concept document provides a full description of a product or service concept that is to be considered for introduction to the market. It provides an overview of the product and service and gives a broad overview of the impacted parties.

- **QUNU's Policies and Procedures (Org_Ins04)**

QUNU adjusted its policies and procedure to align organisation with its strategic objectives. The adjusted policies and procedures impacted on QUNU's daily operations to ensure that objectives were aligned with the strategic ones. The policies and procedures were strong inscriptions, since they governed what can be achieved by the organisation.

- **USSD (Org_Ins05)**

USSD allows the customer to transact in the mobile payment environment. The development teams have to ensure that the customer accesses the correct menu structure for the mobile payment transactions. They develop and integrate the USSD environment with the relevant systems to ensure that the correct information is displayed and that the correct transactions were performed. The USSD menu structure is a strong inscription in the organisational environment and is regarded as the engine room of the mobile payment system. Without the USSD, no transactions can be performed by the customer.

- **SMS (Org_Ins06)**

SMS (short message service) is a text message that is received when transactions are conducted via the mobile payment service. If a payment is made or received, or if the subscriber interacts with the mobile payment system, the system sends an SMS to notify the respective parties that the transaction has occurred. The organisation must ensure that all the integrated systems are synchronised to allow for the seamless transfer of the SMS from the organisational systems to the customer's mobile device. The SMS (will) acts as a record for the organisation that the customer did receive the text message if and when queries do arise. Thus, the SMS is a very strong inscription for the support staff when queries need to be resolved.

- **SIM Card and mobile services (Org_Ins07)**

The SIM card or Smart card contains important information about the type of services that the subscriber subscribed to on the mobile network. This information is embedded in the mobile device. The SIM is embedded with a number that uniquely identifies a subscriber and allows the subscriber to perform certain transactions on the mobile network, which include making mobile payment transactions. Part of the engineering team's responsibility is to ensure that the mobile device can communicate the inscribed serviced on the mobile network. If no Sim card or services are available, then the customer cannot perform certain transactions on the mobile network.

- **Rewards Systems for employees (Org_Ins08)**

The rewards that are inscribed in the registration process contribute strongly to the adoption of the mobile payment service. Once the registration process is complete, and subscribers receive the rewards they are entitled to redeem. The redemption of the rewards in most cases, allows them immediate access to the mobile payment service, thus encouraging usage and in turn strengthening the inscription.

5.3.4 Mobilisation

Mobilisation occurs when representatives and spokespersons that were introduced to speak on behalf of the other actors promote the network to prevent failure (betrayal) and disintegration of the network. Challenges that were experienced during the translation process resulted from QUNU's inability to appoint an appropriate representative/spokesperson to promote the network. These include representatives/spokespersons that had multiple roles and at times were not sure which role to favour or were unable to find a balance between their various roles. This was evident during the deployment phase, where business analysts had to substitute for project managers, and vice versa. As a result, each role became contaminated with multiple smaller unrelated tasks that caused the representative/spokesperson to deviate from what was expected from them (Org_Fail01). The business analyst representing the financial services division stated that they negotiated the role that the retailer would play in the network (respondent OE_BA7). Had these negotiations been conducted by the business owners of the product or service, there could have been a better understanding of the broader business objectives, and this could have led to a proper definition of the role the retailer was expected to play.

During the data collection period, it also became evident that the mobile payment systems did not enjoy the same success in the different areas that were impacted as those of QUNU's other existing product portfolios at the time. This can be attributed to insights and skills that were lacking at the time in QUNU, and they could have been attributed to a lack of resources in or knowledge of, the particular environment, in this case, the mobile payment environment, which in turn influenced the type of representative/spokesperson that was chosen (Org_Fail02). The lack of success was also attributed to the selective training that the foreign partner administered to QUNU's representatives on the project (Org_Fail03). The business analyst that represented the USSD team stated that they received training from the foreign partner before starting the development (respondent OE_BA3), whereas the situation for the business analyst representing the product integration team was quite different. He stated that the only training they received was in relation to the concept documents (respondent OE_BA2). The representatives/spokespersons were not treated equally during the mobilisation phase. This impacted the interest of the other actors negatively (Org_Fail04). Many representatives/spokespersons have aborted the project for various reasons, leaving the network with very few knowledgeable representatives/spokespersons.

5.3.4.1 Irreversibility

Although the mobile payment systems were deployed successfully on the mobile network, there was no guarantee that the system would remain a black box and be irreversible. The mobile payment system had to compete for resources, and at the time of its launch, it also became evident that the priority had shifted to achieve other more important objectives of QUNU. It was a case of efficiency and effectiveness in producing revenue streams for QUNU. If a new service appeared on the scene that is more effective and efficient, it could potentially replace the QUNU mobile payment system. The mobile payment system was decommissioned in 2016 by QUNU. The parent company's mandate to implement the mobile payment system in hybrid economic conditions presented a challenge for Qunu who operate in a market with a well-established banking sector. Proposed. This meant that existing payment and banking solutions exist and that the customers have alternatives that may prevent the establishment of inscriptions on a longer term. Although the mobile payment environment was not new to Qunu, since they invented the prepaid mobile service purchases, the agreements made by the focal actor and the enrolled actors did not last and Qunu could not establish irreversibility due to the alternatives that exist in the market. In April 2020 it was announced that QUNU and a sister company

acquired the rights to the mobile payment system from the parent company (Shapshak, 2020). Although QUNU's South African mobile payment venture ended in a decommissioned system they saw an opportunity to access other mobile payment IS ecosystem in other African countries to extend their African commercial footprint.

5.3.5 Summary of the translation process

From the evidence reviewed in section 5.3, it can be agreed that, although the objective of implementing and deploying a mobile payment system was met, at an organisational level, there were challenges that were experienced during the translation process. The problematisation process demonstrated the importance of properly defining the problem. One of the immediate concerns to address during the translation process was the lack of input into the problematisation phase from key stakeholders. If problematisation takes place in an environment where information about the situation (lacks) is lacking, then there could be a ripple effect on the outcome of the other processes. This was evident during the implementation and deployment of the mobile payment service, which was met during a transition period in QUNU's history. The change of ownership and the policies and procedures that were fast-tracked during the period impacted on the initial objective for introducing the mobile payment service. This situation was exacerbated by the fact that during the period from initialisation to deployment, the mobile payment project had encountered three different leadership ideologies in QUNU, and this led to redefining the problematisation process several times. This hampered negotiations with the relevant actors. Not all the identified actors were willing to abide by the conditions that the focal actor presented to them, thus rendering it challenging to enter the obligatory passage point. As a result, improper Interestment strategies followed that did not serve the focal actor well. Identified actors entered negotiations and decided at very crucial points to surrender their participation in the network. This was evident with many of the QUNU representatives that aborted the project or requested to move to other environments. It was evident that the lack of expertise in QUNU pertaining to how the mobile payment market operates, impacted the evolving network, hence the reason for QUNU to focus on enrolling actors with the relevant skill and knowledge about the environment.

Enrollment was mostly dependent on QUNU's ability to persuade the relevant actors to join the network. QUNU employed different strategies to render enrolment successful which included training of relevant stakeholders, rewards systems and acquiring knowledge and skills where they

were lacking, however, just like the previous translation phases, enrolment has to be an ongoing process and fast-tracking the process can result in deterring the growth of the network.

QUNU required competent representatives/spokespersons to negotiate and convince other actors to enrol into the mobile payment environment. What was also evident was the lack of initiators to accurately define the representatives/spokespersons roles and how they should negotiate, enrol and integrate other actors into the network.

Although irreversibility was partially achieved, it could not be rendered as successful since all the objectives for QUNU were not met. The mobile payment system, for example, was hosted remotely and not in QUNU's immediate environment as initially planned. After almost three years of operation, QUNU had decided to review the conditions and environment in which the current mobile payment systems were operating and introduced some changes that allowed it more control on how the translation process could be managed by replacing the foreign mobile payment systems with its own in-house mobile payment system. This did not resolve the concerns that plagued QUNU. Hence QUNU decided to decommission/terminate the mobile payment service in 2016.

5.4 Organisational environment Structuration process

Following the findings of the ANT analysis of the organisational environment, in this section, the ST lens is applied to facilitate understanding of how the failure or success factors, that were highlighted through the translation process, impact the organisational social structures. The section seeks to understand the design and emerging consequences arising from the introduction of the mobile payment system in the organisational setting.

The following section discusses the ST analysis as it emerged during the formation of the actor-network. As indicated in section 4.3, *“the central concern of structuration theory is the relationship between individuals and society”*. The previous section focused on how the mobile payment network evolved through the ANT lens and how success or failure/betrayal occurred. This section focuses on answering question QR2 by elaborating how context, through the structuration process, is influencing or is being influenced by the evolving mobile payment ecosystems. ST should ultimately shed light on how social context is re-produced or shaped by the process in question

(Pool and Desacntis, 2004). The interplay between the micro, meso and macro environment can broaden our understanding of how structuration influences a multi-layered context itself.

5.4.1 Structuration entailing Signification Internal and External Communication

Multiple structuration processes have been identified that entail signification structures from the ANT analysis of the organisational environment. Structures of signification, as indicated in section 4.3.1.2, produce meaning through organized webs of language. QUNU uses its annual report (2009) to communicate various future strategic directions that it may employ to achieve its objectives. In the problematisation phase (section 5.3.1) it was noted that the QUNU received a mandate from its parent company, as stated in the annual report (Org_Sig01), that the organisation will diversify and become a total communications service provider focusing on parallel telecommunication products and services. QUNU was mandated to introduce a mobile payment service into the South African environment. This mandate (Org_Sig02), although a direct instruction from the parent company that is further discussed in the structure of domination, is also regarded as a structure of signification since it was formally communicated to QUNU's staff via numerous interpretive schemes. During August 2010 the CEO formally communicated the intended introduction of mobile payment service in the South African telecommunications environment via the internal email (Org_Sig03), to QUNU's staff, and this was followed by a series of radio and television commercials (Org_Sig04), to inform individual members of the public. Employees and stakeholders were informed through staff roadshows (Org_Sig05), bulletins (Org_Sig06) and internal communication about the strategic change and had the option to choose whether or not they wanted to participate in the new strategy of exploring new markets, thus allowing them to revisit existing interpretive schemes to make a decision. These commercials, roadshows, bulletin boards and internal communications constitute the structure of signification.

It is evident from the organisational case 5.3 that internal communication structures like email and meetings were prevalent in communicating how the mobile payment network should evolve. The CEO, (as stipulated in the above,) communicated and informed the QUNU staff of the importance and prospect of the mobile payment system. The update of existing, and the introduction of, new methods and ways (Org_Sig07) were going to be required to accommodate

the mobile payment system in the QUNU environment, in order to allow QUNU to transition into non-telecommunication related products and services, as part of the change of strategic direction. The environmental impact utilised updated interpretive schemes and the introduction of new semantic codes pertaining to mobile payments, thus equating to a signification structure.

One of the requirements for QUNU was to partner with a foreign partner. The foreign partner provided a business resource that was required to implement the mobile payment system. A project was initiated that consist of both human and non-human resources to deliver the mobile payment systems to its subscribers as a working system. Multiple resources were required, which included human, time, money, hardware and software. Each phase in the project required multiple levels of communication and resources to plan the requirements necessary for the execution of an agreed-upon business requirement plan. The liaison with the business partners occurred mostly in the interesement and enrolment phase in the organisational case and resulted in a constant loop of producing and reproducing signification structures in the form of business documentation (Org_Sig08) such as functional specifications, business requirement specifications, project plans, budgets and group meetings (Org_Sig09). Since QUNU received a standard blueprint for the mobile payment system from its parent company, it needed to customise it to suit the South African legal and regulatory environment. QUNU had to re-produce a signification structure to suit its market.

The CEO's communication also highlighted prospective business partners whose products and services might be integrated with the mobile payment service. This communication on the prospective business partners (Org_Sig10) constitutes a structure of signification since it indicates the different types of possible consumer services that could be associated with the mobile payment system. At the time the CEO emphasised that these negotiations were soon to commence with the relevant business partners. This will be discussed in the Business environment case.

Scheduling meetings to discuss important project delivery dates was also a challenge, since the foreign partner and QUNU operated in different time zones, QUNU was based on the African continent and the foreign partner in Europe (OE_PM1). The time difference was problematic

since it contributed to delays in important delivery decisions. Time is regarded as a business resource, as indicated above, and both QUNU and the foreign partner had a predetermined working schedule that they operate in. These working schedules (Org_Sig11) form part of the signification structure since it can be argued that human agents can use time, like language and text, to determine the appropriateness of when communication should occur. It also constitutes the structure of legitimation.

The organisational case also highlighted several mobile technologies (Org_Sig012), as technical resources that form part of the mobile payment systems. These technical resources form part of the daily language and jargon used to describe the status of the mobile payment implementation and its requirements, e.g., USSD, SMS. These technologies describe the size and impact that the mobile payment has on the organisational environment. They indicate the magnitude of what can be expected, thus contributing to the structure of signification. Multiple departments within QUNU played different roles in the development of the mobile payment network. Each one contributed a different skill set indicative of that department's contribution to the evolution of the mobile payment network. These skills can be regarded as signification structures since they describe the individual departmental contribution. These can also be a domination or legitimation structure.

5.4.1.1 Summary of signification structures in the organisational environment

Formal and informal communication documents such as emails, media reports and the QUNU 2009 annual report are structures that allowed stakeholders to set out what the organisational intention was when introducing the mobile payment systems. Since this information was communicated both formally and informally, it allowed stakeholders to decide what meaning they wanted to derive from it. These communications could be static or interactive and ranged from articles in newspapers, leaflets or websites to the mobile payment advertisements on radio and television.

The CEO's interaction with QUNU's employees at the roadshows and email communications allowed stakeholders to generate an idea of what the intentions were behind the introduction of the mobile payment system. It created a vision of what the organisation intended to achieve

through the utilisation of the possible business resources at its disposal, which included both human and non-human resources. The human resources contribute to agency and use, and the non-human resources contribute to produce and reproduce structures such as project plans requirements specifications.

Time is an important aspect of human communication. It allows social groups to communicate and share relevant information at pre-defined times. Time, like text and language, indicates what the status is of the situation, e.g., a certain phase of the project will commence at a specific time, and this is what is required. Since QUNU operates in the telecommunication industry, the use of technology such as SMS or USSD produces meaning to the rest of the project stakeholders of what the project entails. All the above scenarios contributed to the structure of signification within the organisational environment.

The next section will elaborate on the structure of Legitimation in the organisational environment.

5.4.2 Structuration entailing Legitimation Organisational actions and Interactions (behaviour)

This section discusses how the creation of the actor-network impacts on the structure of legitimation in the organisational case. In Legitimation structures, human agents are sanctioned by the environment on how to act and interact. This structure, as stated previously in chapter 4, may include concepts such as culture, social influence, values, principles, morals and moral codes, ethics, beliefs, traditions and customs.

Getting the business and divisions involved was regarded as a seamless process, since QUNU operated in a project-based environment to introduce its products and services. This environment allowed QUNU to include the mobile payment systems as an addition to its products and services road map for a particular period. This method ensured that all the stakeholders, responsible for product delivery, would abide by or closely follow QUNU's standard operating procedures for introducing products to its market (responded OE_PM4).

However, QUNU's standard operating procedures (Org_Lit01) did not make provision for products that are foreign to its markets, like the mobile payment service. The mobile payment environment exposed QUNU to new methods, procedures and ways (Org_Lit01) that were characteristic of a banking/financial services environment.) Thus, QUNU had to review current structures of Legitimation or produce new structures that would allow for proper procedures to sanction the implementation of the system. This scenario was evident when (section 5.3.2.4) the foreign partner played a role in the transference of knowledge about the mobile payment environment to QUNU's internal stakeholders. In section 5.3.4, it was noted that the knowledge transfer only targeted certain groups in the project team and created a scenario where different groups had multiple interpretations of what was expected from their respective areas.

Since QUNU had a broad and deep understanding of the mobile telecommunications market, due to its 20-year association with the industry, the challenge QUNU faced was to transfer their market insight to the foreign partner to allow them to envisage how the implementation of the mobile payment systems would suit the South African market. QUNU's attempt to sanction the foreign partner on how to act and interact (Org_Lit02) in the South African environment was not a suitable approach for the foreign partner since the mobile payment environment they were familiar with, which was a licensed product that QUNU leased from its parent company, required significant adjustments to comply with QUNU's recommendations (respondent BE_EM2).

As stated in section 5.3.2.9, time zone differences impacted the office hours of QUNU's South African operations since they differed from those of the foreign partner. Effectively it meant that the standard working hour schedule (Org_Lit03) within QUNU was impacted. The impact on the work schedule resulted in miscommunication, for example, if meetings were arranged for a specific time frame, it might be that the meeting was too early or too late for the impacted party due to the time zone difference.

Although the CEO communicated the change in strategic direction and encouraged the South African operations to adapt to the new types of non-telecommunications related products and services (section 5.3.1) the challenges associated with shifting and adopting the new strategy

remained, since producing new or reproducing legitimation structures occur over time and space, e.g., culture, moral order and values develop over time.

5.4.2.1 Summary

Producing new or redrafting current Legitimation structures impacted the processes and procedures that were standard for QUNU. The mobile payment systems environment exposed QUNU to new methods, procedures and ways that are characteristic of a banking/financial services environment, thus challenging QUNU to review their current structures of Legitimation or produce new structures of Legitimation, to allow for proper procedures to sanction the implementation of the system. Receiving the mandate to implement the mobile payment systems in the South African environment meant that QUNU's traditional operating procedures faced some reforming challenges. Producing new or redrafting current Legitimation structures impacted the moral order, customs and traditional methods of project implementation that QUNU was familiar with for the previous 15 years.

5.4.3 Structuration entailing Domination Organisational environment power relations

This section discusses how the creation of the actor-network impacted on the structure of domination in the organisational case. Domination structures focus on the production and exercise of power to control authoritative or allocative resources. Domination can also include power or authority over people or resources through coercion, control, command, management and dominance.

As indicated in previously in section 5.4.1, during the problematisation phase in the organisational case (section 5.3.1) it was noted that the QUNU received a mandate (Org_Dom01) from its parent company that the organisation will diversify and become a total communications service provider, focusing on parallel telecommunication products and services. Since 2008, when the parent company acquired an additional 15% shareholding (Org_Dom02), it became a primary decision-maker in the way, QUNU was managed and operated.. The parent company mandated QUNU to introduce a mobile payment service into the South African environment. Subsequently the CEO formally communicated the intended introduction of mobile payment service in the South African telecommunications environment, via the internal

email to QUNU's staff, thus sanctioning (Org_Dom03) the organisation to acknowledge the importance of implementing the systems. The CEO, in this regard, was the custodian of driving the parent company's strategic objectives within QUNU and of liaising with the relevant stakeholders on timelines and road maps to key strategic and operational objectives set out by the parent company and the board of directors. During the implementation of the mobile payment system, 2008 to 2015, QUNU went through three leadership (Org_Dom04) changes). Each leadership had its own ideological ideas of how QUNU should achieve its strategic objectives and ranged from autocratic to charismatic. Each leadership style had a different impact on the introduction of the mobile payment system. QUNU became aware of the mobile payment service in 2007 since it was introduced by a sister company. Awareness of the possible introduction of the mobile payment service started during the reign of QUNU's first CEO in early 2008. It was only in 2009, after the appointment of the second CEO, that the planning phase started. During 2012, at the start of the third CEO's reign, QUNU was still experiencing significant concerns with the newly implemented mobile payment service. These concerns were eventually addressed in a follow-up or replacement implementation of the mobile payment systems in 2014.

In addition to adhering to authoritative figures such as the parent company and the CEO, QUNU also had allocative domination concerns. As indicated in section 5.3.1 the new strategic direction and ownership resulted in QUNU introducing a variety of different non-telecoms related products to its emerging economy markets. This led to the prioritisation of resources (Org_Dom05) to important projects, thus creating a competitive environment within QUNU. This led to some divisions or areas in QUNU being impacted by the mobile payment system that were less prepared than the other areas, e.g., training for the mobile payment service was aimed at certain teams only (section 5.3.4). There were also challenges to obtain hardware resources in the test environments to test the system (section 5.3.2.6). Also, project teams had to split their priorities between key projects and that of the mobile payment system. This led to overburdened teams that complained that they had to stand in for other teams that did not understand the logical flow of how the systems should work (respondent OE_PM3).

When QUNU introduced the mobile payment system, it introduced a transaction fee structure for performing certain mobile payment transactions like transferring money. If they did not have

funds available, they could not perform the transaction. The fee structure (Org_Dom06) was a form of allocative resource that was enforced on the customer if they wanted to make use of the mobile payment service. In addition to the fee structure, the customer needed to be a QUNU subscriber to subscribe to the mobile payment service. To have access to the network required a SIM and a mobile device which also constituted an allocative resource that the customer required.

Although the implementation of the mobile payment systems was regarded as a very important objective, some of QUNU's staff experience challenges when dealing with a foreign partner. The time zone differences, implementation timelines and requirements specifications all added to these challenges. The foreign partner played a significant role in allocating both skills and systems related resources. QUNU was not in a position to dictate the role of the foreign partner.

5.4.3.1 Summary of dominative structures in the organisational environment

Although the parent company and the CEO played a crucial role in governing resources, they were not always in a position to dictate what the best course of action was on how to implement the mobile payment systems. This was evident in the dealings with the foreign partner. What emerged was that all other stakeholders had some level of dominative leverage in their environments on how to proceed with the implementation of the mobile payment system. This resulted in many delays since agreements could not be reached in some environments.

The next section will elaborate on the structuration in the business environment.

5.5 Context Analysis Organisational Environment

5.5.1 Activated Ba: Internal and External Communication

Signification structures in the organisational environment allow both the organisation and the business environment to interact, similarly to the Consumer environment. Interaction mainly occurs through the Dialoguing ba, Systemising ba and Exercising ba. In the current case, dialoguing ba contexts occurred when the CEO and various other divisions within the organisation engaged with the employees and business partners through collective and face to face dialogue (Org_Sig_Con01). This allowed the employees and business partners to reinforce

their understanding of what the mobile payments systems were and what role they were going to play. The organisation employed multiple signification structures to support and aid the promotion of mobile payment services. Systemic ba was used to promote multiple signification structures in a virtual environment and included email, radio and online advertisements (Org_Sig_Con02). Manuals and business blueprints were effectively communicated and processed in an Exercising ba (Org_Sig_Con03).

