



**Investigating failure to implement contactless payments: A case of Near Field
Communication payment systems in South Africa**

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Investigating failure to implement contactless payments: A case of Near Field Communication payment systems in South Africa

Abstract

Near Field Communication (NFC) contactless payment systems are being touted as the future for retail payments and public transport fare-collection systems. Studies have shown that such initiatives require many organisations from different industries to work together for the goal to be realised. The effort and collaboration required to achieve this goal cannot be underestimated. The aim of this research is to explore the failure of NFC contactless payment system implementations. The Actor Network Theory (ANT) has been shown as appropriate for investigating IT implementation failures, and so serves as a study lens for this investigation.

A case study research strategy was used in the research to gain an understanding of the as-lived experiences of the actors involved in an NFC payment system implementation. The data was collected using different methods such as interviews and review of project documents. Thematic analysis techniques were used to trace and unpack the interactions occurring around implementation of these NFC payment systems and the challenges encountered.

The key factors identified as leading to the NFC payment system implementation failure are external dependencies, lack of required financial investments, interoperability issues due to new and legacy systems, and lack of clear governance structures and bodies. The results of the study suggest that, when there is external dependence, but the tasks, resources required, actors' capabilities, workloads and the duration for completing these tasks are not known, then there will be frequent conflicts, leading to NFC payment system implementation failure. Regulatory bodies and clear leadership structures in collaborative NFC payment system implementation were found to be crucial. The results of the study also propose that when new and legacy systems from multiple actors are to be integrated to develop an NFC payment platform, there is likely going to be system interoperability issues due to the numerous vendors involved, which lead to failure. In addition, unwillingness to commit to the required capital investments by stakeholders was identified as leading to the failure of the NFC payment system implementation.

A prescriptive framework is developed based on these lessons that could aid in ensuring better outcomes in future NFC payment systems implementations.

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Acronyms

3PP – Third-Party Payments providers

ANT – Actor Network Theory

CA – Card Association

CP – Contactless Payments

EFC – Electronic Fare-Collection

EMVco – Europay MasterCard and Visa consortium

EPNP – Electronic Payments Network Provider

FFF – Fast Food Franchise

ISO – International Standards Organisation

IEC – International Electrotechnical Commission

MNO – Mobile Network Operator

NFC – Near Field Communication

PASA – Payments Association South Africa

QRC – Quick Response Codes

RFID – Radio Frequency Identification

SA – South Africa

SIM – Subscriber Identification Module

SMS – Short Message Service

SP – Service Provider

TSM – Trusted Service Manager

USSD – Unstructured Supplementary Service Data

Chapter 1: Introduction

1.1 Research background and problem statement

The following section is a brief background of the research, the research questions and sub questions.

There are a number of new electronic payment solutions being introduced that do not get implemented for commercial use after the live commercial trials (Madureira, 2016; Ondrus, 2015; Silic, Back and Ruf, 2014; Apanasevic, 2013; Madlmayr, Langer and Scharinger, 2008). In some cases, these new payment solutions are implemented successfully in developed countries, but do not have similar outcomes when introduced to developing countries. An implementation approach that does not start with a thorough scoping to understand the environment and the complexity of the system does not work when it comes to these payment innovations. Even within the developing country contexts, a solution that is successful in one country might not be successful in another. For example, the M-Pesa solution (a mobile payment system, hugely successful in East Africa) whose success was not replicated in South Africa (Harry, Sewchurran and Brown, 2014). The use of a predefined and generic business justification to introduce M-Pesa in South Africa's dual economic environment was not appropriate (Harry et al., 2014).

Although the introduction of new electronic payment innovations has transformed most industries, resulting in collaborations in previously unrelated industry sectors (Lee et al., 2015), there is an abundance of new electronic payments systems or innovations that do not get implemented. A good example is the Near Field Communication (NFC) payment system. NFC is a communication technology based on RFID (Radio Frequency Identification) technology and it allows contactless communication of up to about 10cm between two NFC-enabled devices (Widmann et al., 2012). While a number of NFC payment system trials have been done, large commercial deployments are not evident (Apanasevic, 2013). Madureira (2016) echoes the same sentiment. Furthermore, NFC payment systems in developing countries are implemented in a context with challenges around infrastructural, cultural, economic and political factors. It is vital to take all these factors into account when planning to introduce NFC payment systems to such a market. While NFC payment systems allow smooth interaction and transactions for consumers, the political and infrastructural

issues that influence implementation are complex. They require collaboration between actors on different levels to warrant interoperability if a thriving NFC payment system is to be deployed.

Madureira (2016) and Dahlberg et al., (2008) claim that there is a lack of depth in electronic payment research. There are not many research studies that study NFC payment technology implementation, least-of-all in developing countries. Most of the NFC payment literature focuses on consumer adoption and little on service providers and implementation (Dennehy and Sammon, 2015; Dahlberg et al., 2008). Most published NFC research has been in the context of the developed world. In general, there is an under-representation of Africa in studies of Information Systems (IS) implementation (Mpazanje, Sewchurran and Brown, 2013). No studies on NFC payment system implementation focused on African countries could be found in the academic literature. This makes the applicability of existing NFC payment system implementation research to developing markets debateable. In Africa, most of the studies on electronic money have centred on mobile money transfer, and mobile payments (Okeahalam and Afful, 2005; Morawczynski, 2009; Harry et al., 2014). So there is need for NFC payment research studies that focus on South Africa and Africa in general, taking into account that contextual conditions differ from developed countries. The purpose of this research is to provide an explanation of these NFC payment system implementation failures by answering the following research questions.

1.2 Research question and Objectives

Research Question

Why do Near Field Communication (NFC) based contactless payment systems fail to get implemented in developing country contexts?

Research Objectives

- To understand how an NFC payment system project is initiated
- To describe why NFC payment system project networks fail to be established and strengthened
- To describe the fundamental conditions influencing the failure to implement NFC Payment Systems
- To identify the processes that lead to the failure to implement NFC payment systems

1.3 Necessity for and Value of Research (i.e. expected contribution)

There is a gap in literature in the understanding of how and why NFC payment systems fail to get implemented in developing countries, specifically in Africa. No published academic studies regarding NFC payment systems implementation challenges in African country contexts could be found. Most published research articles have focused on NFC payment systems in Asia, Europe and America. This study aims to provide a better understanding of these failures in a developing country context, given that context plays a key role in NFC implementations. Very little is known about why NFC payment systems do not get fully-implemented in developing countries. The purpose of this research is to investigate and explain why Near Field Communication based contactless payment systems fail to get implemented in South Africa. In so doing, guidelines for improving outcomes of implementation can be recommended. The Actor Network Theory will be used as the theoretical lens for this study, given its usefulness as a lens to examine implementation processes.

1.4 Overview of the Dissertation Report

In total, this dissertation has seven chapters and the rest of the proposal is structured as follows: Chapter Two provides an extensive analysis of the literature on NFC implementation challenges and the Actor Network Theory, which is used as the theoretical lens in this study. Chapter Three is a detailed description of the research design and objectives. A detailed description of the case study is provided in Chapter Four. Chapter Five details the analysis of the findings that emerged from the case study. The discussions and the conclusion are in Chapter Six and Chapter Seven, respectively.

This report uses the Actor Network Theory (ANT) as a lens; as a result, ANT vocabulary is extensively used throughout the report. There were various limitations in carrying out the study, and among them were the following: The study time was limited due to the amount of time available for Masters Degree by coursework. Therefore, all the involved parties in the study were not followed to understand their as-lived experiences. Despite these limitations, the results are usable and can be generalised.

Chapter 2: Literature Review

2.1 Introduction

The introduction of new electronic payment innovations has transformed most industries, resulting in collaborations of previously unrelated industry sectors (Lee et al., 2015). For example, partnerships between electronic payment companies such as Visa, and mobile manufacturers such as Samsung. The collaborations have made it possible for consumers to purchase goods, pay bills and perform bank transactions online. These alliances however, come with a number of processes and complexities which I seek to explore and understand by answering the following question: *Why do Near Field Communication based contactless payment systems fail to get implemented in developing country contexts?* The question was broken down into the following sub-questions: *How is an NFC payment system project initiated? Why do NFC payment system project networks fail to be established and strengthened? What are the fundamental conditions influencing failure to implement NFC Payment Systems? What processes lead to failure to implement NFC payment systems?*

The aim of this literature review is to explore the key barriers to the introduction of NFC contactless payments by analysing research articles in a systematic way. A review of the existing literature is necessary to understand and uncover what has been done before (Webster and Watson, 2002, pp. 48-49, as cited in Levy and Ellis, 2006). This paper follows a systematic review process of existing studies on the main obstacles in the implementation of NFC payments. A systematic literature review is an orderly way to find, assess, and interpret the available empirical research conducted on a phenomenon of interest (Kitchenham, 2004). While literature review processes are varied, the actual literature review is vital for any research (Boell and Cecez-Kecmanovic, 2014). Most literature review processes have their strengths and weaknesses.

For this study, published papers focusing on NFC payment system collaboration issues were analysed. Databases, such as Google Scholar, Science Direct, JSTOR, ACM and IEEE were searched. While the searches brought up many articles, only peer reviewed papers focusing on NFC payments and ecosystem issues were selected. The analysis revealed a number of issues which will be discussed in detail in the next section. This literature review has two parts; the first

part of the literature review will start with the definitions of terms, the use of NFC in different sectors, the current state of contactless payments in developing and developed countries, and the collaboration issues associated with NFC payments ecosystem. The second part is an in-depth review and discussion on the theories that emerged from the literature review.

2.2 A brief overview of the NFC contactless payment systems

Contactless Payments (CP) or proximity payments can be done using NFC, Quick Response codes or Bluetooth technologies. An NFC contactless payment is a cashless transaction that is done wirelessly using a smartphone, Personal Digital Assistant (PDA) or cards embedded with a Near-Field Communication (NFC) chip (Wiechert, Thiesse and Fleisch 2009). No contact between the payment devices and the contactless-enabled card reader is required. This means consumers will no longer need to swipe or insert their cards into card readers and enter a PIN code (Lacmanović, Radulovi and Lacmanović, 2010). Instead, payment is initiated by the consumer when they wave their NFC-enabled card or mobile device in front of a reader. An acoustic or beep sound usually plays after the transaction has completed successfully and continuous beeps if the transaction is unsuccessful. A transaction is processed in less than two seconds, hence, some solutions based on NFC are called *payPass* and *payWave* by MasterCard and Visa, respectively. For these reasons, NFC contactless payment systems are used in transit, fuel stations, fast food restaurants and other quick payment environments. NFC contactless payments are made possible by Card Associations (CA), also known as electronic payments network providers (EPNP) such as, Visa, MasterCard, Diners Club and American Express (Liu, Kauffman and Ma, 2015).

Besides the electronic payments industry, NFC systems are used in a number of other industry sectors; for example in the health sector, transit, access control, and in smart posters in the advertising and tourism industries (Apanasevic, 2013). Projections are showing that NFC payments will grow rapidly in the next coming years (Dutot, 2015). NFC contactless cards and NFC smartphones are the common NFC payment instruments in both retail and transit industries (Gannamaneni, Ondrus and Lyytinen, 2015; Kazan and Damsgaard, 2013). A number of previous studies have been done on electronic payments. Focus has been placed mostly on the consumers (Dennehy and Sammon, 2015; Dahlberg et al., 2008) and few studies have focused on service provider issues (Ondrus and Pigneur, 2007; Lai and Chuah, 2010). There is lack of research on

electronic payments using theories to guide the empirical research (Dahlberg et al., 2008; Lai and Chuah, 2010). In their study on digital payments, Kazan and Damsgaard (2013) highlight that there is a lack of research on payment technological developments. While there has been many research studies done recently on payment platforms in developing countries, most of the studies have focused on mobile money transfer, mobile payments and other different types of payment media. Few studies have focused on how alliances are formed amongst the stakeholders (Okeahalam and Afful, 2005; Morawczynski, 2009; Harry et al., 2014). No studies have been found that focused on NFC contactless payments in African countries from the service providers' perspective.

2.3 Near Field Communication (NFC)

NFC is based on RFID (Radio Frequency Identification) technology and was designed mainly for mobile phones. NFC allows contactless communication of up to about 10cm between two devices (Widmann et al., 2012; Finžgar and Trebar, 2011). NFC operates at a frequency of 13.56MHz and supports ISO 14443 and ISO/IEC 18092 international standards, which are vendor-independent standards that outline communication modes for NFC contactless smart card to guarantee industry-wide compatibility (Kazan and Damsgaard, 2013; Wiechert et al., 2009). NFC chips can be 'active' or 'passive' and the NFC chip and application can be on cards (usually same size as bank cards), watches, tags, SIM cards and mobile phones (Kazan and Damsgaard, 2013). Active NFC chips such as those in NFC-enabled mobile phones are integrated into the device and powered by the device itself. Passive NFC chips such as those embedded on contactless cards and tags are powered magnetically by the NFC reader (Kazan and Damsgaard, 2013). NFC is commonly embedded in cards and smart phones.

2.4 NFC contactless payment smart card

The evolution of the bank-issued contactless cards can be traced back to the 1960s when Jürgen Dethloff and Helmut Grötrupp came up with the idea of a smart card (Husemann, 1999). Smart cards have been used for different purposes and in many sectors such as health, transport and banking. For example, the German health care sector has been using smart cards to store medical related data since 1992 (Attoh-Okine and Shen, 1995). In developed countries, most transport operators have replaced the traditional ticketing systems with smart cards (Pelletier, Trépanier and Morency, 2011; Blythe, 2004). Contactless NFC cards evolved from smartcards, but they offer

more benefits than the smart card, for example they have a read or write capability (Curran, Millar and Mc Garvey, 2012). The NFC contactless card offers many advantages and it addresses most of the security issues and disadvantages associated with other types of cards. However, there are security concerns associated with the use of contactless smart cards; for example they can be hacked whilst they are in the consumer's pocket (Me and Strangio, 2005; Lacmanovi et al., 2010). Also, if a contactless card is stolen and the owner does not report it, the card can be used by anyone since it will not ask for a PIN for low-value transactions. Several other issues have also been raised with regards to using contactless payment solutions. For example, a person-to-person payment using cards cannot be conducted. Another major issue is the significant costs of the system for small businesses (Au and Kauffman, 2008). These costs are associated with the investments required to setup the NFC payment system.

2.5 NFC contactless mobile payment

There are many mobile payments definitions, for example Dahlberg et al. (2008), one of the most cited papers on mobile payments, define it as '*use of a mobile device to pay for goods, services and bills*'. This definition however, can be misleading considering that bill payment can be for a service that was offered. On the other hand, Ondrus and Pigneur (2007), define it in simple terms as '*payments carried out with at least one mobile device*'. However, this also does not explain it clearly. Mallat (2007) defines it clearly as '*a cashless payment system that allows a transaction to be conducted through the use of a mobile device such as mobile phone and Personal Digital Assistant (PDA) either directly or through an intermediary to the receiver*'. This however, does not explain NFC mobile payments. A simple NFC mobile payment definition is '*a contactless payment transaction that is done using an NFC-enabled mobile phone as the payment device*'. The growth of the mobile phone in both developed and developing countries has led to the growth of mobile money technologies. There are many mobile money solutions such as NFC, Unstructured Supplementary Service Data (USSD) and Short Messaging Service (SMS). USSD and SMS are payment services based on message service that is available to all ordinary phones (Kazan and Damsgaard, 2014). Kenya's successful M-Pesa solution is a good example of an SMS-based mobile money platform. Italy's SIESTA projects, contactless mobile payment system and ticketing platforms, are good examples of payment and ticketing solutions based on NFC technology (Baldo, Benelli, and Pozzebon, 2010). While USSD and SMS are most-widely used in mobile money

transfer, NFC is used in mobile payment and ticketing solutions (Tobbin, 2011). Juntunen, Luukkainen and Tuunainen, (2010) consider contactless mobile ticketing in transportation a breakthrough in NFC service. This is however, very much dependent on the environment considering the costs of NFC-capable mobile phones, which can cost between R7,000 and R15,000.

2.6 NFC payment in transport: Electronic fare-collection systems

The public transport industry has experienced many changes across the world. One of the current waves of change that the industry is experiencing is the use of cashless payment systems for ticket purchase or fare payment (Madureira, 2016). These range from the use of magnetic strip transit fare cards, contactless smart cards and mobile phones using NFC technology. The NFC electronic fare-collection (EFC) system enables electronic collection of fares, tolls and associated data through the use of contactless cards or NFC-enabled phones (Pelletier et al., 2011). While some EFC systems have not been successful, Hong Kong's Octopus, a smart card used in the public transport system, is an exception. The Octopus system, introduced in 1994, was one of the first contactless payment systems to be introduced in public transport (Chau and Poon, 2003). The Hong Kong's underground railways corporation persuaded local public transportation operators to join them and together they jointly developed an automated fare-collection system that uses contactless smart card technology (Chau and Poon, 2003). The London Oyster card which was introduced in 2003 by Transport for London (TfL), in partnership with a number of other actors (Blythe, 2004), was also a successful project. These collaborations can be between private corporations, public and private, and public partnerships (Pelletier et al., 2011).

2.7 NFC payment in retail

It is evident from the literature review that contactless smart cards are mostly-used in the transport sector (Lacmanovi et al., 2010; Turner and Wilson, 2010). For this reason, most past research has focused on contactless payment in transit and a few in retail. There have been a few studies that were carried out that focus on electronic payments in the retail sector (Teo, Fraunholz and Unnithan, 2005; Mallat and Tuunainen, 2008; Wiechert et al., 2009). Most retailers focus on improving customer waiting time - they see reduced customer waiting time as the most-important factor that can result in customer satisfaction (Lai and Chuah, 2010). Compared to contact

payment, contactless payment requires additional infrastructure, for example, terminals that accept contactless payment devices at point of sale. NFC payment can speed-up the payment process resulting in improved waiting times. It is certainly faster than cash and card payments that require PINs and other mobile payment technologies (Massoth and Bingel, 2009). Wiechert et al. (2009) carried out a study to find out how much a contactless payment system implementation costs, compared to the advantages of adopting the fast payment method, i.e. the NFC contactless payment systems. They concluded that while costs would initially affect the retailer's profits, the speed and convenience that the system brings might eventually result in high sale volumes.

