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The impact of technology on the South African mobile payment market structure

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

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ABSTRACT

Mobile phones have transformed the telecommunications industry profoundly. Phones are equipped with functionalities that open up new business opportunities to mobile network operators, banks and merchants. Near Field Communication (NFC) is a contactless application that can be applied within a mobile phone to enable it transact very much like a mobile credit card or wallet. The mobile payments environment continues to evolve with various stakeholders and business models emerging worldwide. Each stakeholder is motivated by their own set of business case drivers to either pursue or reject the move towards mobile payments.

Revenue sharing arrangements associated with any of the potential business models represent both a point of great potential competitive friction and ultimately the key to a break-through for rapid deployment of mobile payments. Drawing on the international studies of mobile payments, this report evaluates the possible business models and revenue sharing arrangements that could potentially evolve in the South African mobile payments environment. The report also examines the reasons and business case drivers for merchants to adopt the technology and "self-organised" solutions. Lastly, the paper includes an analysis of the possible disruptions that this technology could cause. The assumption is made that mobile payment solutions will replace cash and card based solutions and become the payment instrument of choice as it offers more processing power capabilities than cash and cards.

The research methodology employed in this study was qualitative and utilised semi-structured in-depth interviews where the content of transcripts were analysed. Thirteen interviews were held with mobile payment industry experts and practitioners in banks, mobile network operators and interchange companies.

The research elicited some interesting findings. Collaboration was regarded as the most feasible business model and respondents believed that the answer to

revenue sharing lay within the value that each stakeholder brings to the mobile proximity payments environment.

Merchants play a key role in the mobile payments environment and their motivation to adopt the technology relies on the cost benefit continuum. Merchants are motivated to adopt the technology if it reduces cash handling, lower shrinkage, increases throughput and reduces the risk in terms of theft.

Merchant “self-organised” solutions in competition with banks and mobile network operators is a possibility; but an unlikely option considering the recent deployment cost of upgrading payment infrastructure for contactless smart card technology in South Africa. Merchants encountered large capital expenditure during the latter upgrade and they would rather take a “wait and see” approach.

Lastly, it is unlikely that mobile payment solutions will replace cash and card based solutions except for specific niche markets such as transportation and fast food restaurants. Both cash and cards as payment solutions are linked to customers’ perception of the “prestige” of using these payment solutions.

DECLARATION

I, Alta Theresa Kotze, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Alta Theresa Kotze

Signed at ……

On the …….. day of …… 2009

DEDICATION

This research is dedicated to my brother and best friend.

ACKNOWLEDGEMENTS

Geoff Bick, my supervisor, for his time, effort, unending patience and valuable assistance on this research report.

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CHAPTER 1 INTRODUCTION

1.1 Purpose of the study

The purpose of the study is to evaluate a framework for proximity mobile payments considering the revenue sharing between banks and MNO's; the adoption of merchants and their motivations to find alternative payment schemes, and the disruptiveness profiles that exist where cash and card based solutions are replaced by phone-based solutions.

The classification was done in previous research by Ondrus and Pigneur (2005), whilst the disruption was based on a framework done by Rafii and Kampas (2002) and adopted to fit the South African environment.

Mobile technologies and services are in constant evolution and it is speculated as to whether or not proximity mobile payments with specific reference to the application of contactless smart card technology will be successful in the proximity mobile payments environment.

1.2 Context of the study

Mobile phones have transformed the telecommunications industry and mobile services are heralded to create a tremendous spectrum of business opportunities. Global pilot studies coupled with the increase of mobile phones equipped with contactless smart card chipsets are expected to revolutionise mobile proximity services such as proximity mobile payments. Near Field Communication (NFC), the contactless application within the mobile phone brought new capabilities such as easier device-to-device communication, reading of other contactless chips and emulation of contactless cards. To encourage wide use of the NFC enabled phone as a payment device, multiple payment cards could be supported by the mobile phones. Customers can then carry their choice of payment cards on the NFC enabled phone and choose a payment option at the time of purchase, just as they do today using a physical wallet or purse and plastic cards. The payment cards can be thought of as "soft

cards" that reside on the phone in electronic form and are managed by a secure wallet software programme. Financial information such as an account number and expiration date is stored in a secured memory area in the NFC phone. Customers could request that soft cards be issued over the air (OTA) by clicking a few buttons on their NFC enabled phones and identifying themselves to the issuers as the correct cardholder. Activation and cancellation of cards are available via enhanced OTA management capabilities (Smart Card Alliance, 2007).

Various stakeholders are involved in the testing and piloting of mobile payment technologies. Mobile network operators have been very successful in penetrating the telecommunications market across all income segments and the number of mobile phones in use far exceeds any other technical device that could be used to market, sell, produce or deliver products and services to customers (Dahlberg et al., 2007; Jenkins, 2008). Mobile network operators (MNO's) are incentivised to consider mobile payments because of their need for new revenue sources to boost their average revenue per user (ARPU), customer acquisition and management of churn, and the reduction of airtime distribution costs, to name a few. Although keen to invest in such initiatives, MNO's also face limitations and constraints such as regulatory limitations to provide financial services, e.g. on taking deposits and issuing e-money (Jenkins, 2008).

Banks have traditionally owned the payment space and are positioned as the customer's most trusted provider of financial services. Motivation for banks to enter the mobile payment space will be to provide the banking customer a choice of payment solutions, establish presence in new customer segments and geographic areas, and capturing additional revenue through retention of deposits. As in the case of MNO's, banks also have limitations and constraints. Banks have been largely unsuccessful in the penetration of their products, have a narrow customer base, and they also lack the experience with, and in some cases interest in, low-income customers (Jenkins, 2008).

The competition between MNO's and banks has been largely hidden but are becoming more visible because of the emergence of proximity mobile

payments. The fee structure within the mobile payment space dictates that revenue and expenses should be shared amongst merchants, banks and MNO's. Without an increase in volume and executing the same transaction with a contactless smart card enabled phone, there may be no incremental increase in revenue. Other considerations include the introduction of new components such as OTA. This could also increase the cost of the standard service because of additional activities such as customer service, device tracking, application management and key management (Smart Card Alliance, 2007).

Growth and the use of proximity mobile payments to make contactless payments depends on the willingness of customers and merchants to adopt the technology. The addition of proximity mobile payments technology to a mobile phone is therefore logical, considering the suite of services already available on the mobile. However, customers have choices regarding the technology that they use to perform transactions, and as long as the alternatives offer real advantages over other technologies, adoption will be slow (Rao and Troshani, 2007). Customer adoption of contactless payments is driven by the need to reduce the risk of carrying cash, increased convenience and speed of transactions and increased access and affordability of payments. Alternative methods of transacting, lack of awareness, limited literacy and cultural and psychological resistance can hinder such adoption (Jenkins, 2008).

Merchants create the market for financial institutions and other payment providers and their active participation in promoting a payment solution is crucial to consolidate a large number of points of acceptance (Dahlberg et al., 2008a).

Another important aspect to take into consideration is that merchants could become mobile payment service providers themselves. The large commission taken by banks for transactions can motivate merchants to implement their own payment schemes. Merchants could become competitors for the current payment service providers and they could create a disruption in the market by offering mobile payment schemes that have lower performance and less functionality, but at a lower cost (Ondrus and Pigneur, 2005). Some merchants already operate their own payment solutions in industries such as public

transportation and retail (Dahlberg et al., 2008a). Merchants are motivated to adopt and launch "self-organised" payment solutions themselves by reduced transaction fees, reduced cash handling costs, reduced queues and increased speed of transactions (Jenkins, 2008).

Classic payment solutions include cash and card based payments. Globally, MNO's and banks have successfully offered alternative methods of payments e.g. mobile payments schemes that compete with classic payment instruments (Ondrus and Pigneur, 2005). Taking the current market experiences into consideration, it remains to be seen if mobile payments will replace cash and card based solutions within the payments market.

Considering the above, much uncertainty exists in terms of a) the revenue sharing between banks and MNO's, b) the possible disruption where merchants demand cheaper and independent payment schemes, because banks take high commissions for financial transactions and c) the possibility that mobile payment solutions will take over the role of cash and card based solutions considering the extent of mobile phone penetration.

1.3 Problem statement

1.3.1 *Main problem*

The Research Problem is to investigate the impact of a new technology on the market structure in the South African proximity mobile payments environment.

In order to achieve the above mentioned aim, the following sub-problems are identified:

1.3.2 *Sub-problems*

Sub-problem 1: Would MNO's and banks collaborate and find a solution to share revenue in order to create a viable proximity payments offering?

Sub-problem 2: What are the main reasons for merchants to adopt proximity mobile payments?

Sub-problem 3: Would merchants disrupt the proximity mobile payments environment, by finding their own payment solutions, excluding banks and MNO's with the purpose to drive down transaction costs?

Sub-problem 4: To what degree would mobile payment solutions take over the role of cash or card based payment solutions considering the extent of mobile phone penetration?

1.4 Significance of the study

Following global pilot studies as well as research into adoption, business and revenue sharing models, the economics of proximity mobile payments and issues impacting the mobile payment market, little research has been done on smart card contactless payments solutions in the South African environment.

Over the past years success was limited with Japan, South Korea and Singapore leading the pack offering mobile payment services in several purchasing scenarios such as manned and unmanned and remote- and proximity payments for physical and digital goods. Even though the technologies and services are more advanced, usage rates and adoption remain low.

In Europe and the United States, most solutions have been launched for specific purposes e.g. digital content, parking and vending machines. These niche markets ensure a relatively secure business case, but growth potential of these proximity mobile payments remains highly limited. Western countries have not been able to deploy proximity mobile payments in a massive scale and it appears that the success of proximity mobile payments depends greatly on the effective alignment between business models and the environment in which the technology will be launched (Ondrus and Pigneur, 2008)

This study draws upon a framework to research the possibility of collaboration between MNO's and banks and how revenue sharing can be achieved between them in order to create a viable mobile proximity offering. It also considers to what degree merchants would adopt self-organised solutions, in competition to other stakeholders and for what reasons. The study further investigates the possible disruption where mobile phones become the method of payment, that due to their high penetration rates, they replace cash and card based solutions.

1.5 Delimitations of the study

The study involves several exploratory interviews with South African mobile payment experts to evaluate collaboration and revenue sharing between MNO's and banks as well as the two possible disruptions where mobile phones will replace cards as the payment mechanism and merchants will start their own payment system with contactless technology and bypass banks and MNO's.

The study involved only selected banks, mobile network operators and merchants and did not include an evaluation of the appropriateness of the technology.

1.6 Definition of terms

- Near field communication (NFC): A standards-based wireless communication technology (contactless card or chip) that allows data to be exchanged between devices that is in close proximity (less than 2-4 inches). NFC payment transactions between a mobile and a POS terminal use the same standard contactless communication protocol used by contactless credit and debit cards.
- POS: Point of sale. This term is also used to describe the equipment used by the merchant to complete the payment transaction.
- mPOS: Mobile point of sale payments.
- P2P: Person to person money transfer. The transfer of funds on a remote basis between persons.

- Proximity mobile payments: A payment to a physical merchant that is in initiated from an NFC-enabled mobile phone held in close proximity (less than 2-4 inches) to the merchant's point-of-sale equipment.
- Trusted service manager (TSM): A neutral third party service provider that provides a single integration point to all mobile network operators for financial institutions and merchants (retailers) that want to provide payment to their customers with NFC-enabled mobile phones. The TSM provides services to manage the secure download and life-cycle management of the mobile NFC applications on behalf of the financial institutions and merchants (retailers). The TSM does not participate in the transaction stage of the service, allowing existing business models to be implemented.
- M-payment: A payment initiated from a mobile phone.
- MNO: Mobile network operator. The mobile telecommunications company that has the relationship with the end user.
- OTA: Over the air transfer of customer information.
- SMS: Short message service is a communication service using standard communication protocols allowing the interchange of short text messages between mobile devices.
- WAP: Wireless Application Protocol is an open international standard for application layer network communications in a wireless communication environment. Its main use is to enable access to the Mobile Web from a mobile phone.
- USSD: Unstructured Supplementary Service Data is a capability of mobile phones associated with real-time or instant messaging type services
- ARPU: Average revenue per user is a measure primarily by consumer communications and networking companies describing the total revenue generated by users divided by the number of subscribers
- IVR: Interactive Voice Response is an interactive technology that allows a computer to detect voice and keypad inputs. This

technology is used extensively in telecommunications and allows a computer to detect voice and keypad inputs.