5.5.2 Activated Ba: Organisational actions and Interactions (behaviour)

The production and reproduction of legitimation structures occurred predominantly in Systemic and Exercising ba. When QUNU were mandated to perform a particular task by their parent company, it used its legitimation structures (internal procedures) and attempted to force them upon the mobile payment system. The collaboration with the business partners meant that QUNU had to abandon this attempt and redraft these legitimation structures since part of operating a mobile payment system required National Payments System (NPS) silence, only obtainable from the Reserve Bank. Although the parent company communicated to QUNU what the objective was with the mobile payment system, the regulated payments environment in South Africa did not allow it to be implemented as mandated. This resulted in QUNU communicating the rules of engagement via virtual media (Systemising ba) internally and with business partners (Org_Lit_Con01) and updating its procedures with the requirements of the business partners (Org_Lit_Con02) via Exercising ba. Although Dialoguing ba was present, it was only to consult with a small group on the legal requirements around the implementation of a mobile payment system.

5.5.3 Activated Ba: Organisational environment power relations

It was evident that the mandate by the parent company did not require in-depth face-to-face discussions within the organisations. An objective was set, and the organisation would have to utilise internal resources to achieve it. The CEO explained the change in strategic direction and the new mobile payment service at organisational roadshows, through internal media and virtual media like email and the intranet. The mobile payment blueprints were communicated to staff, and they were sanctioned to focus their attention on implementing the service. Dialoguing ba (communicating the mandate at roadshows) (Org_Dom_Con01) Systemic ba (via virtual media

including emails) (Org_Dom_Con02) and Exercising ba (mobile payment blueprint and other manuals) (Org_Dom_Con03) were evident. Originating ba was not utilised.

5.6 Summary

This chapter focused on the data analysis for the organisational environment. The first section introduced the organisational case, the second focused on the ANT analysis of the organisational case and the third analysed the context that was derived from the ST analysis. Tables 5.2, 5.3 and 5.4 provide a summary of the analysis.

ANT Concept	
Case	Organisational
Actor/s	<ul style="list-style-type: none"> • Parent company • QUNU business units (e.g., Finance, Fraud and Risk, Marketing etc.) • Call Centre/Customer Care • Regional Field Workers • Network Engineering • SMS • USSD • Business Analysts from the different divisions within QUNU • Project managers from the different divisions within QUNU • External consultants • Development and Support team (both external and internal) • Payment devices • Mobile handsets • SIM cards

	<ul style="list-style-type: none"> • Mobile payment system • The CEO • Leadership ideologies
Actor-Network	Evolves around the organisation and its related systems and processes.
Translation	
Problematization	Is to generate a new revenue stream for (the) QUNU, encourage loyalty and increase current revenue streams through the implementation of the mobile payment service.
OPP	As indicated by the CEO: QUNU had to recruit industry experts and external consultants to gain insight into the operating environment of the new products and services, such as the mobile payment service.
Interessement	The Interessement strategies were very successful in the organisation. This can be attributed to the level of control that QUNU could exercise internally.
Enrollment	Was facilitated by policies and procedures that contributed to the success of enrolling the internal actors.
Inscription	<p>Identified inscriptions:</p> <ul style="list-style-type: none"> • Parent Company's strategic mandate • QUNU's Policies and Procedures • Mobile Payment System • Rewards Systems for employees • USSD • SMS (organisational) • SIM Card and mobile services. • The Product and service concept document
Mobilisation	Representatives/spokespersons were not treated equally during the mobilisation phase. This impacted the interest of the other actors negatively.
Speaker/delegate/Representative	Speakers/representatives were in the form of policies and procedures. These policies and procedures governed the internal stakeholders' roles in implementing the mobile payment system
Betrayal	Occurred where resource constraint or conflicting project deadlines were experienced. Projects with higher financial return were given priority.
Irreversibility	The successful deployment of the mobile payment system did not guarantee that an irreversible state would be achieved. This was compounded by the drive to produce efficient and effective revenue streams. If a rival new service is more effective and efficient, it could potentially replace the mobile payment system.

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Table 5.2: Summary of ANT analysis and findings for the organizational environment.

Structuration Concepts	
Case	Organisational
Signification Structures	Annual report (Org_Sig01), QUNU mandate (Org_Sig02) internal email (Org_Sig03) radio and television commercial (Org_Sig04) staff roadshows (Org_Sig05) bulletins (Org_Sig06) new methods ((Org_Sig07) business documentation (Org_Sig08) group meetings (Org_Sig09) business partners (Org_Sig10) working schedules (Org_Sig11) mobile technologies (Org_Sig012)
Legitimation Structures	QUNU's standard operating procedures (Org_Lit01) foreign partner on how to act and interact (Org_Lit02) standard working hour timeframe (Org_Lit03)
Domination Structures	mandate (Org_Dom01) decision-maker (Org_Dom02) sanctioning staff (Org_Dom03) leadership (Org_Dom04) resources (Org_Dom05) fee structure (Org_Dom06)

Table 5.3: Summary of Structuration analysis and findings for the organizational environment.

Context Analysis	
Case	Organisational
Originating Ba	
Dialoguing Ba	(Org_Sig_Con01) the CEO and various other divisions within the organisation engaged with the employees and business partners through collective and face to face dialogue (Org_Dom_Con01) (communicating the mandate at roadshows)
Systemising Ba	(Org_Sig_Con02) promote multiple significations structures in a virtual environment and

	<p>include email, radio and online advertisements.</p> <p>(Org_Lit_Con01) communicating the rules of engagement via virtual media internally and with business partners</p> <p>(Org_Dom_Con02) (via virtual media including emails)</p>
Exercising Ba	<p>(Org_Sig_Con03) Manuals and business blueprints were effectively communicated and processed</p> <p>(Org_Lit_Con02) updating its procedures with the requirements of the business partners</p> <p>(Org_Dom_Con03) (mobile payment blueprint and other manuals)</p>

Table 5.4: Summary of Contextual analysis and findings for the organizational environment.

The following chapter will elaborate on and discuss the data analysis for the business environment case.

CHAPTER 6

Data Analysis: Business Environment

Similar to the Organisational sub-case, the analysis here is done on three levels, the first level based on ANT followed by ST and contextual analyses.

6.1 Introduction

As with the organisational environment, the Section 6.3 will discuss the ANT analysis of the business environment as it was impacted by the implementation of the mobile payment system. The data that was gathered for the case study came from a variety of sources, as indicated in Table 6.1.

Case Name	Business environment sub-case	
The period for data collection	One and a half year period. December 2013 to May 2015	
Data sources	Interviews (semi-structured and open-ended), marketing material, media reports.	
Number of Interviews	<p><u>6 Individual and 2 group Interviews</u></p> <p>1 x Group Aggregator Interview: 3 People, length more than an hour 1 x Group Outlet Interview; 5 People, length more than an hour Interviews (individuals include administrators of the systems, regional managers, industry experts)⁷</p> <p>Interviews vary from 15 minutes to an hour. Internal Respondents X 1 semi-structured interviews External Respondents X 5 semi-structured interviews</p>	
Actors	<p><u>Human Actors</u></p> <p>Aggregator Owner Outlet Owner QUNU business unit representative Past project members Business Partners</p>	<p><u>Non-human Actors</u></p> <p>Reserve Bank Commercial Bank MNO business unit Location of consumers Type of services - Power/Electricity Mobile Device Reward/loyalty initiatives Agreements</p>

Table 6.1: Data Sources for the business environment case.

6.2 Business environment

This section will describe briefly how the three cases will be analysed. The chapter is divided into three main sections.

Roux (2011) argues (see 2.6.1) that there are three types of economic systems which include:

- The traditional system.
- The command system.
- The free-market or capitalist system.

Lipsey (1974) states that no economy has ever existed that can operate as a purely economic system, e.g., free market or command systems, without the elements of the others present in the economic system. This is evident in the United States that professes to be a free market system, but after the market crash in 2008, the government intervened to save the economy. Although the SA economy is deemed to be based on capitalism it still has significant number of elements that support the traditional system, and the government plays a significant role in the decision-making process, an element of the communist systems, when it comes to poverty alleviation initiatives like the case of Broadband Black Economic empowerment, thus making it a mix capitalist state. As a result of the almost equal presence of the traditional and capitalist systems, South Africa is thriving on both a formal and informal economic environment.

A refreshment stopover that supplied fresh goods and services to European ships, sailing to and from the east, was established in South Africa during the 1600s. The European Settlers, who settled in South Africa, were mostly farmers and traders who produced and sold fresh products to ships and shipping companies participating in the spice trade. Before 1850, the South African economy mainly consisted of agricultural products. Gold was discovered in the Johannesburg region between 1870 and 1880 (Davenport, 2013). This event was the catalyst for an industrialized environment that supports the mining of precious metals in the region. Railroad infrastructure was built, and the banking societies evolved to support investment in the mining sector etc. The discovery of gold led to the transformation in the South African economy into one that supports both an agricultural and industrialized environment.

Today the South African business environment consists of various industries which include (South Africa: Investor's Handbook 2011/2012):

- Mining and minerals, which have put South Africa at the forefront of the mining industry with an abundance of different mineral resources that contribute to a significant portion of the world's production reserves.
- The financial services sector, which provides commercial, retail, merchant banking, mortgage lending, insurance and investment services to consumers and businesses. The financial service industry consists of a well-developed banking system that competes favourably with industrialised/developed countries.
- In 2010, during the hosting of the FIFA Soccer World Cup, South Africa, was visited by 8,1 million foreign tourists. The tourism industry is a significant contributor to the South African industry. Tourism in South Africa includes eco-tourism, due to South Africa's rich fauna and flora environments, cultural tourism, due to the diversity of cultures in the country, adventure and sports tourism and business tourism since South Africa has been regarded as the hub of African business.
- Agriculture, as indicated earlier, caters to both large-scale commercial farming and subsistence-based production in deep rural areas. Apart from being self-sufficient in the agricultural environment South Africa also exports some of its crops. Crops and horticultural products include maize, wheat, sugar cane, ground nuts and seeds, citrus and tropical fruit, vegetables and indigenous fruits, wine made from fruits and vegetables.
- South Africa has a well-developed Information and Communication Technology (ICT) industry that supports all the other sectors.
- South Africa is also a prominent manufacturer of industrial and textile products. The manufacturing industry is an active contributor to the South African economy with the motor manufacturing environment, one of the biggest industries in the country.

The next section will explain how these industries impact the mobile payment environment.

6.3 ANT - Translation process of the Business Environment

6.3.1 Problematisation

Problematisation in the business environment has evolved around the external stakeholders that are required to participate in creating the mobile payment network. After the successful deployment of the mobile payment systems, QUNU was required to build a network of interest that would support the mobile payment environment. This included the Interestment and mobilisation of business partners and regulatory bodies required to commercialize the mobile payment services.

Problematisation, as defined in ANT by the focal actor, is to engage and negotiate with the relevant stakeholders to create partnerships that will support the mobile payment environment. QUNU were required to generate and attract interest from the business community to participate in creating and supporting the mobile payment environment. Problematisation, in the business environment case, is defined as the encouragement of the business community to create an environment that will support the mobile payment service resulting in the adoption the mobile payment service by various industry stakeholders and regulatory bodies. To achieve this, QUNU started negotiating with various industry players before launching the mobile payment service, to encourage them to participate in an environment that could be beneficial to them. QUNU needed various business partners to participate in creating the mobile payment environment. The primary actors were identified and will be discussed in the following section.

6.3.1.1 Identification of the relevant actors

Since QUNU made the decision to change its strategy in order to be a total telecommunications provider that would focus on almost any industry, in 2008, it was in the process of transforming itself. It did not have the relevant knowledge and expertise and resources available at the time the mobile payment service was initiated. This required a significant skills acquisition drive from QUNU to fill the knowledge and expertise gaps. QUNU achieved this by recruiting the relevant expertise and creating partnerships with current industry leaders. South Africa's regulated and progressive business environment did not make it easy for QUNU to simply enter these new industries. A significant amount of time was spent on understanding the requirements for entering specific industries. This gave QUNU time to gain insight into industries it did not operate in and to incorporate new products and services into its portfolio. During the data analysis process of the business environment, several actors were identified. The actors that were identified as prominent in establishing the mobile payment network outside the organisational environment will be discussed in greater detail throughout the translation process, according to which role they played in the establishment of the actor-network. These actors include the following:

- Reserve Bank – National Payments License (Bus_Act01)
- Banking Partner (Bus_Act02)
- Retailer (Bus_Act03)
- Mobile Device (Bus_Act04)

- SIM manufacturers (Bus_Act05)
- Outlets (Bus_Act06)
- Aggregators (Bus_Act07)
- Regulators (Bus_Act08)
- Commission structures (Bus_Act09)

6.3.1.2 Defining the Obligatory Passage Point (OPP)

For the OPP the focal actor had to generate and attract interest from the business community to participate in creating and supporting the mobile payment environment. This meant that the business community must have interests that are aligned closely to the OPP of the focal actor. QUNU had to engage and negotiate with the relevant business partners to participate in creating and supporting the new mobile payment environment. Building interest meant that QUNU would have to accept the fact that some of the intended business partners may decide not to adopt the role that was intended for them in the network, or they might ask the focal actor to adjust the role they were to play in the network. This meant that QUNU might have to renegotiate its role to re-align its interest to achieve the objective of allowing the mobile network to materialize and allowing all actors to pass through the OPP without complications.

6.3.1.3 A summary of problematisation

Defining interest and aligning it with the interest of the focal actor was not a straightforward process in the business environment. QUNU was not always in a position to identify and persuade the intended actors to participate and accept the roles that were ascribed to them so that the focal actor could render itself indispensable by establishing or defining the obligatory passage point (OPP). As stated by the business analyst (respondent OE_BA4), not all actors were interested in sharing their operating domain, in this case, the mobile payments environment, with a QUNU. The original bank that was identified decided not to participate in the network (respondent OE_BA4). The regulatory bodies did not allow QUNU to enter specific markets without the relevant regulations in place. QUNU also had concerns with its appointed Aggregators; some of them felt that the benefits were not serving their needs. e.g., a different commission structure was introduced, which was less lucrative than the existing commission structures. The retailers were convinced that the amount of time that they would spend on transacting via the mobile payment service would benefit them. However, the lack of aligning

interests contributed to various factors which included the strategies used for interessement. These strategies will be discussed in the next section.

6.3.2 Interessement

Interessement follows the problematisation in the translation process. The identified actors are exposed to different Interessement strategies that are aimed at convincing the actor to assume its identified role in the network. Interessement strategies will differ between actors due to the heterogeneous environment.

6.3.2.1 Different strategies for interessement

With mobile payment systems almost fully functional, the next step for QUNU was to create an environment where the systems operating functionality would be sustained, by engaging with different stakeholders. QUNU could not introduce the mobile payment service to the South African mobile consumer market without the relevant regulatory requirements, a proper distribution channel, and the relevant services. QUNU needed to persuade a number of actors outside the telecommunications environment to enrol so that it could build the mobile payment network. The actors were required to engage in the distribution of the mobile payment service, integrate the service with external systems to broaden the payment scope of the service, and abide by the relevant regulatory and lawful requirements for operating a payment system. The next section will discuss how each actor contributed to the establishment of the mobile payment operating environment.

- **The Reserve Bank**

During the implementation phase of the mobile payment system, QUNU discovered that the system required particular legal and regulatory certification. One of these requirements was to obtain a National Payments Systems (NPS) license from the Reserve Bank, the central bank of South Africa. This caused the commercial readiness date of the systems to be postponed. As stated by a former project manager (respondent OE_MM2) on the mobile payments project: *“The commercial readiness date of the systems was delayed between 2009 and 2010 since QUNU required an NPS license and was engaging with prospective partners to fast track the Reserve Bank requirement”* The NPS was a requirement from the South African

Reserve Bank to regulate the payment systems environment and to protect financial institutions and consumers. The NPS is defined by the South African Reserve Bank as:

"South Africans use various payment instruments to initiate the transfer of claims between them after having used such instruments to purchase goods and services, to make financial investments and to transfer funds from one party to another. These payment instruments include cash, cheques, debit and credit cards, and mechanisms to trigger electronic funds transfers (EFTs). Non-cash payment instruments facilitated the movement of claims by a financial institution such as a bank of the payer to the bank of the beneficiary. Financial institutions involved need arrangements in place to transfer funds between them, either on their behalf or on behalf of their customers. The NPS thus refers to a set of instruments, procedures and rules that allow consumers, businesses and other organisations to transfer funds, usually held in an account at a financial institution to one another. The South African legal framework empowers the Reserve Bank to oversee the NPS and ensure its safety and efficiency". (South African Reserve Bank: National Payment System Department: available at <https://www.resbank.co.za/AboutUs/Departments/Pages/NationalPaymentSystem.aspx>)

Since QUNU was not registered as a bank or financial institution it needed to negotiate its interest with prospective partners that have access to an NPS License. Once successful in negotiating its interest with a prospective partner that is already enrolled in the network, QUNU will simultaneously satisfy the requirements set out by the Reserve Bank and will be able to proceed with the commercial introduction of the systems to the mobile payment industry in 2010.

- **The banking partner**

QUNU's original intention was to partner with one of the biggest commercial banks in South Africa (respondent BE_EM1). This did not materialize since the intended partner did not show any interest in being enrolled in the mobile payment network. During the data collection period, it was discovered that before the launch of the mobile payment system some of QUNU's board members served on the board of other organisations that could potentially be viewed as partners in the mobile payment environment. It could be that QUNU took advantage of this relationship that was fostered by its board members and managed to attract the interest of a different commercial bank. It was also observed

that both QUNU and the commercial bank had board members that served on each other's board. This scenario may have played in QUNU's favour since it became easier to convince the commercial bank of the benefits of enrolling into the mobile payment network. According to Lonie and Wagener (2012), who were involved and played strategic roles during in the deployment of the mobile payment systems from QUNU and the commercial bank perspective respectively, the commercial bank saw an excellent opportunity to partake in a transformational banking environment and “bring a world-class service” to the South African market. Lonie and Wagener (2012) stated that this opportunity allowed the bank to shrug off the perception that it lagged behind its competitors in the South African banking environment. By partnering with QUNU the bank could pursue its hunger for a mass-market innovation that would allow it to broaden its access to a more significant distribution channel.

- **Integration with the banking partners system**

Before the mobile payment systems could be released into the market, it needed to be integrated with the banking partner's systems. This was required for both QUNU and the commercial bank as part of the regulatory and compliance environment. The challenge was to reconcile a fast and innovative telecoms environment with a slow and regulated banking environment that would be able to facilitate the management of the mobile payment environment (Lonie & Wagener, 2012). The commercial banks' internal stakeholders needed to buy into the idea of having a payment system that required a lot less intermediation from banking processes and systems.

- **The Foreign Partner**

QUNU acted on the mandate of its parent company to implement the mobile payment system. The mobile payment system that was released to the South African market was leased from the parent company and was managed by the foreign partner. Apart from integrating with the banking partner QUNU needed to integrate the mobile payments systems with its network environment. The challenge for QUNU was to convince its foreign partner that South Africa operates in a dual or mixed economy and that they required the foreign partner to make the necessary changes to the mobile payment system

to suit the market conditions that the systems will serve. QUNU needed to establish a working relationship with the foreign partner that function across different time zones, since the foreign partner operated in a different time zone from that of QUNU.

- **Integration with the foreign partner's system**

The realization of the mobile payment system was pre-empted by the integration of QUNU's systems and those of the foreign partner. QUNU communicated its integration requirements with the foreign partner who, in turn, needed to communicate its integration requirements with QUNU's development team. The mobile payment systems would be hosted in a foreign country and would serve multiple other markets apart from those in South Africa. This created numerous challenges for QUNU since its market conditions were different from other developing countries in which those mobile payment systems were released (respondent OE_MM13).

- **Distribution channels**

- **MNO's Service Providers (SPs) and Dealers**

QUNU utilised its current distribution of SPs and Dealer shops as registration points, and for its customers to transact. These shops were located close to business amenities and served mostly local subscribers. These subscribers included individuals in townships, suburbs or rural areas that were located close to the transport systems that allowed them access to these amenities. The Dealer shops assisted the subscribers to register for the mobile payment service; they allowed them to transact and had one or two staff members that would be available to assist subscribers. When the dealer shops became busier during the day, there was a shift in the priority of the staff that assisted with the mobile payment service towards assisting the other products and service areas that the Dealer shop offered. This was observed during a visit to 3 different Dealer shops by the researcher, which led to the conclusion that the primary focus of the Dealer shops was not on growing the mobile payments network. The Dealer shops were not actively recruiting mobile payment service subscribers, the Dealer

shops only registered these customers when the mobile payment service was requested (respondent OE_EM14).

- **Aggregator**

The Aggregator had an initial focus of increasing the adoption rate of the mobile payment service. The Aggregator's main focus was on volume. The more registrations they processed, the better the financial incentive from QUNU. To achieve the volumes required, the aggregator had to employ additional temporary staff, which they called foot soldiers. The foot soldiers would, in addition to the aggregators' staff, be allocated to specific areas to promote the mobile payment service and register the subscribers on the platform. The Aggregator targeted townships, business areas and at times, rural areas.

- **Outlet**

The Outlet had a different focus from the Aggregators. Although the Outlet participated in increasing the adoption rate of the mobile payment service the main focus was to manage the mobile payment service requests in most townships, business and rural areas where there was a lack of access to banking environments. The Outlet went around and explained the service to the patrons while recruiting them as active mobile payment service subscribers. The Outlet's primary focus was on the volume of the transactions - more transactions meant a bigger reward paid to them from QUNU. An owner of an outlet could have multiple outlets in the same area, thus allowing them to maximize the transaction volume. The outlets that were encountered during the fieldwork were owned by one or two owners per region. This was also encouraged and supported by QUNU since it simplified the management of the Outlets and eliminated unnecessary competition. Interestment strategies amongst outlets also varied. Some Outlet owners depended on QUNU for assistance to market the mobile payment service, and some used their own initiatives to grow the mobile payment network. As one owner explained, *"I went around, I distributed some flyers that show them that if you save R10 per day, you can make around R3000 per year..."* (respondent

BE_ RU1 or **Outlet 1**), thus producing the outlet's flyers to promote the mobile payment service as a savings account.

- **Retailer as a Business Partner**

The retailer's main focus was to increase its business activity by allowing subscribers and prospective subscribers to register and transact at their stores. This allowed the subscriber to have access to mobile payment services at a retail store closer to their location. QUNU expected that the retailer would also target its customers to sign-up for the mobile payment service. This would allow QUNU's subscribers to have access to retail stores where they can participate in market-related activities; thus, QUNU positioned the mobile payment system close to market-related activities in order to increase transactions in the mobile payment environment.

6.3.2.2 Interestment strategies have different impacts on actors and the level of success varies.

QUNU's subscriber base of about 28 million was the main target market for the mobile payments service. QUNU also targeted additional subscribers. For QUNU to add these additional subscribers, it needed to interest the relevant partners that already had access to the prospective subscribers and had the ability to enrol them into the mobile payment network. QUNU's strategy was to partner with a retail store that has one of the biggest customer bases in South Africa. Again, QUNU deployed different strategies of interestment to attract the potential business partners that would allow QUNU to persuade its own subscriber base as well as potential subscribers from other mobile networks and the customers of retail partners, to adopt the mobile payment system.