2.8 NFC contactless payment in Developing Countries

Although there are many mobile devices in use in various markets, mobile phones with NFC capabilities are still very expensive to purchase (Finžgar and Trebar, 2011). This has resulted in a slow penetration of NFC payment in Europe and globally (Apanasevic, 2013; Juntunen et al., 2010). For this reason, cards are still widely used as a payment medium. Ondrus and Pigneur (2007) in their assessment of NFC for future mobile payments found that NFC cards were still preferred compared to the use of NFC-enabled mobile device as a method of payment. Apanasevic (2013) also echoed the same sentiment. NFC-enabled mobile devices and readers are expensive for both consumers and merchants (Au and Kauffman, 2008). The success of the NFC contactless payment method hugely depends on the consumers embracing the solution and the value that the payments service providers are going to offer to the consumers.

Most research on new NFC payment developments have focused on developed economies in Europe, America and Asia (Kazan and Damsgaard, 2013; Lai and Chuah, 2010; Wiechert et al., 2009; Ondrus and Pigneur, 2007). While many developed countries are already using contactless payments, only a few countries in developing countries have started using NFC contactless payments. Nigeria and South Africa are some of the few countries in Africa that have introduced contactless payments and electronic ticketing using NFC (ABSA, 2011; Turner and Wilson, 2010). This is not surprising considering that Nigeria and South Africa are considered Africa's biggest economies. Africa has millions of mobile phone users, but very few of them have capabilities to handle contactless payments. Most people in developing countries cannot afford a device with

NFC functionality. Consequently, most research on electronic payments in developing countries has focused on person-to-person money transfers (Kshetri and Acharya, 2012).

2.9 NFC payments ecosystem issues, success and failure factors

Most Information System (IS) projects fail to produce the intended final quality product or service mainly because of poor planning, poor project management and lack of research on the systems to be implemented (Dwivedi et al., 2015; Roztock and Weistroffer, 2011). While some innovations in developing countries meet all these requirements, the services are not always used or accepted by the intended community. Other collaborative activities fail to launch on the commercial market. Such large-scale systems implementations are risky projects. The challenges and risks increase when various organisations are involved in the projects (Fedorowicz et al., 2009). This is due to a number of factors, explained in the next section, such as competition, technology complexities, regulations and different objectives and interests of the participants (de Reuver et al., 2015; Apanasevic, 2013).

2.9.1 Competition and collaboration issues amongst stakeholders

Like any other payment network, the NFC payment ecosystem has many actors. The NFC contactless payment ecosystem is a fragile system; if one actor withdraws then the ecosystem will be affected or even fails (Gannamaneni et al., 2015). There are many problems in the payments ecosystem associated with service provider collaborations such as competition, regulatory and contractual issues (Lee et al., 2015; Kemp, 2013; Au and Kauffman, 2008). While competition, cooperation between employees and laws shape and positively influence technological developments (Liu et al., 2015), they can also negatively affect or lead to the failure of a system (de Reuver et al., 2015). Although collaborations between unrelated companies such as Google, CitiBank and MasterCard have accelerated the introduction and developments of NFC contactless payments in developed markets (Liu et al., 2015), some studies show that these joint ventures result in competition and rivalry leading to abandonment of the solutions (Gannamaneni et al., 2015; Kazan and Damsgaard, 2013). This is particularly true considering the abundance of electronic payments that usually end up failing. In analysed studies, issues of competition were reiterated. Lee et al. (2015) recommend that organisations in these partnerships need to be aware of the technology they are adopting; organisations must know that competition can even come

from unrelated industries as a result of these collaborations and convergences must be with the right partners.

Studies have shown that initiatives such as the ones discussed earlier, require a number of companies from different industries to work together for the goal to be realised (de Reuver and Bouwman, 2012; Lee et al., 2015; Fedorowicz et al., 2009). In most cases, these collaborations are complex and dynamic, and involve many stakeholders. The contactless payments key stakeholders can be categorised into two groups - users and providers. Dahlberg (2008) identified these two groups as the prime actors in the payments ecosystem. There are two types of users - consumers or cardholders and merchants. Providers include actors such as Mobile Network Operators, Banks, Trusted Service Managers, Electronic payments network operators (such as Visa and MasterCard), device manufacturers and payments service providers. Contactless payment using mobile phones and contactless payment using bank-issued card will have different stakeholders and their challenges are significantly different. For example, contactless payment using mobile phones involves device manufacturers and MNOs. When such payments are introduced, MNOs might also want to control the payment solution and profits have to be split according to the agreements. This is known as digital convergence (Yoffie, 1999). If an NFC chip is stored on a SIM then the MNO will have control over the contactless payment technology rather than the mobile device company that manufactured the phone (Curran et al., 2012). This can actually cause conflicts between organisations. The lack of cooperation in the NFC payments has led to the introduction of NFC stickers that can be attached to the phone (Kazan and Damsgaard, 2013). In this way, MNOs will not be involved in the contactless payment process, but it allows consumers to still enjoy the benefits of contactless payment using mobile phones.

2.9.2 Different objectives and interests

While many research studies have been carried out on companies collaborating to produce innovative products and services, Lee et al. (2015) in their investigations on the provisioning of mobile banking solutions, argue that the dynamic relations between the involved parties that can shape these relationships are not well known. de Reuver et al. (2015) in their in-depth TRAVIK project case study, found that four major banks in Netherlands teamed up with telecommunication operators to develop a TSM platform for NFC payments. The project which started in 2009 also

included other external stakeholders. The project was cancelled in 2012 before the solution was introduced to the market because of stakeholder conflicts on the market introduction strategy. de Reuver et al. (2015) found that different interests and different strategies of the parties involved in the collaboration caused many conflicts which resulted in dissolution of the TRAVIK project. The use of a single case in the study provided a deep understanding of the situation. A project instituted by *Maestro* between Swiss organisations failed at design stage, which is another example of a platform solution that did not reach the market (Ondrus, Lyytinen and Pigneur, 2009). Despite a successful pilot, PostFinance payment, another solution that also failed, was terminated after first production environment test (Gannamaneni et al., 2015). This shows that pilot tests are small and have high chances of being successful in the test environment. On the other hand, massive market rollouts involve many actors which increase the complexity. While it is essential for organisations to work together to achieve certain goals that cannot be achieved by a single organisation, the effectiveness of organisations working together must be assessed, recommends Westphal et al. (2010). The issue of dealing with various interests of stakeholders in an ecosystem cannot be overlooked (Dutot, 2015). Interests need to be clearly defined early on, otherwise there will be problems in the ecosystem which can result in the failure of the system (Harry et al., 2015).

It is quite common that organisations working together to achieve a goal will have different interests because of the different industry sectors. These different interests and objectives cannot always be easily merged and when these interests are merged, it usually results in conflicts between the organisations. If organisations do not have common interests and objectives, it leads to discontinuance or even failure to start a collective undertaking (de Reuver et al., 2015). When organisations collaborate to achieve common interests, organisations pull resources together resulting in the organisations depending on each other. Aligica and Sabetti (2014) postulate that sharing resources leads to two dilemmas. The first problem is that whilst one organisation uses resources freely, they will want other organisations to control their use of resources. This issue might lead to introduction of new rules on the use of shared resources, which is another dilemma since these rules are also shared rules that have to be managed (Aligica and Sabetti, 2014). It is therefore vital to collectively make decisions in these collaborations.

2.9.3 Unclear business models

There are many technological developments in electronic payments but few have been successful (Chau and Poon, 2003; Kendall, Schiff and Smadja, 2014). Contactless payments are complicated systems that require adoption from both card holders and merchants in order to create a successful and sustainable payments platform (Kazan and Damsgaard, 2013). They are multi-sided platforms, that is, they act as intermediaries that bring consumers and merchants together. Studies have shown that most pilots do not include business models. They are only introduced at commercial launch of the solution (Juntunen et al., 2010). When introducing new services, most banks leverage on the existing customers and they also bundle new services with existing products. They also use the ‘supply push strategy’ business model (Kazan and Damsgaard, 2013), for example, embedding NFC functionality in new SIM cards and bank cards. This gives the focal actors control over customers and gives them power to control what can be introduced to their customers and potential revenue streams. There is, however, need for a strong business plan. In other recent studies, the business models are not always found to be clear leading to challenges and slow penetration of NFC payments (Juntunen et al., 2010).

Kazan and Damsgaard (2013), in their case studies involving three cross-case analysis of organisations that implemented NFC or contactless solution, found out that two of the NFC platforms ‘*Girogo* and *Orange*’ were collaborations involving other actors; one contactless platform, ‘*Yapital*’ was a solo effort (which failed to take off). This shows that other actors have to play a role in the electronic payment solutions. Collaboration is necessary for these solutions to be successful (Dahlberg et al., 2008; Ondrus and Pigneur, 2009; Lee et al., 2015). Although some NFC payment collaborations pass the pilot stages, they do not get launched on a commercial stage (Kazan and Damsgaard, 2013; Apanasevic, 2013). For example, *Payter*, a multifunctional NFC based e-wallet launched in Rotterdam in 2007, lacked a business model for the pilot, which led to problems due to the inability of parties reaching an agreement on business model for further commercial service deployment (Apanasevic, 2013). Although lacking an in-depth analysis of the case studies, they found that parties could not reach an agreement because of lack of clear business models to support commercial launch. In recent research on barriers slowing the rate of NFC payments penetration, Dutot (2015) found that the business environment is a big obstacle in NFC payments. The business model should be developed taking into account the business environment.

2.9.4 Lack of uniform standards

Considering how technology has evolved and the increasing introduction of new technologies, it is vital to have standards and regulators to enforce compliance. Using economic theories to explore the stakeholder issues in electronic payments, Au and Kauffman (2008) identify that many issues were related to compatibility of technology, lack of universal standards, changing technology and integration. Juntunen et al. (2010) echoes the same sentiment. Whilst alliances are essential for the successful implementation of systems, standards wars have evolved as a result of these alliances (Lee et al., 2015). It also is important however, to recognise that there are many issues to be considered when implementing these systems. For example, while Juntunen et al. (2010) and Apanasevic, (2013) found technological standards as the main supplier side barrier, Gannamaneni et al. (2015) highlight that lack of business models that support all participants' interests was the main barrier. On the other hand, Lee et al. (2015) explore how banks and MNOs converge to offer a service and highlight the issues arising from the convergence of these unrelated industries. They found that technology played a huge role in shaping and structuring the network of unrelated actors, but the same technology also caused clashes between MNO and banks over control of customer information.

2.9.5 Governance

There must be clear leadership structures and rules that direct and govern these collective efforts for successful implementations. This is also echoed in de Reuver et al., (2015) in their empirical study on collaboration issues between banks and telecommunication operators who tried to develop an NFC payment solution. They identified issues that led to failure of the collaboration, issues such as governance and lack of leadership. Leadership structures must be collectively established taking into account the different business cultures. Dahlberg et al. (2008) found that it is vital for electronic payments service providers to recognise business, cultural and environmental differences that exist in the payment industry. They also point out that service providers should cooperate to develop sustainable mobile payment solutions. Therefore all involved actors in these alliances must be consulted when establishing leadership structures. de Reuver et al., (2015) however, postulate that consensus decision making slows the momentum of collective actions. On the contrary, without consensus, it will be difficult for the involved actors' interests to be met.

Rules are crucial for continuation of the common interest. There needs to be governance and leadership, this will also result in representation of all group interests.

2.9.6 Regulations

Whilst governance is usually done by focal actors in a collaboration effort, regulations are stipulated by national government. For example, ways of collecting revenue with NFC are controlled and there is a limit and regulations on the amount that can be loaded on the contactless media (Apanasevic, 2013). It is considered good practice in case the cardholder loses their card. However, these regulations might lead to a slow growth of NFC payments (Apanasevic, 2013). In some cases, government regulations also guarantee financial institutions involvement in electronic payments (Juntunen et al., 2010), resulting in increased complexities and regulations. For example, the China central bank regulations delayed a Chinese bank's plans of introducing virtual credit cards (Liu et al., 2015). This shows how regulators play a part in the contactless payment ecosystem.

2.10 Theoretical models related to the research

Theories in research help to guide and direct the study. While Yin (1994) recommends using a theory as a lens to guide a case study, Stake (1995) argues that case studies can be carried out without using a theory. Walsham and Sahay (1999) used Actor Network Theory (ANT) in their three-year field study of Global Information Systems (GIS) implementation in India. In their study, the choice to use the ANT theory evolved over time and through reading and researching more on related studies. Creswell (1994) echoed this idea of applying a theory towards the end of the study. This approach, however, defeats the purpose of using the theory to guide and direct the study. Harling (2012) recommends applying a theory right from the start to use it as a lens to direct and structure the study.

Concepts that have been revealed by the literature review such as stakeholders, interests and competition guided the choice of appropriate theory. A number of theories were considered including Collective Action theory, Stakeholder Management theory and ANT. The proposed theory that will be used as the theoretical lens in this study will be fully-explained in this section, but firstly, other theories that were considered will be briefly discussed.

2.10.1 Collective Action theory

The Collective Action theory has been used in previous studies to understand collaboration issues, for example, in NFC payment solutions or platforms (de Reuver et al., 2015) and in Information Systems in general (Klein and Schellhammer, 2011). The Collective Action theory explains how organisations or groups collaborate to achieve a common goal (Olson, 1965). Olson (1965) postulates that collaborations can take place even if the expected gains are lesser than the effort put in. Ostrom (2014) on the other hand, argues that individuals will collaborate to fulfil their self-interests. It is possible that the gains might be smaller than effort put in by the organisations to accomplish the common interest. While the aim of the collective action is to produce a ‘collective good’, the collaboration is not only for economic reasons. The collective good is not only used by the participating organisations but also other organisations and consumers. For example, banks and telecommunication operators collectively developed a TSM platform that other organisations which were not part of the group can also sign-up and use the TSM service without paying fees (de Reuver et al., 2015).

2.10.2 Stakeholder Management theory

The stakeholder management theory recommends identifying stakeholders, clearly elaborating management responsibility and finally having rules that will solve conflicts between the competing stakeholders (Reed, 1999). Freeman (1984) defines stakeholders as individuals, groups or organisations with an interest in an organisation. If anything happens to the organisation, all the stakeholders will be affected (Freeman, 1984). However, a conducive environment will result in continuation of the activities. The theory has been used in information systems and IT research (Pouloudi, 1999; Boonstra, 2006; Littau, Jujagiri and Adlbrecht, 2010). The theory can be used to understand business challenges and the complexities associated with these challenges (Parmar et al., 2010). Wagner-Mainardes, Alves and Raposo (2011) note that the theory has shortcomings. They postulate that there is no clear link between participating actors. For example, the theory does not show clear links between internalities and externalities, and it also views an environment as static, with only stakeholders. The other limitation is the non-inclusion of non-human actors (Luoma-aho and Paloviita, 2010). They suggest that any stakeholder theory must include non-human actors (Luoma-aho and Paloviita, 2010). Non-human actors need to be involved to fully-

understand complex collaborations. For example, to understand collaboration challenges in the development of a Trusted Service Manager, the TSM platform must be considered as a stakeholder.

2.10.3 Actor-Network theory (ANT)

ANT evolved in the sociology of science in the 1980s (Latour, 1987). The theory was initially used in science laboratories, but it is now being applied to other social science and technological studies (Law and Callon, 1992). In ANT, the social and technical are separated, which helps to understand complex networks of relations (Hanseth, Aanestad and Berg 2004; Walsham, 1997). ANT can help understand how networks of relations are formed, how they are sustained and how these networks compete with other networks (Tatnall and Gilding, 1999). There are two ways in which the theory can be used to gather data – through interviews (following the actors) and inscriptions (items such as texts and images).

Lee et al. (2015) claim that ANT is a powerful theory that can be used to analyse these networks to establish how actors form alliances (networks), and enrol other human and non-human actors. The theory has been recently used in information systems (IS) studies, predominantly in social studies of technology. It has proven to be useful in a number of IS studies (Heeks and Stanforth, 2015; Mpazanje et al., 2013; Sarker, Sarker and Sidorova, 2006). ANT was used as the theoretical lens for this study as it helps identify sequential steps and processes involved in building up networks of relations (Lee et al., 2015; Walsham and Sahay, 1999; Sarker et al, 2006; Harry et al., 2014). ANT has been used in technology-related studies to study the formation, dissolution and failure of processes (Heeks and Stanforth, 2015; Sarker et al., 2006). ANT concepts relate to the terms that have been revealed by the literature review as important to NFC payment system implementation, such as stakeholders, interests, artefacts, networks and competition.

While ANT criticisms have been echoed in a number of studies (Whittle and Spicer 2008), other authors (Hanseth et al., 2004; Shim and Shin, 2015) claim that ANT can help to understand the complex relationships when organisations collaborate to produce a service or product. A previous study that used ANT was a case study by Sarker et al. (2006), who wanted to understand exactly the actions that resulted in business process change failure at a telecommunications organisation

in the United States of America. Their study found that a number of issues that the ANT theory suggests actually led to change failure. According to Sarker et al. (2006), ANT is a credible way of understanding a sequence of events. Whittle and Spicer (2008) argue that separating humans from nonhumans makes it impossible for ANT to understand true events of nonhuman actors without involving the humans. Shim and Shin (2015) claim that despite the limitations of ANT, it is still very useful if the objective is to appreciate and understand the complexities of reality and the role of actors in a network. ANT is valuable in studying evolution of collaborations. Whittle and Spicer (2008) also echoed the same sentiment when they pointed out that ANT is a valuable technique to understand how different parties collaborate, how artefacts are constructed and how nonhuman and human objects and artefacts enable the collaborations.