1.7 Assumptions

In the study it is assumed that all interviewees are experts in the field of proximity mobile payments with specific reference to the application of contactless card technology and Near Field Communication.

CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

The context of this study falls within the emerging market realm with specific focus on the South African environment. This study investigates the successful application of contactless smart card technology, referred to as NFC within the mobile payment environment, thus focusing on proximity mobile payments. In order to make sense of the proximity mobile payments environment, focus is given to various stakeholders within the proximity mobile payments environment, such as banks, mobile network operators, customers and merchants. Researchers identified issues amongst and between stakeholders that have an impact on the successful implementation of proximity mobile payments. These issues include the importance of technology acceptance and adoption amongst customers and merchants and the finalisation of revenue sharing models between banks and mobile network operators. Attention was also be given to the degree of disruption that technology might have within the proximity mobile payments environment.

2.2. Background to contactless smart card technology

Contactless smart card technology is an important event for the payments industry. The technology relies on a secure microcontroller or equivalent intelligence, internal memory and a small antenna embedded in a device that communicates with a reader through a contactless radio frequency interface. These smart chips are available in a variety of forms such as plastic cards, watches, key fobs, documents and the other handheld devices, such as mobile phones. This technology is being leveraged to improve speed, convenience and security in mobile payment transactions (Smart Card Alliance, 2006).

The contactless smart card technology application within mobile phones is called NFC chipsets (Ondrus et al., 2009). NFC refers to fast, secure and high bandwidth wireless communication between networked devices in close proximity (Nathanson et al., 2008). Proximity mobile payments in turn are

contactless payments in which the payment credentials is stored in the mobile phone and is exchanged over the air, based on NFC chipset technology, with a dedicated and compatible payment terminal or Point of Sale device (POS).

NFC was jointly developed by Phillips and Sony in late 2002 followed by adoption by Ecma International, the International Organisation for Standardisation (ISO) and the International Electrotechnical Commission in December 2003. Nokia, Phillips and Sony founded the NFC forum in 2004 to promote the technology (Ortiz, 2006).

According to www.nfc-forum.org (2007) global trials to test NFC for real world use occurred at a fevered pace with a wide range of applications for example:

- Turnstiles
- Parking meters
- Check-out cash registers or POS equipment
- ATM's
- Office, house and garage doors
- Personal computers
- Posters, street signs, bus stops, local points of interest (with NFC-readable tags only)
- Product packaging

2.3. What are proximity mobile payments?

Proximity mobile payments is a type of payment transaction processing in the course of which – within an electronic procedure – the payer uses mobile communication techniques, in conjunction with mobile devices, for initiation, authorisation or completion of payment (Pousttchi et al., 2007).

According to Bailly and Van der Lande (2007), there are two kinds of proximity mobile payments:

- Remote mobile payments
- Proximity mobile payments

2.3.1 Remote mobile payments

Remote mobile payments uses a variety of mobile phone data channels to initiate a transaction such as short message services (SMS), wireless application protocol (WAP) or the unstructured supplementary service data (USSD) protocol. The majority of mobile phone applications over the last 5 years were equipped with the latter functionalities.

Remote mobile payments can further be classified into “micro” and “macro” remote payments. Micro payment amounts are generally low and include value added SMS services such as downloadable ringing tones. For remote macro payments, the mobile is linked to a payment card (credit/debit card) or an account (bank account and /or store account) via an activation/enrolment process and is used afterwards as an authenticator of remotely stored information (Visa, 2003). Applications include; topping up of mobile pre-paid accounts, mobile shopping, mobile banking, bill payments, internet shopping, person to person payments (P2P), mobile point of sale payments (mPOS) and international fund transfer for migrant communities (Bailly and Van der Lande, 2007).

2.3.2 Proximity mobile payments

The definition of mobile proximity payments differ from source to source. Simplistically, proximity mobile payments can be defined as a payment for goods or services with a mobile device such as a cell phone (Au and Kauffman, 2008). The payment is contactless and the payment credential is stored in the mobile and is exchanged over the air (Bailly and Van der Lande, 2007). Contactless technology lets users pay for transactions by simply holding the NFC enabled card close to, rather than swiping them through a card reader (Ortiz, 2006). In other words, the mobile acts as a contactless payment card, thus becoming a new payment form factor (Visa, 2003).

NFC further provides intuitive and safe communication between electronic devices. Communication occurs when two NFC-compatible devices are brought within four centimetres of one another to initiate a payment (Das, 2008).

NFC could be used in many ways, including merchandise and service payments, event ticketing and facility- and computer access controls (Ortiz, 2006).

The future of the mobile phone in proximity mobile payments is to become a "wallet" in which users will be able to store several dematerialised eCards from different issuers (Smart Card Alliance, 2007).

2.4 The evolution of proximity mobile payments

The application of NFC is growing in popularity and stakeholders such as cell phone vendors, merchants, mobile network operators (MNO's), banks and trusted service managers (TSM's), responsible for the download of the secure payment application via over the air-OTA personalisation, have piloted the application worldwide with various successes and failures (Au and Zafar, 2008; Ondrus and Pigneur, 2008; Dahlberg et al., 2008). The most successful applications have been in Japan, South Korea and Singapore, but even though the deployed technologies and services are more varied and advanced, the usage rates remain low and wide spread diffusion has taken place (Ondrus et al., 2009). One of the fundamental reasons is that proximity mobile payments require customers and merchants to adopt the payment mechanism and change their behaviours towards the technology, much as the case was with credit card adoption (Evans and Schmalensee, 2005).

In Western countries, mobile proximity payments have been applied for specific purposes or niches which ensure a relatively secure business case but successful massive scale application has been limited (Ondrus et al., 2009).

Much uncertainty also exists as to how a globally accepted NFC business model will be defined and implemented. The success of proximity mobile payments appears to depend greatly on the effective alignment between business models and the physical environment in which it will be launched (Ondrus et al., 2009; Nathanson, et al., 2008; Dahlberg et al., 2008b; Ondrus and Pigneur, 2006b; Pousttchi et al., 2007).

A survey conducted by members of Smart Card Alliance Contactless Payment Council Proximity mobile payments Work Group during December 2007 and January 2008, resulted in four potential business model scenarios being discussed with interviewees. The majority of interviewees believed that a model with collaboration among banks, MNO's and other stakeholders such as cell phone vendors and TSM's in the mobile value chain, will be the most successful. Findings further showed that banks are taking a "wait and see" attitude, MNO's are demanding a fair share of revenue and refuse to be sidelined, merchants are uncertain about their return on investment and TSM's are angling for new services revenues (Smart Card Alliance, 2008). According to Smart Card Alliance (2008), the revenue-sharing arrangements associated with any of the potential business models represented both a point of great potential competitive friction and ultimately the key to a break-through for rapid deployment of NFC-based proximity mobile payments.

Proximity mobile payments are considered to be under-performing and only useful in niche markets with banks and MNO's underestimating the potential of such technology. This is a typical sign of disruption innovations. Overtime investments in research and development will improve this technology and make it more attractive and more adapted for the mainstream market. Therefore, the sustaining technology might be replaced by disruptive technology and competition with new entrants will be inevitable (Ondrus and Pigneur, 2005). Researchers have identified two potential disruptions that could occur namely; i) the physical device for payment could move from cash and card based to mobile based and ii) current bank and MNO driven solutions could be displaced by merchant driven solutions.

2.5 Mobile payment programmes – East versus West and Europe

2.5.1 East

Depending on the area in the world, the extent of interest and the degree of development and diffusion of proximity mobile payments systems and

alternative electronic cash systems will dramatically differ (Ainin et al., 2005; Humphrey et al., 2006; Jyrkonen and Paunonen, 2003; Pousttchi, 2003). Asia has been the first region in the world to understand the tremendous benefits of contactless payments and is regarded as one of the areas where successful mobile proximity payment programmes have been implemented. Korea and Japan are following closely with specific reference to NTT DoCoMo (the largest mobile phone operator in Japan) as a prime example (Ondrus and Pigneur, 2007a; Smart Card Alliance, 2007). Recent numbers show that NTT DoCoMo is quite successful with the launch of the osaifu-keitai or mobile wallet function. Over a period of 1 year, 20 million of their subscribers have been equipped with and 2.6 million have already activated their credit card functionality (Balaban, 2007). Currently, more than 30 percent of NTT DoCoMo's mobile handsets are contactless and enabled with the necessary technology (Bailly and Van der Lande, 2007). NTT DoCoMo also involved various stakeholders within the deployment of their venture such as retailers, banks, transportation companies and taxi fleet operators. This demonstrated the importance of involving different partners from various industries in order to increase customer and merchant base. Other projects include mobile Suica and Edy in Japan, Moneta in South Korea and Octopus in Hong Kong. The mobile Suica scheme was a disappointment with only a third of predicted customers registering and reasons given for the slow uptake as "complicated membership enrolment process". Other reasons for failure of customer uptake was awarded to the low number of POS devices installed and standardisation of NFC technology in the payment terminals.

2.5.2 West and Europe

Western and European countries had various levels of success and included a variety of different stakeholders as well as the use of several payment scenarios. Most of the proximity mobile payment solutions in the latter regions was launched for specific purposes such as digital content download, parking, vending machines, retail purchases and transportation/ticketing. These niche markets ensure a relatively secure business case, but the growth potential of proximity mobile payments remains highly questionable (Ondrus and Pigneur,

2007a). More successful applications have been in areas such as Austria, Spain, Croatia and the Scandinavian countries with one major difference to other regions namely the technology deployed. Asian countries make use of NFC technology whereas European countries uses short message services (SMS), wireless application protocol (WAP) or interactive voice response (IVR). The reason for the latter application in European countries was to facilitate uptake of proximity mobile payments by using the existing technologies installed on mobile phones within the current customer base (Ondrus et al., 2009).

Many researchers and business analysts believe that proximity mobile payments will flourish in the coming years as the underlying technologies and the market for digital wireless phones mature (Clark, 2006; Dash and Belson, 2006; Karnouskos, 2004). Research conducted by Royal Phillips Electronics and Visa International on the NFC protocols and contactless payment technology shows that consumers like the convenience and ease of use for transactions and payments with their mobile phones (Visa International, 2006).

According to Ortiz (2006) there has been great optimism as well as hype surrounding proximity mobile payments since 2000. Many market experts, vendors and mobile operators have high expectations. Their optimism was based on the increasing popularity of mobile phones and the positive attitude consumers exhibited when using the devices. The vision of the handset as a mobile transaction device is widely shared. According to ABI Research, a market analysis firm, shipment of NFC enabled devices will surge from 3.7 million in 2006 to 672 million in 2010. They also predict that contactless payments worldwide will rise steadily from $303.3million in 2006 to $1.08billion in 2010.

A statement made regarding the inevitability of the convergence of proximity mobile payments by John Philip Coghlan, previous CEO of Visa USA during March 2007 expresses the bullish sentiment towards proximity mobile payments application more clearly (Smart Card Alliance, 2007).

2.6 Stakeholders in the proximity mobile payments environment

The proximity mobile payment environment, also referred to in most literature as the “ecosystem” (Konig-Reis et al., 2005; Smart Card Alliance, 2007) involved various stakeholders with different levels of value, add to their commercial offering namely;

2.6.1 Customers

This group represents the potential customers that would use a mobile proximity payment scheme. Ondrus and Pigneur (2007b) claim that the success of proximity mobile payments are dependent on (i) a great number of participants (i.e. customer and merchant base) and (ii) a high volume of transactions. Proximity mobile payments attempts to offer customers increased convenience and speed of transactions; and savings and personalised assistance with their shopping and payment needs. Customers will be able to manage their entire debit, credit, prepaid, gift card and loyalty card portfolios using their mobile phones. Mobile phones will also be able to give customers entry through access control points and enable ticketing purchases (Smart Card Alliance, 2007).

