A Framework for Mobile Payment Adoption through a TOE Lens: A Case of South African Merchants (SMEs)

By

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Abstract

In pursuit of increasing the understanding of the mobile payment ecosystem, this research focused on the role of the merchant within this ecosystem, with a specific focus on South African SMEs, given the major role that they have at an economic and social scale. This thesis is a design science research (DSR) led research study examining the critical factors impacting adoption of mobile payment technologies by South African Merchants, specifically SMEs.

Past and present research has focused predominantly on technology, security and consumer adoption studies, with limited research into merchant related studies. To further expand our understanding of the mobile payment ecosystem, there is a need to respond to identified recommendations to further study the merchant as it is as vital as the consumer. In the South African economy, SMEs play an important role in job creation, contribution to GDP, social upliftment, adoption of new technologies. However, there is a lack of understanding of what impacts SMEs in South Africa in their adoption of mobile payment technologies.

The Dynamic Capabilities (Teece, 1997) was applied to increase the researchers understanding of the business environment that the merchants (SMEs) operated in. The dynamic capabilities approach was incorporated into the study with the broader focus being through the lens of the Technology Organisation and Environment (TOE) theory (Tornatzky and Fleisher, 1990). At a firm level, the TOE served to be a stronger fit in understanding the role of technology in organisations.

Through an interpretive approach, qualitative and quantitative research methods were applied in the process of data collection. In each of the DSR cycles, a different method of data collection was used, primarily; semi structured interviews, survey and focus groups. This allowed the researcher to further understand the merchants (SMEs) while building out a framework as part of the DSR process.

The findings from the interviews with the SMEs, identified critical factors and themes to be considered for mobile payment usage and adoption by SMEs. The findings revealed that the factors impacting mobile payment adoption by South African SMEs

were risk, convenience, ease of use, trust in service providers, system features, device features and issues, cost of fees, company image and credibility, blue tooth connection, customer service and integrated systems. At a broader thematic level, several themes emerged that would warrant future research: business decision making and impacts, customer access and marketability, the impact of payment systems and payment process on the business, infrastructure setup, support, and connectivity and operating a business and its processes.

The results indicate that multiple factors within the TOE spheres need to be considered holistically when developing mobile payments solutions for use by merchants in South Africa. The Merchant Mobile Payment Conceptual Framework shows that the following factors are deemed more critical in influencing the adoption of mobile payments by merchants in South Africa: convenience, customer service, risk, ease of use, cost of fees and trust. This thesis contributes to the body of knowledge as it adds to the ICT profile of SMEs, exploring how they use ICT and how factors such as power shortage and access to the internet and Wi-Fi affect them. Most importantly, this thesis identifies the critical factors that mobile payment solution providers need to address in the provision of mobile payment technologies for use by SMEs.