Achieving this task required QUNU to engage with multiple actors outside of the organisational environment. It became evident that there was not a straightforward Interestment strategy that could be applied, as in the organisational environment, since QUNU had to engage with business partners that would compete with QUNU in the same market, like the commercial banks and the retailers.

QUNU had to focus on attracting well established and stable business partners to focus on growing the network and allowing the prospective mobile payments subscribers to have access to a broader range of services apart from QUNU's offerings. Although QUNU managed to attract the relevant business partners, it became evident that the commercial bank and retailer that provided the additional services had minimal interest activities that kept them engaged. Their main concern was the benefit that the mobile payment service would bring to their businesses. The commercial bank and the retailer became aware of the return on time spent per mobile payment transaction. The amount of time spent could be up to 20 minutes per transaction, in the current, already stretched, retail and banking environments, and some establishments relegated the mobile payment service to less active time periods.

6.3.2.3 Summary of Interest

QUNU managed to attract and interest the relevant business partners, like the bank and the retailer. The retailer had one of the biggest customer bases in South Africa and was well-positioned to allow QUNU to achieve its target of adding prospective subscribers to the mobile payment service. QUNU's prior relations and engagements with relevant business partners was also a favourable situation it enjoyed during the Interest phase. This was evident because QUNU and the commercial bank had individuals that served on both organisation's boards of directors.

6.3.3 Enrolment

Enrolling the relevant actors into mobile payment ecosystem was challenging for QUNU, especially in the business environment, but it was successfully achieved. This meant that QUNU had successful agreements with most of the targeted actors. During the enrollment phase in the business environment agreements were regularly altered to encourage actors to take up the role in the network in the business environment.

"We the original plan were to partner with a major bank, but they were not interested in partner with us. The reason could be that they do not need us since they know the banking business." (OE_BA6)

This meant that the OPP was redefined for certain actors. This could be attributed to the fact that the intended business partners, found it difficult to see the value they would gain from the partnership. Nevertheless, the enrolment of business partners was facilitated by QUNU's prior relations and engagements with several relevant business partners.

“QUNU’s former CEO and the CEO of the commercial banking partner served on each other’s Board of Directors. It was as simple as that to get the commercial bank involved.”
(OE_EM2)

QUNU’s partnership with the commercial bank was necessary to gain approval from the South African Reserve bank since QUNU required a national payments license before the mobile payment system can be operationalized (OE_BA4).

Enrolling the retailer was an easy process. QUNU partnered with the biggest clothing retailer at the time of the research in South Africa. This was achieved through a series of negotiations between the mobile payment team and the retailer directly.

We are in the final stages of drawing up agreements between QUNU and one of the biggest retailers. We are busy training the staff at their stores. The stores will act as mobile payment outlets. This will access to a bigger market and will enhance the services provided to the mobile payment subscriber” (OE_BA3)

QUNU also extended the enrolment process to independent actors that set up their own mobile payment system transaction points. These independent actors operated one or more outlets in areas that QUNU deemed as very important for the development of the mobile payment network. These areas include taxi ranks and townships.

"I applied for an Outlet licence from QUNU since it provided me with the opportunity to start my own business. I came here from Zimbabwe and could struggle to find proper work to do. I started this business, and it allowed me to grow and sell different products because the people when they make withdrawals want to buy things with their money. I saw the opportunity and provided them with some of the stuff they want to buy"
(CE_RU1)

The Aggregator, similarly to the outlets, opted to be enrolled since it extended their current service and product offering or existing business. Most of them sold products and services that QUNU offered to the market, or some of them already had an existing market that they served.

The dealer shops were an existing business partner. QUNU merely extended the mobile payment service to its dealers and franchise stores. Enrollment was straight forward in this environment.

The enrolment of the foreign partner was a pre-determined enrolment since the foreign partner was actively involved in rolling out the mobile service for QUNU's parent company in other countries.

6.3.3.1 Inscription

As with the previous case, this section will analyse and discuss how the inscriptions, which were identified during the analysis of the Business case, impacted on the identified objectives of the Business case. The focal actor's role in engaging these inscriptions and moulding them to interest other actors is also scrutinised and documented in this section. Each inscription contributed differently to the translation process, some being more influential than others in achieving the objectives.

An inscription, as stated previously, often occurs as part of the enrolment process. Successful agreements between actors during the enrolment process stabilize the actor-network, and these commitments need to be recorded into the shared memory of the social system through inscription (Sarker et al., 2006). Inscriptions are, after all, informed by aspects which include (Mpazanje et al., 2013):

- Identification of explicit anticipations/scenarios/objectives from which inscriptions start
- How these anticipations are inscribed to interest actors/actants

- Focal actors undertaking the inscriptions
- The strength of the inscriptions and their capability to form irreversible networks

During the analysis of the case study, the following inscriptions were identified

Business Partner/Customer Agreements (Bus_Ins01)

Since the registration process needed to occur first, it was important to establish the relevant partnerships that would aid QUNU with the registration of customers on the mobile payment network. QUNU achieved this by setting up a series of agreements with multiple business partners who would aid in engaging with customers to sign up or register to use the mobile payments system. These agreements could be regarded as very strong inscriptions, since any new connection to the network, whether it be a business partner or a mobile payments subscriber, would be established each time a successful registration was completed.

Rewards Structures for Business Partners (Bus_Ins02)

The rewards that were inscribed in the agreement contributed strongly to the type of relationship the business partner had with QUNU and how much they valued the business association with the mobile payment service. Different partners required different rewards, e.g., the Outlets valued the reward associated with administering mobile payment transactions, whereas the Aggregators valued the monetary reward associated with registering subscribers on the mobile payment network. The retailer and the commercial bank may have deemed access to new markets (Lonie and Wagener, 2012) of higher value. For the Commercial bank, this partnership allowed access to markets that other banks might find difficult to penetrate, according to an Aggregator (respondent CE_OT1).

Signage/branding (Bus_Ins03)

Lonie and Wagener, 2012 noted that for a commercial bank to partner with one of the best network operators in South Africa was something the bank was not going to bypass. To associate the banks branding with that of QUNU was an indication that the bank was exploring innovative banking solutions. The branding and display of signage had a mixed reception with the smaller partners like the Outlets and Aggregators. The Aggregators, as observed during the data collection period, were very fond of being associated with the

QUNU brand. Although some of the Outlets in more secure locations shared these sentiments with the Aggregators, some of the Outlets that were located in a less secure locations, like bus stations, taxi ranks and railway stations, deemed the signage to be a risk to their business, stating that if people think they are carrying cash, then the business is prone to be robbed. (respondent CE_OT1 & CE_RU1). They argued that when the mobile payment signage is visible from outside their stores, it could be perceived by criminals as a place that keeps money on the premises, as stated by the owner of an Outlet in a Township. Some Outlets that had the signage and brand association felt that these encouraged a sense of trust in clients, who would therefore be happy to transact at that specific location.

Business Relations (Bus_Ins04)

QUNU also extended the mobile payment environment to its current distribution channel, which included dealer shops and existing partners, like the retail partner a since existing relationship exists with these partners. In the case of the commercial bank, one of QUNU's previous CEOs was a board member of the commercial bank and in turn, the bank CEO at the time, was a board member of QUNU. This could have favourably influenced the decision of the commercial bank to partner with QUNU. QUNU also made several industry appointments on an executive level over the previous couple of years which included individuals that were employed by the commercial bank. This was evident when their public profiles were scrutinised during the data collection period.

Access to potential innovations (Bus_Ins05)

Both QUNU and its business partners would benefit from innovations that stemmed from the mobile payment environment. For example, QUNU would have access to sound banking practices, and in turn, the commercial and reserve bank would have the opportunity to gain insight into the management of the technological artefact. As previously stated, one of the main reasons for the commercial bank to enrol into the actor-network was that it saw a great opportunity to partake in a transformational banking environment (Lonie and Wagener, 2012). This association would result in better management of the mobile payment environment and its associated services.

6.3.3.2 Summary of Enrolment

Although the enrolment phase in the business environment succeeded, many challenges arose while trying to keep these actors enrolled. The retailer could not find a balance between time spent on old and new responsibilities and ended up spending more time and resources on managing the mobile payment system than on their daily transactions.

"The amount of time it took for the Retailer to conduct a transaction did not justify the operational value gained from the partnership with QUNU for the mobile payments service. The retail stores ended up spending more time on mobile payment services than what is normally required, thus impacting on their daily retail activities. We ended up allocating only a certain time slot to do mobile payment transactions, especially during hours when business is slow." (respondent BE_BA1)

A similar experience by the commercial banking partner led to them terminating the agreement they had with QUNU since the impact was extended to their IS systems environment. Apart from the retail concerns they dealt with, their IT systems were impacted since they required integration with the mobile payment system. QUNU ended up recruiting a new banking partner.

One of the Aggregators (respondent CE_OT2) who were initially enrolled to extend the mobile payment service stated that:

"QUNU staff was not very eager to register for the service of less than 20% of QUNU staff registered during our first registration phase. There were days when less than three employees from QUNU would register when we visit the QUNU offices."

6.3.4 Mobilisation

Mobilisation, as stated previously, is the phase where representatives and spokespersons are introduced to speak on behalf of the other actors. Challenges and bottlenecks are everyday experiences for representatives and spokespersons during the translation process. Fair representation of all actors is seldom experienced during translation.

As observed during the data collection period, many potential business partners were interested in doing business with QUNU in the mobile payment environment but could not achieve a level

of Interessement that suited QUNU. A representative of a ticket vending company was trying to negotiate a deal with the regional mobile payment manager to incorporate the company as a service provider in the mobile payment environment. An unfortunate scenario played out. QUNU was in a phase where only the major business partners were required for the mobile payment service to become a reality, and they could not accommodate any additional services at that time that QUNU had not planned for. This impacted the quality of services and uptake of prospective business partners and subscribers to the service, since it limited the number of services available in the mobile payment environment.

Not all business partners remained with QUNU after the mobile payment service was introduced. Several of them terminated the partnership since their interests were no longer served. QUNU and the commercial bank decided to terminate their agreement in late 2013. As a result, the mobile payment environment could not operate legally, as it was now without a National Payments License, as per the Reserve Bank's regulations. Each time QUNU replaced a business partner there was a potential hold up in the type of service that customers subscribed to, e.g., to replace the commercial banking partner could take up to one year.

6.3.5 Irreversibility

Irreversibility was not achieved during the analysis of the business environment case. On the broader scale, irreversibility was hampered by disloyal representatives/spokespersons and a number of betrayals. Although strong inscriptions allowed the network to slowly progress, it was not supported by the key actors, such as the dealer stores and some registered subscribers. However, in some of the regions irreversibility was achieved, e.g., rural areas and townships, where banking services were lacking, while in other areas irreversibility was not possible, e.g., suburbs and business districts which were located very close to existing banking facilities.

By adding a few key actors, the network could have been stabilized to the point where irreversibility could have been achieved in all regions. These key actors could have included retailers that sell consumer goods and services, such as prepaid electricity and food.

6.3.6 Summary of the translation process

One of the immediate concerns to address during the translation process in the business environment was the lack of input into the problematisation phase. Many actors felt that QUNU could have done more to include them in the initial planning and rollout of the service, this could have eliminated many unnecessary mistakes that occurred when the mobile payment consumer network started to evolve. The deployment of different interestment strategies was necessary for a diverse emerging economy that favoured both a formal and informal market system. This allowed for a broader focus but the failure to establish the correct target market was costly for QUNU.

Prospective subscribers were not adequately informed about the existence of the service when they were introduced to it, so they were not sure of its intended use. This resulted in multiple uses of the mobile payment service by different actors.

Although the mobile payment service is no longer active, it will require a significant review of the translation process to new and prospective subscribers. This includes the review of different subsidiary services attached to the mobile payment services such as the ability to have access to other services such as buying prepaid electricity and bill payments.

The decision by QUNU to only allow their subscribers to make use of the service also backfired since other MNOs in the mobile payment service environment launched competing services and allowed all the other mobile network subscribers to make use of their service without porting into their network.

6.4 Business environment Structuration process

The sources of data that were collected for the business environment include media from news agencies, industry-specific and news websites, vendor and business partner conversations and interviews. Although the initial focus was on gaining insight from formal sources, it was realised that external media had a more detailed description of the business environment's response to the introduction of the mobile payments service. In cases where interviews were conducted, it was backed up with external media from the same source.

6.4.1 Structuration entailing Signification

Communicating to the business via multiple media platforms

QUNU's proposed intention to introduce a mobile payments service to the South African market was noted in multiple media sources which included radio stations (Radio 702 and 567 Cape Talk) and industry websites like www.mybroadband.co.za and www.moneyweb.co.za (**Bus_Sig01**). QUNU communicated its change in strategic direction (**Bus_Sig02**), as set out by the parent company, in its 2009 annual report, during roadshows, radio station interviews and television commercials. The "then" CEO noted QUNU's intentions to become "a total communications service provider" (section 6.2.2). As with the organisational environment case, the external media acted as a structure of signification for QUNU since the industry was formally informed about its intentions to introduce new mobile services to the South African telecommunications environment. By revealing its strategic intentions through the use of different media platforms, QUNU had the opportunity to encourage prospective business partners to join them or prepare themselves to compete with QUNU in the specific markets. Advertisements, media reports and the CEO interviews all constituted the structure of signification since it *"produces meaning through organized webs of language and text for other industry stakeholders and QUNU to interpret."*

What became evident during the structuration analysis of the business environment were the methods by which QUNU chose to communicate the introduction of the mobile payment service. QUNU moved from internal communication to seeking external partnerships through the utilisation of the various media. These media informed the industry stakeholders on what action to take to anticipate QUNU's proposed change in strategic direction. Since the problematisation in the business environment, as indicated in section 1.3.2.1, was to create interest about the mobile payment service and build partnerships, the business environment (**Bus_Sig03**) informed, and to some extent dictated how interpretive schemes were updated and re-introduced to the environment and created and updated new semantic codes in the mobile payments environment, thus contributing to the signification structure.

QUNU's partnership with the commercial bank, aggregator, retailer, outlet, Reserve Bank etc. constituted the acquisition of business resources to grow the mobile payment network. This was an important requirement for QUNU since it allowed the mobile payment system to extend beyond the borders of the organisation into the broader macro environment. It also meant that signification structures within QUNU and the business environment would require renewal due to the interchange between the organisational and business environments. The different types of

environments could also be seen as signification structures since they would allow both QUNU and its business partners to adjust and learn from these newly formed structures

6.4.2 Structuration entailing Legitimation Business Consumer's actions and Interactions (behaviour)

Section 5.3.2.5 of the actor-network analysis of the organisational environment indicated the potential benefits of the commercial bank partnership with QUNU to introduce the mobile payment system to the South African environment. Lonie and Wagener (2012) argued that the commercial bank saw an excellent opportunity to partake in a transformational banking environment and "*bring a world-class service*" to the South African market. The desire for the commercial bank to partner or to consider a partnership (**Bus_Dom01**) with QUNU directly contributed to QUNU's reputation and standing that it occupied in the South African market. As indicated earlier customs, morals and tradition, in this case, excellent South African business practices, led QUNU to achieve its position as a market leader. The commercial bank saw and seized the opportunity to have its brand associated with that of QUNU, thus allowing it to benefit from existing legitimation structures. This was also the case with the Aggregator and Outlets. The foreign partner was only interested in getting the mobile payment service operational. It deemed its values and customers as of better standing than those of QUNU.

6.4.3 Structuration entailing Domination Business environment power relations

In section 6.3.2.1, QUNU became aware that the mobile payment system required a particular legal and regulatory certification before it could be introduced to the market. The Reserve bank, as the custodian of banking and financial regulatory matters in South Africa, requested that QUNU abide by the current payments regulatory environment as set out for the South African environment. This resulted in QUNU delaying the introduction of the mobile payment system since it required a National Payments license (NPL) (**Bus_Dom03**). In South Africa, the Reserve bank is the only institution that controls the allocation NPLs, thus allowing them to have strong domination structures that had an impact on QUNU's mobile payment service initiative.

Since QUNU was not registered as a bank or financial institution (section 6.3.2.1) it needed to negotiate its interest with a prospective banking partner that had access to an NPS license. As stated previously the initial prospective banking partner did not see QUNU's proposal, to be part

of the mobile systems environment, as a viable adjunct to its current business operating model and declined the offer to partner with QUNU. The bank preferred not to engage its resources to become part of the mobile payment environment, thus shifting the balance of power away from QUNU.

It can also be argued that the foreign partner significantly impacted QUNU's balance of power (impact QUNU significantly) in the mobile payments environment. The foreign partner was a sister company of QUNU that operated in a developed country, and their main role was to configure the mobile payment system according to QUNU's requirements. However, as indicated in section 5.3.2.9, the foreign partner did not always adhere to what was agreed with QUNU resulting in delays that could have been avoided if the dual economic nature of QUNU's operating environment had been given priority.

Although QUNU controlled the distribution channels for its products and services, it did not control what these channels focused on as priority sales items. As a result, greater focus was given to items that had higher commission value. As noted in section 6.3.2.1, distribution channels, above when the dealer shops became busier during the day, there was a shift in the priority of the staff that assisted with the mobile payment service towards assisting the other products and service areas that the Dealer shop offered.

6.5 Context Analysis Business Environment

6.5.1 Activated Ba: External Communication

Signification structures in the business environment allowed both the organisation and the business environment to interact. Interaction mainly occurred through the Dialoguing ba, Systemising ba and Exercising ba. Once the intention was clear from the QUNU CEO and the signification structures were established, QUNU selected individuals who had the right mix of specific knowledge and capabilities to liaise with potential business partners. These included a former CEO who was a board member of the banking partner to negotiate the bank's participation through the exercise of dialoguing ba. QUNU's intentions were made clear to the partner through a series of collective and face-to-face meetings (**Bus_Sig_Con01**) between QUNU and the banking partner. QUNU also commissioned its sales staff and field workers to interact with its existing distribution network to promote the mobile payment system.

Systemising ba occurred when QUNU decided to utilize various media to inform the industry stakeholders on what action to take to anticipate QUNU's proposed change in strategic direction.

These media included advertisements, media reports CEO roadshows and interviews with the CEO (**Bus_Sig_Con02**) These contributed to Systemising ba.

New signification structures were produced. QUNU updated its branding to include the mobile payment branding, and this was distributed to business partners, and mobile payment marketing material was combined with that of the business partners (**Bus_Sig_Con03**), thus contributing to Exercising ba. The update of the USSD menu structure as well as the SMS content for the mobile payment system, also contributed to Systemising ba.

6.5.2 Activated Ba: Business action and interaction

As indicated during the ANT analysis, a former CEO of QUNU that served on the board of the commercial bank influenced the decision by the bank to partner with QUNU. This allowed the top management of the commercial bank to be informed by a trustworthy source about the benefits of partnering with QUNU. Collective and face-to-face interactions occurred between the ex-CEO of QUNU and the commercial bank's board members (**Bus_Lit_Con01**). The concept of the mobile payment systems externalization was explained in detailed terms at a high business level which was a consciously constructive way to appreciate how it would impact the commercial bank. This could only occur in the Dialoguing ba context. Only a few high-level individuals were engaged in these discussions at the highest business management level.

6.5.3 Activated Ba: Business environment power relations

The business environment consisted of stakeholders that signed up to participate in the mobile payment environment. Each stakeholder had a role to play to promote and grow the mobile payment service. Some stakeholders had a bigger influence than others on the mobile payment service. The Reserve Bank imposed the regulatory requirements on QUNU and dictated how the mobile payment service should be managed. QUNU did not have the leverage to discuss alternatives with the Reserve Bank, in order to change the regulatory requirement. Interaction between QUNU and the Reserve Bank occurred in Systemic and Exercising ba. Dialoging and Originating ba had no bearing on the regulatory requirements. It was a regulatory requirement imposed by the government. Electronic communications formed the basis for Reserve Bank's requirement. The retailer and the bank decided to cease performing mobile payment transactions during peak operational hours. Systemising ba formed the basis for this interaction. QUNU's partners noted that they spent too much time on promoting a service that is not their primary service. The staff was informed to focus on their core duties first before engaging in mobile payment activities.

Outlet 1’s owner removed the signage that informed customers about the service. Exercising Ba was the basis for this interaction since it was an action that occurred that made the removal of the signage possible. When the signage was in place customers learned about the existence of the service when they visit the store and not only through word of mouth. (Dialoguing ba).

6.6 Summary

This chapter focused on the data analysis for the business environment. The first section introduced the organisational case, the second focused on the ANT analysis of the organisational case and the third analysed the context that was derived from the ST analysis. Tables 6.2, 6.3 and 6.4 provide a summary of the analysis.

ANT Concept	
Case	Business
Actor/s	<ul style="list-style-type: none"> • Reserve Bank – National Payments License • Banking Partner • Retailer • Mobile Device • SIM manufacturers • Outlets • Aggregators • Regulators • Commission structures
Actor-Network	Evolves around the business environment and its related systems and processes.
Translation	
Problematization	The encouragement of the business community to create an environment that will support the mobile payment service resulting in the adoption of the mobile payment service by various industry stakeholders and regulatory bodies.
OPP	The OPP for the focal actor was to generate and attract interest from the business community to participate in creating and supporting the mobile payment environment, it meant that the business community must have interests that are aligned closely to the OPP of the focal actor.
Interessement	Different strategies of interessement were deployed to attract potential business partners that would allow QUNU to leverage from its subscriber base as well as potential subscribers of other mobile networks and the retail partners' customers to adopt the mobile payment system.

	The focus was on attracting well established and stable business partners to focus on growing the network and allowing the prospective mobile payments subscriber to have access to a broader range of services apart from QUNU's offerings. QUNU was aided by prior relations and engagements with the relevant business partners, these were favourable situations it enjoyed during the Interesement phase.
Enrollment	Enrollment was also aided by QUNU's prior relations and engagements with the relevant business partners. Levels of trust existed before successful enrollment.
Inscription	<ul style="list-style-type: none"> • Business Partner/Customer Agreements • Rewards Structures for Business Partners • Signage/branding • Business Relations • Access to potential innovations
Mobilisation	Not all business partners remained with QUNU after the mobile payment service was introduced.
Speaker/delegate/Representative	The partnerships that were successfully established constituted multiple representatives in the business environment. These included partnerships with the Reserve Bank, Commercial bank, Outlets and Aggregators.
Betrayal	Occurred when the business partner demoted the amount of time spent on mobile payment processes. Some partners introduced specific time slots for mobile payments.
Irreversibility	<p>Irreversibility was not achieved.</p> <p>On the broader scale, irreversibility was hampered by disloyal representatives/spokespersons and many betrayals.</p> <p>Although strong inscriptions allowed the network to slowly progress, it was not supported by the key actors such as the dealer stores and some registered subscribers</p>

Table 6.2: Summary of ANT analysis and findings for the business environment.