Research by Van den Dam (2005), focussing on the theory of customer choice and demand found widespread occurrence of multi-homing where customers use a combination of different kinds of payment instruments (i.e. cash, cheque, credit and debit cards) to maximise their utility. The reason for the latter is because of the unique characteristics and benefits that each payment method offers such as airline miles, hotel points and cash-back bonuses.

It is therefore questionable if proximity mobile payments will replace cash and credit cards, to become a universal payment device or will it only fill a particular niche market.

Another theory that has been used to explain the value creation in the mobile payment environment is that of “network externalities”. Network externalities

exist when the utility derived from the use of a product increases with the number of people using the product (Farrell and Saloner, 1985; Katz and Shapiro, 1985; Katz and Shapiro, 1994). In other words, a new user that joins an existing network or group of users will confer additional benefits to the existing users in the network. The more consumers using the same instrument, the more merchants will accept that instrument – and vice versa. This increases the utility of each consumer since the payment instrument becomes more practical (Milne, 2006).

Another factor is switching costs, that exist when customers find it expensive to switch to a competitor once they have bought from one supplier, even if the products of the old and new suppliers are functionally identical (Beggs, 1989). When switching costs exist, rational consumers usually display brand loyalty if they have to choose between functionally identical products. Switching costs provide consumers with a strong incentive to continue buying from the same firm.

Deloitte (2005) stated that contactless payments are attractive for many customers as an alternative to cash especially for low-value transactions and the reasons being, speed, convenience and security.

2.6.2 Mobile network operators (MNO's)

According to Smart Card Alliance (2007), MNO's could see significant economic benefits from offering proximity mobile payments. The potential benefits included new customers, reduced customer churn and revenue from new payment related data services, such as text message advertisements. Other benefits recognised by Bailly and Van der Lande (2007) included transaction fees, renting space on handsets of SIM cards, data traffic and managing service providers' applications. Offering additional services can attract new customers and stabilise their subscriber base.

A potential model for mobile payment operator-centric businesses has been researched by Smart Card Alliance (2007). This model is where the mobile operator acts independently to deploy mobile payment applications to NFC-

enabled mobile devices. Customers prepay or the operator charges to the customers' existing wireless account. The primary benefit of this model to operators is the sole control over the revenue stream. Problems with such a model are however, the lack of a banking license, merchant relationships, privacy, fraud and risk management. Operators may not be the best suited to handle such sensitive financial information. Alternatives to the latter business model is for operators to partner with financial institution, taking a fee for every credit or debit "card" loaded on the operator's subscriber identity module (SIM) card or on any other secure element within the mobile phone. Other revenue avenues are via increased network use.

2.6.3 Banks

Proximity mobile payments allow financial service providers to offer new, differentiated payment services to their customers, increase their credit and debit card transaction volumes and extend their brands. Proximity mobile payments will also reduce cash handling and plastic card issuing costs and more importantly, the opportunity to offer more interactive services linked to online banking services e.g. providing credit at the point of purchase (Smart Card Alliance, 2007; Bailly and Van der Lande, 2007).

Network externalities for proximity mobile payments also exist amongst banks. Considering the beneficial impacts of shared ATM networks, in the form of individual network growth, the value of a shared electronic banking network to the banks and its cardholders will increase as the network grows (Kauffman and Wang, 2002).

Proposed bank centric models (Smart Card Alliance, 2007), is where the bank owns the relationship with the customer and is responsible for getting the NFC-enabled phone into the possession of the customer (as is the case with a bank card). The current relationship that banks have with merchants will continue, and they will capture revenues streams from micro payments. Problems with such a model is that banks have little experience in distribution of mobile phones and that the servicing and maintenance of mobile phones could be an added costs for banks.

2.6.4 Merchants

The success of proximity mobile payment solutions depends considerably on merchants. Merchants have the need to lower the costs of their payment infrastructures, reduce fraud and provide alternative purchase channels to their clients. Merchants have an important role in the development of payment services as they create the market for financial institutions and other payment service providers (Dahlberg et al., 2008a). Convincing merchants of the worth of investing in the equipment, to accept new forms of payment as well as demonstrating worthwhile business models to them (merchants), will be crucial to the success of proximity mobile payments in future (Deloitte, 2005).

Another important aspect to take into account is that merchants could become mobile payment service providers themselves. A typical example of such an initiative is that of the Octopus card applied in transportation in Hong Kong and the IKEA card in retail (Dahlberg et al., 2008a).

Some researchers studied merchant adoption in order to better comprehend this important side of the market. Merchants can benefit from proximity mobile payments in the form of faster payment transactions, lower cash handling and improved customer convenience. Proximity mobile payments can also help merchants establish stronger customer relationships and customer loyalty, because of this increased convenience. Other benefits include branding opportunities, market differentiation, loyalty programmes, e-coupons and rewards that can also enhance the value proposition (van der Heijden, 2002; Mallat and Tuunainen, 2007; Bailly and Van der Lande, 2007).

2.6.5 Other

For the purpose of the study, other stakeholders include (i) handset manufacturers, (ii) application developers and (iii) Trusted Service Managers (TSM's). Although part of the ecosystem, these stakeholders do not have a direct influence on the success of various business scenarios, in that they cannot operate without the corporation of the mobile operator, bank or merchant (Smart Card Alliance, 2007). Their contribution is limited to the successful

development of the hardware and software as well as the security applications within the SIM or secure element within the phone. According to Smart Card Alliance (2007) and Davis (2007) the following benefits will accrue to these stakeholders;

- Handset manufacturers – gaining of competitive advantage by selling handsets that support payment and other mobile applications
- Application developers – they can offer advanced features in the software applications of the phones that has additional security features, credit balance displays or enhanced loyalty programmes
- Trusted Service Managers – they are needed to ensure the secure OTA download of applications and to manage the life cycle of those applications

2.7 Interplay between stakeholders in the proximity mobile payments environment

The NFC environment is extremely complex, with the various stakeholders aiming to take their share of the revenue. MNO's are looking for new revenue sources to boost their average revenue per user (ARPU) and are not accustomed to sharing their customers with other entities. Banks on the other hand, have traditionally owned the payment space and are positioned today as the customer's most trusted provider of financial services. Banks also own the relationship with merchants. This will motivate banks to enter this market in a way that provides new services to the customer and offers the banking customer a choice of mobile payment solutions. The competition between mobile operators and banks has been largely hidden, however, because mobile services have been slow to catch on. Proximity mobile payments have made this competition visible (Smart Card Alliance, 2007). The proximity mobile payment landscape continues to evolve with various business models as a result of the competition between stakeholders.

2.8 Adoption of proximity mobile payments solutions

2.8.1 Customer adoption

The adoption and implementation of proximity mobile payments have been uneven in different countries. For instance, proximity mobile payments have been very successful in countries such as Japan and South Korea, but not in the United States. There have also been similar mixed results in other developed countries such as France and the United Kingdom. In other areas such as Egypt and the Democratic Republic of Congo adoption was readily accepted amongst unbanked markets. The pervasiveness of wireless networks is creating new opportunities to offer innovative mobile services. Virtually every industry group involved in the mobile transaction value chain is investigating the use of proximity mobile payments and mobile commerce (Ondrus and Pigneur, 2007a).

Wilcox (2008), representative of Juniper Research Limited, predicted from trends found in research that NFC will achieve traction initially in developed countries and regions, with Japan already leading the way with FeliCa-enabled phones.

North America, Western Europe and countries such as Korea, Singapore and Australia are likely to see service take-up. Global transaction values are predicted to exceed $75 billion by 2013 with 90% represented by Far East and China, North America and Western Europe.

Research done on adoption issues of customers was mostly based on the technology acceptance model (TAM) (Davis, 1989) with additional constructs adapted to study proximity mobile payments such as security, cost, trust, mobility, expressiveness, convenience, speed of transaction, facilitating condition, attractiveness of alternatives, privacy, system quality and technology anxiety (Dahlberg et.al., 2008b). When considering customer adoption (www.nfc-forum.com) mobile payment pilot projects and implementations carried globally, have shown that customers value the convenience of using their mobile phones for payment at a physical Point of Sale (POS) device.

Other survey results done in Europe and Canada showed that at least 76% of respondents would be interested in buying movie tickets with a mobile phone and 78% would use a service whereby their buying transactions would be charged on their mobile carrier bill.

2.8.2 Merchant adoption

Wilcox (2008) further remarked, that the trials thus far done with NFC, have been encouraging but that the industry as a whole, will need to convince not only customers, but merchants also need to be convinced of the merits of yet another payment mechanism on top of cash, cheques, credit and debit cards, and to allay understandable fears and scepticism about the security of the e-wallet. From a merchant perspective, the adoption of mobile payment systems is expected to reduce the costs and facilitate the sale of products and services to customers at any time and from any location. Merchant adoption of proximity mobile payments, however, has not been as fast and wide as expected (Ondrus and Pigneur, 2007b) and research done by Mallat and Tuunainen (2007) suggests that the main merchant adoption drivers are related to the means of increasing sales or reducing costs of payment processing, whereas the barriers to adoption include complexity of the systems, unfavourable revenue sharing models, lack of critical mass and lack of standardisation.

2.9 Revenue sharing models between banks and mobile network operators

The term business model is regarded as the most discussed and least understood term in electronic commerce, and thus in mobile commerce (Timmers, 1998). In the mobile payment environment, banks and MNO's are typically referred to as "mobile payment service providers". Banks are very powerful in the payment market as they have financial networks and licenses as well as risk management expertise. On the other side, MNO's have a large customer base due to the high penetration rate of mobile phones. In addition, they also control the mobile network infrastructure and the end-user device.

These two dominant types of stakeholders can therefore choose to collaborate and cooperate or to compete with each other.

Business models proposed by Smart Card Alliance to participants in a survey during 2008, had 86% of survey participants support a collaboration model. Agreement amongst survey participants was that a collaboration model would focus stakeholders on their own core competencies, open the door for new revenue from incremental services, drive customer retention and loyalty and respond to fundamental demand for customers.

Collaboration is also needed in order to share revenue as well as risks and investments, which are especially important in countries where there is no contactless payment infrastructure in place (Bailly and Van der Lande, 2007). Smart Card Alliance (2008) commented on revenue sharing and suggested that payment transaction revenues belong to the bank, while airtime, operator services and fees for application residency on the handset or wallet belong to the mobile operator. Another comment by Smart Card Alliance (2008) in terms of risk and security is that banks should own the financial liability while mobile operators own network security.

2.10 Disruption profiles

Over time, investments in research and development improve the technologies involved and it becomes more attractive and adapted in the mainstream market. A disruptive technology may come to dominate an existing market by either filling a niche that the older technology is not able to fill; or by successively moving up-market through business process and firm-level performance improvements until firms that have adopted the disruptive technology, begin to replace the market incumbents as market leaders (Ondrus and Pigneur, 2005).