2.10.4 ANT concepts

The following section will describe the key elements of ANT.

Translation is also referred to as the Sociology of translation. It involves alignment of interests between focal actor and other actors and establishing the network (Sarker et al., 2006). This will then lead to a stable network, but there is no guarantee that the alignment might succeed, it can also fail. The four stages of translation can show how networks come into being and then establish or fail where actors involved are from different environments (Callon, 1986). Following this process will help answer the research question. Translation involves four moments of translation or stages of translation described below.

The first stage of translation is **problematization**. This is when the focal actor identifies both a problem and other actors with the same interests (Sarker et al., 2006). The focal actor makes itself indispensable to how the problem can be resolved (Mähring et al., 2004), which is known as **Obligatory Passage Point** (OPP). The other actors will view the problem as something that they cannot resolve on their own.

The second stage of translation is **Interessement**. This entails convincing other actants to join the network (Sarker et al., 2006). It also involves negotiations and agreements between the focal actor and other actants (Callon, 1986). The actors will not necessarily have the same or identical interests as the focal actor, but the interests will be aligned. The focal actor also gives the other actors incentives for joining the network.

Third stage of translation is **enrolment**. This is a result of a successful interessement. This is when other actors accept roles aligned to their interests that get assigned to them by the focal actor (Sarker et al., 2006). Although at this point the actors can foresee the benefits of performing their roles, enrolment is temporary and it can result in **betrayal**.

The fourth stage is **mobilisation**. This is when the focal actor encourages other actors to follow the rules that have been agreed on (Sarker et al., 2006). Focal actors and other actors may communicate through **speakers** or **delegates** (Callon, 1986). The delegates, even though acting on behalf of involved actors, also have to abide by the rules set by the focal actor. Continued support by the other actors will result in a continuous stable network and relationships.

Enrolment drives **inscription**. This is the creation of artefacts that will result in protection of interests (Sarker et al., 2006). Commitments to the inscriptions will stabilize the network (Mähring et al., 2004). The artefacts can be, for example, a software manual in a software development project. Sarker et al. (2006) argue that enrolment and inscription can happen in parallel which will result in **irreversibility**. When the network has been established and strengthened, making it difficult to make any changes to the network, irreversibility takes place (Sarker et al., 2006). It will be impossible for the focal actor and other actors to carry out another translation process or follow a new and different translation path.

An **Actor Network** is defined as an association of actors with aligned interests (Sarker et al., 2006). Once networks are established, it is possible and natural that they can fail or become unstable. It is crucial to outline the actors and how they fit in the network. After the translation process, irreversibility takes place which will lead to '**Black boxing**' the network (Latour, 2005). This allows for better control for the focal actor. There will however be no limitations on the actors; even after black boxing, actors can still pull out from the network.

2.11 Literature review conclusion

Although most of the previous studies analysed in this literature review address the same questions around collaborations, a variety of theories were used. Most of the studies were qualitative in nature and the data collection methods used were case studies. Whilst some studies used a single

case study, others used multiple cases. The review has shown the processes that lead to the formation of actor networks, the role players in these alliances and how they relate to each other, and success and failure factors of these collaborations.

It is crucial that organisations cooperate to provision an NFC payment solution. Consequently, cooperation and competition go hand-in-hand. If organisations collaborate to provide a service, there is bound to be competition. Other issues such as unclear or lack of business models, different interests and objectives, and technology standard issues have led to the failure of collaboration efforts. The findings from previous studies show that many solutions fail because of various unrelated factors at different phases of network formation, from problematisation phase to the commercial launch phase of the payment system. For electronic payments to be successful, it is important for the focal actors to first understand the environment (Liu et al., 2015). For example, understanding why consumers pay using certain preferred methods and why merchants accept certain methods of payment. This will also help the actors to predict future demand for any payment solution before introducing it to consumers in different settings. NFC contactless payments in industry sectors such as transit and retail are a result of collaborations between different stakeholders or actors. Usually transport operators, retailers, MNOs, payments network operators and other actors cooperate with banks to introduce NFC contactless payments in different countries.

Studies concerning the processes and challenges in contactless payment systems introduction in developing countries in Africa could not be found. Guided by ANT to analyse the process that leads to the formation of a network by multiple players, this study's aim is to bridge that gap by providing better explanations of these failures in a developing country context. In summary there is lack of research done on stakeholder issues in NFC payment collaborations in Africa. Most of the studies on electronic payments focus on SMS mobile money transfer and mobile payment technological issues and consumer adoption. Not only is there need for more research focusing on service providers and merchants, but also studies focusing on failures of payment solutions (Gannamaneni et al., 2015).

Chapter 3: Research Methodology

In this chapter the research design is presented and the researcher's approach towards carrying out the study is described in detail.

3.1 Research perspectives

There are three research perspectives or philosophical approaches in Information Systems research (Klein and Myers, 1999). These philosophical approaches are:

Positivist studies mainly aid to test theories to improve predictive knowledge and understanding of a phenomenon. The studies are carried out using structured instruments. Orlikowski and Baroudi, (1991) classify studies as positivist studies when - there is proof of formal propositions, variables can be measured quantitatively and conclusions can be drawn about a phenomenon from the sampled population. Positivist studies comprises of assumptions and hypotheses prior to carrying out the research. These assumptions and hypotheses are then weighted to check if they are supported by the collected data.

Interpretive studies endeavour to understand a phenomenon by “accessing the meanings that participants assign to them” (Orlikowski and Baroudi, 1991). This approach is subjective and knowledge is gained from the researcher's interactions with the respondents to understand their shared understanding of the phenomena. Unlike the positivist approach, these studies cull the chances of an "objective" account of events. The goal is not usually to generalise to a population but rather to comprehend the deeper structure of a phenomenon (Orlikowski and Baroudi, 1991). Other settings can then be informed by this deeper understanding of the phenomenon.

Critical studies intend to “critique the status quo, through the exposure of what are believed to be deep-seated, structural contradictions within social systems, and thereby to transform these alienating and restrictive social conditions.” (Orlikowski and Baroudi, 1991). An information system research study is classified as critical if the main purpose of the research is social critique and if there is proof of a critical stand from the researcher towards assumptions about a phenomenon that are taken for granted.

These philosophical approaches are all different in their assumptions about the association between theory and practice, the nature of reality, the foundations of the knowledge and development of this knowledge (Orlikowski and Baroudi, 1991). An interpretive philosophical approach is deemed appropriate for this research. From an interpretivist perspective, to understand how and why NFC payment systems fail to get implemented, there is need to have in-depth discussions with the key role players that are involved in the project (Walsham, 2006).

3.2 Purpose

The study has an explanatory purpose. The reason why this research was explanatory was for the researcher to fully-understand the processes and sequential steps that lead to the failure of NFC payment system implementation.

3.3 Strategy

A single case study approach was adopted. There are a number of case study critics and misleading definitions of the term ‘case study’. Harling (2012) define it as a thorough investigation of an innovation in its natural setting. Case studies are commonly used in studies focusing on organisational systems and are appropriate for these types of studies (Tatnall and Gilding, 1999). Flyvbjerg (2006) and Dubé and Paré (2003) agree that case studies can be generalised analytically. Lee and Baskerville (2003) echo the same sentiment, highlighting that case study research allows for generalising from data to concepts and theory. Dubé and Paré (2003) emphasise that case study research can be used with any philosophical approach. Considering the objectives of the study and the complexity of the phenomena, an in-depth case study is required. Therefore, the case study approach was deemed appropriate and a fit methodology to understand why NFC payment systems fail to get implemented, starting from how the concept was birthed, up to the project implementations and commercial field trials.

In-depth case studies are useful in studying actor network projects and problems involving many different actors (Klein and Myers, 1999; Walsham, 2006). As a result of using the case study approach, data was collected using various methods such as interviews, documents and observations. Using these multiple methods resulted in an extensive data-gathering exercise, which ultimately resulted in a more critical account of the phenomena.

There are several challenges in case studies. For example, access to some information may be difficult for an outside observer (Walsham, 1995). Walsham (1995) recommends establishing trust and a good relationship with respondents. The researcher built and maintained a good relationship with respondents through introductions from the first respondent. This resulted in the respondents being more open and therefore willing to share more information. There is one case that was used in the research. Themes within the case will be presented, and then a thematic analysis of the case follows, as recommended by Dubé and Paré, (2003).

3.4 Time Frame

The study was cross-sectional. The data was collected once during a period of about three months. There was no need for the researcher to interview the actors more than once, unless if something that required the researcher to follow-up emerged. While extended periods of field work might have led to the discovery of new findings and validation of the research, it was not feasible for this research due to time limitations. On the other hand, being highly-involved (spending more time at the site) in such a study can be time-consuming and may not necessarily uncover new information. Time saved by less involvement was allocated to other tasks such as analysis, as recommended by Walsham (2006). Although longitudinal case research is recommended in IS because of the dynamic and the ever-evolving nature of the IS projects (Dubé and Paré, 2003), a cross-sectional timeframe was deemed appropriate since data was collected in retrospect in the case study. A work schedule used for completion of the research is provided in Appendix 5.

3.5 Data Collection

The data was collected using a number of methods such as semi-structured interviews (face-to-face and telephone interviews), face-to-face group interviews, informal discussions and also from different secondary sources such as project documents, meeting notes, websites, etc. Group interviews helped in getting more respondents involved and it was also a quick way of gathering experiences of the involved actors.

3.6 Target population

Actors that were involved in the projects were the target population. These included a Bank, Payment Service Provider, Electronic Payments Network Operator, and Fast Food Merchant/Franchise. The aim of focusing on them was to gather their as-lived experiences during the implementation of an NFC payment system. The sample was large enough for a qualitative study (13 respondents) and the target population was the right one for all different perceptions of the phenomena to be accommodated, as recommended by Jansen (2010).

3.7 Sample

The sample for qualitative data is small because the aim is to identify themes in the data that will be collected and not to prove if assumptions are supported by data collected. Usually the interviews or other methods of gathering data involve a small number of participants (Collis and Hussey, 2009). Large sample sizes are usually not feasible in qualitative research (Mason, 2010). Purposive or judgemental sampling was used to select the respondents that were part of the research study. Though difficult to perform sampling in case studies, it was helpful to perform sampling in this case. The respondents were selected based on their knowledge and involvement in the NFC payment system project. The respondents increased as new information became available from the initial investigation. The initial interview with the main actor guided and directed the researcher to the other actors that were interviewed (*follow the actors*). This process of following and interviewing actors ended after saturation had been reached. Saturation was reached after the researcher was not getting new evidence from the interviews. According to Walsham (2006), research field work is very much dependent on the context, therefore the researcher will have to make their own decisions with regards to sampling, which can be difficult. The researcher made their own preferences and decisions, taking into consideration the context and constraints, and case study principles and recommendations (Walsham, 1995; Klein and Myers, 1999; Dubé and Paré, 2003; Flyvbjerg, 2006; Walsham, 2006). The study focused on multiple actors that had been directly involved in the implementation of an NFC payment system. The organisation and the people that were involved in the projects were the primary unit of analysis.

Walsham (2006) claims that we are biased by our background, knowledge and the way we see things. Therefore, the field studies were carried out in non-contrived environments, that is, natural

environment in which the events normally occur. Although the issue of bias cannot be completely avoidable, the researcher took a neutral stance when they carried out the study. That is, they were not aligned to any group or view and they did not show any views based on previous experiences as recommended by Walsham (2006). The style of involvement was neutral mainly for two reasons. Firstly, if the researcher gets too closely involved the respondents might think that researcher has a hidden agenda. Secondly, if the researcher gets too closely-involved they might not obtain a fresh look (Walsham, 2006). Table 3.1 below highlights the key attributes of the research methodology used.

Research context	Understanding NFC payment project failure
Research purpose	Explanatory and descriptive
Philosophical approach	Interpretive
Research theoretical lens	Actor Network Theory
Research strategy	Case study (One case study)
Data collecting techniques and sources	Qualitative Semi-structured interviews Project related documentation Secondary sources (Articles and books)
Data analysis	Qualitative and Actor Network Theory
Time frame	Cross-sectional

Table 3.1: *Summary of the research method that was followed in this research*

3.8 Study setting

A comprehensive elucidation describing the context of where the research is carried out and exact period of time under investigation was imperative, as recommended by Dubé and Paré (2003). The researcher gained sufficient access to the organisations and spent adequate time to develop a close understanding of the study setting and the NFC payment ecosystem. The study was done in South Africa’s Gauteng province. All of the actors such as the Fast Food Franchise, bank and the other companies that were involved in the NFC payment system implementation are based in Johannesburg.

South Africa was a suitable country to investigate since it is a developing economy (some aspects of the economy resemble a developed country) and it has started NFC payment system projects. South Africa is well-known for its dual economy (Harry et al., 2014). It has a population of over fifty-three million people and it has a fairly-large upper middle-income level (World Bank, 2014). South Africa is one of the largest economies in Africa. It has also the best banking and payment systems in Africa (Okeahalam and Afful, 2005). Johannesburg is the largest metropolitan city followed by Cape Town.

3.9 Description of the case

Dubé and Paré (2003) recommend that there should be a justification for choosing a particular case in case studies. Flyvbjerg (2006) echoes the sentiment. The strategic selection of cases is vital as it increases the generalisability of the findings, argues Flyvbjerg (2006). In a single case, the case should be rare and unique, and in multiple cases, there should be some logic to the selection of the cases, postulates Dubé and Paré (2003). The case chosen in this study is both unique and rare. According to the respondents, the NFC implementation was one of the first projects in South Africa, but was not successful. This single case is an exemplary case that will answer the research question concerning NFC payment system implementation failure. The case is described in detail in the next chapter.

3.10 Pilot Study

Since participating actors played different roles in the introduction of NFC systems, an open-ended interview guide was custom-developed for each actor and in some cases, the same questions were used. This approach helped the researcher to gather an in-depth understanding of roles played by each actor in the implementation of this system. The pilot studies are known to help to determine appropriate unit of analysis, refine data-gathering instruments and to familiarise with the research topic (Yin, 1994). This can also help the researcher to gain more knowledge and insights into the issues being studied (Dubé and Paré, 2003). NFC payments are still new in South Africa, and because of this, it was difficult to find other NFC payment system projects and use them as pilot studies.

3.11 Data collection methods

ANT recommends following the actors themselves to understand their innovations and to understand the established associations (Latour, 2005, p. 12). The data was collected through semi-structured interviews from the main role players from different organisations that were involved in the projects. The questions that were asked in the interviews were guided by ANT. For this reason, semi-structured interviews were used in the research. The instrument that was used in the research is attached in Appendix 2. Questions were prepared before the interview, but these were not complete and the researcher had to improvise as necessary, as suggested by Myers and Newman (2007). Interview questions in the appendix do not represent all the questions that were asked during the interviews as some questions emerged during the interviews. Also, the order in which the questions were asked was not in any particular or sequential order, as some questions were asked based on the responses to preceding questions. Interviews are the best source of data in interpretive studies (Walsham, 1995). Contextual information, informal conversations and other data were collected through field notes. Elsenhardt (1989) defines field notes as events and running commentaries that unfold in the course of a case study. During the case study, field notes were recorded into a journal and this was done almost on a daily basis. The field notes included items such as informal discussions, the researcher's personal comments and the researcher's own interpretation of events soon after an interview. To validate and cross-check data gathered, data was also extracted from project documents and other data sources.

The preliminary investigations helped the researcher to compile a list of participants that were interviewed. The list grew as the researcher gained more knowledge of the phenomena. Where possible, telephone and face-to-face interviews were used to collect data from the participants. To complement the interviews, data was also collected from secondary sources from some of the organisations that were involved in the project. Tape recorders were used where possible to record interviews. It was the researcher's discretion to decide when sufficient actors had been interviewed or enough data had been gathered that could assist the researcher to explain the problem. However, it was by no means an exhaustive list of all the actants in the NFC system implementation. The field work ended when data gathering had reached saturation; that is, when no new information was emerging from the interviews. It is crucial to state the roles of the respondents, therefore the roles of the respondents in the above-mentioned cases will be stated.

When carrying out a case study, it is vital to ensure that reliability and validity issues are addressed. This allows other researchers to be able to follow the same steps to repeat a case and yield the same results (Yin, 2003). In this case, data collection procedures were clearly documented. The length of interviews varied depending on the role of the person being interviewed. As envisaged, most interviews were between 45 and 60 minutes long. Respondents, if willing, were asked to listen to the recorded interview after each interview in case there was something that needed to be added or corrected. Data collected was transcribed in to a Word document after the interview. This saved time and allowed the researcher to focus on what the respondent was saying whilst observing the body language and gestures.

Interviews have their weaknesses, for example they “intrude into the social setting they would describe; they create as-well-as measure attitudes, they elicit atypical roles and responses, they are limited to those who are accessible and will cooperate” (Webb et al., 1966). Interviews force respondents to answer a stranger’s questions under time pressure. The interviewer was sensitive to likely biases and distortions in the narratives gathered from the interviewees as suggested by Klein and Myers, (1999). There is a chance of lack of trust because the researcher is a stranger to the interviewee, consequently information considered sensitive by the interviewee may not be divulged and this information might be important for the research. Therefore this lack of trust may result in incomplete information being gathered. Lack of time to carry out the field work may also result in incomplete data gathering.

Since this research took an interpretive approach, interviews were the main data collection method that was used. Interview guides were used in both the pilot and final interviews to guide and direct the interviews. As discussed earlier, data was collected from multiple sources. This offers triangulation of the data gathered which resulted in increased internal validity of the findings. As part of the data collection procedure, transcribed data was verified by the interviewees. Though time consuming, this is done to check and confirm that the transcribed interviews are a true reflection of what the respondents said.