Structuration Concepts	
Case	Business
Signification Structures	multiple media sources (Bus_Sig01) strategic intentions (Bus_Sig02) business environment (Bus_Sig03),
Legitimation Structures	partnership (Bus_Lit01)

Domination Structures	Partnerships (Bus_Dom01) . National Payments license (NPL) (Bus_Dom03) .
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Table 6.3: Summary of Structuration analysis and findings for the business environment.

Context Analysis	
Case	Business
Originating Ba	
Dialoguing Ba	(Bus_Sig_Con01) : Collective and a face-to-face meeting between QUNU and the banking partner) (Bus_Lit_Con01) meetings between ex-CEO of QUNU and the commercial bank's board members
Systemising Ba	(Bus_Sig_Con02) advertisements, media reports, CEO roadshows and interviews with the CEO (Bus_Lit_Con02) Ideas and knowledge (Bus_Dom_Con02) branding and other documents were combined (Bus_Dom_Con04 - pertaining to the process of enrolling new clients
Exercising Ba	(Bus_Sig_Con03) Updated QUNU branding to include the mobile payment branding, mobile payment marketing material was combined with that of business partners Bus_Lit_Con03 - discussions on how to implement practical solutions (Bus_Dom_Con01) - procedural information was shared (Bus_Dom_Con03) outlets and the agent's interaction with QUNU

Table 6.4: Summary of Contextual analysis and findings for the business environment.

The following chapter will elaborate and discuss the data analysis for the consumer environment case.

CHAPTER 7

Data Analysis: Consumer Environment

Following on from the Organisational and Business environment sub-cases, the analysis for the Consumer sub-case was done on three levels, the first level based on ANT followed by ST and contextual analysis.

As with the organisational and business environment, the next section will discuss the ANT analysis of the business environment as it was impacted by the implementation of the mobile payment system. The data that was gathered for the analysis came from a variety of sources, as indicated in Table 7.1.

Case Name	Consumer environment sub-case	
Period for data collection	Two year period. July 2013 to June 2015	
Data sources	Interviews (semi-structured and open-ended), marketing material, quantitative data sources, media reports.	
Number of Interviews	<p><u>20 Individual and 1 group Interviews</u></p> <p>Interviews (individuals include mobile subscribers, administrators of the systems, non-registered and registered users)' Interviews vary from 15 minutes to an hour. Internal Respondents X 6 semi-structured interviews External Respondents X 14 semi-structured interviews.</p>	
Actors	<p><u>Human Actors</u></p> <p>Aggregator Owner Outlet Owner QUNU business unit representative Past project members Business Partners</p>	<p><u>Non-human Actors</u></p> <p>Reserve Bank Commercial Bank MNO business unit Location of consumers Type of services - Power/Electricity Mobile Device Reward/loyalty initiatives Agreements</p>

Table 7.1: Data Sources for the consumer environment case.

7.1 Introduction

Some emerging economies, like South Africa, are characterized by dual economic activities, those that stem from an informal market and those that stem from a regulated, formal market system. As a result, a hybrid group of consumers are present in South Africa, consumers that are served by both informal and formal market systems. The next section will explain how these hybrid consumers came about.

7.2 The consumer environment in South Africa

South Africa's population has grown to just over 51.8 million people according to Statistics South Africa (<http://www.statssa.gov.za/default.asp>) since the country's first democratic election in 1994. The shift of the political environment to a democratic voting system that determines the leadership of the country resulted in South Africans having a broader scope in participating in the South African economy. Markets became accessible to previously disadvantaged individuals who, in the past, were prevented from entering these markets due to the political concept of "apartheid" which can be briefly defined as the segregation of racial groups, enforced by legislation, based on skin colour. It allowed certain groups of individuals to have more economic and social privileges than other groups. The consequence of this was that some racial groups were moved to rural areas, while others remained in cities or suburbs, while some were forcibly removed to areas called townships.

7.2.1 Rural areas

Rhodes (2009) noted that "*rural areas were developed as peripherals to the apartheid core*". She states that rural areas were used as "*human-dumping grounds*" to accommodate the oppressed, which were exploited as a source of cheap labour. The government limited the development of certain areas in favour of the cities and suburbs that were only accessible to the privileged. Rural areas, for this research project, can be defined as areas that are located on the periphery of townships, suburbs and cities, that have low population densities and that have minimal infrastructure for communal and social development. Typically, people stay in mud huts or houses, or poorly constructed dwellings and lack proper ablution facilities, running water and electricity. Infrastructure like transport, telecommunication, shops and health facilities are lacking in these areas.

7.2.2 Townships and Shantytowns

A township or “colonial township”, according to Pernegger and Godehart (2007), is considered a South African ‘invention’ that was inspired by town planning during the apartheid era. Townships can be found throughout South Africa and are also common in many African cities such as the ones close to cities like Nairobi in Kenya and Lusaka in Zambia. Most townships are located on the fringes of cities and suburbs and consist of brick-and-mortar houses, which are either detached or semi-detached and include flats and shantytowns containing corrugated sheet houses, wooden and Wendy houses (a type of low-cost wooden house). Most houses and flats have proper ablution facilities, running water and electricity. Townships are sometimes located close to transport facilities, and some have proper telecommunications and health facilities but at times these are overstressed by the number of people accessing the services. In some three-bedroom houses in townships, as many as 20 people can stay on the premises. In the shantytown section, the dwellings are built very close to each other. These are often very overcrowded with as many as three families staying in a single dwelling.

Organisations operating in emerging economies that support a hybrid consumer market often favour the formal sector that is regulated and supported by the country’s government. Multi-national organisations often favour these formal sectors since it is less risky to gain entry into a regulated economy. However, some organisation’s products and services are used by both formal and informal economy consumers, like telecommunication services. MNO’s operating in these markets often finds it challenging to cater for a hybrid consumer environment.

In the case of South Africa, MNO’s introduced services that catered for both formal and informal markets since mobile network services were introduced in 1994. South Africa was the first country globally that introduced the concept of pay before you use the services (prepaid mobile network services). The mobile network subscriber can add a pre-defined credit value to the mobile subscription account that can be used at a later stage, often called “buying airtime”.

QUNU extended its mobile services in 2010 by introducing a mobile payment service. For three years, QUNU managed to register almost one million users to the mobile payment service. The next section will discuss how this mobile payment network evolved over the three years from the consumers' perspective.

7.3 ANT - Translation process of the Consumer Environment

7.3.1 Problematisation

The creation and deployment of a mobile payment system environment and the mobilisation of business partners and regulatory bodies shaped the platform for mobile payment services to incubate, to be realized and to make an entrance into the portfolio of products and services that QUNU was able to offer to its existing and prospective subscribers.

Problematisation, as defined by the focal actor in ANT, is to generate a new revenue stream for QUNU, encourage loyalty and increase current revenue streams (Org_P1). Problematisation, for the consumer case, is defined as encouraging QUNU's current base of more than 30 million active subscribers and prospective subscribers from other networks to adopt the mobile payment service by subscribing to QUNU's network (Cus_P2). To achieve this, QUNU deployed a series of initiatives over three years to encourage the adoption of the mobile payment service. Executing these initiatives required various actors to participate in creating the consumer network. The primary actors were identified and will be discussed in the following section.

7.3.2 Identification of the relevant actors

QUNU required Outlets, Agents and Aggregators to sign up prospective subscribers and existing subscribers of QUNU that already used their mobile devices, in order to participate in the new mobile payment services. These subscribers resided in different locations in and around QUNU's operating areas and were of diverse economic and educational backgrounds. They were registered and signed up by the Outlets or the Aggregators after producing their Identity Document (ID) and providing their mobile phone number. QUNU realized that the implementation of the mobile payment system would allow it to extend its dominance in the existing operating environment and position it to reward loyal subscribers with loyalty products and services, services which were previously inaccessible to subscribers. These loyalty products could be redeemed via the mobile payment system and the current service environment. It also allowed QUNU to diversify its market and sell products and services that it did not previously have in its products and services portfolio.

The actors that were identified as prominent in establishing the mobile payment consumer network were as follows:

- Aggregator (Cons_Act01)
- Outlet (Cons_Act02)
- Bank (Cons_Act03)

- MNO business unit (Cons_Act04)
- Current MNO service subscribers (Cons_Act05)
- Prospective MNO service subscribers (Cons_Act06)
- Location of consumers (Cons_Act07)
- Type of services - Power/Electricity (Cons_Act08)
- Education level of subscribers (Cons_Act09)
- Mobile Device (Cons_Act10)
- Reward/loyalty initiatives (Cons_Act011)
- Registration process (Cons_Act012)
- Community (Cons_Act013)
- Money (Cons_Act014)
- Identity Document (Cons_Act15)

7.3.3 Defining the Obligatory Passage Point (OPP)

Since the OPP for the focal actor, in the organisation case, was to encourage the adoption and active usage of the mobile payment service, it meant that the consumer had to have interests that were aligned closely to the OPP of the focal actor. QUNU had to recruit actors to act as representatives/spokespersons to target the intended groups of consumers to adopt and use the mobile payment service. These groups of consumers could choose to abide by the role that was intended for them in the network, to adopt the system, or they could rebel against the role and challenge the focal actor to adjust the role they played in the network. Doing the latter would either result in them being excluded from the network or would force the focal actor to alter the network to accommodate them. If interests were perfectly aligned or the consumers, which could consist of QUNU's current subscriber base or potentially new subscribers from other MNOs', were willing to sacrifice aligning their interest to those of the focal actor, then passing through the OPP would be without complications.

7.3.4 Summary of problematisation

Although the main objective in the problematisation process was for the focal actor to define the identities and interests of other actors that were consistent with and aligned with its own interests, allowing it to render itself indispensable by establishing or defining the obligatory passage point (OPP), it did not mean that the identified actors would necessarily participate and

pass through the OPP. Over five years, from September 2010 to September 2015, QUNU managed to sign up close to a million subscribers, as indicated by the CEO during a company presentation. However, it did not reflect a successful problematisation process since, as pointed out by some of QUNU's regional mobile payment managers and a business analyst, less than 10 % of the million subscribers were actively transacting at any one point. QUNU did not achieve the 10 million subscribers that were broadcast as its target during a radio station interview in 2012. The lack of successfully aligning the OPP could be attributed to the confusion caused by a lack of clarity regarding the actual intended purpose of introducing the mobile payment system, and to who would bear the financial burden of implementation. Since QUNU entered an environment, in this case, mobile payment services, which deviated from its existing portfolio of products and services, it required key partnerships to stabilize the mobile payment network, as indicated in the business environment case. These partnerships included having an alliance with a bank. The partnering bank had its own mobile payment clients to serve, while QUNU was using its distribution network run by its Service Providers and dealers, who preferred to push products of higher commission value. In addition, retailers and Outlets were not adequately supported by QUNU (respondent OE_MM3) when it came to resolving customer issues and concerns. This compromised their ability to provide an excellent service to mobile payment subscribers. The issues and concerns raised by the customers can be attributed to various factors which included the strategies used for interessement. These strategies will be discussed in the next section.

7.3.5 Interessement

Once problematisation has been defined the next phase in the ANT translation process is interessement. During the Interessement phase actors that had been identified during the problematisation phase were exposed to the interessement strategies. These strategies were aimed at convincing the actors to accept the identity and role that was imposed on them by the focal actor. Since ANT supports a heterogeneous environment, these actors need not all adhere to the same interessement strategy since they have different interests, e.g., non-human actors may respond differently to an interessement strategy aimed at human actors.

7.3.5.1 Different strategies for interessement

After deploying the mobile payment systems and enrolling the relevant stakeholders to facilitate a mobile payment service environment, QUNU moved to the next step of realizing the Mobile payment network, engaging with the prospective and existing subscribers so that they would adopt and use the mobile payment service.

QUNU had approximately 30 million subscribers at the time that the mobile payment systems were introduced and enrolling them all would require a mammoth interestment process. The initial target, as stated by the previous CEO, of QUNU, was to register 10 million subscribers on the mobile payment platform. This target required the enrolment of several actors who could engage in registering and training the subscribers. This was achieved through the introduction of the Aggregator, the Outlet, the partnering Bank, retailer and the business unit in QUNU responsible for Sales. Each had a specific area that they concentrated on, and at times they overlapped each other's areas, e.g., the Aggregator would focus on a business environment that needed the mobile payment service but was located in a township, whereas the Outlet may have already been active in the township.

The next section will discuss how each contributed to the registration and adoption process of the mobile payment service.

- **MNO's Service Providers (SPs) and Dealers**

QUNU utilised its existing distribution of SPs and Dealer shops as registration points, and for the customers to transact. Most of these shops were located close to business amenities and served mostly the subscribers that resided close to these amenities. These subscribers included individuals in townships, suburbs or rural areas that were located close to the transport systems that allowed them access to these amenities. The Dealer shops assisted the subscribers to register for the mobile payment service; they allowed them to transact and had one or two staff members who would be available to assist subscribers. When the Dealer shop becomes busier during the day, there is a shift in the priority of the staff that assists with the mobile payment service towards assisting the other products and service areas that the dealer shop offers. This was observed during a visit to 3 different dealers' shops by the researcher, which led to the conclusion that the dealer shops have less of a focus on growing the mobile payments network. The Dealer shops are not actively recruiting mobile payment service subscribers the dealer shops only register these customers when the mobile payment service is requested.

- **Aggregator**

The Aggregator had an initial focus of increasing the adoption rate of the mobile payment service. The Aggregator's main focus was on volume. The more registrations they processed, the better the financial incentive from QUNU. To achieve the volumes required, the

aggregator employed additional temporary staff, which they call foot soldiers. The foot soldiers were, in addition to the aggregators' staff, allocated to specific areas to promote the mobile payment service and register the subscribers on the platform. The Aggregator targeted townships, business areas and at times, rural areas.

- **Negotiating with QUNU's staff**

A few weeks before the commercial launch of the mobile payment systems in September 2010, some aggregators started to register QUNU's employees on the mobile payment platform. This was accomplished by visiting some of QUNU's offices, where most of these employees worked, in the major regions of South Africa. The employees received an email from their managers or the division responsible for promoting the mobile payment service. The email informed the staff member that they would receive a financial incentive should they decide to register for the mobile payment service. The financial incentive for the staff members was a meal voucher worth R28. Some managers received an incentive of just over an R100 for encouraging the staff to register for the service. When the staff member entered the area where the registration occurred; the Aggregator educated QUNU's staff member about the mobile payment service and explained the benefits to them. If the staff member was interested, the Aggregator registered them, and then they could claim the reward.

- **Negotiating with QUNU's subscriber market**

Each registered mobile payment subscriber that was enrolled by the Aggregator received a monetary reward and a Starter Pack, a SIM card with airtime that needed to be activated to allow the registered subscriber access to the mobile payment service on QUNU's mobile network. Since most of QUNU's active subscribers had existing mobile devices, some of them used their existing devices to activate and receive the monetary reward, in this case, a Rand value of about R30 on their mobile payment account. These subscribers registered using their existing mobile numbers.

- **Negotiating with the prospective subscribers**

Each registered mobile payment subscriber that QUNU enrolled via the Aggregator received a monetary reward, in this case, R30, and a Starter Pack, a SIM card that needed to be activated, that allowed the registered subscriber access to the mobile payment

service on QUNU's mobile network. They also needed a mobile device. Some prospective subscribers used their own mobile devices, and some used that of family members and friends to activate the mobile service. Once they received the starter pack, they inserted the SIM into a borrowed mobile device to activate the service and redeem their rewards.

- **Outlet**

The Outlet had a different focus from the Aggregators. Although the Outlet participated in increasing the adoption rate of the mobile payment service, its main focus was to manage the mobile payment service requests in most townships, business and rural areas, where there was a lack of access to banking environments. The Outlet went around and explained the service to the patrons while recruiting them as active mobile payment service subscribers. The Outlet's main focus was on the volume of the transactions - more transactions meant a bigger reward paid to them by QUNU. An owner of an Outlet could have multiple outlets in the same area, thus allowing them to maximize the transaction volume. One or two owners per region owned the outlets that were encountered during the fieldwork. This was also encouraged and supported by QUNU since it simplified the management of the Outlets and eliminated unnecessary competition. Interestment strategies amongst outlets also varied. Some Outlet owners depended on QUNU for assistance to market the mobile payment service, and some used their initiatives to grow the mobile payment network. As one owner explained, "*I went around, I distributed some flyers that show them that if you save R10 per day, you can make around R3000 per year...*" (BE_RU1 or **Outlet 1**), these outlet's flyers promoted the mobile payment service as a savings account.

- **Negotiating with QUNU's subscriber market**

The main objective for the outlet, as stated above, was to maximize transaction volume. The Outlet promoted the service in areas such as taxi ranks or business hubs, as observed during the fieldwork. At the taxi rank, there is a lot of informal business activity, and patrons of these informal businesses seldom have access to banking facilities to bank their proceeds for the day. The outlets' staff went around the area and explained to the patrons what the mobile payment service was about and

how beneficial it would be for them to make use of the service. The outlet promoted the service to patrons as well as pedestrians in a particular area.

- **Negotiating with the prospective subscribers**

Outlets also encouraged non-MNO subscribers and subscribers to other networks to adopt the service. The same rewards were given to these subscribers as in the case of the Aggregator.

- **Retailer**

The retailer's main focus was to increase their business activity by allowing subscribers and prospective subscribers to register and transact at their stores. This allowed the subscriber to have access to mobile payment services at a retail store close to their location. QUNU's expectation was that the retailer would also target its customers to sign-up for the mobile payment service.

- **The mobile payment service subscriber**

The newly registered mobile payment subscribers also had some obligatory role in growing the network. Once they had register and started transacting via the mobile payment system, they required individuals who could receive the funds that would be sent, to be in a position to receive hem. In this regard, subscribers had to inform the prospective receiver of their intentions to transact and encourage them to either register for the service or enable their devices to receive the services. A Business Analyst (OE_BA5) in QUNU explained that a farmer, who registered as an outlet for the mobile payment service, informed his farmworkers that they would receive their wages via the mobile payment service and that they could redeem the payment at the farm stall, which belonged to the farmer. The parents and family members residing in rural areas, who have children attending tertiary institutions in the major cities in South Africa, encouraged them to use the service, since it made it easier for the parents to go and transact at one of the local outlets rather than having to go to the nearest bank that could be miles away. This example was reported by a Mobile Payment Regional Manager. While conducting fieldwork in a township, the primary researcher observed that some registered users and non-registered users of the mobile payment service

were only interested in using the service for essential, physiological and some material needs. While tracing the events that led to the redemption of the mobile voucher at a bank the primary researcher observed that the non-registered user used the money to buy electricity and food for their household, bought airtime for a prepaid house telephone and shared the rest of the money with family and the community. What interested these users was the validation SMS that they received on their device to redeem the monetary value. At an Outlet in a township, an Outlet owner (respondent CE_UU2) explained that a number of his clients started to use the mobile payment as a savings mechanism that allowed them to save up to buy material goods either for themselves or their businesses. He mentioned that one elderly mobile payment user was "overwhelmed" to find out that his small change, which he saved daily, grew to a very sizable savings amount. This led to the Outlet owner promoting the mobile payment service as a savings mechanism.

7.3.5.2 Unintended Negotiations

Unintended negotiations occurred when the mobile payment service was used as a savings mechanism. Since **Outlet_01** (BE_RU1) started to promote the service as a savings mechanism, users started depositing money whenever it became available. By doing so, it allowed them to leave the money in a safe place rather than to take it home and have it almost immediately consumed by other needs and wants of the family members (respondent CE_RU2). A representative from the Outlet went around during the day and collected money from mobile payment users. Once they received the money, they completed a receipt form and gave it to the user. This receipt was an acknowledgement of receiving the money. Once the money was received, the representative went back to the Outlet and captured the transaction by transferring money from the Outlet's account to the users' account(s). The representative went to the participating bank and deposited the money received from the user, although the user's account has already been updated, into the Outlets account. During the day, as mentioned and confirmed by the Outlet, multiple transactions could occur. Instead of depositing just one sum, the Outlet would deposit multiple payments into their account while transacting with multiple users. This scenario did not suit QUNU since multiple deposits meant multiple rewards payments to the Outlet. QUNU requested that the Outlet be investigated for fraud. This did not sit well with the Outlet which requested that the regional manager renegotiate its stance with QUNU. The Regional Manager negotiated

with QUNU, and a new process was established for both the Outlet and QUNU to counter excessive deposits from one Outlet via the mobile payment service.

7.3.5.3 Intersement strategies have different impacts on actors and the level of success varies.

At the time of the study, QUNU had a subscriber base of about 30 million (subscribers). Due to the large subscriber base, QUNU deployed different strategies of intersement to attract its subscribers and potential subscribers of other mobile networks, to adopt the mobile payment system. To achieve this task required QUNU to engage with multiple actors which included business units of QUNU, the Commercial bank partner, Aggregators, Retailers, Outlets and registered mobile payment subscribers. The focus of QUNU's business units, the service providers and dealers, was to have the service available when customers request it and to allow for transacting when requested. Active intersement strategies were almost non-existent at QUNU business units. Their main interest was to maximize the number of transactions that earned higher commissions when they sold mobile services and products. The Commercial bank and Retailer that provided the service also had minimal intersement activities. Their main focus was to provide the service for new registrations for mobile payment transactions. The Aggregators had the lion's share of the recruitment drive. One Aggregator stated that in a good month they register between 10 and 15000 mobile payment subscribers. The Aggregator mentioned that at some point during the registration process they realized that the target market, as stipulated by QUNU, was unfitting for the mobile payment service. They discovered that it should have been aimed at the middle class rather than the unbanked, hence the Outlet's decision to market it as a savings account rather than a payment service. The Outlets, in some instances, also included a collection service. They opted to collect the money for savings deposits and provide the mobile payment subscribers with a receipt, whereas QUNU business units, the Commercial bank and Aggregators did not provide these services.

The lack of interest to actively promote the mobile payment service from QUNU business units, Retailers, and the Commercial bank inhibited the intersement process. As mentioned above, because they were focusing on higher commission gains from other products and services there was a lack of active interest in the mobile payment service by QUNU's business units. The Commercial bank and the Retailer could see the lack of return on time spent, which could be up to 20 minutes per transaction, in the current, already stretched, retail environments, and some relegated the mobile payment service to less active periods. The Outlet which started a collection

service could not agree with QUNU that commission should be received per transaction rather than per lump sum deposited. The amount of effort did not justify the reward they received from QUNU.

7.3.5.4 Summary of Interessement

QUNU managed to register almost 1 million subscribers over four years, 2010-2014 through various interessement strategies. Although this was a mere 10% of its initial target of 10 million registrations, it was deemed as an on-going interessement process. In 2014 QUNU relaunched a new version of the mobile payment system that increased the number of transaction points for the subscribers. The relaunched service included transactions via ATMs, point of sale systems as well as online transactions, where subscribers could transfer money from their bank account to the mobile payment account.