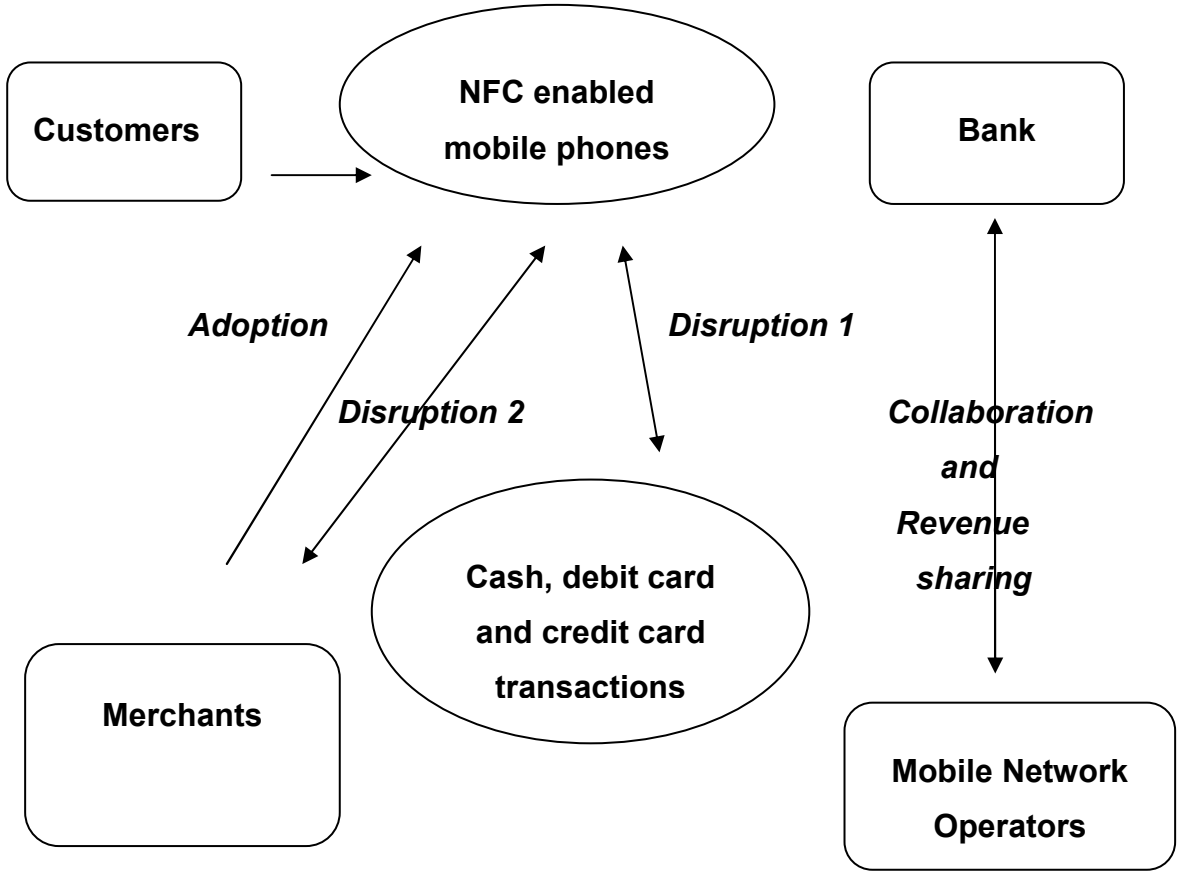
Analysts believe that proximity mobile payments could initially fill the proximity mobile payments niche that other previous electronic cash solutions were not able to do. Longer term integration with debit and credit cards are possible in order for customers to securely pay for larger transactions from their cell phone or other mobile devices (Au and Kauffman, 2008). Proximity mobile payments

could complement debit and credit cards but at the same time, have the potential to replace them. Other disruptions identified by analysts refer to merchant driven solutions where demand for cheaper and independent payment solutions exists (Ondrus and Pigneur, 2005).

2.11 Evaluation framework

The framework for the evaluation was adopted from various studies considering the above mentioned sub-problems in the mobile payment environment.

Figure 1: Framework for the impact of technology on the South African mobile payment market structure.



2.11.1 Revenue sharing

Collaboration between banks and mobile network operators in the proximity mobile payments environment is limited as both want to control most of the

value chain so as to increase their revenue (Dahlberg et al., 2008a). The revenue sharing model is wide open and no consensus has been reached in terms of the structure of such a model (Smart Card Alliance, 2008). This research attempts to determine the benefits and drivers of collaboration and revenue sharing between MNO's and banks within the South African mobile payments environment. It also considers what alternatives, value chain benefits over and above revenue, could be realised for these stakeholders through the implementation of proximity mobile payments.

2.11.2 Adoption

Adopting a new payment system is typically a major operation, and there are several barriers to the merchant adoption of such systems. Merchants together with customer adoption are crucial to the successful implementation of proximity mobile payments. Understanding the barriers and drivers of adoption of proximity mobile payments by merchants it is therefore important to consider this in the field of mobile payment solutions (Mallat and Tuunainen, 2007). This study proposes that the main adoption drivers for merchants are related to the means of increasing sales and decreasing the cost of payment processing.

2.11.3 Disruption

A disruptive technology is a new technological innovation that creates the basis for new products and services, infrastructure and applications that eventually displace the technologies, products or services that currently dominate the way firms do business, the nature of their business processes and the markets they operate in (Yoris and Kauffman, 2006).

Disruption 1: This disruption assumes that mobile phones could become payment instruments as they offer more processing power capabilities than cash and cards.

Disruption 2: This disruption assumes, on the back of the demand for cheap and independent payment schemes, that merchants, especially those with a large customer base, would launch their own mobile payment schemes.

Merchants would therefore bypass banks and mobile network operators (MNO's) in a quest to reduce transaction fees.

2.12 Conclusion of the literature review

Throughout the literature, three main themes remain regarding the successful implementation of proximity mobile payments: The importance of collaboration to create viable revenue sharing between MNO's and banks, the importance of merchant adoption and the possibility of merchants launching self-organised solutions, as well as the degree of disruption that mobile payment could cause in the environment with specific reference to cash and card based solutions (Au and Kauffman, 2008; Dahlberg et.al., 2008a; Lange, 2008; Mallat and Tuunainen, 2007; Ondrus and Pigneur, 2005; Ondrus and Pigneur, 2007b; Smart Card Alliance, 2008; Wilcox, 2008; www.nfc-forum.com;). These main themes give rise to the following propositions:

2.12.1 Proposition 1

Collaboration between MNO's and banks will create a viable mobile proximity payments offering for revenue sharing.

Bailly and Van der Lande (2007) stressed that collaboration between banks and MNO's would be mutually beneficial. Both players will be able to re-use their existing infrastructures in the development of new payment solutions, and they will be able to share the risk and the costs of launching them. Interviews conducted by Smart Card Alliance (2008), indicate that respondents tend to follow current payment models with some revenue going to mobile operators for application download and secure element space rental.

2.12.2 Proposition 2

The main adoption drivers of merchants are related to the means of increasing sales and decreasing the cost of payment processing.

The most important drivers for the adoption of proximity mobile payments have been indentified to be related to the ubiquity and personal nature of the devices and services. Ubiquity is commonly distinguished as a superior value proposition for mobile technologies in both developed and developing countries (Mallat and Tuunainen, 2008). For merchant adopting the mobile channel and the enabling mobile payment systems, ubiquity offers the potential to sell their products and services to customers at any time and from most locations. Another potential value add is cost savings in terms of cash handling, reduced processing of paper-based payments, speed at check-out counters, faster collection of funds, enhanced inventory management and customer convenience (Weber and Kantamneni, 2002).

2.12.3 Proposition 3

Mobile phones would replace cash and card based payment solutions

The assumption behind the above disruption is that NFC enabled mobile proximity payments could become payment solutions because of the processing power capabilities that they offer. Mobile phone penetration rates are very high in the South African environment, estimated at 98.5% (Lange, 2008). The assumption is therefore made that mobile phones would replace the current card transaction mechanisms.

2.12.4 Proposition 4

Merchant "self-organised" solutions will evolve in competition with operator driven (MNO and financial institution) solutions.

Self-organised solutions refer to merchants that are motivated to find cheaper and independent payment solutions from that of operator driven institutions. The demand therefore exists for merchants to enter the market because of their large customer base and volume transactions.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Research design

The research methodology employed in this study is qualitative in nature and utilises semi-structured in-depth interviews where the content of transcripts were analysed. The literature review was used to identify existing research on the issues surrounding the successful implementation of mobile proximity payments. Characteristics and qualities to be examined were defined and examined in precise and concrete terms. The content of the transcripts were broken down in small manageable segments and analysed separately (Leery and Omrod, 2005).

Qualitative research as a form of inquiry in almost every discipline has grown significantly over the past decade (Daley, 2004). Qualitative research seeks a better understanding of complex situations, it is exploratory in nature and uses observations to build theory from the ground up. It serves various purposes namely, description, interpretation, verification and evaluation. As a general rule, qualitative studies do not allow the researcher to identify cause-effect relationships to answer questions such as “what caused what” as in quantitative research (Leedy and Omrod, 2005).

3.2 The qualitative research method approach

Qualitative research tends to seek a better understanding and the meaning imbedded in participant experiences through open-ended questions with an unstructured and subjective approach, the focus being on understanding the meaning embedded in the participants’ experiences through open-ended questions with an unstructured and subjective approach (Lincoln and Guba, 1985). Research is holistic, descriptive and focuses on the depth and details of experiences (Dezin and Lincoln, 1998). Researchers enter the setting with open minds, prepared to immerse themselves in the complexity of the situation and interact with their participants. Categories emerge from the data, leading to

context-bound information, patterns, and or theories that help explain the phenomenon under study (Leedy and Ormrod, 2005). Conduct is in a naturalist setting through e.g. interviewing, observing, field notes and documents (Wolcott, 1994). The research is conducted in a natural setting, utilising interviews, observations, field notes and documentation.

Data is analysed through an ongoing and evolving process of identifying themes in a particular context. The above approach is contrasted with the view that quantitative research is always "objective", while qualitative methods are subjective and will always lead to more meaningful analysis (Golafshani, 2003).

Qualitative researchers construct interpretive narratives from their data and try to capture the complexity of the phenomenon using a more personal, literary style, including the participants own language and perspectives (Leedy and Ormrod, 2005).

Because qualitative research occurs in a more natural setting it is more "true to life" if compared with quantitative research which is sometimes conducted in a laboratory or artificial setting (Leedy and Ormrod, 2005).

3.3 Population and sample

Interviews were held with mobile payment industry specialists and practitioners in banks, mobile network operators and interchange companies. The following stakeholders have been identified for interviews:

- The four largest banks in South Africa
- The two largest mobile network operators in South Africa
- The two major interchange companies in the global payment environment
- Consulting firm(s) that specialise in mobile payment market advice

All the above stakeholders have head offices located in Gauteng where most of the decision making takes place. Choices in terms of banks were limited to the largest banks which hold more than 95 percent of total banks' assets. The two largest mobile network operators together service approximately 92 percent of

all cell phone customers and the interchange companies involved are the largest global players in the payment environment. One consulting firm, actively reporting and publishing on mobile payments was included in the interview process in order to obtain a more objective view than that of banks and mobile network operators. The interchange companies interviewed represented all the financial institutions interviewed and are globally the largest in their field.

Various attempts were made to interview merchants with poor response. Merchants contacted did not know about the application of contactless card technology on mobile phones and rejected to be interviewed. They were therefore defined as a secondary source of data and not included in the interview process due to the fact that they (merchants) are driven by customer needs and how banks propose to solve those specific needs.

Table 1: Profile of respondents (if appropriate)

Description of respondent type	Number to be sampled	Number of respondents per type
Banks	4	8
Mobile network operators	2	2
Consulting firms	1	1
Interchange companies	2	2

3.4 The semi-structured interview

The semi-structured interview is a technique used in exploratory research where respondents are probed on topics in a relaxed environment to maximise the richness of the discussion and data collection (Creswell, 1998). The interview technique does not offer closed-ended questions found in structured interviews. On the other hand, it also does not contain a loosely defined agenda. Instead it is guided by a list of open-ended questions that focus on core themes being probed by the researcher. An interview questionnaire guiding the interviewer is constructed to ensure that all propositions are explored (See: Appendix A).

Advantages of semi-structured interviews

- The researcher can shift focus as new data comes to light (Leedy and Ormrod, 2001).

Disadvantages of semi-structured interviews

- The researcher, by nature of his or her presence, may alter what people say and how events unfold (Leedy and Ormrod, 2001).

3.5 Method of analysis

Qualitative researchers make use of inductive reasoning, by making many specific observations and drawing inferences about larger and more general phenomena. The data analysis is also more subjective in nature by scrutinising the body of the data in search of patterns, subjectively identified as reflected in the data (Leedy and Ormrod, 2005).