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Keywords

Adoption

Conceptual

Dynamic capabilities

Design Science Research

Entrepreneurs

Framework

ICT

Merchants

Mobile

Mobile payments

Payments

SME

TOE

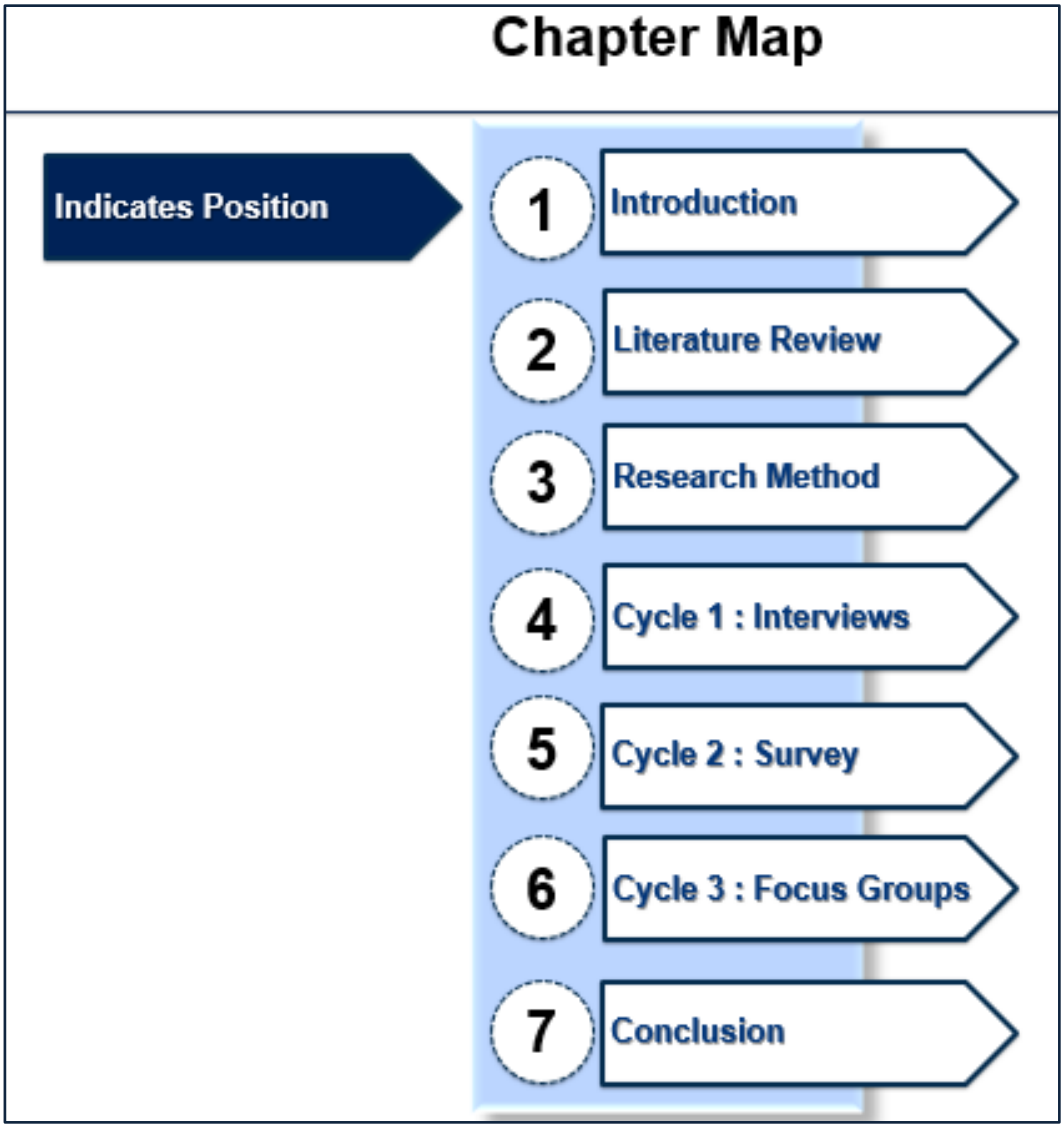
Abbreviations

Abbreviations	Full Wording
ATM	Automated Teller Machine
B2B	Business to Business
DC	Dynamic Capability
DTI	Department of Trade and Industry
DSR	Design Science Research
e-commerce	Electronic Commerce
EFT	Electronic Funds Transfer
ICT	Information Communication Technology
IVR	Interactive Voice Response
IT	Information Technology
M-commerce	Mobile Commerce
MMPCF	Merchant Mobile Payment Conceptual Framework
MNO	Mobile Network Operator
MPS	Mobile Payment System
NPS	National Payment System
POS	Point of Sale
QR	Quick Response
RFID	Radio Frequency Identifier
RSA	Republic of South Africa
RBV	Resource Based View
SA	South Africa
SARB	South African Reserve Bank
SEDA	Small Enterprise Development Agency

Abbreviations	Full Wording
SME	Small and Medium Enterprise
SMME	Small, Medium and Micro Enterprise
SMS	Short Message Service
VRIN	Valuable, Rate, Inimitable and Non-Substitutable
UK	United Kingdom
USA	United States of America
WAP	Wireless Access Protocol

Table 1: Abbreviations

Thesis Map



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1 INTRODUCTION

Previous studies have discussed consumer adoption of mobile payments in developing countries (Cruz, Neto, Munoz-Gallego & Laukkanen, 2010; Puschel, Mazzon & Hernandez, 2010; Bhimasta & Suprapto, 2017; Ting, Yacob, Liew & Lau, 2015; Lwoga & Lwoga, 2017; Lepoutre & Oguntoye, 2017). These studies have focused on the use of differing theories to explore antecedents and consumer adoption factors in developing countries such as Mozambique, Tanzania, and those in Southeast Asia. Studies have also been done in developed countries (Van Bossuyt & Van Hove, 2007; Ghezzi, Renga, Balocco & Pescetto, 2010; Koenig-Lewis, Palmer & Moll, 2010; Liebana-Cabanillas, Marinkovic, de Luna & Kalinic, 2018; Choi, Park, Kim & Jung, 2020) and have focused on consumer adoption studies for differing technology options in countries such as China, South Korea, Japan, USA, Sweden, and Australia.