7.3.6 Enrolment

Enrolment was a partially successful process since QUNU managed to enrol all the relevant actors and, just like interessement, it was an on-going process. As stated above, a mere one million, mobile payment subscribers were enrolled. From the one million registered mobile payment subscribers, less than 200 000 were actively using the service. This could be attributed to the following observations that were made during the five years:

- There was an apparent lack of interest from some Dealer stores to promote the mobile payment service actively. The mobile payment service, at some stores, was demoted to a lower level activity due to its lower commission value. This impacted the level of service that was rendered to mobile payment subscribers who, at times, had to wait for long periods before being assisted (CE_RU3).
- The Outlets experienced customer service concerns. Outlet 1 waited for almost two months before a receipt book was delivered to their premises. Mobile payment subscriber queries that were logged by the Outlets were not adequately dealt with by QUNU. A query that was logged was left for weeks and was only resolved if the Outlet owner persisted in getting it resolved (CE_RU1 & BE_RU1).
- Mobile payment subscribers that used the payment service as a payment mechanism for family and friends ceased to use it once these family and friends "quality of life" improved, e.g., a mobile payment subscriber who used to send money to a family

member stopped doing so when the family member moved in with them (respondent CE_RU4).

Successful enrolment, as observed during the study includes:

- Students that resided and studied in the cities around South Africa received money via the mobile payment service from their parents. This was a common occurrence in rural areas like Eastern Cape where parents used mobile payment service to send money to their children (respondent OE_MM3)
- Farmers enrolled for the service to pay their farmworkers who in turn drew the money at the farm stall where they bought goods and services. (respondent OE_BA6).
- Some of QUNU's employees continued to use the service to buy airtime (or mobile phone credits) for themselves and their family members.
- Non-mobile payment subscribers actively used the service to receive money, from family members and friends who subscribed to the mobile payment service, to buy pre-paid electricity, food and to use some of it as travelling fees.

7.3.6.1 Inscription

In this section, as with the previous two cases the author will analyse and discuss how the inscriptions identified during the analysis of the consumer case, impacted on the identified objectives for the consumer case. The focal actor's role in engaging these inscriptions and moulding them to interest other actors was also scrutinised and documented in this section. The level of influence varied from one inscription to another in achieving the objectives.

Inscription, as stated previously, often occurs as part of the enrolment process. It is defined as successful agreements between actors during this process to stabilize the actor-network. These commitments, according to Sarker et al. (2006), need to be recorded into the shared memory of the social system through inscription. Aspects that inform inscriptions, according to (Mpazanje et al. (2013) include the Identification of explicit anticipations/scenarios/objectives from which inscriptions start, how the anticipation is inscribed as interest to actors, how it is undertaken by the focal actor, the strength of the inscriptions and their capability to form irreversible networks. During the analysis of the case study, the following inscriptions were identified:

- **Registration process (Cus_Ins01)**

The registration process required a series of steps that could be seen as an inscription process, since the interests of the various actors were addressed. Since the registration process needed to occur first before a subscriber could use the mobile payment service, it can be regarded as a very strong inscription. During this process, multiple agreements were established amongst actors that together helped achieve the objective, as stated in the problematisation phase.

- **Rewards (Cus_Ins02)**

The rewards that were inscribed in the registration process contributed strongly to the adoption of the mobile payment service. Once the registration process was complete, the subscribers received the rewards they were entitled to redeem. The redemption of the rewards in most cases allowed them immediate access to the mobile payment service, thus encouraging usage and in turn strengthening the inscription.

- **SMS (Cus_Ins03)**

SMS (short message service) is a text message that is received when transactions are conducted via the mobile payment service. If payment was made/received or if the subscriber interacted with the mobile payment system, the system sent an SMS to notify the respective parties that the transaction that occurred. Users of the mobile payment service saw the SMS communication as a confirmation of a process that occurred via the mobile payment system, e.g., when a payment was received (via SMS). The user used the content of the SMS to confirm and redeem the monetary value. Thus, the SMS was a very strong inscription.

- **USSD (Cus_Ins04)**

As indicated previously in section 2.6.4.5 USSD allowed the customer to transact in the mobile payment environment. The customer accessed the USSD menu to perform certain transactions, including mobile payment transactions. USSD extended the service functionality of the mobile payment system and allowed the customer to perform various transactions quickly, e.g., checking balances, changing pins etc. It allowed the user to interact with the mobile payment system frequently, thus encouraging the usage and strengthening the inscription. However, it could also, if the USSD application was erroneous, distort the customers' view of the mobile payment service.

- **Starter packs/SIM cards (Cus_Ins05)**

Starter packs contained the SIM or smart card that played a key role in the enrolment process. It allowed prospective subscribers access to other services, including the mobile payment service, on QUNU's network. An Aggregator stated that "*people are only interested in receiving an MNO starter pack*". Subscribers who received these starter packs were allowed to almost immediately start using QUNU's network after a brief activation process. These services included making voice calls; texting and using packet-switched services, provided the subscriber had the appropriate credit to do so. Some subscribers were only interested in having access to multiple mobile networks and saw the opportunity to register for the mobile payment service as a quick and cheap method to gain access to another network. Some subscribers give these starter packs to a family member or friend after registering for the mobile payment service. These starter packs also allowed an individual, who had never had a mobile phone before, the opportunity to access the services of QUNU provided they could source their own mobile devices. This behaviour of the subscribers rendered it a very effective inscription for growing the mobile payment service, as well as QUNU's network, since new subscribers were entering the network. Dealer shops and Aggregators saw the opportunity to gain additional remuneration from QUNU depending on the number of Starter packs they registered. This SIM also allowed the subscriber to be easily identified by both QUNU and the bank since each SIM had a unique number. The benefits for QUNU were not as straight forward as it may seem, since not all starter packs remained active on QUNU's network. Some subscribers used the SIMs for fraudulent activities while others only activated them to deplete the pre-provisioned airtime on the SIM. Starter packs did not always represent a strong inscription, since not all starter packs ended up being activated on the QUNU mobile network. Some SIMs ended up on other networks when the subscriber ported the mobile number.

- **Location (Cus_Ins06)**

The location of the Outlet or Commercial bank determined the level of accessibility to make physical deposits or withdrawals. Access to immediate funds allowed the mobile payment subscribers to use service for whatever their intentions were at the time, and also depositing money immediately alleviated the mobile payment subscribers from the need to carry certain risks. Known locations of mobile payment service providers were also a strong inscription in the consumer environment.

- **Signage/branding (Cus_Ins07)**

The branding/ signage that indicated the availability of the mobile payment service at a location could have both strong and weak inscriptions. Some Outlets, based on their location, prefer not to be branded. When the mobile payment signage was visible from outside their stores, it could be perceived by criminals as a place that keeps money on the premises. This was the reaction of the owner of an Outlet in a Township. Some Outlets that had the signage inscribed the process of transacting at the specific location.

- **Money (Cus_Ins08)**

Money was regarded as the strongest inscription in the enrolment process. It impacted almost all actors in the mobile payment network. The products and services could be purchased from QUNU if funds were available. The Commercial bank held funds in an account that attracted interest income when deposits were made; the Outlet received a commission on all transactions that were processed; the mobile payment subscriber could make deposits and payments. The lack of money/funds could inhibit the activity during the enrolment process.

- **Family Relations Community (Cus_Ins09)**

Access to communities, which included family, friends and different cultural groups, was a key focus for both QUNU and its business partners. It allowed them to expand their business operations into these different environments. More importantly for the Commercial bank, it allowed access to markets that it had found difficult to penetrate, according to an Aggregator.

- **Convenient use of services (Cus_Ins10)**

Convenience and ease of use was a huge selling point for the mobile payment service. This was a crucial inscription for QUNU to nurture since it was seen as a significant factor that contributed to customer loyalty. For QUNU, loyal customers were an important aspect of maintaining profitability in the very competitive mobile industry in South Africa, as reported by an MNO Regional Manager (respondent OE_MM3).

7.3.7 Mobilisation

During the mobilisation phase, representatives and spokespersons were introduced to speak on behalf of the other actors. These representatives/spokespersons had numerous challenges during the translation process and as a result, did not always portray a fair representation of the mobile payment service. This was evident during the observation at two Dealer stores. The dealer stores did not portray favourable intentions towards the mobile payment service and opted for other services that allowed them to maximize their commission payment from QUNU (**Cus_Fail01**). This impacted the level of service that was rendered to mobile payment subscribers.

Not all mobile payment subscribers actively used the mobile payment service. As indicated by Aggregator 1, many individuals only registered to take advantage of the free Starter pack and mobile payment credit. This resulted in many registered mobile payment subscribers but very few that actively used the service, which was an act of betrayal on behalf of the mobile subscribers (**Cus_Fail02**).

The decision by QUNU to allow only their subscribers to make use of the service also back-fired since other MNOs in the mobile payment service environment launched competing services and allowed all the other mobile network subscribers to make use of the service without porting into their network (**Cus_Fail03**).

7.3.8 Irreversibility

Irreversibility was hampered by disloyal representatives or spokespersons and several betrayals (failures). Although strong inscriptions allowed the network to slowly progress, it was not supported by the key actors such as the dealer stores and some registered subscribers. In some of the regions irreversibility was achieved, e.g., rural areas and townships where banking services were lacking. However, in other areas irreversibility was not possible, e.g., in suburbs and business districts that were located very close to banking facilities.

Adding just a few key actors could have stabilized the network to the point where irreversibility could have been achieved in all regions. These key actors could have included retailers that sold fast moving consumer goods (FMCG) and services, such as prepaid electricity and food. In the end the retail partner found it time consuming to promote the mobile payment service and opted out of the agreement, followed by the banking partner. These failed partnerships resulted in new mobile payment ventures between other MNOs and the absconded retail partners.

7.3.9 Summary of the translation process

One of the immediate concerns to address during the translation process was the lack of input into the problematisation phase. Many actors felt that QUNU could have done more to include them in the initial planning and rollout of the service, this could have eliminated many unnecessary mistakes that occurred when the mobile payment consumer network started to evolve. The deployment of different interestment strategies was necessary for the diverse emerging economy that favoured both a formal and informal market system. This allowed for a broader focus but failure to establish the correct target market was costly for QUNU. Prospective subscribers were not adequately informed about the existence of the service when they were introduced to it, so they were not sure of its intended use. This resulted in multiple uses of the mobile payment service by different actors.

Although the mobile payment service is no longer active, it would have required a significant review of the translation process to interest new and prospective subscribers. This review would have had to include different subsidiary services attached to the mobile payment services such as the ability to have access to other services such as buying prepaid electricity and bill payments.

The decision by QUNU to only allow their subscribers to make use of the service also back-fired since other MNOs in the mobile payment service environment launched competing services and allowed all the other mobile network subscribers to make use of the service without porting into the network.

7.4 Consumer environment Structuration process

7.4.1 Structuration entailing Signification

Communicating to the consumer in Multiple Linguistic environments

By promoting the use of the mobile payment service, QUNU unconsciously articulated and reinforced the communication aspect of mobile technology to the consumer market, thus creating an interpretive schema that associated the mobile payment service with the mobile device and its related usage. The resultant action by the consumer, after registering for the mobile payment service, was not necessary to use the service enthusiastically when signed-up since they could have access to a mobile number and its related benefits of communicating subscribers on QUNU's mobile network or other mobile networks. Mobile numbers (MSISDNs) (**Cus_ST01**) thus constituted to the structure of signification since numbers can be classified similarly to text, that is included in the language and tools used during an interaction for communication purposes

(Callahan, 2004, Kabanda, 2011). The association with the QUNU **brand** was also a significant factor for registering since QUNU was one of the well-known mobile network brands in South Africa. Branding (**Cus_ST02**), therefore, can be seen as equating to a structure of signification, since it included the language and text that consumers used to identify the brand) with QUNU. The consumers became aware that the QUNU brand could be used for both mobile payment services and mobile communication.

During the marketing campaign subscribers were exposed to printed flyers and television and radio commercials that described the mobile payment service and how it would work. QUNU also used SMS to introduce the service to its subscriber base. The use of these marketing media (**Cus_ST03**) informed the subscriber about the new service offered by QUNU. The field workers that QUNU employed were exposed to multiple linguistic (**Cus_ST04**) environments in South Africa. Since the country has eleven official languages, many of the field workers could draw from (their multiple linguistic knowledge backgrounds. In the Western Cape region, the field workers were exposed to subscribers that required verbal communication in multiple languages which included Afrikaans, English, Xhosa, Zulu.

7.4.2 Structuration entailing Legitimation Consumer's actions and Interactions (behaviour)

Current and prospective subscribers were attracted by incentives if they signed up for the mobile payment service. New consumers were incentivized with their starter packs and cell numbers when they registered for the mobile payment service. Registered subscribers redeemed and used their incentives or (passed them on to someone else who would have the opportunity to access a mobile network. The incentive to be a mobile subscriber allowed the subscriber to be a registered owner of a cell number, thus contributing to the legitimation structures, since they were now authorized users (**Cus_ST05**) of the mobile network and the mobile payment service. Given the ability to extend the functionality of the mobile device, by including the use of mobile payments also contributed to the structure of Legitimation since it was deemed as an acceptable practice by the consumers to perform mobile transactions (**Cus_ST06**)(Kabanda, 2011).

7.4.3 Structuration entailing Domination

Consumer environment power relations

Consumers or prospective subscribers that did not possess a valid SA ID could not sign up for the mobile payment system (Section 2.8). The Financial Intelligence Centre Act (2001) of South Africa (FICA) prevented anyone from registering that did not have valid identification documents (**Cus_ST07**). The lack of identity papers constrained the subscribers who intended to register for the service, thus contributing to the structure of domination.

The registered subscribers could decide (**Cus_ST08**) the fate of the starter pack, it could be redeemed and be activated on the mobile network, or it could go into storage, thus limiting its use. The role of the subscriber was essential for the actor-network to grow; it shifted the balance of power from the organisation to the consumer. This power play included transacting on the mobile network. The registered subscriber could decide when and how they interacted with the mobile payment service.

7.5 Context Analysis Consumer Environment

7.5.1 Activated Ba: External Communication

Signification structures in the consumer environment allow both the organisation and the business environment to interact.

The interaction occurred in all but one of the ba quadrants, meaning that contextual situations were utilized for signification structures in these three quadrants: Originating Ba, Dialoguing ba, and Systemising ba.

Originating and Dialoguing ba occurred when consumers were constantly engaging with their fellow consumers and mobile subscribers through face-to-face dialogue (**Cus_Sig_Con01**). This allowed the consumers to build trustworthy relationships amongst one other that aided the promotion of signification structures that supported the mobile payment service. This was achieved through communal trading areas like the one that Outlet 1 operated from, in this case, a taxi depot or rank, which promoted discussions between family and friends, other social groupings and institutional settings and branding (**Cus_Sig_Con02**) about the mobile payment service and its related and intended usage.

Consumers, as stated above, were exposed to the television advertisements and radio commercials (**Cus_Sig_Con03**) that allowed signification structures to be promoted in a Systemising Ba context. This allowed the transfer of knowledge and information about the

mobile payment system to be sent via a virtual environment. It also included the text messages consumers received about mobile payment service.

The consumers did not use the mobile payment service for any purposes other than communication and payments, thus little or no interaction occurred in an Exercising Ba context.

7.5.2 Activated Ba: Consumer action and interaction

The context under which legitimation structures were realized in the consumer environment consisted predominantly of Dialoguing and Systemic ba context. Legitimation structures were produced and re-produced predominantly in group activities. The subscriber interacted with a group of field workers that explained the service to them and then decided to either take it up or decline the offer (**Cus_Lit_Con01**). Potential subscribers discussed the service further in their respective social groups and interacted with others in institutional settings like shops, or a pay point for social grants etc. The service was also incorporated in social and other media where subscribers would interact with the mobile operator or other subscribers to understand what the benefit of subscription to the payments systems would be (**Cus_Lit_Con02**). This constituted a Systemic ba context.

7.5.3 Activated Ba: Consumer environment power relations

Power relations were more evident in Originating or Dialoging ba, however Systemic and Exercising ba also played a role. If a subscriber (**Cus_Dom_Con01**) or potential subscriber (**Cus_Dom_Con02**) failed to have any interaction with field workers **Cus_Dom_Con03**, other subscribers (**Cus_Dom_Con04**) or potential subscribers (**Cus_Dom_Con05**) then it could limit the use of the mobile payment system (**Cus_Dom_Con06**), thus allowing an inactive Originating ba to exist (**Cus_Dom_Con06, Cus_Dom_Con02, Cus_Dom_Con03, Cus_Dom_Con04**). These limitations were also brought on by subscribers not having a relevant ID document or some potential subscribers not feeling comfortable that their private personal details would be exposed. The subscriber might still decide to register and use the mobile payment service but for something entirely different. As stated earlier the outlet/agent promoted the service as a savings environment rather than the original intent of the mobile payment system (**Cus_Dom_Con06**) in an Exercising ba context allowing customers not to be constrained by the original intended use of the mobile payment service. Dialoging ba enhanced the platform to inform subscribers and potential subscribers (**Cus_Dom_Con05**) about other possible uses of the mobile payment system (**Cus_Dom_Con06**) like in the case where the sim card was used as a communication

device (**Cus_Dom_Con07**) which in turn allowed access to a Systemic ba environment. Customers engaged in Dailoging ba to inform other customers how to sign up for the mobile payment service and some used the SIM card and other rewards for self-gain rather than for promoting the service.

7.6 Summary

This chapter focused on the data analysis in the consumer environment. The first section introduced the organisational case, the second focused on the ANT analysis of the organisational case and the third analysed the context that was derived from the ST analysis. Tables 7.2, 7.3 and 7.4 provide a summary of the analysis.

ANT Concept	
Case	Consumer
Actor/s	<ul style="list-style-type: none"> • Aggregator/Outlet/Bank/MNO business unit • Current MNO service subscribers • Prospective MNO service subscribers Location of consumers • Type of services - Power/Electricity • Education level of subscribers • Mobile Device • Reward/loyalty initiatives • Registration process • Community • Money
Actor-Network	Evolves around the consumer and their related systems and processes.
Translation	
Problematization	Problematization, for the consumer case, is defined as encouraging the MNO's current base of more than 28 million active subscribers and prospective subscribers of other networks to adopt the mobile payment service by subscribing to the MNO's network.
OPP	The MNO had to recruit actors to act as representatives/spokespersons to target the intended group of consumers to adopt and use the mobile payment service.
Interessement	The initial target was to register 10 million mobile payment subscribers. QUNU managed to register almost 1 million subscribers over three years through various interessement strategies.

	Although this was a mere 10 per cent of its initial target of 10 million registrations, it was deemed as an on-going interestment process.
Enrollment	
Inscription	<ul style="list-style-type: none"> • Registration process • Rewards • SMS • USSD • Starter packs/SIM cards • Location • Signage/branding • Money • Family Relations Community • Convenient use of services
Mobilisation	Not all registered mobile payment subscribers actively used the mobile payment service.
Speaker/delegate/Representative	QUNU employees who registered for the service, QUNU and other network subscribers who registered for the service.
Betrayal	Some mobile payment subscribers, who registered for the service, only registered since the incentive was to have a SIM card that would allow them access to the mobile network.
Irreversibility	Irreversibility was partially achieved in some regions but at the same time hampered by disloyal representatives/spokespersons and many betrayals in other regions. Strong inscriptions allowed the network to progress in rural regions slowly but were less effective in urban regions.

Table 7.1: Data Sources for the consumer environment case.

Structuration Concepts	
Case	Consumer
Signification Structures	Mobile numbers (MSISDNs) (Cus_Sig01) Branding (Cus_Sig02) marketing media (Cus_Sig03) field workers (Cus_Sig04) multiple linguistic environments (Cus_Sig05)
Legitimation Structures	authorised users (Cus_Lit01) mobile transactions (Cus_Lit02)

Domination Structures	FICA regulation (Cus_Dom01) Registered subscribers (Cus_Dom02)
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21 Table 7.3: Summary of Structuration analysis and findings for the consumer environment.

Context Analysis	
Case	Consumer
Originating Ba	(Cus_SIg_Con01): Interaction by mobile subscribers through face to face dialogue. Discussions between family and friends. (Cus_Dom_Con01): Failed interaction by subscribers with field workers.
Dialoguing Ba	(Cus_SIg_Con02): discussions between family and friends and other social groupings. Include communal trading using the mobile payment system (Cus_Lit_Con01): The subscriber interacted with a group of field workers that explained the service to them. (Cus_Dom_Con01): Failed interaction by subscribers with field workers and other subscribers (Cus_Dom_Con06): Dialoging ba enhanced the platform to inform subscribers and potential subscribers about other possible uses of the mobile payment service
Systemising Ba	Cus_SIg_Con03: The use of the mobile device and external media to communicate mobile payment-related transactions (Cus_Lit_Con02): The service was also incorporated in social and other media where subscribers would interact with the mobile operator. (Cus_Dom_Con03): Failed interaction by subscribers with social and other media. (Cus_Dom_Con07): SIM card was used as a communication device which in turn allowed access to a systemic ba environment
Exercising Ba	(Cus_Dom_Con04): Failed interaction by field workers to share information with potential subscribers. (Cus_Dom_Con05): outlet/agent promoted and used a mobile payment system as a savings environment rather than a payment service

Table 7.4: Summary of Contextual analysis and findings for the consumer environment.

Chapter 8 will present the summarized findings of the investigation and discuss the implications of these findings.

CHAPTER 8

Discussion and Implications

8.1 Introduction

The findings and the contribution of the study will be discussed in this chapter. There will be elaboration on the significance and contributions the study has on methodology, theory and practice. This chapter will include shifting from the traditional view of the organisation driving the IS implementation, to a multi-dimensional approach driving the IS implementation. The chapter argues that IS ecosystems should be evaluated on multiple levels to determine how success or failure impacts the Information systems ecosystem, as it evolves.

The findings of this study will be discussed, followed by a theoretical explanation of the propositions in the following sections:

- Emergence of the IS ecosystems success or failure from an ANT perspective
- Societal impact of IS ecosystems success or failure through the ST analysis lens.
- Contextual conditions under which these successes or failures emerged through a Ba (shared space/context)
- The chapter will conclude with the implications to theory, method and practice

The following three tables will provide an overview of the findings from the ANT, ST and Contextual analysis.