Transcripts from the semi-structured interview with respondents were recorded and analysed in order for them to be studied in more detail. The data obtained from the interviews was used to extract the themes, perceptions and opinions from the respondents. Common themes were identified and then collated and grouped to draw out the validity of the propositions. The data was also applied on the theories discussed in the literature review.

Interviews can yield the following useful information:

- Facts
- People's beliefs and perspectives about the facts
- Feelings
- Motives
- Present and past behaviours
- Standards for behaviour
- Conscious reasons for actions or feelings

Interviews in a qualitative study are less structured and more open-ended or semi-structured revolving around a few central questions (Leedy and Ormrod, 2005).

When conducting interviews it is crucial to indentify questions in advance. Attention should be given to conversations that drift in an unproductive direction and guide them back on course. Encouraging people through listed questions to talk about a topic without suggesting that they give a particular answer, in other words avoiding leading questions, is imperative. Interviews should be set up with a group of expertise in the industry to be researched after written permission and an explanation of the nature of the study and use of the results are given. Finally, find a suitable location where people are comfortable and willing to talk without any distractions.

Other important guidelines in conducting interviews refer to maintaining a rapport, focusing on the actual, rather than on the abstract or hypothetical, and not putting words into peoples' mouths.

When recording, it is important to record all responses verbatim, remembering that the interviewer is not necessarily getting the facts and therefore should keep reactions objective (Leedy and Ormrod, 2005).

3.6 Validity and Reliability

Research that is to be credible requires both validity and reliability. Validity deals with the accuracy of the instrument to the extent that it measures what we wish to measure. Reliability refers to the research measurement procedure's accuracy and precision (Bendixen, 2004).

3.6.1 Validity

Two types of validity occur: The first type, external validity is the extent to which its results apply to situations beyond the study itself – in other words, the extent to which the conclusions drawn can be generalised to other contexts. The external validity of a research project can be enhanced by using the following strategies:

- A real-life setting: Research conducted in the outside world, not subject to the controls of a laboratory project, may be more valid in the sense

that it yields results with broader applicability to other real-world contexts.

- A representative sample: Generalising findings where research is restricted to people with a particular set of characteristics could be problematic.
- Replication in a different context: If multiple researchers search for the same conclusion in various circumstances and contexts – then it can be concluded that validity has been achieved (Leedy and Ormrod, 2005).

The second type, internal validity, is also known as content or faces validity, and deals with the extent to which the measuring instrument provides adequate coverage of the topic under study (Bendixen, 2004). To ensure internal validity of a research study, precautions need to be taken to eliminate other possible explanations for the results we observe. Various strategies can be used to increase the probability that explanations are the "most likely" ones for the observations made:

- A controlled laboratory test: Carefully regulated environmental conditions in a laboratory setting.
- A double-blind experiment: Neither participants nor administrators of the study are aware of what the researcher's hypothesis is or which method is expected to be more effective.
- Unobtrusive measures: People are observed without knowing that their actions are being recorded.
- Triangulation: Multiple sources of data are collected hoping that that they will all converge to support a particular hypothesis or theory (Leedy and Omrod, 2005).

When considering the results from this study, it would be appropriate to conclude that the measurement instrument (semi-structured in-depth interviews) used during the research process in this study provided adequate coverage of the topic. Triangulation was applied as strategy to increase the probability that responses from multiple interviewees supported the particular propositions.

3.6.2 Reliability

Bendixen (2004) outlines the following description of reliability of the research:

- The stability of the research – an instrument is said to be stable if it secures reliable and coherent results with repeated measurements on the same subject.

- The equivalence of the research – equivalence is a measure of the degrees of error brought in by different researchers, or by different samples of items in the questions.

- The internal consistency of the research – this concept deals with the uniformity and homogeneity among the scaled and measurable items researched.

Reliability during this study was enhanced by assuring that the semi structured interview was always administered in a consistent fashion. There was standardisation in use of the instrument from one situation or person to the next. Specific criteria were established, e.g. a questionnaire with transcript analysis, to dictate that the kinds of judgements that the researcher made during the research process was subjective (Leedy and Ormrod, 2005).

3.7 Limitations of the study

Without the application of pilot studies in the South African environment, this research will attempt to predict the possible outcomes amongst various stakeholders of the proximity mobile payments market.

CHAPTER 4 PRESENTATION OF RESULTS

4.1. Introduction

This chapter summarises the key findings of the research results. Responses to the open-ended questions are discussed, the focus being on understanding the meaning embedded in the participants' experiences with an unstructured and subjective approach (Lincoln and Guba, 1985). Furthermore, detailed discussions of the results of the proposition testing are discussed in Chapter 5.

In this section the responses to the interview questions are set in tabular form, and related back to the propositions.

4.2 Responses to Proposition 1

Collaboration between MNO's and banks will create a viable mobile proximity payments offering for revenue sharing.

Question 1 of the semi-structure interviews (See Appendix A) was designed to facilitate discussion with the respondents and to provide a starting point for the interview. The question was intended to address Proposition 1 and to extract any other key information on the subject. The following these were developed from analysing the responses from the interviews:

- **Collaboration model**
    - The model should include all stakeholders in the value chain. These include the banks, mobile network operators, VISA and MasterCard to provide the interoperability and trusted services managers to manage the security needed with the OTA transfer of customer information.
    - Banks need the mobile network operators to drive the application to market and would need to collaborate with MNO's.
    - Banks have not been successful in taking banking to the masses. Over half of South Africans are unbanked. Mobile network

operators have been much more successful in penetrating the market. Collaboration would therefore be necessary.

- Mobile network operators need banks to do the risk management and provide the banking licence. Customer compliance comes at a cost; if mobile network operators collaborate with banks in terms of the latter then they don't have to have invested the capital. Customer compliance comes at a cost.
- Mobile network operators have distribution arrangements where they pay large commission fees to intermediaries. These commission arrangements are not suitable for proximity mobile payments where costs need to be kept as low as possible to attract customers and reach scale.

- **Operator centric model**
  - Mobile network operators are much more aggressive in driving this technology because they want to reduce churn. They have a more compelling case than banks to drive this technology.
  - Mobile network operators also need to increase their revenue streams in South Africa, penetration is saturated and this could be one of the proposed methods to do so.

- **Business case drivers**
  - MNO's wants to create "stickiness", reduce churn and increase their average revenue per user.
  - For banks it would be just another method of payment that they add to customers' choice.
  - Banks look at the mobile more holistically, they want to form "deeper" relationships with clients, rather than reduce churning. Banks want to create a greater functionality to the card holder.
  - There is no compelling case for banks to do this. It is something that they think they "should" do and not because they feel that they are forced to do it.
  - Banks could capture additional revenue e.g. through the retention of deposits.

- **Sources of revenue**
    - Disagreement in terms of revenue sharing exists. Banks do not want to give up any revenue and neither do MNO's.
    - Revenue sharing should be based on "who holds the risk" and who provides the service during that phase of the value chain.
    - Revenue sharing should be determined by looking at the value chain and how each stakeholder benefits and how and where they take risk.
    - The appropriate revenue sharing model should sit on top of the current payment network business model and not compete for the same transaction revenues.

4.3 Responses to Proposition 2

The main adoption drivers of merchants are related to the means of increasing sales and decreasing the cost of payment processing.

Question 2 was intended to narrow the scope of the discussion and focus on the key reasons why merchants would want to adopt proximity mobile payments. Merchants are key to the successful implementation of such technologies and if they do not have a compelling reason to do so, the success could be compromised. The following these were developed from analysing the responses from the interviews:

- **Customer demand**
    - What will inspire merchants to adopt will be the demand from customers side, if that increases then merchants will adopt faster.
- **Banks increasing cash handling costs**
    - Merchants will also adopt the technology faster if banks make cash handling more expensive.
- **Convenience**
    - Merchants would eventually adopt the technology if it is faster, if

there is less interaction and it is more convenient and if it can take away the hassle and risk of using cash.
    - Electronic reconciliation and transactions creates a more convenient transacting environment for merchants
    - No card holder verification is required for low value transactions, what proximity mobile payment are aimed for.
    - Less shrinkage in the merchants till.

- **Speed**
    - Faster throughput will motivate merchant adoption

- **Increased revenue through customer return visits**
    - Return visits to merchants that have the technology is huge
    - Load and top-up revenue earned from customers
    - Enhance customer experience

4.4 Responses to Proposition 3

Mobile phones would replace cash or a card based payment solutions

Question 3 was designed to explore the disruption that mobile payments could have on the current payment solutions namely, cash and card based payments. The following these were developed from analysing the responses from the interviews:

- **Mobile phones will replace cash and card based payment solutions in the long term**
    - In the long run it might, like cheques – it was driven out because other methods proofed to be more efficient. It would show to customers that it is more convenient, efficient for all players in the value chain, or if it gets to critical mass, scale, and the industry decides that mobiles are more cost effective.
    - Yes eventually, it will – it will replace the 16 digit number on the card. The utility and the security around that make it fairly inevitable. For a long time we will see both – card and phone but

later the phone. The security capabilities on the phone are just amazing.

- **Low volume transactions and niche markets**
  - Mobile phone will replace cash in certain niche markets and the areas where transaction values are low. High value transactions will still be done with cards.
  - It could replace cash in certain environments but not replace it. It is a paradigm shift to get people to get rid of cash. Especially in South Africa we don't have the infrastructure where we can get rid of it completely (POS) devices.

- **Mobile payment will not replace cash or card payments**
  - Mobile phones will not replace cards; it could eat into some of their market. Some clients would still like to see the card and signing for the transaction. The prestige of having a card is also something that should not be discounted.
  - We don't foresee that cash or card is going to be replaced by mobile transactions. Take newspapers versus internet news paper reading. Globally people still buy newspapers even though it is available on the internet.
  - "Cash is king" and it will never be replaced in totality. People will always carry cash, it is a culture.

4.5 Responses to Proposition 4

Merchant "self-organised" solutions will evolve in competition with operator driven (MNO and banks) solutions.

Question 4 was structured to investigate if merchants would start their own mobile payment plan in competition with MNO's and banks. An explanation for this is that merchants need specific properties e.g. speed and ease of use. Another is that merchants do not want to pay transaction fees to the banks if they can avoid it (Ondrus and Pigneur, 2005).

- **No self-organised solutions**
    - Merchants will not actively pursue the application of proximity mobile payments. They have spent a large sum of money in the infrastructure of smart chip card payments and will be very reluctant to spend additional funds at this stage.
    - Merchants will not attempt to implement proximity mobile payments by themselves. It would be too costly from a capital expenditure perspective. They will most likely wait for banks to approach them with mobile payment solutions and from there work on a collaboration basis.

- **Self organised solutions**
    - Although not likely, it is not impossible for merchants to attempt self-organised solutions.
    - If customer demand is high enough and scale can be achieved, merchants may consider self-organised solutions.
    - Merchants do not have to apply the smart card technology as NFC in the mobile phone. They can use plastic cards, watches and key rings in an attempt to make the application of the technology easier and cheaper to deploy.
    - Octopus in Hong Kong is an example of a successful mass transit and retail initiative with smart card technology applied in various forms such as plastic cards, watches and rings.

CHAPTER 5 DISCUSSION OF THE RESULTS

5 INTERPRETATION OF RESULTS

The research methodology employed in this study is qualitative in nature and utilises semi-structured in-depth interviews. The literature review was used to identify existing research on the issues surrounding the successful implementation of mobile proximity payments.

5.1 Introduction

The interpretation of the results of this research is based on the findings from the interview and is compared to and contrasted with the findings revealed in the literature review. The results of the propositions tested are discussed by commenting upon the responses to each question as they relate to the proposition.

5.2 Proposition 1

Collaboration between MNO's and banks will create a viable mobile proximity payments offering for revenue sharing.