Interview questions were carefully constructed following the ANT concepts and they were also guided by past questions that were asked in previous related studies that also used ANT. The

questions were appropriate for the objectives of the study to be achieved. The questions were continuously refined after the pilot stage and after a couple of the first interviews. The interview questions asked depended on the role of the individual in the NFC implementation project.

3.12 Access and Ethics

It is important for the researchers to take a neutral stance when carrying out the investigations, as a result, the respondents will not perceive the researchers as having a vested interest and will be more open and honest with their responses (Walsham, 2006). Ethics approval was obtained from the relevant authorities such as the UCT Ethics in Research Committee before conducting the research (Ethics Form attached in Appendix 6). The objectives and purpose of the research were clearly communicated to the participants. The management of the involved organisations were asked to give approval for the researcher to conduct interviews within their organisations. Verbal and written consent (Cover letter and consent form are attached in Appendix 3) was also required from participants. Only respondents who gave consent were interviewed in the study. Other extra measures were employed as required to guarantee privacy and integrity of data. To guarantee confidentiality, the respondents are not identified by their name in this dissertation. Pseudo-names will be used instead of respondents' names and organisation names. There was no physical or social harm caused to the participants involved in the research and there were no racial, minority or cultural variables used in the study. Honest reporting and true information or results will be provided to the organisation if they request to see the responses. There was anonymity so that any individual, organisation or definable group was not identifiable. There are no subjects that are in a dependent relationship with the researcher. There were no payments or inducements that were offered to the respondents. Questions about sensitive behavioural aspects were not asked in the research. The collection or disclosure of information was purely for academic studies. If permission to carry out these interviews was not granted by any of the many actors that were involved in the project, data was collected from alternative sources.

3.13 Data Analysis

The ANT process of translation can be divided into four stages: problematisation, interessement, and enrolment, mobilisation (Sarker et al., 2006). These four concepts were of particular importance to this research during the data analysis. The analysis was carried out and findings

discussed in relation to the actor network theory concepts. Researchers should not use a theory in a rigid way, claims Walsham (1995). Rather than only seeing what the theory suggests, Walsham (1995), recommends preserving a substantial degree of openness to the field data in interpretive research. This will therefore result in an iterative process of data gathering and evaluation. While theory guides the way in which data can be analysed (Walsham 2006), it is evident from the literature review that ANT does not prescribe methods for data collection and analysis. Both these processes are referred to as 'fieldwork' (Latour, 2005, p.135). The theory also does not exclude nonhuman actors, which makes it appropriate to apply the theory's sociotechnical process to this research for the researcher to understand why NFC payments fail to get implemented. Also, ANT does not differentiate micro actors such as individuals and macro actors such organisations, instead it recognises the inherently unstable nature of actors (Sarker et al., 2006). Depending on the level of analysis that is required, this will allow the researchers the flexibility of treating a sociotechnical group as an individual actor or as a collection of single actors.

The researcher utilised initial data analysis methods and tools as well as field notes and coding as a way of reflecting on the collected data. Data collected was transcribed, exported to the NVivo qualitative data analysis program and analysed after each interview. This directed the other interviews and data collection that followed. The data capture, data preparation and analysis was carried out by the researcher. This resulted in the researcher familiarising more with the data, which ultimately helped during analysis and reporting. Thematic analysis was used to analyse the qualitative data. Van Rooij et al. (2012) describe thematic analysis as the searching for themes within qualitative data. The researcher looked for themes that emerged from the collected data from the case study, focusing items that helped the researcher to explain the failure factors. The thematic analysis involves a number of phases. The first stage involves the researcher familiarising themselves with the data and then generating initial codes in the second phase. The third phase and fourth phases involve searching for themes and reviewing themes, respectively. Finally, naming themes and producing the report are the last two phases (Braun and Clarke, 2006, p87). There are a number of qualitative data analysis programs, the researcher selected NVivo version 11 professional as the qualitative data analysis software that was used to analyse the data. Themes identified were validated and themes that could not be supported were dropped. The data that was analysed includes transcribed text, field notes, project documents, observation notes, body language, emphasis, pauses, laughter and "hidden" language (e.g. jargon, slang).

The study had one case, and the case relied on multiple data gathering techniques. When analysing the collected data the researcher searched for case patterns and also performed pattern-matching. Pattern-matching is a strategy used in explanatory research to compare an empirical pattern with a predicted pattern (Dubé and Paré, 2003). This process of pattern-matching also enhances internal validity, claim Dubé and Paré (2003). Although the explanatory case study is more demanding than the descriptive case study, it includes a number of strategies which are vital in providing empirical testing for qualitative data (Yin, 1994).

Van Maanen (1988, p. 32), describes data analysis and reporting as 'presenting a coherent point of view told with grace, wit and felicity'. To ensure comprehensiveness of data and crosschecking of emerging concepts, triangulation of the data and conclusions was performed. This involved among other things, the validation of interview data with collected documents. Triangulation was also beneficial because it provided various viewpoints on issues around NFC payment implementation experienced by the various stakeholders. To ensure credibility of the findings and reporting, direct quotations of subjects' responses and descriptions that are rephrased closely to the respondents' accounts are included in this report. The use of quotes in the final report is a way of bringing in the voices of participants in the research study (Creswell 1998, p. 170). The quotes and audit trails were also sufficient for external observers to follow the root of the findings and conclusions presented from initial research objectives and questions, and vice-versa. As a result, a person not involved in the research can reach an independent decision concerning the qualities of the analysis of the data. The analysis and report on the findings shows a critical reflection on how the research findings 'were socially constructed through the interaction between the researchers and participants' (Klein and Myers, 1999). Finally, the findings and interpretations were checked by academic professionals, industry experts and NFC payments field specialists to validate the findings.

The researcher was aware of the fact that there may be conflicts between the actual findings and theoretical presumptions directing the study design, as suggested by Klein and Myers (1999). The researcher was sensitive to these and the preconceptions were revised where necessary. In addition, the researcher was sensitivity to possible differences in interpretation among the participants, as also suggested by Klein and Myers (1999).

3.14 Summary

In summary, the purpose of the research is to investigate and explain the processes and sequential steps that lead to failure to implement NFC contactless payments by a developing country. In this chapter, among other things, the research perspective, strategy, sample and case description were explained. Considering the qualitative philosophical approach and the use of case studies in the research study, the results were analytically generalised in chapter five.

Chapter 4: Case Description

4.1 NFC payments

A Near-Field Communication (NFC) contactless payment is a cashless transaction that is done wirelessly using payment media such as bank cards and smartphones embedded with NFC chips. Contact between the payment media and the contactless-enabled card reader is not required. There is no need to swipe or insert a card into the card reader and enter a PIN code. The growth in the adoption of NFC-based payment systems by many countries is an indication that the method of payment has improved the service delivery in many sectors.

4.2 Case introduction

This case study focuses on a collective effort by multiple actors that have been directly involved in an attempt to implement NFC payment systems in South Africa in one of the nation's biggest fast food franchise restaurants. The implementation was a partnership between an electronic payments network provider (EPNP) and the fast food franchise (FFF). The focal actor in this case study was the Director of Merchant Sales at the electronic payments network company. After doing some research, the focal actor discovered that the contactless payment method had improved service delivery in other developed countries. For instance, it had significantly reduced the waiting times at the queues at fast food restaurants in Australia. The focal actor and the organisation that he works for then decided to introduce the same method of payment in South Africa. After a thorough search for the best sector to introduce this Contactless Payment System (CPS) to, they chose one of the nation's largest fast food franchise restaurants in SA, which is the same fast food franchise that had implemented the system in Australia. The focal actor approached the SA fast food franchise with the proposal and the franchise bought into the idea. Even though NFC payments are still new in SA, the franchise did not hesitate to buy into the idea because they wanted to be the first large national merchant in the SA to accept contactless payments.

The following sections describe: the current payment process at the FFF stores and its problems; the actors in the NFC payment project and roles that they played; a description of the NFC payment architecture at the FFF merchant stores; and finally the events in the project.

4.3 The current payment process and its limitations

Currently customers pay for their meals at the FFF stores with cash or bank cards that require PINs. From the observations that the researcher carried out, this slows down the queues, especially when customers are using cash and the cashiers have to look for change. If the customer is using a bank card that requires a PIN, the cashier takes the card from the customer, swipes or dips the card into the card reader, hands the PIN pad to the customer, the customer then enters their PIN and returns the PIN pad back to the cashier. The transaction is then routed to the Card Issuing bank for approval through the 3PP, Acquiring bank and Card Association (CA). This transaction flow is shown by the diagram below in Figure 4.1. After the transaction is approved a receipt is printed, the cashier then tears the receipt and hands it back to the customer together with the card. From the observations that the researcher did at the Fast Food Restaurants, this whole payment process takes 30 seconds to about 45 seconds if there are no issues. By using NFC payments the payment processing time can be reduced to about 2.5 seconds as indicated in the following extract.

"...you don't even give your card to the cashier. [.....] On average a normal contact transaction takes around 30 seconds to complete or even longer when a customer enters an incorrect PIN, whereas a contactless transaction takes around 2.5 seconds to complete." **Focal Actor (Card Association)**

Customer ⇔ Merchant ⇔ 3PP ⇔ Acquiring bank ⇔ Card Association (MasterCard, Visa and Amex)
⇔ Card issuing bank

Figure 4.1: *Electronic Payment process or transaction flow*

Currently all the FFF stores accept contact electronic payments, that is, payment transactions that require cashiers to swipe or dip the customer's card into the card reader and the customers to enter their PINs. So for the FFF restaurants to accept NFC contactless cards, i.e. cards that do not require PINs and contact with the card reader, the FFF stores had to go through infrastructure upgrades and certification phases. The FFF asked TANGO (pseudonym for the 3PP), their Third-Party Payments provider, to upgrade the FFF stores infrastructure. After the upgrades were done, the 3PP requested the acquiring bank to initiate the testing and certification processes with the EPNP. The acquiring bank then opened a project with the Card Association to get the FFF merchant certified for NFC payment acceptance. This certification was done, though not successful, by the

acquirer to prove to the Card Associations that the FFF merchant meets the requirements required for new services, i.e. the acceptance of NFC contactless payments.

4.4 Actors in the project

EP-Card (pseudonym for the Card Association) - EP-Card, a payments technology company, is one of the world's largest electronic payment network providers that connects entities such as banks, payment processors, government institutions and merchants across the world. Their network enables the transfer of electronic money from one entity to another. These electronic payment network providers are also known as payment Card Associations. MasterCard, Visa and American Express are some examples of Card Associations. These Card Associations do not issue bank cards, they only provide the technology and networks that enable the movement of funds electronically. Issuers or banks issue the bank cards. EP-Card is the main electronic payment network provider or Card Association in this case. Another Card Association was engaged in the certification phase but only to test acceptance of contactless cards from their networks.

Fast Food Franchise (Merchant) - One of the world's largest chains of fast food outlets, is franchise stores. Franchise stores are agreements between large brands and individuals or companies that allow the individual or company to run local stores under that established brand. Individuals or companies can own one franchise store or many stores. There are more than 200 FFF stores in South Africa. Food can be ordered at any FFF shop through the drive-through facility without getting out of your vehicle or by going inside the shop (walk-in). FFF is the merchant in this case study. FFF does not connect directly to EP-Card or any payment Card Associations to authorise, clear and settle their financial transactions when customers use their bank cards at their restaurants. They have to connect through an acquirer which can be a bank or payment processor. FFF's acquirer is a bank called X-Bank, (pseudonym for the acquirer bank). FFF has got vendors or third-party payment providers that they use for payment processing including setting up the payment infrastructure such as till systems, PIN entry devices, local and wide area networks and payment servers. Their vendor or third-party payment provider is a company called TANGO.

TANGO (Third-Party Processor) is the 3PP that provides the payment infrastructure to FFF such as PIN pads, payment servers and till systems. TANGO does not manufacture any hardware and

they also do not develop any software. They source these from vendors who manufacture hardware and develop software. *Vendors* such as VeriFon, who provide PIN entry devices, and ALPHA (pseudonym for the software vendor), who provide Postilion payment application switch, and Oracle, who provide the till systems, supply these devices and software.

X-Bank (Acquiring Bank), one of the three biggest banks in SA, is a bank that acquires financial transactions for the FFF through TANGO. X-Bank then forwards these transactions to EP-Card, the electronic payment network provider, for authorisation, clearing and settlement of the transactions. X-Bank acquires the transactions for FFF through TANGO, who process payments and provides the infrastructure to FFF.

The roles played by the involved actors are summarised in Table 4.1 below.

Organisation	Role
Card Association or Electronic Payments Network Provider (EP-CARD)	Authorise, clear and settle payments or financial transactions.
Fast food franchise restaurants or merchant (FFF)	Fast food merchant or shop is the client that required a solution to their problem.
Third-Party Payments provider (TANGO)	Payment processor for the FFF. They are responsible for setting-up payment infrastructure at all the FFF stores across South Africa. They also host the payments server running a financial Postilion switch.
Hardware vendor (VeriFon)	TANGO's vendor that provides Micros till systems and VX820 PIN entry devices
Software vendor (ALPHA)	TANGO's vendor that provides Postilion financial switch and payment application called E-Socket.POS
Acquiring Bank (X-Bank)	Acquirers payments or financial transactions for FFF through TANGO and sends them to the Card Association for authorisation, clearing and settlement.

Table 4.1: *Actors and a brief description of their roles*

4.5 Non-human actors in the project

I identified NFC contactless payments technology, NFC contactless cards, test cases, NFC contactless card reader, PIN entry devices, till systems, payment servers, E-Socket.POS software,

Postilion financial switch, certification, communication networks, advertisements, marketing agents, Payment Card Industry standards, and other hardware and software as the non-human actors. Most of these non-human actors are mentioned and incorporated throughout the report to fully understand the complexity nature of the networks.

4.6 Description of the NFC payment architecture and the role players

Below is a brief description of the architecture to help understand the role players and the roles that they played.

FFF uses VX820 PIN entry devices in their stores for card payments. These PIN entry devices were supplied by VeriFon. They have software on them and the software was also supplied by VeriFon. These PIN pads all connect to Micros till systems. The PIN pads connect to Micros till systems which sit on a Local Area Network and connect to a payment server. This payment server runs a software application called E-Socket.POS (supplied by ALPHA) which connects to the TANGO processing centre. TANGO hosts at their processing centre an application switch or software called Postilion, which is a financial switch and also supplied by ALPHA. The TANGO processing centre then connects to X-Bank (acquiring bank) and the acquiring bank then connects to the payment Card Association also known as Electronic Payments Network Provider. The Card Association then authorises or declines the transaction based on the response that it gets from the card-issuing bank. As illustrated in Figure 4.2 below, the role players in this project were the FFF, ALPHA, TANGO, Card Association and Acquiring Bank.

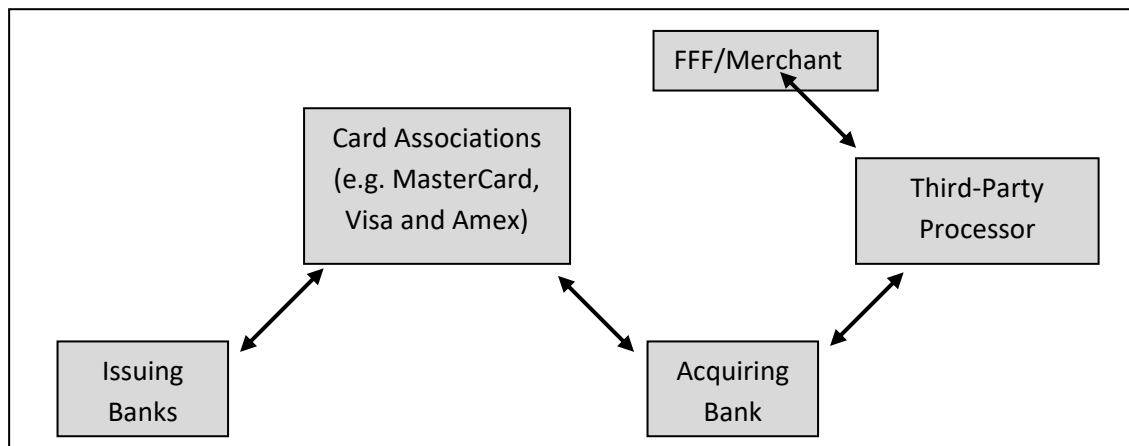


Figure 4.2: *Role players and their links in the financial transaction flow*

4.7 Events in the project

The focal actor approached the fast food franchise after discussing the idea with the electronic payment company’s executives. The first official event in this endeavour to implement electronic contactless payments was a meeting between the electronic payments network company and fast food merchant in early 2013. Two people were in the meeting, i.e. the Director of Merchant Sales and Solutions from EPN Company and the IT manager from the fast food franchise SA head office. After the FFF had agreed to the idea, the EPN company’s Director of Merchant Sales and Solutions drafted a business case or proposal for the fast food franchise. An agreement to implement contactless payment at all the fast food stores was then entered into, and a contract was signed by both parties. The initial discussions and drafting of agreements between EPN and FFF also took place in 2013. A contract was officially signed in July 2014, with the hope of production activation or going live in September 2014.

This NFC payments implementation was going to involve some changes or upgrades at all the participating stakeholders’ sites such as the 200-plus fast food stores across South Africa, the 3PP site, the acquiring bank and the EPN company. These involved hardware, software and configuration changes. The FFF had to upgrade their payment system so that it would accept NFC payments. So because the FFF does not implement the payment infrastructure themselves, in July 2014 they approached their payment services provider, TANGO, who is the provider of the

existing payments infrastructure at all the FFF's stores, to help them upgrade their payment systems so that it can accept NFC payments.