ANT Concept			
Case	Organisational	Business	Consumer
Actor/s	<ul style="list-style-type: none"> • Parent company • QUNU business units (e.g., Finance, Fraud and Risk, Marketing etc.) • Call Centre/Customer Care • Regional Field Workers • Network Engineering • SMS 	<ul style="list-style-type: none"> • Reserve Bank – National Payments License • Banking Partner • Retailer • Mobile Device • SIM manufacturers • Outlets • Aggregators • Regulators • Commission structures 	<ul style="list-style-type: none"> • Aggregator/Outlet/Bank /MNO business unit • Current MNO service subscribers • Prospective MNO service subscribers Location of consumers • Type of services - Power/Electricity • Education level of subscribers

	<ul style="list-style-type: none"> • USSD • Business Analysts from the different divisions within QUNU • Project managers from the different divisions within QUNU • External consultants • Development and Support team (both external and internal) • Payment devices • Mobile handsets • SIM cards • Mobile payment system • The CEO • Leadership ideologies 		<ul style="list-style-type: none"> • Mobile Device • Reward/loyalty initiatives • Registration process • Community • Money
Actor-Network	Evolves around the organisation and its related systems and processes.	Evolves around the business environment and its related systems and processes.	Evolves around the consumer and their related systems and processes.
Translation			
Problematization	Is to generate a new revenue stream for (the) QUNU, encourage loyalty and increase current revenue streams through the implementation of the mobile payment service.	The encouragement of the business community to create an environment that will support the mobile payment service resulting in the adoption of the mobile payment service by various industry stakeholders and regulatory bodies.	Problematization, for the consumer case, is defined as encouraging the MNO's current base of more than 28 million active subscribers and prospective subscribers of other networks to adopt the mobile payment service by subscribing to the MNO's network.
OPP	As indicated by the CEO:	The OPP for the focal actor	The MNO had to recruit

	<p>QUNU had to recruit industry experts and external consultants to gain insight into the operating environment of the new products and services, such as the mobile payment service.</p>	<p>was to generate and attract interest from the business community to participate in creating and supporting the mobile payment environment, it meant that the business community must have interests that are aligned closely to the OPP of the focal actor.</p>	<p>actors to act as representatives/spokespersons to target the intended group of consumers to adopt and use the mobile payment service.</p>
<p>Interessement</p>	<p>The Interessement strategies were very successful in the organisation. This can be attributed to the level of control that QUNU could exercise internally.</p>	<p>Different strategies of interessement were deployed to attract potential business partners that would allow QUNU to leverage from its subscriber base as well as potential subscribers of other mobile networks and the retail partners' customers to adopt the mobile payment system. The focus was on attracting well established and stable business partners to focus on growing the network and allowing the prospective mobile payments subscriber to have access to a broader range of services apart from QUNU's offerings. QUNU was aided by prior relations and engagements with the relevant business partners, these were favourable situations it enjoyed during the Interessement phase.</p>	<p>The initial target was to register 10 million mobile payment subscribers. QUNU managed to register almost 1 million subscribers over three years through various interessement strategies. Although this was a mere 10 per cent of its initial target of 10 million registrations, it was deemed as an on-going interessement process.</p>
<p>Enrollment</p>	<p>Was facilitated by policies and procedures that contributed to the success of enrolling the internal actors.</p>	<p>Enrollment was also aided by QUNU's prior relations and engagements with the relevant business partners.</p>	

		Levels of trust existed before successful enrollment.	
Inscription	Identified inscriptions: <ul style="list-style-type: none"> • Parent Company's strategic mandate • QUNU's Policies and Procedures • Mobile Payment System • Rewards Systems for employees • USSD • SMS (organisational) • SIM Card and mobile services. • The Product and service concept document 	<ul style="list-style-type: none"> • Business Partner/Customer Agreements • Rewards Structures for Business Partners • Signage/branding • Business Relations • Access to potential innovations 	<ul style="list-style-type: none"> • Registration process • Rewards • SMS • USSD • Starter packs/SIM cards • Location • Signage/branding • Money • Family Relations Community • Convenient use of services
Mobilisation	Representatives/spokespersons were not treated equally during the mobilisation phase. This impacted the interest of the other actors negatively.	Not all business partners remained with QUNU after the mobile payment service was introduced.	Not all registered mobile payment subscribers actively used the mobile payment service.
Speaker/delegate/Representative	Speakers/representatives were in the form of policies and procedures. These policies and procedures governed the internal stakeholders' roles in implementing the mobile payment system	The partnerships that were successfully established constituted multiple representatives in the business environment. These included partnerships with the Reserve Bank, Commercial bank, Outlets and Aggregators.	QUNU employees who registered for the service, QUNU and other network subscribers who registered for the service.
Betrayal	Occurred where resource constraint or conflicting project deadlines were experienced. Projects with higher financial return were given priority.	Occurred when the business partner demoted the amount of time spent on mobile payment processes. Some partners introduced specific time slots for mobile payments.	Some mobile payment subscribers, who registered for the service, only registered since the incentive was to have a SIM card that would allow them access to the mobile network.

Irreversibility	The successful deployment of the mobile payment system did not guarantee that an irreversible state would be achieved. This was compounded by the drive to produce efficient and effective revenue streams. If a rival new service is more effective and efficient, it could potentially replace the mobile payment system.	Irreversibility was not achieved. On the broader scale, irreversibility was hampered by disloyal representatives/spokespersons and many betrayals. Although strong inscriptions allowed the network to slowly progress, it was not supported by the key actors such as the dealer stores and some registered subscribers	Irreversibility was partially achieved in some regions but at the same time hampered by disloyal representatives/spokespersons and many betrayals in other regions. Strong inscriptions allowed the network to progress in rural regions slowly but were less effective in urban regions.

Table 8.1: Summary of ANT analysis and findings.

Structuration Concepts			
Case	Organisational	Business	Consumer
Signification Structures	Annual report (Org_Sig01), QUNU mandate (Org_Sig02) internal email (Org_Sig03) radio and television commercial (Org_Sig04) staff roadshows (Org_Sig05) bulletins (Org_Sig06) new methods ((Org_Sig07) business documentation (Org_Sig08) group meetings (Org_Sig09) business partners (Org_Sig10) working schedules (Org_Sig11) mobile technologies (Org_Sig012)	multiple media sources (Bus_Sig01) strategic intentions (Bus_Sig02) business environment (Bus_Sig03),	Mobile numbers (MSISDNs) (Cus_Sig01) Branding (Cus_Sig02) marketing media (Cus_Sig03) field workers (Cus_Sig04) multiple linguistic environments (Cus_Sig05)

Legitimation Structures	QUNU's standard operating procedures (Org_Lit01) foreign partner on how to act and interact (Org_Lit02) standard working hour timeframe (Org_Lit03)	partnership (Bus_Lit01)	authorised users (Cus_Lit01) mobile transactions (Cus_Lit02)
Domination Structures	mandate (Org_Dom01) decision-maker (Org_Dom02) sanctioning staff (Org_Dom03) leadership (Org_Dom04) resources (Org_Dom05) fee structure (Org_Dom06)	Partnerships (Bus_Dom01). National Payments license (NPL) (Bus_Dom03).	FICA regulation (Cus_Dom01) Registered subscribers (Cus_Dom02)

Table 8.2: Summary of Structuration analysis and findings.

Context Analysis			
Case	Organisational	Business	Consumer
Originating Ba			(Cus_Sig_Con01): Interaction by mobile subscribers through face to face dialogue. Discussions between family and friends. (Cus_Dom_Con01): Failed interaction by subscribers with field workers.
Dialoguing Ba	(Org_Sig_Con01) the CEO and various other divisions within the organisation engaged with the employees and business partners through collective and face to face dialogue (Org_Dom_Con01) (communicating the mandate at roadshows)	(Bus_Sig_Con01): Collective and a face-to-face meeting between QUNU and the banking partner) (Bus_Lit_Con01) meetings between ex-CEO of QUNU and the commercial bank's board members	(Cus_Sig_Con02): discussions between family and friends and other social groupings. Include communal trading using the mobile payment system (Cus_Lit_Con01): The subscriber interacted with a group of field workers that

			<p>explained the service to them.</p> <p>(Cus_Dom_Con01): Failed interaction by subscribers with field workers and other subscribers</p> <p>(Cus_Dom_Con06): Dialoging ba enhanced the platform to inform subscribers and potential subscribers about other possible uses of the mobile payment service</p>
<p>Systemising Ba</p>	<p>(Org_Sig_Con02) promote multiple significations structures in a virtual environment and include email, radio and online advertisements.</p> <p>(Org_Lit_Con01) communicating the rules of engagement via virtual media internally and with business partners</p> <p>(Org_Dom_Con02) (via virtual media including emails)</p>	<p>(Bus_Sig_Con02) advertisements, media reports, CEO roadshows and interviews with the CEO</p> <p>(Bus_Lit_Con02) Ideas and knowledge</p> <p>(Bus_Dom_Con02) branding and other documents were combined</p> <p>(Bus_Dom_Con04 - pertaining to the process of enrolling new clients</p>	<p>Cus_Sig_Con03: The use of the mobile device and external media to communicate mobile payment-related transactions</p> <p>(Cus_Lit_Con02): The service was also incorporated in social and other media where subscribers would interact with the mobile operator.</p> <p>(Cus_Dom_Con03): Failed interaction by subscribers with social and other media.</p> <p>(Cus_Dom_Con07): SIM card was used as a communication device which in turn allowed access to a systemic ba environment</p>
<p>Exercising Ba</p>	<p>(Org_Sig_Con03) Manuals and business blueprints were effectively communicated and</p>	<p>(Bus_Sig_Con03) Updated QUNU branding to include the mobile payment branding,</p>	<p>(Cus_Dom_Con04): Failed interaction by field workers to share</p>

	<p>processed</p> <p>(Org_Lit_Con02) updating its procedures with the requirements of the business partners</p> <p>(Org_Dom_Con03) (mobile payment blueprint and other manuals)</p>	<p>mobile payment marketing material was combined with that of business partners</p> <p>Bus_Lit_Con03 - discussions on how to implement practical solutions</p> <p>(Bus_Dom_Con01) - procedural information was shared</p> <p>(Bus_Dom_Con03) outlets and the agent's interaction with QUNU</p>	<p>information with potential subscribers.</p> <p>(Cus_Dom_Con05): outlet/agent promoted and used a mobile payment system as a savings environment rather than a payment service</p>
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Table 8.3: Summary of Contextual analysis and findings.

8.2 Discussion of the ANT Analysis of the Case study Findings.

This section will discuss the key findings that emerged from this study. A review of the events that occurred or should have occurred to support the evolution of the mobile payment network will be discussed as part of the findings. Notably the reader will find that there are actors that represent multiple environments. These actors play different roles depending on the environment they represent e.g., the organisation will configure mobile devices on their network so that consumer can use it to access the services the MNO offer.

8.2.1 Finding TR01

Problematisation was predefined.

The problematisation phase for the organisational, business and consumer environments was predefined by the mobile operator's parent company. During the problematisation phase, QUNU had a significant amount of input from sister organisations in other emerging economies that had implemented similar mobile payment ecosystems. This led to the belief that a homogenous environment would be encountered during the implementation and deployment phases. Although the main aim was to generate a new revenue stream for QUNU, and at the same time encourage loyalty and increase current revenue streams, the heterogeneity of the South African economic environment was disregarded. This view of problematisation was not appropriate and led to the alienation of actors and their roles in the network. As indicated previously, South Africa's economy is dual and intertwined with economic activities existing in

both active formal and informal markets. As a result, a combination of mainstream IS, and ICT4D concern emerged. This led to the focal actor introducing an ICT4D based application to a mainstream IS environment. Avgerou (2008) posits that "*authors of the social embeddedness discourse view IS innovation as a locally socially constructed course of action where innovation is studied as a locally constituted process of technology construction and organisational change*". She further notes that its purpose arises from local problematizations, and its course is determined by the way local actors make sense of it and accommodate it in their lives. Having a predefined problem with little or no input from the local actors was a cause for concern and was immediately evident throughout the evolution of the mobile payment ecosystem.

In the financial services environment, the South African banking sector is renowned for competing with the industrialised world to the extent that even better solutions are produced. The concern here was that most South African citizens have at some point or the other been exposed to this world-class payment environment, and now they were suddenly provided by QUNU with what was deemed to be an inferior product. ICT in the formal sector was managed in a mainstream IS environment and the issues and concerns that the informal sector raised were not dealt with the same rigour as in the mainstream IS environment. This can be attributed to the problematization of the mobile payment service being conceived in a foreign environment and not in the hybrid or dual economic systems that were locally represented.

8.2.2 Finding TR02

Lack of relevant information that led to the displacement of interest.

As a result of the predefined problematisation, relevant information was omitted, about the actual South African consumer environment, when the problem was defined. This led to incorrectly identified target groups. The organisation decided that the mobile payment service should be aimed at the unbanked market in South Africa. This led to the displacement of actors interested in the network and hindered the process from bringing stability to the network. Some of these actors attempted to define the problem for the focal actor, e.g., selling the mobile payment service as a savings mechanism. Akrich, Callon, Latour & Monaghan (2002), assert that a model of diffusion supposes an irremediable separation between innovation and its socio-economic environment whereas, on the other hand, the model of intersement emphasises the existence of a bundle of links which unite the object to all of those which handle it. This finding, TR02, concurs with Akrich et al. (2002) QUNU followed a model of diffusion which moved the

technical object to the interior of a society which constitutes a more or less receptive environment. Had QUNU focused more on the relationship and promoted the role that the actors played in the evolving IS ecosystem with the other actors, the mobile payment project would have followed a model of intersement that would have separated the interested actors from the others and the focus would have allowed the mobile payment IS ecosystem to evolve towards serving a common purpose. QUNU realised this mistake and in 2020, together with a sister company purchased the rights to the mobile payment system from its parent company (Shapshak, 2020).

8.2.3 Finding TR03

Entrepreneurialism was ignited during these phases

Outlet 1's owner did not have any means of sustainable income before signing up as an outlet owner. As a result of managing the mobile payment service, the Outlet owner managed to gain access to funds to start a business that sold complementary mobile payment services to the same mobile payment subscribers. This led to the outlet owner opening multiple shops in the same area. As the word spread about the service, many foreigners started showing interest and applied to register as Outlets.

8.2.4 Finding TR04

The lack of customer service

The lack of addressing customer concerns resulted in Outlets and Aggregators losing interest in promoting the service. Outlets and Aggregators complained that they were not adequately supported to expand the mobile payment service network and maintain customer loyalty. The lack of support also impacted on their businesses and resulted in some of them abandoning the management of the mobile payment service due to the level of effort it took to manage and support the mobile payment subscribers. The actor-network is dependent on the ability of all spokespersons to promote the network. If the spokespersons fail to promote the network, it will never attain an irreversible status.

8.2.5 Finding TR05

Increased risk for Outlets

There was signage that promoted the mobile payment service at Outlets, banks and retailers. Mobile payment signage created a concern for certain outlets since it implied that they held cash, and this put them at risk of theft and robbery. Some outlets removed the signage to eliminate such risk, thus reducing the visibility of the service.

8.2.6 Finding TR06

Registration process too long

The retailers complained that the registration process was too long, and it impacted on their daily business routines. The retailer opted to cease registering potential users during peak periods. This caused concern for QUNU since the adoption process was decelerated. The actors that the focal actor recruited to grow the network prolonged the growing process. The process deployed to register the users was too lengthy and impacted adversely on the daily business of QUNU's partners.

8.2.7 Finding TR07

Betrayal by other actors' impact irreversibility

As indicated under mobilisation, and stated by Aggregator 1, mobile payment subscribers did not always receive support from other actors in the network. Retailers had the perception that the registration process was too long, and the commercial bank decided to resign as a partnering bank, which led to QUNU recruiting another banking partner. Registered mobile payment subscribers also betrayed the network by registering only to receive the Starter pack and other rewards. The retail partner also absconded from its agreement and decided to implement its own mobile payment service.

8.2.8 Finding TR08

The chosen rewards systems are not always a suitable mechanism to promote enrolment.

Various factors contributed to diminishing enrolments. One of these factors include the reward system. A choice of different reward system could have continued to promote enrolment. The betrayal of some registered mobile payment subscribers that opted to register without making

any effort to use the service is evidence that these particular reward systems were not appropriate to keep the interest of these subscribers.

8.3 Findings during the ST and Contextual analysis.

The following findings was derived from the data generated by the ST analysis. The structures that were generated during the evolution of the mobile payment system required the existence of a context. Avgerou (2019) posits that the mechanisms through which contextual conditions in IS research are understood to contribute to the formation of IS phenomena fall into three main categories which include functional, behavioural and power-related. As indicated in section 4.4, section these mechanisms equate to Giddens. Signification, Legitimation and Domination structures. The findings in this section are related to question RQ2, How is the mobile payment IS ecosystem influencing or being influenced by contextual conditions.

8.3.1 Finding STC01

Organisational Communication (Signification) via multiple media platforms

The context of the organisational environment excluded participation in an originating ba context. The omission of originating ba played a crucial role in the failure of the mobile payment implementation. QUNU had the opportunity to include stakeholders as early as the conceptual stage, thus allowing both QUNU and its business partners to craft out a service or product that would work for all interested parties. Instead, QUNU took it upon themselves to finalise the mobile payment industry blueprint provided by its parent company for South Africa. It ignored the fact that it did not possess the relevant skill sets, and instead of building a trustworthy relationship with potential business partners, it decided to customise the mobile payment to suit the profile of its mobile subscriber market rather than that of the intended mobile payment environment. This created the perception that QUNU wanted to compete instead of partner with financial institutions. When Dialoguing ba was exercised during the signification structure, QUNU indicated that they were in charge, leaving very little room for negotiation with its business partners. This was also a cause for concern since the business partners were actively using their own resources to promote the mobile payment system.

8.3.1.1 Finding STC02

Business's Communication (Signification)

When structures collide or combine, renewal of structures occurs. Signification structures in the business environment allow both the organisation and the business environment to interact. This result in the renewal of signification structures or the creation of new signification structures, like the mobile payment branding that contained both the QUNU brand and that of the commercial bank. Signification structures in the organisational and business environment can promote the growth of the mobile payment ecosystem, but equally, if the two environments do not reach consensus on ownership of processes and tasks, can inhibit its growth. This was evident where the Outlet owner decided to remove the branding of the mobile payment service for fear of being target by thieves, and when the retailer decided to cease the registration of prospective subscribers. This business communication occurred mostly in Systemic and Exercising Ba and to some extent, Dialoguing Ba.

8.3.1.2 Finding STC03

Consumer's Communication (Signification)

As with the organisational case, technological resources such as SMS provided an information-rich source to inform subscribers what to expect from QUNU when it came to information about products and services. The subscribers were introduced and kept informed about many aspects of the mobile payment service through various media. These media were structures or knowledge assets that allowed the subscriber and potential subscribers to understand the meaning of what the mobile payment environment entailed. Since the focus was to build awareness of the mobile payment service in the consumers' case, a lot of the activities revolved around the building of meaning and understanding of the mobile payment service environment. QUNU used multiple media initiatives to inform consumers about the mobile payment service. Consumers shared this new gained explicit knowledge with family, friends and in a communal environment. The owner of Outlet 1 actively walked around the taxi rank/depot to promote the mobile service as a savings platform rather than a payment platform, by engaging in face-to-face and group discussions with people. It allowed the owner to build trust amongst individuals and members of the community to start saving their money using the mobile payment system. Contextually Originating, Dialoguing, Systemising and Exercising Ba all played an important role in the adoption of the mobile payment service or the evolution of the IS ecosystem. Originating and Dialoguing ba was important to build trust around the adoption and use of the service,

especially in the context of South Africa with its multicultural, heterogeneous environment. (Systematic ba was a familiar context for the consumer since they interact daily with the mobile payment device.) They knew how mobile technology worked and what to expect from it. The Consumer environment had very little or at times, no activity, in the Exercising Ba context and this could be attributed to the fact that it did not seem necessary for such a context to exist. This is due to the mixed literacy rate of the market QUNU targeted. Exercising ba could have played a pivotal role to strengthen the consumers' relationships with business and organisations by allowing the consumer to actively participate in defining the intended services that they expect from the mobile payment systems; instead, QUNU dictated what and how services should be introduced.

8.3.2 Finding Actions and Interactions (Behaviour/Legitimation)

8.3.2.1 Finding STC04

Organisational Actions and Interactions

The Organisational environment excluded participation in an Originating Ba context either because it was not necessary for such a context to exist or QUNU was mandated by the parent company to implement the mobile payment system. Individual employee consultation was non-existent during the communication and planning phase. The organisation dictated how these structures should be reproduced and in what context.

8.3.2.2 Finding STC05

Business Actions and Interactions

As indicated in the organisational signification structure, QUNU, with its knowledge of the mobile telecommunications field had challenges transferring their market insight to the foreign partner to allow them both to envisage how the implementation of the mobile payment systems would suit the South African market. The production and reproduction of Legitimation structures in the business environment impacted the standard processes of the business partners as well as those of QUNU. Business partners were exposed to new methods and procedures that were characteristic of a banking/financial and telecommunications services environment. This posed a challenge for the business partners since they had to adhere and adjust to new legitimation structures. Not all business partners were in a position to adjust to the partnership arrangements. QUNU's biggest challenge was with the foreign partner who struggled to recognise the market conditions that QUNU operated in. Exercising Ba was the main context for

the interaction with the business partners, since QUNU trained most of their staff to operate the mobile payment system and its processes.

QUNU's interaction with the foreign partner occurred primarily in a Systemising Ba. A lot of email communication was conducted. No interaction occurred in a Dialoguing ba or Origination Ba. This is evident with the concerns and issues raised by the QUNU employees regarding their working relationship with the foreign partner. A similar relationship evolved between QUNU's technical team and the information they received from the field workers when it came to customer queries. These situations led to multi occasions of miscommunication that resulted in a mobile payments system that was not conducive for some environments to adopt.

8.3.2.3 Finding STC06

Consumer Actions and Interactions

Although there was evidence that new structures/knowledge assets were produced and old ones re-produced in Originating and Exercising ba, it was not as frequent as in Dialoguing and Systematic Ba. In the case of Outlet 1, where the owner actively promoted the service on a face-to-face basis, it was in the group interaction where it gained prominence as a legitimate service since people became aware of who the clients of Outlet 1 were and felt comfortable with the communal savings platform. One of the reasons for their adoption could also be that they felt comfortable with the process since communal savings initiatives, like the stokvel where communities of people save money in the same account, are common in South Africa. The outlet owner created a new usage pattern for the mobile payment service by using it as a savings tool for business owners. Originating and Exercising ba was an important context to foster interaction among proponents of the IS ecosystem. Originating Ba might have resulted in some gatekeepers, like the CEO in the Organisational case, that can hold up the evolution of the IS ecosystem.