5.2.1. Collaboration

From the responses to question 1, which was defined around various types of business models for proximity mobile payments, the business case drivers for MNO's and banks and the various sources of revenues and revenue split between them; 100 percent of respondents confirmed that in order to make proximity mobile payments ***viable,*** a collaboration model is required where banks and mobile network operators form partnerships. Fifteen percent of respondents were of the opinion that collaboration is not necessarily required to launch such a technology and stakeholders may decide to launch initiatives

excluding other parties. The latter is not the ideal and it is questionable if such initiatives will be able to reach the scale to be viable.

In order to assess the collaboration process it is important to form arguments around the drivers of proximity mobile payments as well as why and how collaboration can be achieved from both a bank as well as a mobile network operator perspective.

5.2.2. The drivers for mobile proximity payments

Respondents all agreed in terms of the application of proximity mobile payments confirming that the technology would be applied to facilitate low value payments of between R70 and R100; it is about taking cash out of the system and making low value payments more convenient and not having to carry change or cash. Ondrus and Pigneur (2006b) confirmed that the extensive use of credit and debit cards for proximity purchases has already demonstrated the possibility of considerably reducing the volume of cash-based transactions. The conversion of physical to virtual payments has already brought significant benefits to consumers.

5.2.2.1 Adoption drivers for banks

Offering alternative methods of transacting to customers is the major incentive for banks to implement proximity mobile payments. Contactless payment technology will offer faster and more convenient methods of payment and increase customer loyalty.

Another view of banks is around the cost and inconvenience of cash. Banks commented on the benefit of the application of mobile proximity payments versus cash: “if we can take cash out of the system and move it to card or phone, we can benefit”. Cash can be stolen, it needs to be put in a safe; guarded, insured and transported all at a cost.

Another reason for banks to implement proximity mobile payments; mentioned by 90 percent of bank respondents during the interview process was to attempt

to bank the un-banked and to get the under-banked to utilise more banking services. In South Africa only 63 percent of the population are banked (Metcalfe, 2007). Cell phone penetration on the other hand is considered to be 98.5 percent and highly proliferated in the lower LSM's (Lange, 2008). Because of the lack of trust amongst lower LSM's towards banks as well as the fact that they want to avoid paying bank fees on withdrawals, mobile proximity payments could encourage bank customers not to withdraw all their cash at once, improving the bank's capital adequacy. If banks can get lower LSM customers to keep their salaries in their bank accounts and transact with their mobile phones then they (banks) can earn transaction revenue; or if it goes into the pre-paid product then there is float revenue. One of the banks interviewed did not agree on the use of proximity mobile payments to drive the strategy to bank the un-banked or under-banked commenting that the latter strategy will not be driven by proximity mobile payments and that banks will miss out on a huge opportunity if that is the driver.

Irrespective of the above reasons to implement proximity mobile payments by banks, one of the interchange companies interviewed was of the opinion that confusion still exists with banks regarding the business case, technology and functionality of the proximity mobile payments. In the view of the interchange company, banks should look at the mobile payment device or handset more holistically. If it does contactless and proximity mobile payments and it is a personal device then banks should attempt to use that to have a deeper relationship with the customer. In addition, to the latter banks should be incentivised to implement mobile proximity payments because of the fact that their customers require various ways to transact as well as to reduce the usage of cash because of the inconvenience, security issues and handling cost.

Another interchange company was of the opinion that banks are generally driven to be "top of wallet"; with proximity mobile payments they are driven to be "top of phone". Customers are multi banked and if they can offer proximity mobile payments it means that the bank that offer such an application first will be on top of the menu on the phone. Other than being top of phone it was commented than there is no compelling case for banks to implement proximity

mobile payments and the opinion was that it was something that they (banks) feel they should do and not because they are forced into it, a typical “knee jerk reaction”.

Findings by the Smart Card Alliance (2008) survey confirmed that banks are taking a “see and wait” approach because of their ability to take a step towards proximity mobile payments by issuing contactless debit and credit cards. As confirmed by respondents, South Africa has just seen the first 1.5 million contactless smart cards issued by banks to their clients. Interoperability issues still exist with contactless smart cards even though it has taken nearly four years to put the payment infrastructure in place.

5.2.2.2 Adoption drivers for mobile network operators

Mobile network operators have seen significant growth in the South African market and penetration is close to 98.5 percent; they are therefore constantly looking to create new avenues for earning revenue (Lange, 2008). Findings by Smart Card Alliance (2008) confirmed that mobile network operators are demanding their fair share of revenue and will refuse to be sidelined.

Another interesting point that was made by respondents when asked why mobile network operators would want to implement proximity mobile payments was the issue of churn; which is as high as 40 percent in some of the South African operator market segments especially amongst pre-paid customers. Creating “stickiness” will increase the return on targeted marketing efforts to clients as well as network usage. Mobile network operators will therefore attempt to get to customers “first” before competitors in their industry in order to create that “stickiness” required. Unlike banks, where penetration is a much bigger issue than churn, mobile network operators are in a race with each other to get to the customer to secure as much ownership as possible to reduce churn. Benefits will accrue particularly to operators who are “first movers’ and use the technology to their competitive advantage. Mobile network operators recognise that offering additional services can attract new customers and

stabilise their customer base (Smart Card Alliance, 2007, Bailly and Van der Lande, 2007).

5.2.3. The reasons to collaborate

Considering the drivers from both banks and mobile network operators to implement proximity mobile payment the obvious next question is “why collaborate?”

5.2.3.1 Banks

Looking at a scenario where a bank attempts to drive this technology on their own, respondents commented that banks sit with the dilemma that a large percentage of banking customers have more than one bank account and questioned the convenience for customers to carry more than one phone, for example, a phone to transact with and a phone to make calls with. If one single bank therefore decides to offer this technology, customer take-up could be slow or minimal because it would exclude the customers’ accounts with other banks. Another potential problem with going at it alone would be the cost involved with issuing technology compatible handsets to customers and the risk of low uptake and usage. This could be a very costly exercise and the return on investment is uncertain. To determine the best strategy, it is important for banks to measure the readiness of the market (customers and merchants) for proximity mobile payments (Smart Card Alliance, 2007).

Strengthening the argument for banks not to go it alone; respondents commented that global proximity mobile payment handset manufacturers have withdrawn from further development of compatible handsets. The opinion is that the contactless application will most likely be on the SIM card because of its security and its non-reliance on handsets even though there are still unresolved issues in terms of the technology and development to make contactless part of the SIM. Having the application on the SIM will also allow customers to access various bank accounts from a single mobile device increasing customer convenience.

5.3.2.2 Mobile network operators

Mobile network operators are restricted to implement proximity mobile payments in isolation to the extent that they do not own banking licenses and are not allowed to take deposits and “hold” money. They also do not have the risk management infrastructure that banks have and compliance to regulations such as FICA could be a costly exercise for them because compliance comes at a cost.

Mobile network operators also have the dilemma that product distribution to customers takes place via intermediaries. Interviewees confirmed that intermediaries currently earn as much as 28 percent on the total client monthly utility account. If this arrangement is extended to low value proximity mobile payments it might not make it an attractive proposition for customers and mobile network operators depending on who would carry the intermediation costs.

Mobile network operators handle transactions as low as 1.5 cents per second and have the financial platforms that process small transactions profitably. Banks on the other hand have financial platforms that process transactions profitably at a cost of approximately R80 and amounts lower than the latter would not be profitable for banks considering their existing business processes. Cash is typically used in transactions of lower values, with banks not having to provide profitable financial processes for low value transactions because the method of payment is handled outside the banks financial platform. The current financial platform can therefore not be applied profitably to low value transactions. Banks would therefore have to rethink their business processes before attempting offering mobile payment solutions to their clients.

The creation of an open system for all stakeholders that could benefit from the payment mechanism and to join one payment platform would therefore a more sensible solution.

Respondents all agreed that the technology be implemented on the SIM card and not the phone, which in turn will be distributed to customers via the mobile

network operators. Banks will then offer a platform for payments, renting space on the SIM cards from mobile network operators for the purpose of proximity mobile payments. Enablement can be fast tracked by introducing 3rd party players, which are referred to as "trusted services managers" to do the securitisation of the application. There is no doubt that collaboration is needed in order to share risks and investments which are especially important where limited contactless payment infrastructure is in place. Trust between mobile network operators and banks are key; and the role of the trusted service manager is a good way to build a trusting relationship (Bailly and Van der Lande, 2007).

5.3.2.3 "To collaborate or not to collaborate"?

The possibility exists that banks and mobile network operators implement mobile payment solutions without collaboration with each other in the South African environment, but not without difficulty. Their current payment infrastructures, how their core businesses are perceived by customers, their individual strengths and weaknesses could be overcome if they collaborate.

Considering the above, it would therefore be in the interest of both banks and mobile network operators to collaborate. Banks have years of experience with moving money, security, fraud and risk management. Mobile network operators have been much more successful in driving customer penetration and banks would therefore need them to drive the application.

5.2.4 Niche markets followed by mass market application

Over and above the need for collaboration between banks and mobile network operators, other considerations in terms of the launching of proximity mobile payments should be taken into account. Comments made by respondents regarding the acceptance of proximity mobile payments varied but the majority agreed that in South Africa the application will see their initial launch in niche markets such as transportation followed by mass market application; especially

when the technology becomes cheaper. The ultimate “sweet spot” is the masses; assuring a positive return on investment.

5.2.5 Global Interoperability

Other issues that could affect the successful launch of this technology are the need for standardisation and interoperability with point of sale devices via a standard hardware and software interface. One of the barriers to the widespread implementation of contactless payments globally is the lack of contactless protocol for contactless payments (Bailly and Van der Lande, 2007). Global interoperability is given by interchange companies such as Visa and Mastercard. During the interviews, respondents also mentioned that interoperability could be enhanced by adopting a business model where trusted service managers are included as part of the proximity mobile payments environment; but uncertainty still exists in terms of the auspices under which the trusted service manager should function; that of the banks or the mobile network operators.

From the above it is evident that respondents in the South African proximity mobile payments environment agree that to make the application work collaboration is required. Initially in a niche market, rolling out into a mass market with standardisation and interoperability. This does not yet solve the issue around revenue sharing (Timmers, 1998, Smart Card Alliance, 2008).

5.2.6 The “real estate debate”

From the interviews with industry experts two distinct debates came to the front, the one referred to as the real estate debate of “who owns the customer” and the other, the “risk” debate which was dependent on the technology and process used for the transaction.

The real estate debate is structured around whom; between banks and mobile network operators who owns the customer? If the payment application is distributed by the bank then the bank argues that they own the customer; but if the application is on the phone or SIM card and the phone and SIM are

distributed by the mobile network operator, then the latter argues that they own the customer.

Respondents are of the opinion that in future collaboration, banks will provide the transaction capture, processing and credit risk management, whilst the mobile network operators, together with trusted service managers, will offer the handsets or SIM cards, secure application management and application loading services. These real estate debates are therefore not as serious as it makes out to be; it is the moment that revenue sharing comes into play that the turf wars start.

5.2.7 Revenue sharing

Respondents all agreed that when revenue sharing is considered that stakeholders should “stick” to what they do best. The debate then becomes more one of who holds the risk, and who provides the service, during what phase of the value chain. Revenue sharing can then be determined by looking at the value chain and how each stakeholder benefits and how and where they take risk. Smart Card Alliance (2007) confirmed what South African respondents echoed in terms of revenue sharing and also added that the appropriate revenue sharing model would compensate operators and trusted service managers for their services; but sit on top of the current payment network business model and not compete for the same transaction revenues. In addition, it is believed that proximity mobile payments will lead to greater service volumes for the mobile network operators, which would translate into greater revenue.

Both banks and mobile network operators had different views in terms of the value that they bring to the proximity mobile payments environment. The question regarding a reasonable split in revenue between banks and mobile network operators had various responses and as expected each of the parties disagreed on their value proposition and was biased and not prepared to share any of the revenue within their “perceived” value chain. Comments were made that unless an independent body determines the value chain and the role of

each of the stakeholders it will be very difficult to get agreement in terms of revenue sharing.