TANGO then approached the acquiring bank and told them that they want to accept and process contactless transactions for their client (FFF). At the same time, TANGO approached its vendors, ALPHA (Postilion financial switch provider) and VeriFon (hardware provider), and asked them to do the necessary changes and to provide the required hardware and software for contactless payments. After the upgrades, TANGO informed the acquiring bank that FFF were ready to be certified to accept contactless payments. Acquirer device validation tests (ADVT) were then done. Without going into too much detail, ADVT is testing done by the acquirers to test systems and connections between a merchant and the acquiring bank. Thereafter, the acquiring bank approached the CA and advised them that they were ready to acquire NFC payments for FFF. A project was then opened by the CA to have the configuration changes done on the CA side and to initiate the certification process. That is how the certification process was initiated.

The certification phase, unlike the ADVT mentioned above, is a full, thorough end-to-end test, i.e. from merchant, TPP, acquiring bank, card association and all the way to the card-issuing bank. The certification phase consisted of 80 test cases from each of payment card association. The test cases are scenarios, card transaction scenarios. The Card Associations provides the scenarios, i.e. type of transactions and conditions. After the test transactions are done, the CA then check the result of each test case and if that result is the same as the expected result, then the acquiring bank passes the test case. And if they get all of the test cases right, then they pass the certification phase. The acquirer has to pass the certification for each Card Association. In this case the certification was not passed, on some of the test cases the acquiring bank was getting incorrect results and as a result they could not get activated by the Card Association for acceptance of NFC payment transactions in the production environment. So the project could not get certified for contactless payments. In order for the acquirer to pass the certification, ALPHA had to do additional updates on their E-Socket. POS software and Postilion software, and VeriFon had to do additional updates on their firmware on the POS devices to pass the certification. TANGO had to do some additional hardware upgrades also, which are all expensive tasks.

4.8 Summary of case

To conclude, although FFF entered in to an agreement directly with the CA, they had to go to TANGO, their payment service provider, for the actual implementation of the hardware and software. The CA had no direct communication with the TPP. Figure 4.3 shows the lines of communication (highlighted with different colours) between the participating actors during the project.

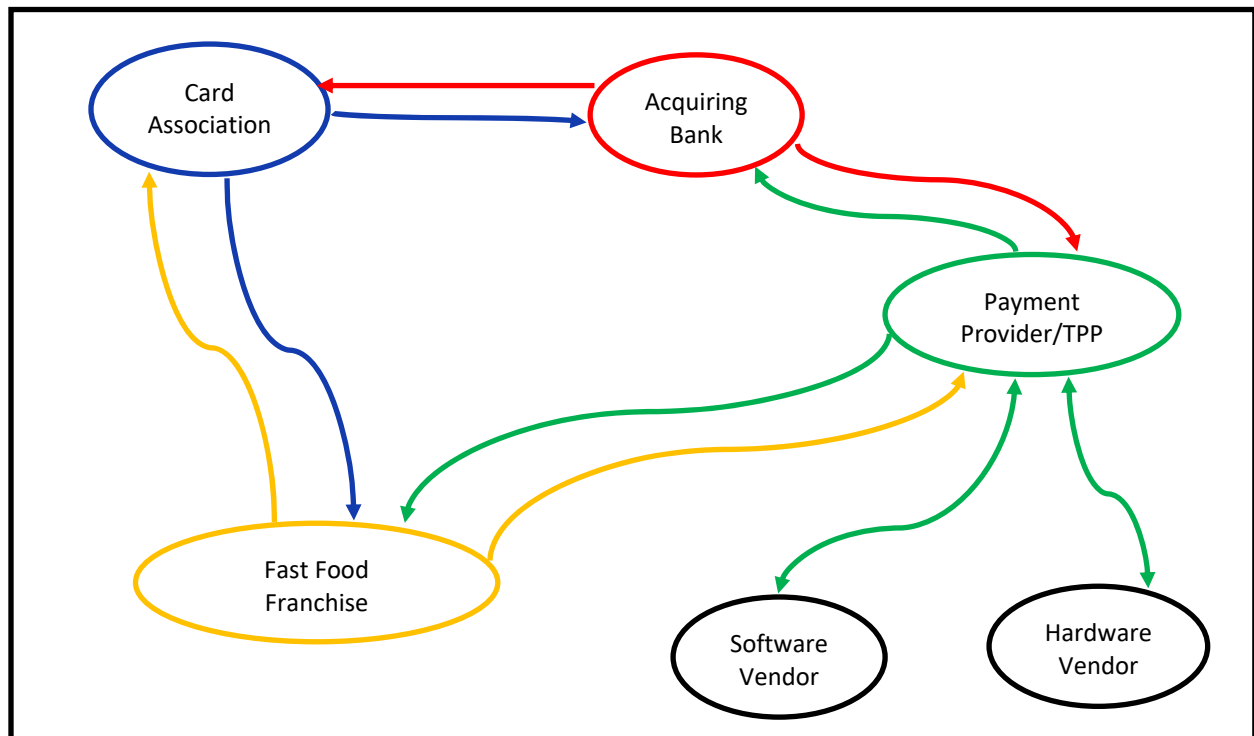


Figure 4.3: Lines of communication between the participating actors during the project

The CA communicated directly to the FFF and the Acquiring bank. The FFF communicated directly with their Payment Provider and the CA. The Acquiring bank communicated directly with the Payment Provider and the CA. While the Payment Provider, TANGO, had direct contact with the FFF, Acquiring bank and the vendors, they had to converse with the payment Card Association through their acquiring bank.

Chapter 5: Data Collection, analysis and findings

5.1 Data Collection Experience

A total of 13 participants were interviewed as shown in Table 5.1 below. A number of problems were encountered during the data collection process. For instance, one participant did not allow the researcher to record the interviews because of data secrecy issues despite reassurance that the voice recordings would be handled with confidentiality. Since NFC or contactless payments is still new in South Africa, a few organisations or individuals who participated in the interviews were not willing to divulge some of the details about the project. They were worried about the information getting to competitors and competitors taking advantage. Also, some organisations did not grant the researcher access to project documents. The data collection process started at the beginning of March and was completed at the end of May 2016. The respondents were individuals who were involved in the project. These individuals were all from the different organisations involved in the project stated in the case description.

Case name	Fast Food Contactless payment campaign
Period in the field	3 months collecting data
Duration of interviews	45 minutes to 1 hour for individual interviews and 1 hour and 20 minutes for the group interview
Place	Johannesburg
Number of interviews	11 individual interviews and 1 group interview
Human actors	13
Non-Human actors	16 identified non-human actors

Table 5.1: *Summary of case*

5.2 Coding, Description of Data Quality

The data collection method was a good fit for the case study. For all interviews were permission was granted, the interviews were recorded using voice recorders and then transcribed into Microsoft Word by the researcher. The transcripts were then imported in to NVivo 11 professional version. The data was studied and codes were generated from the themes that emerged. Queries on recurring terms were used to explore what the respondents experienced during the time when the project was implemented. The project that was investigated started in 2013 and the project is still ongoing as of June 2016, so the data that was collected was still new. Most respondents who were involved in the project are industry experts in electronic payments. A majority of them had more than 15 years of experience in electronic payments.

5.3 Presentation of Data, data formats and availability

Most of the data that is presented is text. This is mainly because the data was collected from the participants that were sharing their as-lived experiences through narrations. Data collected is available and stored in Microsoft Word, Portable Document Format and Microsoft Project files. Due to the nature of the type of data analysed, there is a minimal use of tables, graphs and images used in this report.

5.4 Research Management

The researcher was skilled in carrying out interviews. Interview guides were used in carrying out the interviews. A sample of the interview guide that was used in the study is given in Appendix 1. All the collected data was stored securely to maintain the integrity of the data. Ethics approvals (see Appendix 6) and all other approvals were obtained first before the data was collected. The costs incurred when the research was carried out were low, so the research did not require any funding. The data that was collected is stored securely and there are no identifiers.

5.5 Findings

The objective of the study was to understand why NFC-based contactless payment systems fail to get implemented in developing country contexts. The objective was split into the following multiple sub questions: (1) How is an NFC payment system project initiated? (2) Why do NFC

payment system project networks fail to be established and strengthened? (3) What are the fundamental conditions influencing failure to implement NFC Payment Systems? (4) What processes lead to failure to implement NFC payment systems?

The analysis of the case study findings was done using ANT concepts to understand the as-lived experiences of the participants using ANT terms. After thoroughly going through the interview questions and the responses from participants, themes started to emerge. The researcher was able to understand how the project was initiated and how the project network failed to strengthen. The two important ANT concepts used to analyse and discuss the findings in this study are the **four moments of translation**, i.e. problematisation, interessement, enrolment and mobilisation, and **inscription**.

As discussed in the second Chapter, **Translation**, also referred to as the Sociology of Translation involves alignment of interests between focal actor and the other actors and establishing the network (Sarker et al., 2006). This will then lead to a stable network, but there is no guarantee that the alignment will succeed, as it can also fail. The four stages of translation can show how networks come into being and then establish or fail where actors involved are from different environments (Callon, 1986). Applying this translation process helped the researcher to understand the objectives stated above. Translation in this case study involved all four moments of translation or stages of translation described in the sections below.

5.6 How is an NFC contactless payment system project initiated?

Problematisation

The first stage of translation is **problematisation**. This is when the focal actor identifies both a solution to a problem and other actors with the same interests (Sarker et al., 2006). The focal actor in this case is the Card Association also known as electronic payments network provider. From the focal actor's statement below, the FFF had a problem of long queues both inside the shops and at the drive-through facilities pay points.

"...if you look at their mission statement or motto, it's more to do with like you know what fast service! fast service! Especially when you look at this drive-in [drive-through facilities at FFF restaurants]. So you

don't want people who drive through to buy food and then they spend like five minutes in a queue." **Focal Actor (Card Association)**

The focal actor's statement below, extracted from the interview transcript, elaborates further the problem of long queues at the pay points.

"...if they can control the cooking of the food and everything, that they are experts at that. What they couldn't control was the payment piece. So contactless [NFC payments] now enabled them to be able to at least match what they are doing in the back, the speed, with what they are able to do at the front."

Focal Actor (Card Association)

The statement above shows that the focal actor makes itself indispensable to how the problem can be resolved (Mähring et al., 2004), which is known as the **Obligatory Passage Point (OPP)**. The FFF restaurant viewed the problem as something that they could not resolve on their own. The focal actor's contactless payment solution, also known as NFC payments, was presented as a solution that could resolve the problem of long queues at pay points and charge-backs (charge-back is the reversal of funds from merchants to cardholders for disputed transactions) as can be seen from the following extract:

"...you don't even give your card to the cashier. So from a cardholder perspective, it was like safe, secure. From a merchant perspective, quick checkout time plus no charge-backs." [.....] "On average a normal contact transaction takes around 30 seconds to complete or even longer when a customer enters an incorrect PIN, whereas a contactless transaction takes around 2.5 seconds to complete. So it made sense to the fast food merchant because they want to have people getting in and out as quickly as possible."

Focal Actor (Card Association)

The focal actor formulated a universal problem and the other actors saw themselves as equally important to the solution of the problem (Latour, 2005). In this project, the focal actor had a business case for the FFF. The business case that was presented by the Card Association was that the merchant was going to benefit from this since they would not have to worry about handling cash and manually processing charge-backs as shown by the extract below.

"It takes about 30- 40 seconds for someone to make a payment, you know what I'm saying. At a point of sale terminal, the card is taken by the cashier, he/she punches the money and you enter your PIN, you wait for a receipt to come out and then he/she gives you your card. So we said we can improve that, and they

said anything that improves our check out time from 30 (seconds) to between 7 and 14 (seconds) will be actually good to improve the service, so they like that. And again the other thing I said [earlier] most of the ticket sizes are below R70, about R70 for card. So this one [NFC payments], with a threshold of R300 contactless without actually putting a PIN. They said it will be ideal for them and the fact that again it takes away the pain and risk of charge-backs, for them it was like you know what we have a good solution. So we approached them and we told them about the solution and they liked it" [...] "Because there was no other merchant that had ummm implemented contactless payments we actually earmarked them"

Focal Actor (Card Association)

The Card Association (CA) had their own internal business case. The extract below shows that the business case also targeted customers who use bank cards that require a PIN. Whilst the main reason behind the implementation of NFC payments was for the CA to get more payments volume and profits, this was also going to result in better experience for the customers.

"So our business case was and it still is, we are targeting the entry-level portion of the market where people use lots of cash and we trying to displace that cash and replace it with EP-Card's NFC payments and once it's replaced with EP-Card that's new transaction volume that we never had. So if someone buys lunch at FFF every day, lunch is what, maybe R50, if this person was using cash every single day, then it's likely that once they know that I can do a transaction for R50 without putting any PIN and all of those things and it's very quick, then they are likely to use their card it's much.... they are more likely to use a contactless card than to use a normal EP-Card card [card that requires PIN]. So our business case is we want more transactions and contactless is an opportunity to get people who don't normally use cards to use cards instead of cash. So it's new volume for us." Director - New Technologies, (Card Association)

The fast food franchise easily bought in to the idea since this was going to place them above other fast food restaurants. The extracts similar to the one below came out in a number of responses that were given by the respondents.

"They wanted to be the first large national merchant in the country to accept contactless" Third-Party Payments Service Provider

Like with most electronic innovations, they are first tried in developed countries before they get introduced to developing countries. This is also how the contactless payment system idea was introduced at the FFF. It was based on the FFF (a multinational organisation) experiences in

America and Australia that they decided to do the same thing in South Africa as shown in the extract below.

"Then like with all our solutions, we would say ok fine it has worked in America let's go to markets outside America, like Australia and other big markets, and we looked at South Africa and we looked at the infrastructure and said acceptance is fairly good here, infrastructure wise" **Focal Actor (Card Association)**

"They did it in Australia and they were saying that it reduced the queues by up to three times, this is having contactless. So because of the success in Australia they decide to do the exact same thing here in South Africa." **Director - New Technologies (Card Association)**

The decisions to introduce these innovations is usually informed by other success stories in other markets, mostly developed markets, and that is how most of these payment innovation projects are initiated.

Interessement

The second stage of translation is **Interessement**. This entailed convincing other actants to join the network (Sarker et al., 2006). It also involved negotiations and agreements between focal actor and other actants (Callon, 1986). The actors did not necessarily have the same or identical interests as the focal actor, but the interests were aligned. The focal actor developed a business case for the fast food franchise. From the analysed documents, this also included a projected growth in sales that the FFF was going to see after implementing NFC payments. While it was specifically for the FFF, the business case that was developed and distributed by the focal actor benefited every actor as mentioned by Card Association's Director of merchant sales.

"Telling them about the value of the solution, got their buy in, went to encourage the [card] issuers through the other BDs [Card Association's Business Development team] to say you know what, you should issue [contactless] cards because the market is ready for those cards. Went to the acquirer as well to say, ok the cards are being issued, but from an acquirer perspective you need to upgrade your systems, acquiring systems so that your acquiring systems can recognise these contactless transactions and process them. So we got all the stakeholders involved because now there is a business for it.....so it was a business case that everybody else actually saw value in." **Focal Actor (Card Association)**

The focal actor also gave the other actors incentives for joining the network. In this project the contract that was signed by the Card Association and FFF shows that there were some negotiations that were done and an agreement was reached. There were incentives listed in the contract between the Card Association and the FFF. The first big incentive was \$300,000.00 (which is about five million Rand), given to the FFF by the Card Association. Some of this money was used or channelled to efforts related to bringing the project live, such as upgrades, training of FFF staff and campaigns to advertise to customers. The CA had a huge interest in the project as can be seen from the financial investments that they made. They also had allocated a significant number of human resources to the project. As stated by the focal actor in the previous extract, it was going to be the first merchant to implement NFC payment solution. The FFF was carefully handpicked by the focal actor. This was also mentioned by the CA's Project Manager coordinating the entire project.

"I was very hands-on on that one because that was gonna be our flagship go-live merchant" **Project Manager (CA)**

The negotiations also show that *interessement* is an ongoing process (Mpazanje et al. 2013), as new roles need to be assigned due to changes within the project or when unforeseen problems arise. The meetings that were held to encourage actors and to update other actors on the journey to achieving ultimate goal also show *interessement* as an ongoing process.

Enrolment

The third stage of translation is **enrolment**. This is a result of a successful *interessement*. This is when other actors accept roles aligned to their interests that get assigned to them by the focal actor (Sarker et al., 2006). Although at this point the actors can foresee the benefits of performing their roles, enrolment is temporary and it can result in **betrayal** as indicated by the statements below.

"So this specific product, like anything, is very ecosystem dependent, so effectively if you don't have all the parties certified or doing what they need to do, it becomes challenging." **Project Manager (CA)**

In the group interview, without mentioning any names, the FFF IT / Project Manager had this to say about other actors not accepting roles assigned to them.

"We should have definitely gone slower, but our employees were ready. Other organisations participating in the project were not ready." **Project Manager (FFF)**

Since problematisation was packaged differently by each actor for their vendors, the task assignment was done by the actors to their vendors or service providers. In this case interestment was successful at the initial stages of the project but in some instance it was unsuccessful, especially when there were problems to be fixed or system upgrades to be done.

"And then the biggest problem which we didn't have, we didn't think of at the time was that when ALPHA updated this E-Socket.POS version, from version, I don't know, 13 to 14 let's say. This version 14 did not work with the Micross version on the till. So out of the stores let's say there is 200 FFF stores. 40% of those stores had an old version of Micross and that version wasn't compatible to this E-Socket.POS version. But we needed this new E-Socket.POS version to allow these test cases. Then we halted this project because then we said now TANGO need to go and upgrade all these Micross environments, but in order to upgrade the Micross environments, these are not corporate stores. The franchise stores you cannot force them to go to a new version if it's going to cost them more money. So you have corporate stores, which is easy because you control them, and then you also have franchise stores." **Head of Merchant Acquiring Sales and Services (Acquiring Bank)**

The roles that were assigned to the actors were all related and the ultimate aim was to deliver an NFC payments system. The enrolment process was not a success in some instances, as actors did not want to accept their roles and carry out their tasks because of the costs involved with less benefits. This resulted in **betrayal**.