8.3.3 Findings: Power Relations (Domination)

8.3.3.1 Finding STC07

Organisational power relations

Although the parent company and the CEO played significant roles in governing resources, they were not always in a position to dictate what the best course of action was to implement the mobile payment systems. This was evident in the dealings with the foreign partner. What also

emerged was that all stakeholders had some level of dominative leverage that impacted the implementation of the mobile payment system. This resulted in many delays since agreements could not be reached. The CEO's influence was limited to the organisation's daily operations. Internal communication occurred on almost all contextual levels. The CEO had face-to-face meetings with some individuals, engaged with the employees at roadshows, emails were sent to employees to indicate the strategy that the organisation focused on concerning the mobile payment service. Field workers trained and informed internal staff about the service through internal training sessions, meetings and media sources.

8.3.3.2 Finding STC08

Business power relations

It was evident that the business environment did not want to be dictated to by QUNU. The retail and banking partners ceased all mobile payment transactions during peak business hours. Power relations in the business environment occurred in the Dialoguing Ba where QUNU dictated how the mobile payment system should be implemented. The primary contexts to negotiate these power relations were in the Systemic and Exercising Ba where the business partners, instead of aligning their processes and methods with QUNU, decided to implement their own since QUNU did not allow for flexibility during the initial negotiations.

8.3.3.3 Finding STC09

Consumer environment power relations

The registered subscribers' interactions with the mobile payment environment could equally promote or constrain the evolution of the IS ecosystem. The subscribers, whether registered or unregistered, had some level of dominative leverage in their environments on how to proceed with the implementation of the mobile payment system. If the fieldworker did not interact with the subscriber, then a constraint would be placed on the evolution of the IS ecosystem. If interactions did occur and the registered subscribers' demands were not met, that situation can constrain the evolution of the ecosystem. As indicated above, with the action and interaction of the consumer, Dialoguing and Systematic ba are important contexts to promote the mobile payment environment, from a consumer perspective. The consumers' involvement in the mobile payment service was critical and should have been acknowledged as such.

8.4 Propositions

The next section will elaborate on the relationships among concepts by discussing how they relate to the IS field and how can these relationships be further explored. Part of doing this research was to find out whether a theory's proposition conforms to empirical evidence or data. Some theoretical propositions are in the form of assumptions; others can be tested with empirical data.

8.4.1 Proposition PP01 (Derived from RQ1 - evolution of the ecosystem)

When IS organisations engage in the practice of rigid context-neutral systems implementation life cycle methodologies, the beneficial evolution of the IS ecosystem will be hindered.

During the implementation and roll-out phase of the mobile payment system, it was clear that the parent company dictated the functionality of the mobile payments system. Given the same blueprint of the ICT initiative the success of its implementation differ from economic systems to economic system, especially between the developed and developing worlds, using conventional implementation methodologies. If developed country organisations introduce or try to introduce IS solutions in countries with hybrid economic systems where both ICT4D and Mainstream IS components are present, do not have a clear objective of how the ICT initiative will serve the market and continue to proceed with the implementation. , the likelihood of it failing increase significantly due to the lack of context specific analysis to determine the suitability of the ICT initiatives in the specific country or market context. The organisation should find a need and clear objective for the initiative, reinforcing the need for context-specific requirements analysis. Davison & Martinsons (2016) argue that context is king when it comes to Information Systems (IS) research and state that a wide variety of contexts exist that may be classified in terms of their geographical, cultural, organisational and human characteristics. Similarly, Schilit and Theimer, who introduced the term "context-aware" in the first work relating to the subject, refer to context as "*location, identities of nearby people and objects, and changes to those objects*" (Dey, 2001; Schilit, Adams, & Want, 1994; Schilit & Theimer, 1994). In the behavioural science, context, according to Cappelli and Sherer, is portrayed as "the surroundings associated with phenomena which help to illuminate those phenomena, typically factors associated with units of analysis above those expressly under investigation" (Johns, 2006). Avgenou (2001) advocate that IS studies should go beyond the rational technical actions of professional experts and managers and should consider the institutional forces that necessitate or legitimate the action. The relevance of contextual analysis is equally important for academics and professional practice. This is further reinforced

by the Heeks argument about developed country academics (Heeks, 2002), that treat developed and developing world data as similar, and expect a similar result, instead of applying context.

8.4.2 Proposition PP02 (Derived from RQ1 - evolution of the ecosystem)

When relationships or partnerships in an IS ecosystem are severed or discontinued, it leads to the enhancement of the IS ecosystem or the creation of a new IS ecosystem.

Akrich et al. (2002) note that the fate of the innovation depends on the active participation of all those who have decided to be part of its evolution. Betrayal in the IS ecosystem can hinder the growth of the ecosystem but can also result in new "stronger" actors becoming available to be enrolled in the network, thus creating a stronger support system for the network. Betrayal also allows for the development of a bigger network or establishment of a new ecosystem since the resigned actors may want to form an innovation network that may impact the one they resigned from. The banking and retail partners were changed multiple times during the implementation of the mobile payment system. In some cases, where agreements were terminated with partners, the partner decided to establish their own mobile payment system.

8.4.3 Proposition PP03 (Derived from RQ2 – Contextual impact)

When IS organisations recreate the innovation wheel, the process of doing so may transcend the organisational boundaries and can be a valuable mechanism for society to renew itself since new methods and tools for skills development are conceived.

Avgerou (2008) posits that even if the technologies implemented in an IS project are common and widespread, the local IS implementation experience constitutes an innovation for the organisation undertaking it and may well constitute innovation for its socio-economic context. In contrast to the Avgerou (2008) statement, it took QUNU some time to adopt the mobile payment technology, and their indecision can be attributed to the well-established world-renowned banking sector in South Africa. Common and widespread technologies adopted in an IS project may result in a waste of resources if the innovation that the organisation has undertaken is also common in the specific context. However, these common and widespread innovations made their way in areas where society did not previously see it fit to make use of the ICT applications extensively. During the pandemic that started in 2019 existing ICT applications allowed society to renew itself in the way we operate daily. Online meetings and bookings and ordering became the norm, delivery services for almost anything is at the order of the day.

8.4.4 Proposition PP04 (Derived from RQ2 – Contextual Impact)

When IS organisations recreate the innovation wheel, resources are wasted, but the process can be a valuable tool for skills development.

During the initiation of the mobile payment service in QUNU, the organisation went through a structural change in ownership. A partner company increased its stake in QUNU to become the parent company and the majority shareholder. This change of ownership occurred during the 2008/2009 period. Two years earlier, the parent company introduced the mobile payment service in a developing country that, today, is a resounding success story. That success could not be emulated in a hybrid economic market since the contextual conditions were vastly different. However, the implementation process yielded some valuable learning and skills development opportunities. Although South Africa is renowned for its banking and mobile industry the mobile payment initiative allowed the outlet owner to development some new skills and business ideas that was not previously available without the owner working in a bank or in the telecoms environment.

8.4.5 Proposition PP05 (Derived from RQ1 - evolution of the ecosystem)

When top management support and understand the ecosystem that the IS initiative has given rise too, the ecosystem prospers.

Although it is argued by Ngwenyama & Nørbjerg (2010) that top management support is not necessarily required for successful IS project implementation, it is however essential that such structures exist for continuity purposes for projects of a long term nature. From the initiation of the mobile payment service by QUNU, the organisation was led by three different CEOs, each with their own priority list. The first CEO did not have the mobile payment service as a priority. This could be attributed to his impending retirement. The second CEO initiated the development and implementation of the mobile payment service but shifted focus from stabilising the systems to encouraging adoption. The third and current CEO reprioritised the mobile payment systems environment and commissioned a redevelopment of the mobile payment systems that were aligned with QUNU's existing operating environment, rather than focusing on a system that would be built purely from a developing country perspective. Although the new system was eventually decommissioned the same CEO announced in 2020 that they acquired the rights for the mobile payments system from their parent company indicating his support to learn more from IS ecosystems where the mobile payment system has been successfully operating. The CEO, as a focal actor, will be in a better position to understand the mobile payment ecosystem and may introduce inscriptions that will become irreversible. Thus,

although top management support is not required for IS systems implementation, it is required to stabilise an environment of which those systems will form part or where it will be integrated.

8.4.6 Proposition PP06 (Derived from RQ1 - evolution of the ecosystem)

When the ecosystem is actively evolving other elements of development like entrepreneurialism can be ignited.

Outlet 1's owner, did not have any means of sustainable income before signing up as an outlet owner. As a result of managing the mobile payment service, the Outlet owner managed to gain access to funds to start a business that sold complementary mobile payment services to the same mobile payment subscribers. This led to the outlet owner opening multiple shops in the same area. As the word spread about the service, many foreigners started showing interest and applied to register as Outlets.

8.5 Revisiting the Research Questions

How does the mobile payment IS ecosystem evolve in the hybrid economic conditions in South Africa? (RQ1)

QUNU, being a market leader in its industry in South Africa, had a strong sense of belief that they could just introduce the mobile payment system, and it would diffuse throughout its customer base. However, regulatory requirements impacted on their diffusion strategy. They were further pressured by the parent company to go ahead with the introduction of the mobile payment service. Their change of strategy meant that partnerships needed to be built with businesses and customers to endorse the evolution of the mobile payment system in a heterogeneous economic environment that could boast some of the best banking systems in the world. Although QUNU was aware of the importance of the other actors, it still enforced some of its methods and ways onto them. Some actors found this tactic very intrusive and opted to abandon the partnership, with some even starting their own mobile payment network. The mobile payment service could not be sustained and eventually it was terminated in 2013.

How is the mobile payment IS ecosystem influencing context or is being influenced by contextual mechanisms? (RQ2)

QUNU introduced the mobile payment system into a heterogeneous and constantly changing environment. Each change to the environment impacted the existence of the mobile payment system. The changes that QUNU proposed also impacted the environment. As the ecosystem evolved, negotiations with the actors occurred in multiple contexts that ranged from virtual to

individual level. Each contextual setting was reconfigured depending on the impact of the mobile payment decision-makers and in turn, these impacted the mobile payment environment. The context was not static, and as the mobile payment system evolved so did the contextual setting.

8.6 Reflecting on the objectives

In section 1.5, research objectives were established for this study. First, the researcher identified an apparent theoretical gap in the prior research relating to evolving IS ecosystems. This study explored that gap and highlighted key components through the literature review, ANT, ST and Contextual data analyses that impact the evolving IS ecosystem.

Second, IS ecosystems have been under-researched in the prior IS literature. Apart from this study, that adds to the IS ecosystem research, there remains an opportunity to grow the large-scale IS ecosystems implementation environment.

Third, this study indicated that the mobile payment system was implemented to serve the informal or developing component of South Africa's economy. The IT artefact was designed and implemented by the developed component of the South African economy. The requirements were handed down to QUNU from its parent company since they deemed South Africa to be entirely in a developing state. QUNU employed a mainstream IS approach to implement the mobile payment system with very little interaction with the informal sector. It resulted in decommissioned system. The lack of understanding of the informal sector prompted QUNU to acquire the mobile payment systems from its parent company to prevent future failures. This study indicates the usefulness of studying the hybrid economic and environment and its contextual influence on the IS ecosystem, thus bridging the knowledge gap.

Fourthly, based on the review of the prior research, there is a methodological gap. This research highlighted the importance of using a multidimensional theoretical framework to explore the evolution of the IS ecosystem. It allowed for a broader, yet deeper introspection into the evolving phenomena. Actor-Network Theory (ANT) was chosen as the theoretical lens to generate a deeper understanding of the phenomena, and ANT will facilitate the answering of the first main research question (RQ1). Opting to use ANT for this study facilitated both the sensitising and enlightening aspects of the research. ST provide a valuable encompassing perspective of multi-level engagement amongst actors from the different environments and

points to meaningful insight for future interventions (Ogden & Rose, 2005). Although prior research indicated that ST and ANT could be used as complimentary theoretical frameworks agap exist in enlightening the research community how context can be framed in support of ANT and ST. ST with the support of the concept of was used to answer the question,” *How is the mobile payment IS ecosystem influencing or is being influenced by contextual conditions? (RQ2)*”, by elaborating on the actors' awareness of the context where the structuration process has occurred (knowledgeability of the agent).

Lastly, this study, given that an empirical gap was identified, contributes to the rigorous research that is lacking in the prior literature on the IS ecosystems phenomenon as a whole. It also allows for the interplay between ICT4D and mainstream IS noted by Sahay, Sein & Urquhart (2017) as a pressing concern in IS research due to the lack of it.

8.7 Implications

8.7.1 Implication to theory

- When problematisation is predefined, the impact of IS ecosystem can be miscalculated in countries that have experienced economic transitions when they move from one economic system to the other. As a result, the full impact of the initiative does not materialise and is undermined by emergent factors that could have been identified before the launch of the IS artefact. This renders the problematisation phase as a critical phase to predetermine, rectify or adjust implementation strategies. Dividing problematisation into micro, meso and macro phases, depending on the scale of the project, may improve the chances of achieving project objectives. Heeks (2002) argues that ICT design often happens remotely in industrialised countries and often dominates the domain of developing country information systems. He states that this domination is partly due to the economic prosperity and global bargaining power that industrialised countries possess and the cultural notion in developing countries that imported goods are superior to local products or services. What might be a simple implementation in one environment might end up being an implementation nightmare in another, when the IS ecosystem as a whole is taken into consideration.
- As the actor-network grows and economic development occurs, it becomes imperative to implement a mediation process/methodology to allow IS implementations to transition into

mainstream IS, in transition or hybrid economies. This process may act as a mechanism to streamline the transitioning process in a heterogeneous environment. This transitioning can be a slow process of discovery, since the economic transition is slow and only a few newly industrialised economies exist at any one time with the perfect heterogeneous environment to allow for an in-depth study on the process.

- Spokespersons are important for the promotion and survival of the actor-network. Akrich (1992) states that *"it is only when the script set out by the designer is acted out – whether in conformity with the intentions of the designer or not – that an integrated network of technical objects and (human and non-human) actors are stabilised"*. If actors that act as spokespersons are not aware of their role in growing the actor-network, the existence of the network will not be consolidated and will prevent possible learning and growth opportunities to understand the environment. Achieving alignment of Spokespersons roles in an IS ecosystem remains a challenge.
- Signage is classified as an inscription and inscriptions represent the successful agreements between actors during the enrolment process to stabilise the actor-network. The strength of the inscriptions and their capability is to form an irreversible network. Inscriptions, apart from being successfully agreed, can have a negative impact on the actor-network since they can give rise to unwanted network elements, like the signage that indicate the presence of a mobile payments service at the premises of the Outlet may attract criminal activity that can have an adverse effect on the actor-network. Inscriptions can represent irreversibility and break down of the network simultaneously, thus stalling the network.
- Since the organisation's focus was to introduce the mobile payment systems, as per the request from their parent company, in a newly industrialised/hybrid economy, a new set of objectives was required, that was aligned with the information requirements suited for the heterogeneous nature of the hybrid economy. The organisation could not define how the product/service would be positioned in the hybrid economy and this resulted in several stakeholders being confused. Again, the opportunity arose for the organisation to establish the level of interaction, be it on micro, meso or macro level, that was required to define problematisation; this might have made provision for more detailed information to be made available to the relevant stakeholders.
- Studies around actor-network network betrayal are not as prevalent as actor-network

development. The finding indicates that more emphasis should be placed on studies that focus on ANT betrayal and its context. Properly defined problematisation can eliminate betrayal concerns if adequately defined. Betrayal can also foster a knowledge transfer, since new knowledge can be applied outside the actor-network.

- Problematisation did not evolve as QUNU anticipated. Unrelated network elements from other environments impacted QUNU's problematisation process. The defining problematisation in a heterogeneous environment was a challenge since multiple network elements impacted the process.
- Not all actors were kept enrolled; as a result, the value of the loss of these actors is not immediately visible. This can be concerning since the actual value of certain key actors may be understated.

8.7.2 Implications to Practice

Organisations spend massive amounts of capital on ICT initiatives in economies deemed as developing countries. These organisations ultimately failed as a result of a lack of understanding of the economic state of the country or region. This is often the case where organisations attempt to cross-pollinate the different countries, or industries they operate in, with successful ICT initiatives that were implemented in homogenous economic environments. Cultivating success of ICT implementations in heterogeneous environments can create a favourable environment for cross-pollination of ICT success. Newly industrialised economic environments harbour a wealth of different factors that may impact ICT4D initiatives and may allow for a more in-depth learning experience for the organisation.

Opportunities can arise to bridge the gap or to create a mediation process to allow ICT4D implementations to transition to mainstream IS in hybrid/newly industrialised economies. This means that project implementation life cycles, including those that have evolved into hybrid life cycles, e.g., scrum and agile methodologies, will continue to evolve to allow for multi-level (micro, meso and macro) project implementations. This is evident with the number of research articles in recent years that focused on project management in multiple environments.

Spokespersons are important for the growth of the network and maintaining the relationships among network elements can be costly for organisations. Organisations should foster

collaborative opportunities amongst network elements and seek other initiatives to keep spokespersons stimulated to serve the actor-network. These include spokespersons in and outside the organisational environment.

Successful inscriptions require support activities from other actors to prevent them from occupying dual roles, that of network promoter and that of network eliminator.

The notion that one size fits all or "if we built it, they would use it" is concerning for organisations operating in hybrid economies. This can, and as indicated in multiple academic research, impact the implementation relevance of the system.

The cost of deriving business benefits from partnerships can be costly and time-consuming. Although issues may arise from an implementation process, these costs can, however, be minimised if objectives are set that include all relevant stakeholders. Proper agreements can prevent business partners from stealing ideas and starting their own networks.

Reward systems are a requirement to keep a network growing. The organisation requires various initiatives to reward its business partners, since their interest in the network all differ.

8.7.3 Implications to Method

Traditional contextual analysis focuses on the environment; here the author proposed a different view on contextual analysis that may benefit the future contextual analysis. The limitation to delve deeper into the data sources with the inductive method led to the emergence of elements of the abductive approach being deployed that governed the research enquiry which, as stated in chapter four, and reiterated by Ngwenyama (2019), is concerned with developing understandings and explanations of "the skilled accomplishments of competent social actors, drawing on the mutual knowledge that the actors use to make sense of their activities". Although a robust explanatory sensitising result has been achieved, the author is of the belief that part of the study employed elements of phronetic research. For example, during the analysis of the consumer case, it was discovered that the signage was removed at a particular outlet that offered the mobile payment service. This was discovered after the taken-for-granted beliefs, socially relevant influences and social conditions that can explain the events, decisions or states-of-affairs had been intensely scrutinised (Ngwenyama, 2019). It was important for the Outlet owner not to advertise the business like a bank or payment point, since that could attract possible crime to their business that would in turn negatively impact on the business itself and the lives of its

clients. Given South Africa's crime statistics, QUNU did not consider the impact of rolling out the mobile payment system on the wellbeing of human beings. Given this consideration, it may be worth focussing future research on the phronetic research approach to abstract some more detailed contextual data and how they impact the value and well-being of the actors participating in the evolution of an IS ecosystem.

8.8 Conclusion

This chapter was devoted to the interpretation of the findings that were derived from the detailed analysis of three cases or environments. The interpretation led to a realisation of how differently the mobile payment ecosystem evolved in different economic environments, and how different implementation strategies were required when looking through the ANT lens. This indicates that, although the implementation was successful in some environments like the organisational environment, when extended beyond the borders of the organisation, the power dynamics change; even the least expected power player has an equal impact on the evolution of the actor-network. Another aspect that is highlighted is how the mobile payment ecosystem impacts society and how the structures, governed by the knowledgeability of the agent, was impacted by time and space during the evolution of the mobile payment ecosystem. The chapter also highlighted how context (time and space) as argued by Dilley (1999) is "is both constitutive of social action and itself the outcome of social action, and it is both a generative principle and a resulting outcome". Thus, social action reinforced the notion that context is a social structure which is identical to Giddens duality of structure theorem. The chapter highlighted the total research effort. The research questions were revisited, and the research contribution was discussed.

In Chapter Nine, after an evaluation of the research, limitations of the study are pointed out, and opportunities for further research are discussed.

CHAPTER 9

Theoretical Integration

9.1 Introduction

The purpose of this chapter is to evaluate the conduct of the study. The evaluation is based in the first instance on the proposed framework of Barrett and Walsham (2004) on how interpretive case studies can be evaluated. Klein and Myers's (1999) propose a set of principles for conducting and evaluating interpretive field studies. Although the original intention was to use the set of principles as a guide, many researchers in interpretive field studies have used it as a checklist to guide their research. Barrett and Walsham, however, examined how contributions are established in interpretive case studies and conclude by providing some suggestions as to how IS researchers can make improved contributions from interpretive case studies. Their proposed framework consists of of following key concepts for evaluating contributions which are derived from previous work done by Locke and Golden-Biddle (1997), Latour 1987 and Walsham 1995b:

- Structuring intertextual coherence,
- Problematizing context for contribution,
- Positioning as translating interests, and
- Qualitative generalizations as content contributions

In the second instance the study is assessed using the key features of actor-network theory and structuration theory; how combining the two approaches impacted on the study and the challenges derived from using these approaches to conduct empirical research in the field of IS.

9.2 Structuring Intertextual Coherence

There are two processes that are in tension with each other, namely structuring intertextual coherence and problematizing context (Locke and Golden-Biddle,1997). Constructing intertextual coherence refers to the need for texts to establish contribution by re-presenting and organizing existing knowledge to form a context that will reflect the consensus of previous work. What has been written concerning the topic under investigation, how deeply it has been discussed and what are the deviations and similarities? The deviations and similarities support the problematisation process but can develop tension for authors since they must subvert or problematize “the very literature that provides locations and raisons d’etre for the present efforts”.

Three levels of intertextual coherences are suggested by Locke and Golden-Biddle's (1997) analysis that is as follows:

- Synthesized coherence focuses on drawing connections between works and investigative streams not typically cited together, to suggest the existence of the undeveloped research areas which imply that researchers working in different areas are not aware that their work points to common ideas.
- Progressive coherence indicates “networks of researchers linked by shared theoretical perspectives and methods working on research programs that have advanced over time” highlighting cumulative knowledge growth and construction of consensus amongst researchers.
- Non-coherence intertextual fields focus on finding “referenced works that are presented as belonging to a common research program but as linked by disagreement”. Multiple viewpoints are generated around the same area/topic.

This study structured intertextual coherence through the deployment of all levels of intertextual coherence.

9.2.1 Synthesized coherence

This (research) study, according to Gregor (2006), was of an exploratory nature and an extensive exploration process was gone through to define a theoretical framework that was adequate to explain the phenomena under review. The work of Giddens and Latour was consulted, popular amongst exploratory researchers, to provide this study with the theoretical basis for its enquiry into mobile payment ISIS ecosystems success and failure, as indicated in Chapter 3, the Research Framework. Although, the concept of contextual variability was partially explained in ST the author opted to include the work of Nonaka and Takeuchi (1994) to provide the study with the basis to explore how context influences successes and failures of these large-scale ecosystems.