Dahlberg et al., (2008a) did an extensive literature research on 97 published papers using seven different databases between 1999 and 2006. The authors of these papers have been actively researching various mobile payment issues for the past several years and till as recent as 2008 uncertainty still existed as to whether or not the adoption, and use of proximity mobile payments will prevail. Banks and mobile network operators are launching isolated initiatives to respond to current specific market needs. One consequence of this, is that collaboration between banks and mobile network operators is limited, as both want to control most of the value chain in order to increase their revenue. Major research findings showed that collaboration between stakeholders is preferred to competition.

5.2.8 Alternative business models

If collaboration is limited to date, then the question arises if any other business model could be considered in the South African payment market. Research by Dahlberg et al., (2008a) reviewed the strengths and weaknesses of various mobile payment providers and found that differences exist in terms of each stakeholder in each national market. Collaboration is therefore, not always a guarantee for success. Although beyond the scope of this paper, it appears that the success of proximity mobile payments depends greatly on the effective alignment between a business model and the physical environment in which it will be launched (Ondrus and Pigneur, 2008).

Table 2 below, draws a picture of the positive and negative business case drivers for stakeholders to implement proximity mobile payments it then draws a conclusion that if alternative business models are possible considering these business case drivers.

Table 2 Business case drivers and alternative business models

STAKEHOLDERS	POSITIVE BUSINESS CASE DRIVERS	NEGATIVE BUSINESS CASE DRIVERS	ALTERNATIVE BUSINESS MODELS
MOBILE NETWORK OPERATORS	High customer penetration rates Granularity of operating platform Need to create additional revenue streams and customer stickiness	Regulations and licensing Limited or non-existing risk and fraud management capabilities High commission percentages paid to intermediaries Limited knowledge of money handling	Impossible due to regulatory and licensing considerations
BANKS	Licensing Known to handle money Privacy, risk and fraud management capabilities Need to reduce cash handling costs Banking the unbanked Need to create customer convenience	Low penetration rates Operating platform incapable to handle low volume transactions profitably Customers banking habits – multiple bank accounts Capital expenditure risk – expensive to launch Handset compatibility	Uncertain return on investment and limited scale if launched in isolation

MERCHANTS	Need to reduce high transaction costs Need to increase customer convenience, speed and throughput - ultimately sales	Large capital expenditure to upgrade current payments infrastructure for contactless smart card technology Large capital expenditure to upgrade payments infrastructure for proximity mobile payments Large commission charges by banks	Possible but unlikely due to recent capital expenditure on payments infrastructure
GENERAL CONSIDERATIONS	Global interoperability required Unresolved revenue sharing arrangements Scale required to assure profitability – need to reach mass market penetration soon after launch		

Considering the above, it is either impossible, or as in the case of MNO's, unlikely in the case of banks and a possibility in the case of merchants that alternative business models to collaboration could emerge in the South African environment.

5.3 Proposition 2

The main adoption drivers of merchants are related to the means of increasing sales and decreasing the cost of payment processing.

5.3.1. Capital expenditure

During the research process, attempts were made to identify merchants in the South African environment that did or are considering implementing proximity mobile payments. To date, merchants had to spend large amounts of capital to upgrade their infrastructures to accommodate contactless smart card payments, which has recently been launched in South Africa; merchants would therefore not contemplate another change right now. However, as proximity mobile payments become an application driven by customer needs merchants will give greater consideration to invest in the infrastructure.

All respondents interviewed in this study confirmed, that due to the above scenario; mobile proximity payments were a mere concept in the mind of merchants and very far from a reality. Merchants do not proactively drive payment technologies and generally wait for banks to act first.
Smart Card Alliance (2008) confirmed in their survey that merchants are still "in the dark" irrespective of the critical role that they play in the evolution of proximity mobile payments. If merchants do not accept proximity mobile payments as a new method of payment deployment of both technology and services will stall.

5.3.2. Merchants role in the proximity mobile payment environment

In order to test proposition 2, respondents were asked to identify where merchants fit into the proximity mobile payments environment and why they would want to participate in such a technology.

Respondents confirmed that merchants, as the case is with customers, are crucial in creating the market for financial institutions and other payment service

providers. Their active participation in the promotion of payment solutions is essential to consolidate a large number of points of acceptance. Merchants power should not be underestimated as they could decide altogether to reject a payment scheme that would not suit them, especially in the case where high commission fees are charged (Dahlberg et al., 2008b).

When considering merchants and the value that they will derive from adopting proximity mobile payment technology one also has to take into account the various merchant “types” within an economy. All respondents interviewed confirmed that the main adoption drivers for merchants in South Africa would be less cash handling, less shrinkage, faster throughput e.g. fast food restaurants, electronic reconciliation of transactions and reduced risk in terms of theft. Another reason why merchants would want to adopt “other” types of payment methods as opposed to cash, is because the transaction value is higher when customers use alternative payment methods. When customers use cash, they tend to spend less and the transaction value is also lower. Interviewees also mentioned that international experience showed that the return visits to contactless enabled merchants are huge and customer prefer using the infrastructures because of the convenience and speed.

Reasons or barriers why merchants would not consider adopting this technology are twofold, and both are related to cost. Additional hardware sitting on their counters are related to capital expenditure and the actual cost of the transactions. If the technology makes the actual transaction costs cheaper, then merchants would be more willing to adopt the technology.
The proposition therefore holds that merchants would adopt proximity mobile payments to increase sales and reduce costs during their transaction processes.

5.4 Proposition 3

Mobile phones would replace cash or a card based payment solutions

The assumption behind this proposition is that mobile phones could become payment instruments as they offer more processing power capabilities than cards. Moreover ,the acceptance number of mobile phones is very high which makes for the eventuality that phones can replace cash or cards more likely in the future. The disruption does not necessarily mean that cash or cards will totally disappear to leave proximity mobile payments as the only payment method.

5.4.1. Niche market application

Respondents all agreed that mobile phone payment solutions could replace cash and card based solutions in certain niche markets. These niche markets are typically environments where convenience and speed of payments are an important reason for adoption, such as transportation, fast food restaurants, purchasing movie tickets, tickets for sports events and toll roads. These transactions are mainly low value transactions that can be done over a contactless environment.

5.4.2. The “prestige” of cash and cards in various customer groups

Two interesting responses to proposition 3 was the “prestige” element that certain segments of the South African population hold towards either cash or cards. One respondent mentioned the “prestige” that cash has in previous disadvantaged communities in South Africa. Although not researched, previous experience in the respondents’ business environment has shown that cash was preferred to any other method of transaction for two reasons, namely the preferential treatment of the customer when he pays with cash and secondly the “tax free” tag that cash has when transacted with.

Cards on the other hand hold “prestige” for other segments of the South African population, especially credit cards; for those customers seeking credit and the “value” of creditworthiness. This is evident in the successful penetration of card based payment solutions and an expected growth to 2010 of 20% (Metcalfe, 2007).

These two drivers of adoption of cash and card could act as a barrier in terms of mobile payment adoption and respondents made mention that attention in future research should be given to these issues before projections in terms of adoption are made.

The minority of respondents (7.6%) was bullish enough to predict that proximity mobile payments would replace cash and cards in totality. They were of the opinion that all three methods of payments have been available for some time but that the utility and the security around mobile phones could make the disruption inevitable. Other respondents said that such predictions could be over optimistic and the threat is still weak considering that South Africa lacks the infrastructure to “get rid” of cash and cards and replace it with proximity mobile payments.

5.5 Proposition 4

Merchant “self-organised” solutions will evolve in competition with operator driven (MNO and banks) solutions.

Some studies have analysed the potential of merchants becoming payment service providers (Au and Kauffman, 2008, Ondrus and Pigneur, 2005, Dahlberg, et al., 2008a, Smart Card Alliance, 2008).

5.5.1. Merchant “self-organised” solutions

In South Africa, merchant driven solutions in terms of proximity mobile payments would have to be done either on a “pre-paid” basis where customers load funds on their NFC enabled cell phones; or where merchants adopt alternative methods of using smart card technology e.g. plastic cards, key rings or watches as in the case of Octopus in Hong Kong.

Respondents all agreed that it is not impossible for merchants to develop “self-organised” solutions but considering the capital expenditure, in terms of contactless smart cards that merchants had over the last four years, it is unlikely that they would be leading such an initiative at the moment. Cheaper alternatives for merchants to using a contactless application in a mobile device or a SIM card; could be to follow the route to that of Octopus in Hong Kong as mentioned earlier (Ondrus and Pigneur, 2005).

5.5.2. Infrastructure costs

Respondents all agreed that merchant would rather take a step back and wait for banks, which they have a closer relationship to, than mobile network operators to initiate proximity mobile payments. Smart Card Alliance (2008), commented that merchants feel “in the dark” despite their critical role in the evolution of NFC and proximity mobile payments. Merchants would have to update their infrastructures to accept the new payment type and the development of a well-defined business case to demonstrate the return on investment is needed, before large scale merchant involvement will be seen.

Merchants still need to be convinced, just as much as customers, to adopt proximity mobile payments. Dependability is a primary concern and the last thing that a merchant needs is for a payment acceptance technology not to function as required (Smart Card Alliance, 2007).

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

The key results of this study are presented through a discussion of the research findings in terms of the four propositions that were qualitatively tested. Relevant findings from the literature are introduced in the discussion.

6.1. Conclusions to reposition

6.1.1. Proposition 1

Collaboration between MNO's and banks will create a viable mobile proximity payments offering for revenue sharing.

The overwhelming support from respondents for collaboration corresponds with previous research (Smart Card Alliance, 2008, Timmers, 1998, Yoris and Kauffman, 2006, Bailly and Van der Lande, 2007). Collaboration in the South African context is driven by legislative as well as stakeholder specific considerations and discussed below.

a. ***Legislation***

Banks have the financial licences that allow them to handle and move money, as well as strong relationships with merchants and the ability to do privacy, fraud and risk management, which mobile network operators do not currently have.

Mobile network operators do not have access to banking licences and are therefore limited to provide proximity mobile payments on a pre-paid basis or for charges to be added to the customer's existing mobile accounts. These methods are not ideal and require customers to top-up their mobile wallets and places additional billing and customer service requirement challenges on mobile network operators. Banks have better capabilities to manage payment resolution concerns, and it is core to their set of competencies.

b. *Market penetration and adoption*

Customer adoption and the ability to create scale with proximity mobile payments are very important in the successful roll-out of the technology. Initial niche market followed by mass market penetration has to happen to make this technology viable for all stakeholders involved. Consideration should be given to customers' loyalty towards cash and cards and how that will influence adoption.

Other considerations include how and by who the technology will be introduced into the market. MNO's have been very successful in market penetration which is crucial in driving the product to market with banks achieving much lower success rates with their product offering penetration. It is therefore recommended that MNO's use their infrastructures to drive penetration. This has to go hand in hand with alternative commission arrangements with intermediaries in order to make the product more cost effective.

Another important stakeholder in the proximity mobile payments environment is the merchant. Merchant adoption, as with customer adoption is essential if critical mass and scale is required. Banks have a stronger relationship with merchants and merchants tend to "follow" banks in payment solution initiatives. It is therefore recommended that banks manage the relationship with merchants and make the technology as cost effective as possible to drive adoption with them.

c. *Product distribution*

Product distribution is crucial in terms of "getting" the product to market. Mobile network operators current distribution channel arrangements might not be the ideal for driving proximity mobile payments, due to their commission arrangements.

d. *Operational efficiencies*

Proximity mobile payments are aimed at low value transactions. Mobile network operators have the operational infrastructure to be able to handle small transactions cost effectively whereas banks financial platforms only process transactions profitably at a transaction cost of approximately R80. Amounts lower than the latter would not be profitable for banks considering their existing business processes. Banks would therefore have to reconsider their operational efficiencies, if they were to contemplate offering proximity mobile payments in future.

e. *Revenue sharing*

The major drivers for mobile network operators to adopt and launch proximity mobile payments would be to create additional revenue streams and well as customer “stickiness”. Banks on the other hand, would offer proximity mobile payments to customers to create convenience and speed of transactions. They are also incentivised by increased revenue streams especially within the lower LSM segment, as well as niche markets, such as transportation, parking, convenience store and fast food restaurants.