"I think what could have happened, okay, which didn't happen, is these guys (pointing on his drawing) actually have software, okay, TANGO services have got a software called TemPOS and this TemPOS software could have....they could have rolled it out on this VX820 and then they wouldn't have been dependent on VeriFon, but I think we (big sigh) we didn't think about it, we always thought VeriFon was going to come through, we didn't know if it was really a VeriFon problem or ALPHA problem, they were both pointing fingers at each other." **Head of Merchant Acquiring Sales and Services (Acquiring Bank)**

The statement above shows that some actors did not want to carry out their assigned tasks, which resulted in betrayal. The analysis shows that all the actors had reasons for enrolment. The main reason was profits for the actors that participated. The analysis similarly shows that there were

also some non-human actors enrolled such as the contactless payment system, certification stage and the contactless cards.

Mobilisation

The fourth stage of translation is **mobilisation**. This is when the focal actor encourages other actors to follow the rules that have been agreed on (Sarker et al., 2006), but there was however no regulators involved in this project. Focal actors and other actors may communicate through **speakers** or **delegates** (Callon, 1986). For instance, from the extract below the acquiring bank as a speaker, also helped to communicate and convince the merchant that it was a good idea to go for the contactless solution. This was also going to result in more profits for the bank that acquired transactions for the FFF.

"We basically said to FFF that we believed the ummm, they are the right Merchant target with an average transaction of below R200 and a large portion of cash turnover" [...] "So I think our business case really rested around the displacement of cash, so you really wanted to increase the card turnover at the FFF by displacing small value payments using contactless cards." **Head of Merchant Acquiring Sales and Services (Acquiring Bank)**

The delegates, even though acting on behalf of involved actors, also have to abide by the rules set by the focal actor. Continued support by the other actors will result in a continuous stable network and relationships.

Spokes agents spoke for the network to the other actors and the messages were different. For instance, the contactless payment in Australia and US was a spokes agent for the project, and it spoke to the FFF. The project was a success at the same fast food franchises in Australia and America and because of that, it was easy to convince the same FFF in South Africa to join the network. The fact that the system had worked at the same franchise fast food merchants in Australia also helped the South African fast food franchise to make a decision and agree to implement the same solution in South Africa. From the statement below, it shows that the network had spokes agents who were speaking on behalf of the network.

"At our outlets in Australia they realised that contactless payments had improved the checkout time and customer experience within the shops" **Project Manager (Fast Food Franchise)**

Similarly, the stakeholders spoke for the network by encouraging other actors within the stakeholder's organisation to do their tasks to achieve the ultimate goal. So the representatives in organisations that are part of the network spoke for the network in their respective organisations. For example, the acquiring bank representative was responsible for conveying the messages to his team within the bank and also overseeing and delegating tasks.

5.7 How do NFCs fail to be established and strengthened?

The weak inscriptions failed to strengthen the project actor-network which caused the network to fail to reach irreversibility. When the project network was formed, it had quite a number of actors. One of the problems that caused the actor-network not to strengthen was that there was no regulator involved in the project to enforce the rules. Even though, during the mobilisation stage, the focal actor sets rules for the other actors, these are not enough. Also the focal actor did not have authority over the third-party payment provider, the software vendors and the focal actor similarly did not have direct communication with them as seen in Figure 4.3. A regulator should have been involved in the project to enforce compliance with NFC standards for actors that participate in NFC payments, as the lack of a regulator was a major concern as shown by the response below.

"So we asked EP-Card, we asked everybody to come and help us to force these guys to comply, but there is no regulatory body that..... EMVco [Europay MasterCard and Visa consortium] needs to say if you guys wanna play in the EMV space, you need to comply with the standards. So when cards did not work on the software version properly and it didn't work with the source node. So nobody forced VeriFon to say upgrade your software and nobody forced Postilion to upgrade." [...] *"So Gamalto (He giggles) Gamalto or the EMVco, which is the standards authority for EMV chip cards, okay. Should have said 'Guys we have a new standard. All the role players that play in this space should now comply with this new standard', which didn't happen, okay"* **Head of Merchant Acquiring Sales and Services (Acquiring Bank)**

The main challenge in these collaborations is that, despite a successful enrolment process, other actors prioritise and pay more attention to issues that bring them more revenue, hence the need for re-interessement otherwise the project network might disintegrate (Latour, 1986). It is crucial for every actor to participate and work together in a constructive way for the actor-network to be strengthened. The organisations that provided the services to the fast food franchise did not seem

to get along and contactless payments were also new to them, as can be seen from the extract below.

"Objectives and priorities, because that was one of the things where I think often what happens is it may be a priority in FFF and X-Bank's worlds but it may not necessarily be a priority in TANGO or not to say it's not a priority but, TANGO is a technology company that's dealing with multiple clients and multiple aaah work-streams as well. So how do you get that prioritised in their world for instance, you know. You have to almost not just coordinate, but sale the value of 'if we all work together and get this resolved there is benefits for everyone, regardless of what your priority is'." **Project Manager (Card Association)**

"What then also happened (He giggles) during this time, because this project took two years, ok, because there was a lot of finger pointing between ALPHA and VeriFon, ok" **Head of Merchant Acquiring Sales and Services (Acquiring Bank)**

When implementing these kinds of projects that involve many different organisations, it is crucial to have recurring meetings regularly to discuss issues such as project progress, challenges encountered in the project, and how these are being addressed. Meetings can help to strengthen the actor-network, but in this case some actors did not attend the meetings regularly.

"I think we had a number of meetings where the vendors actually didn't even come, they wouldn't even come for the meetings so that also was...I remember that was an issue." **Director - New Technologies (Card Association)**

There were also some political issues that put a strain on the actor-network, particularly the relationships between the software vendor and the service provider. The Card Association was being asked to verify everything shared between the two parties. This then created that level of distrust as shown by the extract below.

"ALPHA, where everything they now say is not trusted by their client and the client ends up needing to speak to us and that's...it's not professional. We can't be there to monitor what's going on between two entities with contracts between themselves, we shouldn't be coming in to verify things, but we ended up having to do that. So that was an issue." **Director - New Technologies (Card Association)**

5.8 Conditions influencing failure

Enrolment drives **inscription**, which is the creation of artefacts that will ensure protection of certain interests (Sarker et al., 2006). The artefacts can be, for example, a fully-functional NFC payment system. Strong commitments to the inscriptions will stabilise the network (Mähring et al., 2004); however in this NFC payments implementation endeavour, commitments to the inscriptions were weak. It was not an easy task, to fit in contactless payment systems into the legacy systems, and this was highlighted as one of the major challenges in this project as shown by the extracts below. Although a more expensive approach, it could have been better if the actors were working completely off new platforms, as they could expedite processes.

"It's also quite new technology, so from a new technology perspective, because of the legacy challenges that a lot of banks have... ummm, that's probably been the major hurdle in getting banks and merchants etcetera, certified. It's because of the South African legacy systems. The major challenge was around integrating this new technology of contactless into the legacy systems." **Project Manager (CA)**

"The NFC technology was new for everyone. We had to do some changes and the changes had to be done across the board, that is software and hardware, and we had to include the vendors for the changes. The problem was that some vendors implement changes in yearly cycles. So it was difficult to force the vendors to change their hardware or software to suit our needs." **Project Manager (Third-Party Payment Provider)**

There was a new standard issued, but the software and hardware vendors did not comply with the new standard. As discussed earlier, there was lack of a regulatory body like the Payments Association of South Africa (PASA) to enforce rules. A regulatory body could have been involved in the enrolment stage. This was a major problem as explained by the extract below.

"So we tried to use our influence to help this project along, but it's difficult because the actual company that wants this to happen is the fast food franchise. But they don't have a relationship with VeriFon or ALPHA. They only have a relationship with these guys (pointing on TANGO Payment service provider on his drawing), and these guys [TANGO Payment service provider] don't have a good relationship with ALPHA or VeriFon (He giggles), because TANGO payment service provider has got another company ummm that sells terminals competing with VeriFon (He giggles), so it was like a perfect storm..." **Head of Merchant Acquiring Sales and Services (Acquiring Bank)**

Madureira (2016) claims that conflicts can lead to rivalry in these collaborations. These conflicts

can be harmful to the project network as they might cause the network to disintegrate. For stable project networks, mutual consultations and negotiations have to be ongoing activities (Callon, 1986).

Enrolment and inscription can happen in parallel, which will result in **irreversibility**. When the network has been established and strengthened, making it difficult to make any changes to the network, irreversibility takes place (Sarker et al., 2006). It will be impossible for the other focal actor and other actors to carry out another translation process or follow a new and different translation path if the inscriptions are strong. In this case study however, weak inscriptions resulted in irreversibility not being reached. The actors involved have a choice to follow or avoid an inscription; consequently, the decision depends on the project network's strength (Mähring et al., 2004). The final complete artefact was not created. The franchise stores were required to upgrade their till systems, but this was going to be an expensive exercise. Although the FFF was given some financial incentives, no one could force them to upgrade their systems if it was going to cost the FFF more money. There was also a lack of internal controls from the Bank, as noted in the following extract.

"But the cause for it [system not being implemented], firstly, I would say lack of internal controls from an acquiring bank perspective.... acquiring bank's production environment was different from the test environment. So things which worked in test didn't work in production pilot. So version control, there was an issue with version control. I would like to think it's an issue with version control. So they thought that things which, they thought that versions were the same, but they weren't." **Technical Expert (Card Association)**

At the time of the case study, there was belief that the project would eventually reach irreversibility even though no one seemed to know the status of the project or when all the problems would finally be resolved.

5.9 What processes lead to failure?

Translation, as discussed earlier, entails that one interest or expectancy is presented to the different stakeholders in different ways so that it mobilises a more common support from the other stakeholders. It can then be a challenge to assure other actants that their interests will also be taken

care of if they follow the focal actors' interests. Interesement may fail particularly if the other actants feel that their interests are at risk (Callon, 1986 and Latour, 1986). As discussed in the literature review, a number of issues can lead to failure in these implementations. The empirical evidence shows that most of the issues pointed out in the literature review also emerged from the analysed data. The first issue that led to failure was lack of a regulatory body in the project network to enforce compliance. Also failure by the Acquiring Bank to get their client certified for contactless payments, which was mainly because the FFF outlets could not carry out some of the card transaction scenarios in the test cases and some of the FFF outlets had to carry out major hardware upgrades.

"We sent a couple of people to FFF to do testing from the bank,; some would work, some would not work. They would have varying failures....So the testing portion of the project was done. Now moving that code or moving the testing environment into production [extended pause]... for some reason it would seem that the X-bank test environment and the X-bank production environment are totally different. So the things which worked in test, once they were moved into production stopped working." **Director - New Technologies (Card Association)**

From the extract below, contrary to what the stakeholders had agreed on during the enrolment and mobilisation stages, deadlines were not being met. During the interviews the Card Association's Technical Expert did not seem to know the current state of the project even though he was heavily involved in the project. The project was halted and there were no bi-weekly meetings anymore to update the participants.

"Needless to say, they then missed their 1 November (2015) deadline. They missed 1 December deadline and then they couldn't implement post-the-first-of-December (2015) because of the year-end freeze, which pushed the project out to February this year. February, when we got into, I think mid-February, when the freeze ended, they tried again to make changes, they failed to implement and had to push out the date. They pushed out to March, we are now in March, we haven't heard from them with regards to what's going on. So up until today FFF is not live with contactless." **Technical Expert (Card Association)**

Even though interrelated roles in the project network are assigned and managed through mutual consultations and negotiations (Callon, 1986), resources and dependency can be any issue. The analysis of the data identified that the shortage of resources was also an issue and at some point it put the project on hold. The New Technologies Director and Project Manager overseeing the entire

project pointed out that there was too much dependency on certain individuals. In addition to this, there was dependency on the various organisations involved. This dependency problem was one of the issues that caused delays as shown by the extracts below.

"ALPHA came on board, they did all the work that they were supposed to do. Unfortunately, midway through the implementation, one of their key resources then resigned and they were now left with no one to do the work and that's when the delay started.... So I think they depended too much on certain key individuals. Once those key individuals had left the bank, they were left in a tight spot where they now couldn't, they couldn't proceed with the project. So I think they (sic) are lots of problems there." **Director - New Technologies (Card Association)**

"It's one of those projects where there was a massive dependence on various different stakeholders both internally from an EP-Card perspective as-well-as externally with the various different parties." **Project Manager (Card Association)**

There was misalignment because of the fact that there were actors who were not prioritising tasks that they should have, i.e. tasks assigned to them by the focal actor during the enrolment stage. Trying to align all the stakeholders was one of the biggest challenges. There was also misalignment with regards to resourcing as shown by the statement below. The extract shows that the actors did not know and did not understand the complexity of the system they were implementing and they did not resource it properly.

"We had to wait for the Bank and the Bank was waiting for their vendor and the vendor was waiting for resources. So in terms of alignment, I think there was some misalignment. Resources were being poached from companies to other companies who are willing pay more for those resources." **Director - New Technologies (Card Association)**

ALPHA as the software vendor, providing software to both the acquiring bank and the third-party service provider, was not delivering. They were not willing to do additional development work to address the challenges that the project was facing. The issues that emerged were not getting addressed; instead they were being passed around as shown from the extract below.

"Acquiring bank have a contract with ALPHA as their Postilion (financial switch) vendor but ALPHA as a vendor was not delivering and when they were delivering they were playing post box, where acquiring bank says, ok this is the problem, they send it to ALPHA. The person at ALPHA says, ok it's fine, I will take

this issue and I will deal with someone else, and they forward it on to someone and that person forwards it onto someone." **Technical Expert (Card Association)**

When the respondents were asked, "*What should have been done differently by the stakeholders for the project to complete successfully, within the expected timeframes?*" i.e. reach irreversibility, the majority of the respondents suggested that a pilot should have been done with a few FFF restaurants and then an informed decision made based on the outcome of the pilots.

"We should have done a pilot with a few of our shops." **Project Manager (FFF)**

Others also suggested doing workshops with all stakeholders in order for them to understand the roles that they had to perform and the amount of resources, time and work required.

"So I would say lessons learned going forward, when you are implementing new technology like this, it's from the onset very good to workshop something with all the parties in a room, understand their dependencies and exactly what would be required from their perspective and get sign-off from the word go as to 'ok there is gonna be this much development work that's required on my system, this is how much time it's gonna take', and build in contingencies for issues arising and then work off that for your timelines." **Project Manager (Card Association)**

This is in line with Lee et al. (2015), who recommends that organisations in these partnerships need to be aware of the technology they are implementing. Workshops are one way of creating this awareness.

5.10 Chapter Summary

This chapter described the data collection and coding experience, and the research management. The narrations of the respondents are presented in text format. Using the empirical findings, the following is discussed - how the NFC payment system project was initiated, how the network failed to be strengthened and the processes that led to failure to implement NFC payment systems. The four moments of translation, i.e. problematisation, interessement, enrolment and mobilisation, and inscription were used. The as-lived experiences shared by the individuals from the different organisations helped the researcher to understand the challenges experienced in NFC payment system implementations.

Chapter 6: Discussions and Interpretations

The aim of the study was to understand why NFC payment systems do not get deployed on the commercial market in South Africa, a developing country context. The study gathered the stories and experiences from the actors that were involved in the implementation project of NFC payment systems in the stores of SA's largest fast food franchise. I found that to build a successful NFC payment solution requires more than just the merchant and Card Associations - it requires the support and expertise of other stakeholders. When more stakeholders are involved in a project, the greater the chances of success, but conversely, the more the stakeholders the more the challenges.

The sections below present firstly a summary of the study; then the challenges to implementation derived from the empirical evidence. Corresponding theoretical propositions are reviewed and discussed as a means of integrating findings derived from the ANT analysis and research questions; and lastly, a summary of the chapter. The researcher used multiple sources of data such as interviews and project documents to come up with the empirical evidence and then drawing the propositions from the evidence and supporting these propositions with concepts derived from literature.

6.1 Propositions derived from empirical findings and supporting literature

Introduction

By revisiting the findings in relation to literature, several propositions emerged, they linked to: external dependencies; stakeholder commitment; leadership; regulatory bodies; system interoperability issues. In this section each will be discussed in turn.

External Dependencies

The NFC contactless payment ecosystem, composed of different actors, is a fragile system. If one actor withdraws, then the ecosystem will be affected or even fails (Gannamaneni et al., 2015). This is also true when other actors do not carry out the tasks assigned to them. This has resulted in prolonged implementation of the fast food franchise NFC contactless payment project. In these implementations, there is so much reliance on other organisations. The empirical evidence from the study has shown that the Card Association and the bank cannot implement these systems by

themselves, as they depend on the payment providers and other hardware and software vendors. This is in line with Madureira (2016), who posits that differences between the actors' possessions in terms of resources, finance and capabilities will result in interdependencies. This shows that there is so much external dependence for these implementations to be fruitful. Heckathorn (1993) claims that actors rationally start a collaboration when interdependencies and a collective aim exist. Because of this external dependence, the tasks, resources required, workloads and the duration for completing these tasks should be thoroughly assessed and known for a successful NFC implementation. These should be known for the entire project as a whole. It is evident from the study that stakeholders went in blindly and did not know the tasks and challenges they were going to face and they were not prepared for these challenges, hence the 'finger pointing' issue, low levels of commitment and conflicts that came out in the interviews. The stakeholders also did not know the complexity of the tasks involved and the associated costs. It is evident from the interviews that the project has been dormant for many months, and stakeholders who are heavily involved in the project do not know what is going to happen next. Apanasevic (2013), in their study which focused on factors influencing the slow rate of penetration of NFC payments in Europe, concluded that the inability of actors to negotiate and share responsibilities causes delays in these projects. Roles need to be clear and properly distributed amongst the actors for the collaborative endeavour to be successful. If the roles are not clear and properly distributed, there will be low levels of commitment and conflicts from the actors which can lead to failure. This is corroborated by Ozcan and Santos (2015), who postulate that low levels commitment from a stakeholder can create delays which can negatively impact the overall alignment towards a successful collaborative behaviour from the other actors. Based on the findings from the emerging themes in the empirical evidence and findings revealed by the literature review, the following theoretical proposition is supported.