This study uses three theoretical frameworks, as indicated in figure 4.6, that have been combined for the first time, to explain phenomena in the IS domain. This is reflected throughout chapter 4. In addition, the work of researchers focusing on large-scale systems success or failure, were explored, like ERP systems (Ngai et al., 2008; Ram & Corkindale, 2014), and their findings were scrutinized and discussed to highlight similar impact or possible impact on mobile payment IS ecosystem.

9.2.2 Progressive coherence:

As indicated in the previous section the work of Anthony Giddens and Bruno Latour has often been associated with the study of IS failure phenomena. The current scholarly view on ISIS ecosystems and IS success and failure were explored and discussed and then mobile payment systems as the base of ISIS ecosystems were extensively explored to explain these phenomena. All three areas were combined to broaden the understanding of the evolution of IS/TS success or failure, its social impact and the contextual variability associated with it. The cumulative scholarly literature on IS success and failure, ST and ANT, were consulted, to broaden the understanding of ISIS ecosystems failure and the notion of Ba (shared space/context) to further add to the body of knowledge. This is evident throughout Chapters Two and Three.

9.2.3 Non-coherence

The discussion on context using ST in the Theoretical framework area was very vague, which made it less definitive to explore the phenomena further; Nonaka's work on the knowledge-creating company has strong instances of disagreement with Giddens work on structuration. Through the exploration of how context is applied in other disciplines, the work of Goa (2007) was drawn on, that explains the similarities between Giddens and Nonaka's work, to extend the theoretical framework by combining multiple theories, and thus to find a fit with what the research set out to achieve.

9.3 Problematizing Context for Contribution

Locke and Golden-Biddle (1997) identify the following three ways of problematizing an intertextual field:

- **Incompleteness** refers to text that claims the existing literature is not finished and that the present article will further develop or specify the topic under review.
- **Inadequacy** is when the text claims that the existing literature does not sufficiently incorporate the different perspectives and views to better understand the phenomena under investigation
- **Incommensurability** focuses on articles that suggest existing literature overlooks different and relevant perspectives and that the claims being made are inaccurate.

9.3.1 Incompleteness:

The motivation for the study was presented in Chapter One where the scarcity of IS ecosystems success or failure research in a heterogeneous context was highlighted. The incompleteness of this sort of research was elaborated on in Chapter Two. It was found that ISIS ecosystems are seldom discussed in a holistic environment that includes external subsystems that extend beyond the organisational boundaries.

9.3.2 Inadequacy:

In addition to the incompleteness, the current scholarly research of IS failure is, in most instances, one dimensional. It either discusses the Failure from an organisational or adoption viewpoint, or in multiple studies that focus on different aspects of the phenomena, it is often over different time frames. IS ecosystems success or failure have never been discussed or explored coherently in a research environment that includes all sub ecosystems of the phenomena. This is a novel project that attempts to draw on the interrelated nature of IS ecosystems success or failure.

9.3.3 Incommensurability

As a result of the inadequacy, a shallow theoretical foundation is created on which the claim is based, and the theoretical foundation became open for scrutiny and almost immediate fallacy. Although success or failure factors are often related to contextual differences, the level of contextual variability can always be questioned. The claim might be, for example, made in a developing country context but then aspects of the developed county context are also included that render the claim questionable. An example could be a social activity (performing a mobile payment transaction); this may occur late at night on the street in a low-income area of a large city, a setting for violent crime and extreme racial-economic inequality. The same activity occurs throughout the day in the backyard or anywhere on the premises of a large house or the street in an affluent suburban neighbourhood in a social setting of relaxation and leisure, surrounded by trust and emotional closeness and safety, with different contextual meanings, the same activity or behaviour may have different consequences (Neuman, 2013).

9.4 Positioning as translating interests

To translate interests the following positioning techniques were used, which are described in below.

9.4.1 Framing

The conclusion of the contribution of this study is that it has a multifaceted contribution. That being observed the author believes that the target audience for this study includes practitioners in industry and the public sector, who often engaged in ISIS ecosystem like environments. These practitioners can include IS professionals, policymakers, government officials. In addition, the author also concedes that academic scholars will benefit from the contribution of this methodical and theoretical perspective. The combination of ANT, ST and the concept of Ba (shared context) can be of particular interest to them since the focus is on an evolving network, societal impact and contextual typology in an IS ecosystems environment. The reason for this framing approach is twofold (i) to target a broader possible audience for deeper awareness of ISIS ecosystems success or failure since ISIS ecosystems studies are almost non-existent and (ii) to encourage niche areas of scholarly contributions in ISIS ecosystems studies and contextual IS field studies. The framing strategy is evident throughout this study with a focus on the micro, meso and macro environment included in in the South African economy.

9.4.2 Staging

The staging strategy for this research revolves around building interest around the success or failure of large-scale IS/IS systems or IS ecosystems. The staging strategies suggest an urgent need for more interest and discussions to arise pertaining to IS ecosystems success or failure from the views of the evolving network, societal impact and contextual setting. The key arguments reflected in the study are to create awareness of how IS ecosystems can result in failure or success, and how context can be influenced by it or how it can be influenced by context. The introduction of mobile technology in the 1990s, ERP systems, Blockchain technology etc. all have multiple stakeholders with intricate relationships that are seldom understood in society and very few or no comprehensive studies exist that research an entire IS ecosystems to shed light on these intricate relationships.

9.4.3 Captation

This study's immediate focus is the emergence of the IS ecosystems. Captation was evident in the way this research paper attempted to shift the study from an IS ecosystems success or failure perspective to how success or failure evolve, how societal structures are impacted and what contextual settings were prevalent when the failure was established. Shifting the study from the actual success or failure towards the evolving IS ecosystem that created the domain for the

success or failure to incubate, allowed for a more holistic approach to examine the IS ecosystems.

9.4.4 Stacking

Using ANT as a lens, as argued by Gregor (2006) and Llewellyn (2003) allows a richer and deeper contribution to the IS knowledge domain.

9.5 Theoretical contributions as per Llewellyn (2003) Guidelines

In this study, theory was formulated using ANT, ST and the “concept of Ba” as the theoretical framework. Level four theory, according to Llewellyn (2003) is theorising about settings, thus explaining how the context for practices are organised. This author explored how ecosystems evolved in a co-ordinated structure that would eventually fail or succeed, through the ANT lens. An explanation was provided to further the understanding of how wider contexts for activities are socially organised, the role each actor played in this organisation and this approach simultaneously revealed the conditions that render the network reversible or irreversible. The author’s understanding of this exploration was deepened through the application of the level five theory from Llewellyn, theorizing structures, to explain the impersonal, complex, large-scale and enduring aspects of social life through the ST lens as the ecosystem evolved. Stones (1991) argument was followed that context ST can be used for contextual studies through the knowledgeability of the agents where Gao (2007) attempts to provide a simplified explanation through the application of a level three theory, knowledge creation, to link agency and structure through practice, hence the inclusion of the “concept of Ba” (shared space).

9.6 Theoretical contributions as per Gregor (2006) Guidelines

This thesis proposed a mid-range theory detailing the interplay between structure and agency coupled with a process theory and some conceptualisation to strengthen the support of combining the theories to explore the IS ecosystems phenomena. This type of contribution to knowledge utilizes the Type 2 theory which distinguishes between two subtypes of theory, (1) theory that is used as a sensitizing device at a high level to view the world in a certain way and (2) theory for enlightenment (Gregor, 2006). Gregor argues that Type 2 theory, which explains primarily how and why some phenomena occur, supports ANT as a theoretical lens for a deeper understanding of phenomena. Here the aim was to investigate and deepen the understanding of

how ecosystems become successful or eventually fail. In doing so multiple theoretical frameworks were employed to act as a sensitised and enlightened device to explain IS ecosystems evolution.

9.7 Theoretical contributions as per the use of multiple paradigms and frameworks.

Gioia & Pitre (1990) state that traditional approaches to theory building are not entirely consistent with the assumptions of alternative research paradigms that assume more prominence in organisational studies. They argue that a multiparadigm approach can produce views of organisational phenomena, that not only allow scholars to recognize inherent and irreconcilable theoretical differences, but also can encourage them to adopt a more comprehensive view by accounting for those differences. Lewis and Grimes (1999) concur with this view and state that a multiparadigm approaches inquiry holds considerable, and largely unmet, potential for extending existing understandings of complex and paradoxical organisational phenomenon by helping theorists employ disparate theoretical perspectives. At the start of this study, an interpretive paradigm was deployed seeking to explain the phenomenon from an inductive perspective. After revisiting some of the data, the study moved towards the, deployment of a multifaceted theoretical framework that allowed the researcher to gain a deeper introspection of the phenomena and steered the study in a deductive direction. The inductive approach of this study finally concluded with the adoption of some elements of the abductive approach. This approach is supported by recent scholars like Grover & Lyytinen (2015) who argue that scholars can do better by being bolder in their theorizing and can be more innovative and rigorous in their treatment of data to accommodate shifts in their ways of knowing. They further posit that limiting the extensive use of borrowed mid-range theories that have often led to noteworthy consequences, such as blinding the scholar as to what truly happens, by being lured into going with the familiar, the path of least resistance. Llewellyn (2006) concurs that “a multiplicity of legitimate theoretical explanations can be offered for social phenomena and these explanations may hold different levels of analysis (individual, group, organisational or societal)”. The approach used here combines multiple theory levels in a quest to find a richer explanation of the ecosystem’s phenomenon.

9.8 Limitations

In this section, the limitations of the research are noted. This research was undertaken using multiple case studies, ideally, to obtain a deeper understanding of the emerging actor-network of

the mobile payment ecosystem and the complexities inherent to its evolution. The data for this research was gathered in a hybrid economic environment supported by the multitude of ethnic diversity in South Africa. The mobile payment service was introduced in the whole country to all subscribers of QUNU. The challenge was to gather data in an often diverse social linguistic environment in South Africa, where there are eleven official languages. The registered users were diverse and most of them understood English but found it easier to explain some experiences in their vernacular. The researcher was often aided by the field worker in a particular region, but it was often the case that data that could have extended the impact of the research was not accessible, due to the researcher, or at times, the fieldworker being logistically challenged. Social linguistic adaptation was the biggest limitation of the research study. The researcher was aware of the consequences of not being sufficiently immersed in the field and opted to mitigate this concern through the assistance of multilingual interpreters to translate certain scenarios. Further details about the data collection techniques employed have been provided in Chapter Four.

9.9 Future research

We envisaged that future research may be undertaken to assess the validity of the theoretical propositions describing the impact that an emerging mobile payment IS ecosystem have on the structures that support or constraints its evolution. We hoped that more work will occur to refine the integration of Nonaka and Giddens work on the knowledge creation process (or structuration) similar to Goa's (2007) and that scholars will elaborate on Stones (1991) argument on strategic context analysis. This author posits in this research that the concept of Ba is an efficient mechanism to explain contextual differences in mobile payment IS ecosystems evolution. It is hoped that similar work, in support of Avgerou (2001 & 2019), will emerge to create a better understanding of contextual studies in IS ecosystems emergence.

9.10 Conclusion

This study sought to describe the multi-dimensional impact an emerging IS ecosystem has on success or failure of a mobile payment systems implementation, how it influences and is being influenced by contextual mechanisms and conditions during its evolution. The author hopes that it will create a spiral of academic interest in the IS ecosystems evolution and in reframing context as an emerging entity in itself that can either constrain or support the IS ecosystem. The conclusion is to assure the reader that the conclusions and knowledge claims made in this study

are the result of a thorough and detailed data analysis, and triangulation to ensure consistency and reliability of the findings. It is hoped that the methods and strategies used, that are in line with many similar studies and supported by seasoned academics such as Blaikie (2000), Neuman (2013), Klein & Meyers (1999), Orlikowski and Baroudi (1991) and Walsham (1993) will demonstrate rigour and ensure relevance to the IS field. It is hope that this thesis will be found useful to support the relevance of advancing the IS, and to some extent, management field of studies.

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APPENDIXES

APPENDIX A: The interview guide for Mobile Payment systems research

Interview Guide		
Type of Interview: <ul style="list-style-type: none"> • Individual • Group • Unstructured • Semi-Structured • Structured 	Name(s):	Title(S):
Phone Number:	Address:	Date: Time:
Interviewer		File: PhD/Interview guide
Basic Questions		

Who is the interviewer	<ol style="list-style-type: none"> 1. Name of the organisation 2. Sector in which organisation operates 3. Short description of core business 4. Number of employees in the organisation 5. Department participant/s is employed under 6. Number of years in the organisation 7. Designation of Participant/s 8. Number of years in career 9. What role do they play in the mobile payment environment? 10. What were the major drivers for the implementation of the mobile payment system? 11. Did these drivers remain constant, or did it change over time? 	
Internal organisational Environment		
Task/Role that was played during the implementation process by the department/organisation	<ol style="list-style-type: none"> 12. Role of the department/ organisation/ industry 13. How many human resources were required by the team/department? 14. What other resources was required by the team/department? 15. What was the sub-goals/objective? Why? 16. How did the sub-goals/objective impact other areas of the organisation? Why? 17. Were these objectives achieved? If not, why not. 18. How interaction amongst team members conducted 	

	<p>was and what impact did this have on the implementation?</p> <p>19. How were external parties involved to obtain the goals/objective? Why?</p> <p>20. What is the current relationship with other stakeholders that was part of the implementation process? Why Is this the case?</p>	
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External Business Environment

<p>Task/Role that was played during the implementation process by the department/organisation</p>	<p>21. Role of the department/ organisation/ industry/Stakeholder</p> <p>22. What other resources was required by the team/department?</p> <p>23. What was the sub-goals/objective? Why?</p> <p>24. How did the sub-goals/objective impact other areas of the organisation? Why?</p> <p>25. Were these objectives achieved? If not, why not.</p> <p>26. How were interaction realized with other key stakeholders conducted and what impact did this have on the team?</p> <p>27. How were other business stakeholders involved to obtain the goals/objective? Why?</p> <p>28. How did the implementation impact other stakeholders? Why?</p> <p>29. What is the current relationship with other stakeholders that was part of the implementation process? Why Is this the case?</p>	
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Consumer/User environment

<p>Task/Role that was played during the implementation process by</p>	<p>30. Who were the users of the mobile payment system?</p> <p>31. What was the reason for using the mobile payment system? Role of the user play?</p> <p>32. What other resources was required by the users to use the mobile payment system?</p>	
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<p>the department/organisation</p>	<p>33. What was the sub-goals/objective for using the mobile payment system? Why?</p> <p>34. How did the sub-goals/objective impact the users? Why?</p> <p>35. Were these objectives achieved by the user? If not, why not.</p> <p>36. How were interaction realized with other key stakeholders and what impact did this have on the users? E.g., customers support.</p> <p>37. How did the mobile payment system impact the users? Why?</p> <p>38. What is the current relationship with other stakeholders that was part of the implementation process? Why Is this the case?</p>	

APPENDIX B: Inventory of Interviews/Conversations/Documents

Detail record of Interviews conducted						
Nature of the group	Number of Interviews/participants				Transcript codes	
	Field Trip 01	Field Trip 02	Field Trip 03	Field Trip 04	Transcript Code	
Executive (org)	1				EO01	
Executive (org)	1				EO02	
Executive (org)	1				EO03	
Executive (business)		1			EB01	
Executive (business)		1			EB02	
Management (org internal)	1				MO01	
Management (org internal)	1				MO02	

Management (org internal)	1				MO03	
Management (org internal)	1				MO04	
Management (org internal)				1	MO05	
Management (org internal)				1	MO06	
Management (org regional)	1				MR01	
Management (org regional)	1				MR02	
Management (org regional)	1				MR03	
Management (org regional)	1				MR04	
Management (org regional)	1				MR05	
Management (org regional)	1				MR06	
Management (org regional)	1				MR07	
Project Management (org)	1				PO01	
Project Management (org)	1				PO02	
Project Management (org)	1				PO03	
Project Management (org)	1				PO04	
Project Management (org)			1		PO05	
Business Analyst (org)				1	BO01	
Business Analyst (org)	1				BO02	
Business Analyst (org)	1				BO03	
Business Analyst (org)	1				BO04	
Business Analyst (org)				1	BO05	
Business Analyst (org)				1	BO06	
Business Analyst (Business)				1	BB01	
Field Worker (org)		1			FO01	
Field Worker (org)		1			FO02	
Field Worker (org)		1			FO03	

Field Worker (org)		1			FO04	
Field Worker (Business)		1			FB01	
Field Worker (Business)		1			FB02	
Registered User (Consumer)	1				RC01	
Registered User (Consumer)	1				RC02	
Registered User 1(Consumer)		1			RC03	
Registered User (Consumer)		1			RC04	
Registered User (Consumer)		1			RC05	
Registered User (Consumer)				1	RC06	
Registered User (Business)				1	RB01	
Registered User (Business)				1	RB02	
Registered User (Business)				1	RB03	
Registered User (Business)				1	RB04	
Unregistered User (Consumer)		1			UC01	
Unregistered User (Consumer)		1			UC02	
Unregistered User (Consumer)			1		UC03	
Unregistered User (Consumer)			1		UC04	

APPENDIX C: CODE BOOK for Actor-Network Theory Analysis

Empirical Observation – Actor-Network Theory			
	Case 1	Case 2	Case 3
Problematization	P1	P2	P3
The focal actor defines identities and interests of other actors that are consistent with its interests and establishes itself as an obligatory passage point (OPP), thus “rendering itself indispensable” (Callon, 1986).			
Interessement	I1	I2	I3
Process of convincing other actors to accept the definition of the focal actor (Callon, 1986).			
Enrollment	E1	E2	E3
The moment that another actor accepts the interests defined by the focal actor.			
Inscription	IN1	IN2	IN3
A process of creating technical artefacts that would ensure the protection of an actor’s interests (Latour, 1992).	Leadership Ideologies		Sim cards Mobile handsets
Irreversibility	IR1	IR2	IR3
The degree to which it is subsequently impossible to return to a point where alternative possibilities exist (Walsham, 1997).			
OPP	OPP1	OPP2	OPP3
The obligatory passage point, broadly referring to a situation			

<p>that must occur for all the actors to satisfy the interests that have been attributed to them by the focal actor. The focal actor defines the OPP through which the other actors must pass through and by which the focal actor becomes indispensable</p>			

APPENDIX D: CODE BOOK for Structuration Theory Analysis

Empirical Observation - Structuration Theory			
	Social Systems		
	Case 1	Case 2	Case 3
Signification structures	Org_Sig01 to n	Bus_Sig01 to n	Cus_Sig01 to n
Legitimation structures	Org_Lit01 to n	Bus_Lit01 to n	Cus_Lit01 to n
Domination structures	Org_Dom01 to	Bus_Dom01 to n	Cus_Dom01 to n

APPENDIX E: CODE BOOK for Context (Concept of Ba)

Empirical Observation - Context (Ba Shared Space)			
	Social Systems		
	Case 1	Case 2	Case 3
Originating	Org_Sig_Con01 to n	Bus_Sig_Con01 to n	S3 Cus_Sig_Con01 to n
Diallonging Ba	Org_Sig_Con01 to n	Bus_Sig_Con01 to n	S3 Cus_Sig_Con01 to n
Exercising Ba	Org_Sig_Con01 to n	Bus_Sig_Con01 to n	S3 Cus_Sig_Con01 to n
Systemising Ba	Org_Sig_Con01 to n	Bus_Sig_Con01 to n	S3 Cus_Sig_Con01 to n

APPENDIX F: Participation Request Letter



University of Cape Town

Department of Information Systems
Leslie Commerce Building
Upper Campus
or Private Bag, Rondebosch 7701
Tel: (021)650-4670
Fax No: (021) 650 2280

Dear Sir/Madam

Request for participation in mobile payment research.

I am a post graduate student at the University of Cape Town in the Department of Information Systems (IS). I will be conducting research on the impact that the introduction of a mobile payment systems will have on the South African mobile subscriber market. This will contribute towards the completion of a Doctor of Philosophy (PhD) degree. The objective is to uncover empirical evidence on how networks are created when a new service/product is introduced to the mobile subscriber market.

I have been granted conditional authorization to gather data in the mobile payment environment by engaging and consulting with current and future mobile payment stakeholders by the organisation that implemented the mobile payment system. To make this research possible I will require permission to consult or interview some of the individuals that participated in the launch of the mobile payment system and the current stakeholders of the system. Participation will remain anonymous and all information gathered will be treated with a very high level of confidentiality.

Should the request for participation in the research be accepted by individuals, groups or organisations, written or verbal consent from the individual should be granted.

Ricardo Harry (Researcher)

Prof. Kosheek Sewchurran (Supervisor)

Signed by candidate

Signature Removed

ricardo.harry@vodafone.co.za
ricardo.harry@uct.ac.za
Cell:0828223822

Kosheek.Sewchurran@uct.ac.za

APPENDIX G: Authorization from the Organisation

memo

To: Research participant
Cc: Ricardo Harry
From: ██████████ - Group Executive: Talent Management
Date: 07 November 2012
Subject: Authorization for academic research in ██████████

This letter/memo is to inform the ██████████ staff that Ricardo Harry, a ██████████ employee, has been authorized to conduct research within ██████████ for academic and organisational purposes.

The objective of the research is to determine how networks are formed when products and services are introduced to the mobile subscriber market and how these network formations can contribute to successful implementation and adoption of products and services. The product/service that will be the focus of this study will be ██████████ mobile payment system.

This study will include, but not limited to, the following research methods.

- Direct/participant observation
- Document analysis
- Interviews
- Fieldwork/site visits.

On completion of the data collection and analysis a vetting process will occur to scrutinize the organisational data in the report.

<p>APPROVED / NOT APPROVED</p> <p>Signature Removed</p> <p>Signature: (██████████)</p> <p>GROUP EXECUTIVE: TALENT MANAGEMENT</p>

APPENDIX H: Ethics committee approval

UNIVERSITY OF CAPE TOWN



Faculty of Commerce
Ethics in Research Committee

Courier: Room 2.26 Leslie Commerce Building Upper Campus University of Cape Town
Post: University of Cape Town • Private Bag • Rondebosch 7701
Email: Harold.Kincaid@uct.ac.za
Telephone: +27 21 650 5041
Fax No.: +27 21 650 4396

UCT/COM/113/2013

5th March 2013

Ricardo Harry
University of Cape Town
hrrric010@myuct.ac.za

Dear Researcher,

Project title: The impact the introduction of a mobile payment system will have on the South African mobile subscriber market.

This letter serves to confirm that the project entitled, “**The impact the introduction of a mobile payment system will have on the South African mobile subscriber market**”, as described in your final submitted protocol 2013, has been approved. You may proceed with the research.

Please note that if you make any substantial change in your research procedure that could affect the experiences of the participants, you must submit a revised protocol to the Committee for approval.

Best wishes for great success with your research.

Regards,

Harold Kincaid

Professor Harold Kincaid
Commerce Faculty Ethics in Research Committee

“OUR MISSION is to be outstanding teaching and research university,
educating for life and addressing the challenges facing our society.”