Although no agreement has been reached on the revenue sharing models, it is recommended that stakeholders look at the value chain and how each of them benefits, also how and where they take risk. The most appropriate revenue sharing model would compensate mobile network operators and trusted service managers for their services; sitting on top of the current payment network business model and not compete for the same transaction revenues. In addition it is believed that proximity mobile payments will lead to greater service volumes for the mobile network operators, which would translate into greater revenue.

Taking the above into consideration, collaboration seems to be the best business model to consider making it viable for all stakeholders within the proximity mobile payments environment.

Hence, proposition 1 is **accepted**.

6.1.2. Proposition 2

The main adoption drivers of merchants related to the means of increasing sales and decreasing the cost of payment processing.

The main adoption drivers for merchants in South Africa would be less cash handling, less shrinkage, faster throughput e.g. fast food restaurants, electronic reconciliation of transactions and reduced risk in terms of theft. Another reason why merchants would want to adopt "other" types of payment methods to cash, is because the transaction value is higher when customers use alternative payment methods to cash. Merchants also prefer offering customers proximity mobile payment infrastructure because of the convenience and speed of transactions.

Although important reasons for adoption, the above drivers cannot be considered in isolation. The fact that merchants have just spent large amount of money on updating their payment infrastructure for contactless smartcard implementation cannot be discounted. This expense could affect the merchants' "appetite" as well as budget for their ability to partake in launching such an application in the short term.
Interviewees agreed on the adoption drivers but unique circumstances in the South African environment such as merchants' current capital expenditure capabilities will make adoption unlikely in the short term but possible in the long term.

Proposition 2 is therefore **partially accepted.**

6.1.3. Proposition 3

Mobile phones would replace cash or a card based payment solutions

The unique legacy within the South African environment in terms of the prestige that cash gives certain previous disadvantaged communities could act as a barrier in terms of the application of proximity mobile payments. These communities prefer to transact in cash because of both the prestige as well as "tax free" tag that cash offers them. Although not clearly defined, other segments within the South African community attaches value the credit worthiness that a card adds to their profile.

In addition to the above, cash and card seems to be payment methods that customers feel comfortable with, and it is debatable if the marketing message of convenience, cost effective and speed that proximity mobile payments can bring, will be enough to convince customers to use this application in the place of their current payment methods.

The fact that proximity mobile payments are suitable for certain niche markets cannot be discounted and if managed carefully, stakeholders could "encourage" customers to use the application instead of cash or cards in these markets.

Proposition 3 is therefore **partially accepted.**

6.1.4. Proposition 4

Merchant "self-organised" solutions will evolve in competition with operator driven (MNO and banks) solutions.

The majority of merchants tend to be reactive rather than proactive when it comes to the implementation of payment solutions. Merchants follow banks and would rather take a step back and wait for banks, to initiate proximity mobile payments.

The above conclusion does not discount the fact that merchants with unique operational requirements exist, and that they would consider finding payment solutions to fulfil their unique needs. The question still remains whether such solutions could be found in isolation and be implemented, in a cost effective and convenient manner that will benefit the customer.

The need for standardisation and interoperability with point of sale devices via a standard hardware and software interface cannot be excluded as an important consideration and is one of the barriers to the widespread implementation of contactless payments. Globally it is the lack of contactless protocol for contactless payments (Bailly and Van der Lande, 2007). Interoperability also seems too dependent on adopting business models where trusted service managers are included as part of the proximity mobile payments environment.

Proposition 4 is therefore **rejected.**

6.2. Final comments

The overwhelming support for collaboration is illustrated by the fact that the majority of respondents supported the model as having the greatest potential for long term success. Collaboration is also the most feasible because it focuses on the strengths of each stakeholder responding to the fundamental demand of customers. Amongst this enthusiasm, is the knowledge that difficulties exist such as revenue sharing considerations, the need for interoperability, large scale adoption to create scale and a clear business case for stakeholders.

Most stakeholders believe that the answer to revenue sharing lies within the value that each stakeholder brings to the proximity mobile payments environment, that banks own financial liability, and that mobile network operators own network security. The role of the Trusted Services Manager was supported by respondents and needs to be considered within the risk management process linked to the transactions.

Irrespective of the benefits that merchants and their customers could experience from contactless technology, it can be concluded that the costs currently outweigh the benefits.

Merchants seem to have a “wait and see” approach and it is unlikely that they would drive their own payment applications, rather waiting for the banks to take the initiative. Considering the fact that merchants have spent large amounts of capital on updating their current payment infrastructure to accommodate smart card technology, it is unlikely but not discounted, in totality, that merchants would pursue such an application on their own. Merchants would participate if they could increase “feet” through their doors, save on payment processing and ultimately if the costs of implementing such a technology are less than the benefits.

It is unlikely that cash and card payment solutions will be replaced by proximity mobile payments. Proximity payments would rather fulfil a niche market need but thorough marketing to the customer would be required to drive adoption. Niche market application will most likely emerge first with the need for mass market adoption fairly quickly in order to create scale. It is also questionable if the South African environment is “large” enough to be able to contribute to the scale necessary to make it financially viable for stakeholders to launch proximity mobile payments.

In conclusion, the future of proximity mobile payments is therefore dependent on the implementation of successful business model(s), collaboration amongst stakeholders, customer and merchant adoption, interoperability and a “large” enough market to launch proximity mobile payment into.

6.3. Limitations of research

The fact that none of the merchants targeted for the research project had any knowledge of proximity mobile payments, made the comments in terms of “merchant adoption” and “own solution” roll out limited to comments from banks, mobile network operators and interchange companies.

6.4. Recommendations

For mobile proximity payments to work, respondents all agreed that an enabling regulatory environment, customer mass market and merchant adoption and bank and mobile network alliances are required.

Stakeholders will continue to search for addition are revenue streams, methods to attract new customers, ways to reduce customer churn, and applications that will increase customer convenience. Considering the application of proximity mobile payments and the possible benefits that it can bring to stakeholders and customers, it would be beneficial for stakeholders to realise that their incentives to drive proximity mobile payments are closely aligned, and that they can achieve these business goals much more effectively by collaboration. It is therefore important that stakeholders bring their strengths and weaknesses to the table to discuss the best way forward. Collaboration between MNO's and banks where MNO's utilises the banks license and risk and fraud management expertise and banks in turn utilises MNO's competencies that they (banks) do not have, is recommended.

In addition to the above stakeholders should consider external factors mentioned by respondents such as the "prestige" that both cash, as well as cards, give to various segments of the South African population and how that could act as a barrier to customer adoption. It is unlikely that cash and card payments will be replaced by phone payments and customer education of the convenience and speed of proximity mobile payments will be crucial in the roll-out of such an application. The recommended roll-out of proximity mobile payments are in niche followed by mass markets, in order to reach scale fairly quickly, and to make it a viable payment application.

Other considerations are the current distribution and commission arrangements for mobile services. Commissions payable to distributors would make proximity mobile payments expensive which in turn could affect the cost of the product and ultimately customer adoption.

Stakeholders should therefore consider if the total potential market in the South African environment is large enough, to launch such technology in order for them to achieve adequate return on their investment.

Merchants although not incentivised to pursue their own payments solutions will be incentivised to adopt proximity mobile payments if this increases their revenue and reduces their payment costs. Banks should therefore, because of their relationship with merchants, be responsible for merchant adoption in the proximity payment environment and make it cost effective for merchants to adopt new technology and upgrade their current payments infrastructure again.

Finally the need for standardisation and interoperability with point of sale devices via a standard hardware and software interface cannot be excluded as an important consideration. The larger the potential market, offering customers proximity payments, the more likely scale and viability will be achieved.

6.5. Suggestions for future research

One of the main reasons for research around proximity mobile payments is the successful implementation of contactless smart cards. Various applications were developed to take advantage of the interaction between contactless smart cards and mobile phones. With contactless technology, mobile phones reinforced their position as multi-function devices. Based on the finding the following suggestions for future research include:

- a qualitative study on the specific cultural and social factors that would affect customer adoption of proximity mobile payments in the South African environment.
- a qualitative study identifying the South African merchant environments' readiness to adopt and implement proximity mobile payments
- determining a financial model for revenue sharing between banks and mobile network operators in the proximity mobile environment
- determining future distribution channel and commission arrangements for proximity mobile payment
- a quantitative study to confirm the findings in this report

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APPENDIX A

Questionnaire – semi structured interviews
Revenue sharing, collaboration and business models 1. What type of business model do you envisage to emerge in the South African proximity mobile payments environment? 2. What are the benefits and business case drivers for banks and mobile network operators in your envisaged model? 3. What are the sources of revenues for banks and mobile network operators? 4. What is the reasonable split of the potential revenues to banks and mobile network operators?
Adopting drivers for merchants 1. What do you consider the drivers of adoption towards proximity mobile payments to be for merchants? 2. What would be the barriers of merchant adoption be?
Merchant "self-organised" solutions 1. Would merchants consider launching their own payment solutions in competition with banks and mobile network operators? 2. If yes/no, what are the reasons?
Disruption – mobile payment solutions replacing cash and card based solutions 1. Would mobile payment solutions replace cash and card based solutions? 2. If yes/no, why, how and what are the reasons?

APPENDIX B

Example of interview transcript: Bank 1	
Question	**Answer**
Revenue sharing, collaboration and business models	
1. What type of business model do you envisage to emerge in the South African proximity mobile payments environment?	Collaboration model: Banks need the MNO's to drive the application and MNO's need the banks for their license and because the transaction needs to be send back for risk management.
2. What are the benefits and business case drivers for banks and mobile network operators in your envisaged model?	Banks: The drive to get the unbanked will not be driven by mobile payments. You will look a huge opportunity miss if that is your driver. MNO's: They need other revenue streams.
3. What are the sources of revenues for banks and mobile network operators?	The revenue sharing should be approached in the following way: what is your role in the value chain, if you give the service to the bank then you (MNO) should be paid by the bank, if you (customers) get service from bank then customer should pay bank.
4. What is the reasonable split of the potential revenues to banks and mobile network operators?	It is very difficult to define the exact split in terms of revenues. I would

	recommend that the revenue sharing model should compensate mobile network operators and trusted services managers for their services. This revenue sharing model should sit on top of the current payment network business model and not compete for the same and current transaction revenues.
Adopting drivers for merchants	
1. What do you consider the drivers of adoption towards proximity mobile payments to be for merchants?	The drivers of adoption: There is less hassle with such technology, more speed, less interaction, convenience, if I can take cash away then more security. Be sensitive for cash handling – it is one component. It can be stolen, it needs to be put in a safe, a FG guard needs to come and pick it up, it needs to be insured. Cash only has value when it is in your bank account. With card all this is less.
2. What would be the barriers of merchant adoption be?	Retailers have made a huge investment in their integrated payment systems over the last few years. This was a huge investment and they will not necessarily drive contactless because of the cost associated in adopting their payments systems to accommodate contactless payments.

Merchant "self-organised" solutions	
1. Would merchants consider launching their own payment solutions in competition with banks and mobile network operators?	Merchants- not looking proactively at contactless. Merchants will not be pushing this technology, they will wait for banks. Retailers have made a huge investment in upgrading their payment systems. This was a huge investment and they will not necessarily drive contactless because of the cost.
2. If yes/no, what are the reasons?	No, merchants will not. Interoperability will always be an issue. Close loops will not necessarily bring the volumes in SA. Merchants need a platform
Disruption – mobile payment solutions replacing cash and card based solutions	
1. Would mobile payment solutions replace cash and card based solutions?	Over time cards in their current form will become less and less. I think that cards will coexist with contactless. It will be applied in niche markets such as transportation, campus, etc where cash are being used a lot. As customers get used to the technology then it will be adopted.

2. If yes/no, why, how and what are the reasons?	No, mobile payment solutions will not replace cash and card entirely. There will always be a place for cash and cards because customers have various preferences and mobile solutions is not a “blanket” answer for transaction processing.

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