When there is external dependence, but the tasks, resources required, actors' capabilities, workloads and the duration for completing these tasks are not known, there will be frequent conflicts leading to NFC payment system implementation failure.

Stakeholder Commitment

The findings from the study show that as-much-as merchants like convenience when it comes to payment solutions, the financial implication is always carefully assessed, and if the costs are more than the envisaged benefits, then the chances of the merchants investing in the solution are slim. In the case study, merchants were not willing to upgrade their existing payments infrastructure because it was going to cost them money. Although the Card Association had invested a significant amount of money towards the upgrades, it was not enough to upgrade all the 200-plus fast food merchant stores. There were also significant investments in system upgrades that the other stakeholders were required to do for their legacy systems to be compatible with the new system; however, the costs were not matching their envisaged benefits. For example, the software provider had to do major upgrades to their POS and payment switching software, which was going to cost them money and resources. This was not a priority to them. The empirical findings show that while the CA or sponsor wanted the merchant and other parties involved to invest in compatible software and hardware such as terminals, the merchant and the other parties did not see value in investing financially in new terminals and other software. The findings are in line with de Reuver et al. (2015), who in their TRAVIK NFC payment implementation case study in Holland, found that while the involved banks were concerned with the strategic interest on NFC payment system, the network operators were interested more in attaining tangible revenues. This is also in line with Dutot (2015), who acknowledges that the issue of dealing with various interests of the stakeholders in the ecosystem cannot be overlooked. Similarly, other studies acknowledged that the creation of a financially beneficial situation and a balanced sharing of costs for all the involved actors is an important area of focus (Madureira, 2016). The analysis shows that while financial capital investments are essential to setup NFC payment platforms, these large scale investments can hinder the system implementation. The empirical evidence leads to the following proposition:

Where there are multiple stakeholders not willing to commit to required capital investments, the implementation of the NFC payment system is hindered, leading to failure.

Leadership

Madureira (2016) notes that governance and leadership structure is essential to employ safety measures against rivalry and conflicts. The dearth of governance and control can lead to actors working at different paces (Madureira, 2016). It was seen in our findings that there should have been some form of governance to control and direct the NFC payment implementation project. It is evident from the empirical findings that there was lack of a clear governance structure. This is

usually done by a focal actor. Williamson, (1975) sees governance as being influential for the controlling organisation to monitor and enforce contractual performance. This is also in-line with Bianco and Bates (1990), who posit that a strong leadership and governance is vital to firstly, attract collaborators for the collective action, secondly, to select the most-capable partners who can perform the tasks and lastly, to attain momentum once the project is in motion. The lack of governance in this case resulted in some organisations not performing the roles assigned to them and working at their own pace. Furthermore, the analysis showed that the sense of urgency when resolving challenges was not the same for each stakeholder since some actors pursued what was in their own self-interest. These findings are corroborated by Madureira (2016) and also in line with Silic et al. (2014) who found that actors focus more on pursuing self-interest in collaborative efforts over long-term collective goals. The de Reuver et al. (2015) case study, discussed in our literature review, reported that the four banks and telecommunication operators involved in the TRAVIK project took part without a clear leadership and authority structure, which contributed to the failure. In our case study, the issue of lack of leadership was mentioned repeatedly by the interviewees. They pointed out that the project lacked a leader who could, among other things, drive the initiative, direct the network and manage conflicts. For example, without mentioning it directly, the interviewees revealed that no one in the project knows what is going to happen next and by when. From the discussions above, the following proposition can be developed:

When there are no clear leadership structures in collaborative NFC payment system implementation initiatives, then there is a high-risk that the involved parties will focus on their own interests, and the initiative will lose momentum leading to failure.

Regulatory bodies

As revealed by past studies in the literature review and as evident in the case study that was carried out, NFC implementation projects are multi-sided and they involve many organisations from different sectors such as technology companies, merchants, banks, card associations, payment providers and trusted service managers. The challenges, conflicts and risks increase when various organisations are involved in the NFC implementation projects (Fedorowicz et al., 2009). The empirical findings have revealed that the lack of a regulatory body in the NFC payments implementation project resulted in breaches in contracts and non-compliance to the standards. Every stakeholder involved in the project had their own priorities, therefore, there was need for a regulatory body. Regulation denotes the engagement of legal instruments for guiding principle

purposes, it involves the establishment of rules, monitoring and issuing of penalties when there is disobedience (den Hertog, 2010). While laws shape and positively influence technological developments, claim Liu et al. (2015), they can also hinder innovation (Prieger, 2002; Stigler, 1971). For example if the laws are too strict and too complex, mainly in problems that cut across various subjects and authorities, it might make it difficult for actors to be compliant. The empirical evidence in this study shows that some organisations did not comply with the current NFC standards and some were in compliance. This resulted in incompatibility of the systems when they were integrated. Given this, the following proposition can be formulated:

If there is lack of regulatory bodies in joint NFC payment system implementation projects, then deployment uncertainties of the system increases, leading to failure.

System Interoperability

The merchant, acquiring bank and the CA reiterated that they should have first assessed the environment and the preparedness of the stakeholders that were going to combine resources for the system to be implemented. For example, the CA pointed out that they should have started the NFC implementation with one-or-two pilot fast food franchise shops and then make informed decisions from there. Integration of the new system with legacy systems should be thoroughly assessed for a successful implementation. In line with the findings of this study, the struggle to launch proximity payment platforms such as NFC has been echoed in a number of studies and the complex nature of these platforms is known to hinder the successful implementation of proximity payment systems (Ondrus, 2015). Lee et al. (2015) recommend that organisations in these partnerships need to be aware of the nature of the technology they are implementing. While this awareness was lacking in the NFC implementation project under study, it was particularly important considering that the new system was going to be integrated with the legacy system. In this NFC implementation project, the new system needed to be integrated with the legacy system, which was not an easy task considering the number of actors involved and the different technologies involved. For instance, the integration challenges of the existing POS terminal software with the new NFC POS terminal software. This led to system integration issues as established in this study. The complex nature of integrating new and legacy systems is also corroborated by Gannamaneni et al. (2015), who also found that the integration and interoperability of a system with dissimilar technologies used by various players was a big challenge in payment systems. This is mainly due to the numerous vendors in the NFC space.

Madureira (2016) came to a similar conclusion in their research that involved practitioners involved in NFC system implementations. They pointed out that increased interoperability is the sole most-vital improvement necessary to allow the realisation of NFC services. The empirical evidence in our study is also in line with Au and Kauffman (2008)'s and Juntunen et al., (2010)'s findings, who in their studies found that many issues were related to compatibility of technology, lack of universal standards, changing technology and integration. Apanasevic (2013) and Juntunen et al., (2010) find technological standards as the main supplier-side barrier. Based on the discussions above, the following proposition is supported:

When new and legacy systems from multiple actors are to be integrated to develop an NFC payment platform, then there is likely going to be system interoperability issues due to the numerous vendors involved, which lead to failure.

Based on the discussions above, the propositions are summarised and presented in a diagram in Figure 6.1 below. The diagram shows the coherent nature of the propositions (grouped under the undesirable causes of failure) and how they can lead to failure.

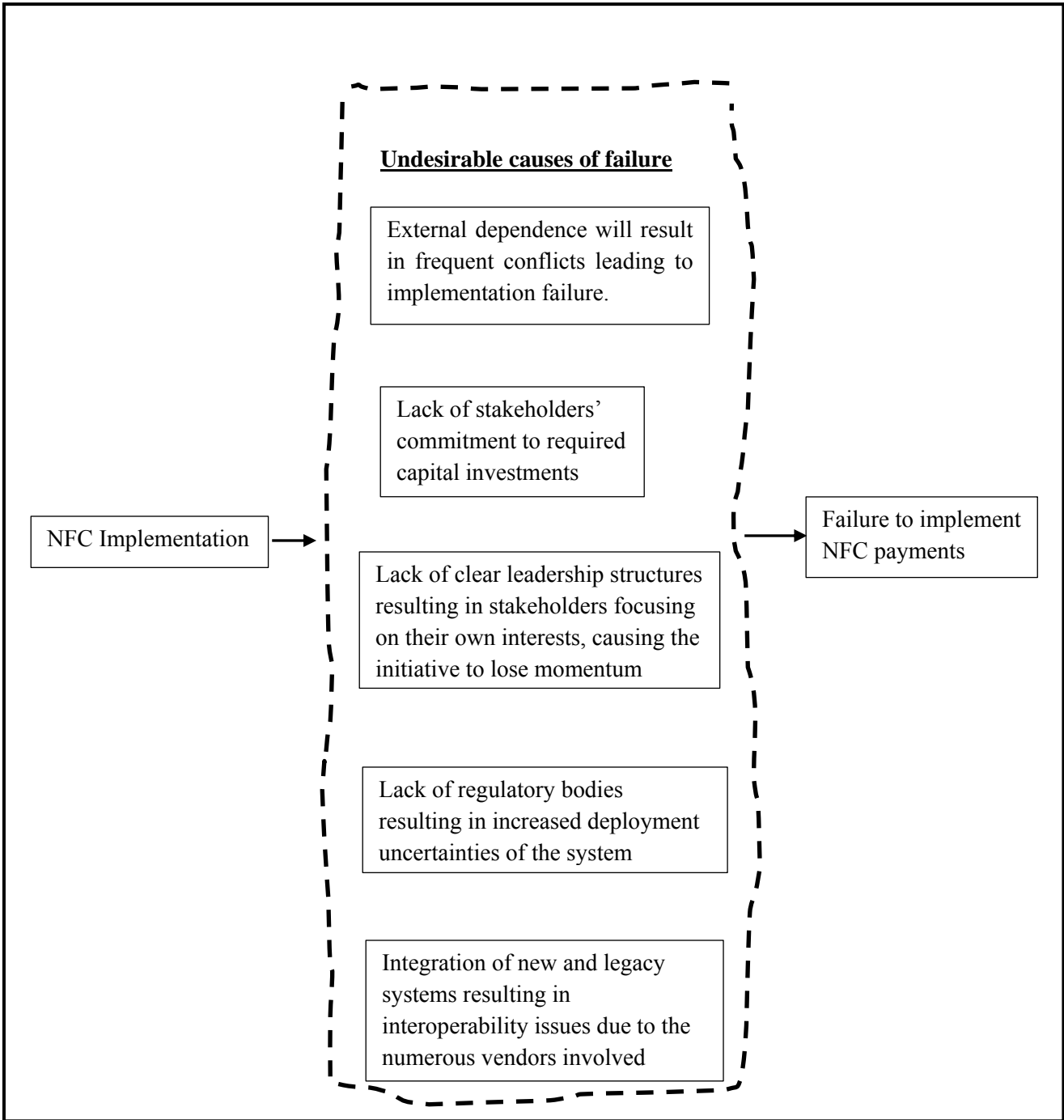


Figure 6.1: Theoretical propositions

6.2 Key NFC payment system implementation phases

The challenges discussed above helped to uncover the key important aspects and possible points of failure, and how they are connected and related in the project phases. Concepts derived from the empirical findings and literature review were summarised, and tied together. A prescriptive implementation model, depicted in the diagram in Figure 6.2, was then developed. Each phase is described in this section.

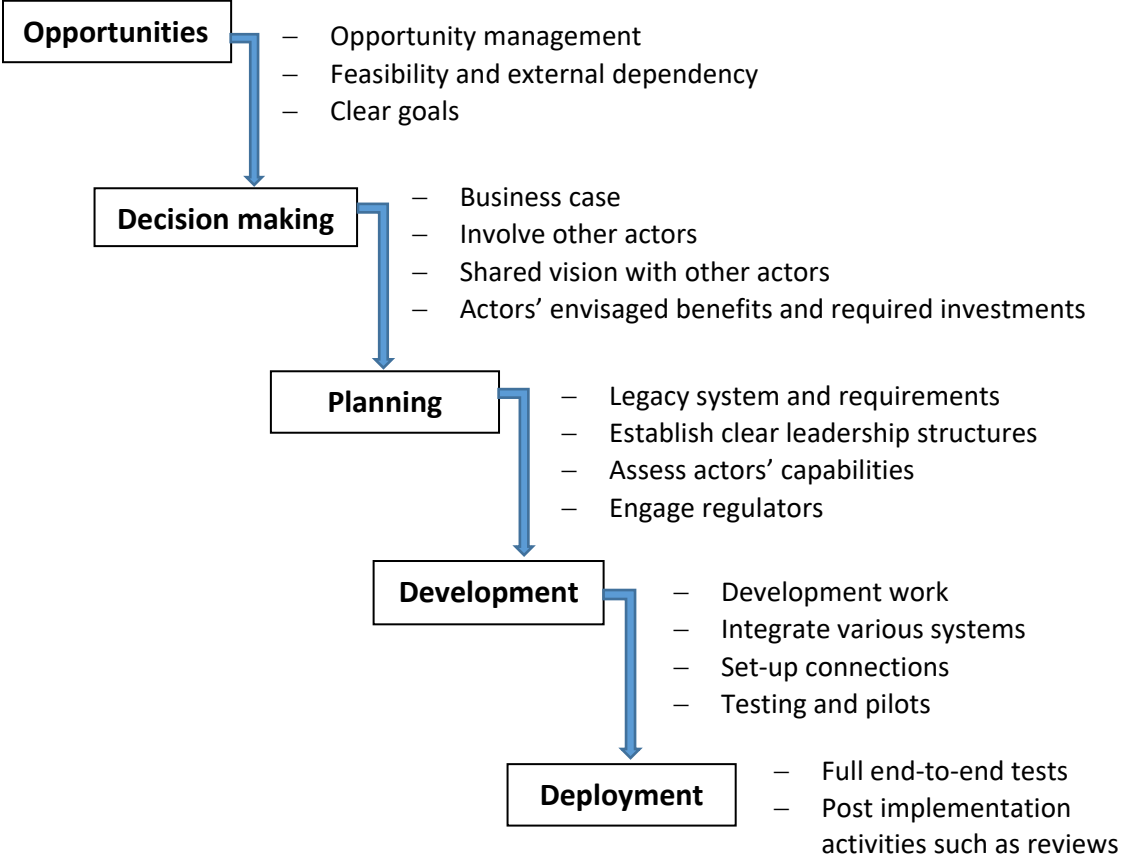


Figure 6.2: NFC payment prescriptive implementation model

Opportunity management phase – This phase involves identification of development prospects that can be implemented to improve systems or processes. Once a development opportunity has been identified, other tasks can be performed. For example, feasibility study, setting clear goals and assessing external dependencies in NFC implementations.

Decision making phase – This phase involves making informed judgements on the investments required, developing business cases and conducting workshops. Due to

dependencies, it is ideal to involve other actors with the same shared visions early in the discussions and in the decision making processes. The benefits that the other stakeholders will reap and the investments required from their involvement must be communicated and agreed on.

Planning phase – involves a detailed gathering of the requirements and the preparation for the implementation. This is where a clear leadership structure needs to be established and firmly reconfirmed, and actors' capabilities thoroughly assessed. Interrelated roles must be defined and allocated to the other participating stakeholders. All the other stakeholders must be consulted in order to reach mutual agreements.

Development phase – this involves all the system development work, integration of the various systems from the different stakeholders and setting-up connections to link these systems. Once all the work has been completed, testing and pilot-related activities will commence.

Deployment phase – this entails the collective execution of the tasks which will result in a successful system implementation. Thorough end-to-end tests, production pilot tests and post-implementation activities such as reviews can then be performed.

The diagram above shows areas in the NFC payment system implementation phases that need special attention and exhaustive planning, otherwise these areas will be possible points of failure. These issues arising in these phases must be addressed before proceeding to the next phase mainly because they will be challenging to address when the next phase has been started and when the other actors have committed. All stakeholders must be involved from the decision making phase all the way to the last phase.

6.3 Summary

The purpose of this chapter was to discuss the findings from the study, to understand why NFC contactless payment systems fail to get implemented. The empirical evidence and literature has shown that it is important to recognise the participating stakeholder interest differences that exist in the payment industry. These collaborations and convergences must be with the right partners. The effectiveness of organisations working together must be assessed. While this is difficult to assess and judge the effectiveness before engaging in these collaboration efforts, the assessment is

imperative, and should be done during the feasibility study to avoid challenges and conflicts, such as the ones pointed out by the respondents in the case study.

Chapter 7: Conclusion

The purpose of carrying out this research was to investigate and explain, through the use of ANT analysis, the processes and sequential steps that lead to failure to implement contactless payments in a developing country context by answering the following research question and sub-questions:

Research question: *Why do Near Field Communication based contactless payment systems fail to get implemented in developing country contexts?*

Sub-questions: *How is an NFC payment system project initiated? Why do NFC payment system project networks fail to be established and strengthened? What are the fundamental conditions influencing failure to implement NFC Payment Systems? What processes lead to failure to implement NFC payment systems?*

The analysis findings showed how the NFC payment project was initiated and how NFC project networks fail to be established and strengthened. The major issues such as incompatibility of systems were experienced during the technical integration. Also, there was lack of capital investments required to set-up the payment system. These all resulted in the Fast Food Franchise failing to get certified for NFC payment acceptance by the Card Associations. Based on the findings from the empirical study, I developed theoretical propositions summarised below:

- *If there is external dependence and the tasks, resources and the duration for completing these tasks are not known, there will be frequent conflicts leading to implementation failure.*
- *The implementation of the NFC payment system can be hindered, leading to failure, if stakeholders are not willing to commit to required capital investments.*
- *Lack of clear leadership structures can result in involved parties focusing on their own interests, causing the initiative to lose momentum, leading to failure.*
- *If there is lack of regulatory bodies in joint NFC payment system implementation projects, then deployment uncertainties of the system increases, leading to failure.*
- *The integration of new and legacy systems from multiple actors to develop an NFC payment platform will likely-result in system interoperability issues due to the numerous vendors involved, which lead to failure.*

Considering the overflow of electronic payments innovations being introduced and very little research that has been done on these developments, the research contributes to the Information System studies relating to the value of these technological innovations. The findings of the study provide better understanding as to the causes of failure and guidelines that can help companies forming alliances to introduce these electronic payments innovations to pay attention to collaboration failure factors. This will ultimately lead to successful and sustainable collaborations.

This empirical research is important and novel in that it explored a subject that was unexamined in a developing country context. It offers the academics, practitioners and society an understanding of the explanations posited by earlier papers. The research integrates findings from a number of extent studies to discuss the reasons for the outcome of various NFC implementation initiatives. It also offered sufficient technical depth, which is useful for understanding the key issues in this NFC payments domain.

Future studies focusing on developing countries may consider doing research on NFC payments and build on the findings from this study. For example, it may be interesting to take a more-focused approach on the research and focus on a specific area such as comparing NFC projects success rates and challenges against other technical cooperative projects. The topic of NFC payments in developing countries could also be a fascinating area for further research and how it can enable these regions to leapfrog legacy technologies. Also, future related studies and cross case analysis of the findings can be performed.

Although in a brief way, I acknowledge the limitations of my work. There were various limitations in carrying out the study, and among them were the following: The time was limited due to the amount of time available for the Masters Degree by coursework. Therefore, all the involved parties in the study were not followed to understand their as-lived experiences. A number of non-human actants were identified in the report. Investigating how these non-human actants act, play their roles, or how they influence the behaviours of the other actors could be an interesting area for further research. Some organisations did not allow me to record the interviews because of data confidentiality issues despite reassuring them that the voice recordings will be handled with confidentiality. Since NFC or contactless payments is still new in South Africa, a few organisations or individuals who participated in the interviews were not willing to divulge some of the details

about the project. They were worried about the information getting to competitors and the competitors taking advantage. Also, some organisations did not grant me access to project documents. Lastly, though the ultimate goal of case studies is not to generalise results statistically, it would have helped to have multiple case studies, one from South Africa and other ones from other African countries and to perform a cross-case analysis. Despite these limitations the results are still valid and usable.

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APPENDIX 1: Interview Guidelines

Demographics

1. Organisation:
2. Organisation sector:
3. Core business:
4. Number of employees:
5. Franchise/Corporate:
6. Interviewee department:
7. Years at the organization:
8. Interviewee title:
9. Number of years in career:
10. Number of projects you have worked on (Estimate):

Details of project

11. Name of project (generally):
12. Number of participants/organisations (project team):
13. Give an overview of the project (what were you solving for)? Initial project objective/s:
(Problematism)
14. Sub-goals/objectives of the project (How were these sub-goals formulated? **(Power of actor associations and interactions)**)
15. What was your business case? **(Problematism)**
16. What is the role you played in the project? What were your roles in the project? Explain in detail
17. Who were the other players and briefly explain the roles? Other actors involved? How? Roles? Their interests and how they were addressed? Stage of involvement? **(Enrollment)**
18. What were their business interests? **(Translation)**
19. What were the other actors going to gain from the project? **(Problematism)**
20. Where all interests of all players taken into consideration? **(Translation)**
21. How were your business interests aligned with the rest of the other actors? **(Translation)**

Initiation and execution of the project

22. How was the project initiated?
23. How many participants attended the first meeting? Why them?
24. How was the project vision presented to other actors? (**OPP**)
25. What was their reaction to this vision? (*success in interessement*)
26. How often and how were the project meetings conducted? (attendees? Any reports or progress documents presented? How were these disseminated to everyone? (**Network strengthening, mobilisation and power**))
27. Any other forms of updating project progress to the rest of the actors? Did this form of communication have an impact? (**mobilisation and power**)

Project status – abandonment/failure

28. Did the project deliver its goals?
29. How best can you describe the project outcome? Success or failure or challenged or abandoned or put on hold? Why do you say so?
30. Why were the objectives stated above not met? (What went well and wrong?) Why was the project abandoned or suspended? (**Betrayal**)
31. What major challenges did you experience in the project? What role did technology play in the project outcome?
32. What players (including your own organisation) were critical in the success of the project and why?
33. What should have been done for the project to be successful (what do the actors need to concentrate on)? What could have been done differently? What was learned from these experiences?
34. What else would you like to add that we might have missed?

APPENDIX 2: Interview Questions

Problematisation (*This concepts of ANT covers the following questions*)

- 1) Introduce yourself and the role you played in the project?
- 2) Give an overview of the project (what were you solving for)?
- 3) What was your business case?

Enrollment (*This concepts of ANT covers the following questions*)

- 4) What were your roles in the project? Explain in detail
- 5) Who were the other players and briefly explain the roles?

Translation (*This concepts of ANT covers the following questions*)

- 6) What were their business interests?
- 7) Where all interests of all players taken into consideration?
- 8) How were your business interests aligned with the rest of the other actors?

Betrayal (*This concepts of ANT covers the following questions*)

- 9) Why was the project abandoned or suspended?
- 10) What should have been done for the project to be successful (what do the actors need to concentrate on)?
- 11) What role did technology play in the failure of the project?
- 12) What players (including your own organisation) were critical in the success of the project and why?
- 13) What major challenges did you experience in the project?
- 14) What could have been done differently?
- 15) What else would you like to add that we might have missed?

APPENDIX 3: Cover Letter and Research Participant Consent Form



Department of Information Systems

Leslie Commerce Building
Engineering Mall, Upper Campus
OR
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: <http://www.commerce.uct.ac.za/informationssystem/>

11 November 2015

Request to conduct research and interview participation consent form

Dear Sir/Madam,

In terms of the requirements for completing a Master of Commerce Degree in Information Systems at the University of Cape Town a research study is required.

The researcher, in this case Cosmas Muchinguri, has chosen to conduct a case study entitled Investigating failure to implement contactless payments: A case of Near Field Communication payment systems in South Africa. The researcher would like to request permission to conduct this case study at your organization. The objective of the research is to investigate and understand why Near Field Communication based contactless payment systems fail to get implemented and the fundamental conditions influencing failure to implement NFC Payment Systems in South Africa.

Your participation in this research is voluntary. All information will be treated in a confidential manner and used exclusively for the purpose of this study. No individual names will be recorded or published. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. You can choose to withdraw from the research at any time for whatever reason, in accordance with ethical research requirements.

The data collection method will be one-on-one interviews with a small group of the staff responsible for NFC payments implementations. The interviews will be conducted at your work premises and will last between 30 to 60 minutes. If you are willing to participate in this study, kindly sign the attached form and return to me at your earliest convenience.

Should you have any questions regarding this research, please feel free to contact me on 082 601 3620 or email: mhcos002@myuct.ac.za

Your participation in this study would be greatly appreciated, but is entirely voluntary.

Sincerely,

Cosmas Muchinguri

Prof. Irwin Brown

Research Participant Consent Form

I, _____, consent to participate in the research on Investigating failure to implement contactless payments: A case of Near Field Communication payment systems in South Africa.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

Signature

Date

APPENDIX 4: Interviewees roles and responsibilities

Focal Actor (Card Association)	Responsible for the driving of the acceptance of electronic payments. Merchant Sales and Solutions
Director - New Technologies, (Card Association)	Responsible for providing the technical expertise behind the NFC related projects and business development leadership
Testing Specialist (Acquiring Bank)	Responsible for providing the technical expertise related to testing of the NFC and other electronic payment related solutions
Project Manager (Card Association)	Project Manager at the Card Association, responsible for overseeing the entire NFC projects
Project Manager (Fast Food Franchise)	Technology Project Manager at the Fast Food Franchise
Head of Merchant Acquiring Sales and Services (Acquiring Bank)	Responsible for the Point of Sale and e-commerce acquiring services
Project Manager (Third-Party Payment Provider)	Responsible for implementation and integration of payment services
Technical Expert (Card Association)	Responsible for providing the technical expertise behind the NFC related projects

APPENDIX 5: Work schedule

Task	Date
Ethics approval, Design questionnaire, Pilot study and Design final questionnaire	31/12/2015
Identify participants and book meetings	20/02/2016
Interviews with first identified actors	01/03/2016
Member checks, data analysis and capturing on to a computer	19/05/2016
Discussions with supervisor	25/05/2016
Report of findings to actors	01/06/2016
Write up of first draft report and submit to supervisor	10/06/2016
Discussions with supervisor and edit draft report based on supervisor's comments	24/06/2016
Discussions with supervisor and edit draft report based on supervisor's comments	24/07/2016
Submission of final report draft to supervisor	15/08/2016
Dissertation submitted	31/08/2016

APPENDIX 6: Ethics Form



UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE



Commerce Faculty Ethics in Research Application Form

Any person planning to undertake research in the Faculty of Commerce at the University of Cape Town is required to complete this form before collecting or analysing data. If any of the questions below have been answered YES, and the applicant is NOT an Honours student, the form it should be submitted to the supervisor (where applicable) and from there for approval by the Faculty FIR committee: Ms Samantha Alexander (samantha.alexander@uct.ac.za).

It is assumed that the researcher has read the UCT Code for Research Involving Human Subjects (Available at <http://web.uct.ac.za/docs/educate/download/uctcodeforresearchinvolvinghumansubjects.pdf>), in order to be able to answer the questions in this form.

Students must include a copy of the completed form with the dissertation/thesis when it is submitted for examination.

1. PROJECT DETAILS			
Project title:	Investigating failure to implement contactless payments by a developing country: A case of Near Field Communication payment systems in South Africa		
Principal Researcher/s:	Cosmas Muchinguri	Email address(es):	mchcos002@myuct.ac.za
Research Supervisor:	Prof. Irwin Brown	Email address(es):	irwin.brown@uct.ac.za
Co-researcher(s):		Email address(es):	
Department: Information Systems (Commerce Faculty)			
Brief description of the project:			
<p>The purpose of the research is investigate and understand why Near Field Communication (NFC) based contactless payment systems fail to get implemented and the fundamental conditions influencing failure to implement NFC Payment Systems in South Africa. The researcher intends to do a cross-case analysis of two firms that attempted to introduce NFC payments but failed. The researcher will interview the stakeholders such as banks, electronic payment network providers, regulators and other financial institutions that were involved in the NFC payment implementation projects. The data will be collected using a number of methods such as semi-structured interviews (face-to-face and telephone interviews) and also from different secondary sources such as project documents. The questions that will be asked in the interviews will be guided by the actor network theory. The data will be collected during a period of weeks or months depending on the availability of the respondents. Though the exact time that will be spent at the site during the study is not known, there will be no need for the researcher to interview the actors more than once, unless if something that will require the researcher to follow up on things. Tape recorders will be used where possible to record interviews. The researcher will enumerate all the actors and report on what is currently known about them and the roles that they played in the NFC payment implementation projects.</p>			

Com Ethics_v9

Data collection: (please select)

Interviews Questionnaire Experiment Secondary data Observation

Other (please specify): Review of project documents

Have you attached a research proposal OR a literature review with research methodology? (please select)

Yes No

2. PARTICIPANTS

2.1 Does the research discriminate against participation by individuals, or differentiate between participants, on the grounds of gender, race or ethnic group, age range, religion, income, handicap, illness or any similar classification?		NO
2.2 Does the research require the participation of socially or physically vulnerable people (children, aged, disabled, etc.) or legally restricted groups?		NO
2.3 Will you be able to secure the informed consent of all participants in the research? (In the case of children, will you be able to obtain the consent of their guardians or parents?)	YES	
2.4 Will any confidential data be collected or will identifiable records of individuals be kept?		NO
2.5 In reporting on this research is there any possibility that you will not be able to keep the identities of the individuals involved anonymous?		NO
2.6 Are there any foreseeable risks of physical, psychological or social harm to participants that might occur in the course of the research?		NO
2.7 Does the research include making payments or giving gifts to any participants?		NO

If you have answered YES to any of these questions, please describe how you plan to address these issues (append to form): Consent attached. Participants will be asked to sign a consent form before the interview.

Affiliations of participants: (please select)

Company employees Hospital employees General public Military staff Farm workers Students

Other (please specify): _____

Race / Ethnicity:

Are you asking a question about race/ethnicity in your questionnaire?

Yes No

Which race categories have been used?

Have you included the option: "Prefer not to answer" as part of your race/ethnicity question?

NO

3. PROVISION OF SERVICES

Does your research involve the participation of or provision of services to communities? NO

If your answer is YES, please complete below:

3.1 Is the community expected to make decisions for, during or based on the research?	NA	NA
3.2 At the end of the research will any economic or social process be terminated or left unsupported, or equipment or facilities used in the research be recovered from the participants or community?	NA	NA
3.3 Will any service be provided at a level below the generally accepted standards?	NA	NA

If you answered YES to any of these questions, please describe below how you plan to address these issues.

3. ORGANISATIONAL PERMISSION

If your research is being conducted within a specific organisation, please state how organisational permission has been/will be obtained:

A verbal organisational permission was given. This will be send to the researcher via email. In addition, all participants will be asked to sign a consent form before the interview.

Have you attached the letter from the organisation granting permission? (please select)

Yes No, but this **will be** obtained before commencing the research Not applicable

Are you making use of **UCT students** as respondents for your research? (please select) Yes No

If yes, have you contacted Executive Director: Student Affairs for permission? (please select) Yes No

Was approval granted? (please select) Yes No Awaiting a response

Are you making use of **UCT staff** as respondents for your research? (please select) Yes No

If yes, have you contacted Executive Director: Human Resources for permission? (please select) Yes No

Was approval granted? (please select) Yes No Awaiting a response

Contact Emails: Executive Director: Human Resources (Miriam.Hoosain@uct.ac.za)
Executive Director: Student Affairs (Moonira.Khan@uct.ac.za)

4. INFORMED CONSENT

What type of consent will be obtained from study participants?

- Oral Consent
- Written Consent
- Anonymous survey questionnaire (covering letter required, no consent form needed)
- Other (please specify)

How and where will consent/permission be recorded?

A research participant consent form will be send to participants via email and they will also respond via email. An email record will be kept. Meetings will only be setup after the responds have given their permission.

Have you attached an informed consent form to your application? Yes No

5. SPONSORSHIP OF RESEARCH

If your research is sponsored, is there any potential for conflicts of interest? Not applicable

If your answer is YES, please complete below

4.1 Is there any existing or potential conflict of interest between a research sponsor, academic supervisor, other researchers or participants?	NA	NA
4.2 Will information that reveals the identity of participants be supplied to a research sponsor, other than with the permission of the individuals?	NA	NA
4.3 Does the proposed research potentially conflict with the research of any other individual or group within the University?	NA	NA

If you have answered YES to any of these questions, please describe how you plan to address these issues (append to form)

6. RISK TO PARTICIPANTS

Does the proposed research pose any physical, psychological, social, legal, economic, or other risks to study participants you can foresee, both immediate and long range? (please select)

Yes No


If yes, answer the following questions:

1. Describe in detail the nature and extent of the risk and provide the rationale for the necessity of such risks
2. Outline any alternative approaches that were or will be considered and why alternatives may not be feasible in the study
3. Outline whether and why you feel that the value of information to be gained outweighs the risks

1.

2.

3.

CHECKLIST	SELECT
A full copy of a research proposal or a literature review with methodology is attached in a separate file	<input checked="" type="checkbox"/>
Interview schedules / cover letters / questionnaires / forms and other materials used in the study are attached in separate files	<input checked="" type="checkbox"/>
Organisational consent letter / UCT student or staff approval letter	<input checked="" type="checkbox"/>
<p data-bbox="181 544 1150 589">On your cover letter to your questionnaire have you included the following?</p> <p data-bbox="231 607 592 651">1. The following UCT Logo </p> <p data-bbox="231 696 863 741">2. A sentence explaining the aim of the research</p> <p data-bbox="231 763 1230 831">3. Sentences of a similar nature to below must be included in the cover letter or consent form:</p> <p data-bbox="280 853 1158 920">This research has been approved by the Commerce Faculty Ethics in Research Committee.</p> <p data-bbox="280 943 1126 1010">Your participation in this research is voluntary. You can choose to withdraw from the research at any time.</p> <p data-bbox="280 1032 1110 1077">The questionnaire will take approximately X minutes to complete</p> <p data-bbox="280 1099 1222 1167">You will not be requested to supply any identifiable information, ensuring anonymity of your responses.</p> <p data-bbox="280 1189 1246 1290">Due to the nature of the study you will need to provide the researchers with some form of identifiable information however, all responses will be confidential and used for the purposes of this research only.</p> <p data-bbox="280 1312 1222 1379">Should you have any questions regarding the research please feel free to contact the researcher (insert contact details).</p> <p data-bbox="231 1435 1158 1480">4. Have you scanned in your signature for the last section of the form?</p>	<p data-bbox="1275 544 1318 589">NA</p> <p data-bbox="1366 544 1398 589"><input checked="" type="checkbox"/></p> <p data-bbox="1366 629 1398 674"><input checked="" type="checkbox"/></p> <p data-bbox="1366 696 1398 741"><input checked="" type="checkbox"/></p> <p data-bbox="1366 853 1398 898"><input checked="" type="checkbox"/></p> <p data-bbox="1366 943 1398 987"><input checked="" type="checkbox"/></p> <p data-bbox="1366 1032 1398 1077"><input checked="" type="checkbox"/></p> <p data-bbox="1366 1099 1398 1144"><input checked="" type="checkbox"/></p> <p data-bbox="1366 1167 1398 1211">OR</p> <p data-bbox="1366 1234 1398 1279"><input type="checkbox"/></p> <p data-bbox="1366 1301 1398 1346"><input checked="" type="checkbox"/></p> <p data-bbox="1366 1413 1398 1458"><input checked="" type="checkbox"/></p>