Despite the large amount of research around consumer adoption, there is limited research in merchant adoption of mobile payments (Dennehy & Sammon, 2015). Padashetty and Kishore (2013) referenced a gap in the understanding of factors that affect the adoption of mobile technologies in business communities and stressed the need for research in this area. Guo and Bowman (2016) concurred, noting the lack of insight into merchants, their behaviour, and their interaction with other actors in the mobile payment ecosystem. This was also the topic of literature reviews carried out by Dahlberg, Mallat, Ondrus and Zmijewska (2007), Dahlberg, Guo and Ondrus (2015), and Dennehy and Sammon (2015), who identified that the academic community has primarily focused on technology and consumer adoption, and that there is still much to understand about consumer adoption. However, the focus of this research will be merchant adoption of mobile payments.

This study articulates the drivers of mobile payment adoption through the Technology-Organisation-Environmental (T-O-E) theory using an understanding of firms' dynamic capabilities. There is limited research on dynamic capabilities of SMEs in developing countries, and research has focused only on certain industries (including those of oil and gas, mobile app usage, and technology firms). Ambrosini and Bowman

(2009) identified the lack of empirical studies on dynamic capabilities as an area of concern, noting that there are many more quantitative studies than there are qualitative studies and that the research is conceptually based with limited primary data usage. Small, qualitative studies are more likely to be appropriate for an understanding of the subtle nature of resource creation, competitive advantage, and the dynamic capability process (Ambrosini & Bowman, 2009). This study seeks to advance this area of study by understanding how the use of mobile payment technologies by the SMEs impacts their dynamic capabilities.

Consumers and merchants have a symbiotic relationship and influence each other strongly during early stages of technology introduction and adoption (van der Heijden, 2002). Mallat and Tuunainen (2008) explained that this interdependent relationship between consumers and merchants makes the process of mass adoption by the market difficult, as mobile payment system providers have to ensure a value proposition that caters for vastly different stakeholders. This argument could account for the proliferation of research on consumer adoption in mobile payments and the limited research into merchants. This is despite Teo, Fraunholz and Unnithan (2005) advocating that the successful adoption by both consumers and merchants would lead to increased revenues for the mobile payment system provider. Teo et al (2005) identified consumers, merchants, financial service providers, and other stakeholders and consolidated this knowledge into a model that would later be expanded on by Dahlberg et al (2007) and other researchers.

Mobile payments began in 1997 however a lack of reference to prior work and the constant rehashing of the same research in different contexts has been identified as problematic (Pousttchi et al, 2015 and Dahlberg et al, 2015). Mobile payments are constantly evolving due to ever-changing technology in the mobile space, and research needs to evolve with it while maintaining a firm grasp on what has been researched already. The adoption of smart phones has increased, as has the use of mobile digital channels as a means for customers to interact with organisations (ACI Payment Systems, 2013).

Mobile payments were proposed as an alternative form of payment for customers and merchants with the increase in mobile device usage (Ondrus & Pigneur, 2004). It was expected that the one major issue to solve was how mobile phones would work seamlessly with in-house merchant payment systems (Ondrus & Pigneur, 2004). The issue of merchant acceptance was considered minor in earlier studies, based on the premise that the ever-new technology like blue-tooth and radio frequency identification (RFID) had a positive effect on the mobile application being accepted by retailers (Ondrus & Pigneur, 2004). However, businesses were not willing to offer mobile payments due to the investment required, as well as the fact that mass-market adoption had not been reached (Teo, et al., 2005). Researchers such as Dahlberg (2007, 2015) and Ondrus and Pigneur (2004) concentrated their research on European countries, specifically Sweden and Switzerland, and have multiple papers authored on mobile payments based on research output in developed countries. Findings from developed countries such as Sweden and Switzerland cannot be generalised to developing countries in Africa. Past research has recommended more diverse research into other countries (Liebana-Cabanillas & Lara-Rubio, 2017). Herein lies another opportunity to add to the body of knowledge with locally based research and validated knowledge on mobile payments in developing countries.

Kreyer, Pousttchi and Turowski (2002) viewed mobile payments as a subset of mobile commerce. Carat (2002) further defined mobile payments as a subset of electronic commerce where at least one side is processed through a mobile device. A mobile payment is defined as the process in which the payer employs a mobile device to initiate an electronic procedure that initiates a financial transaction (Mallat & Tuunainen, 2005 & Pousttchi, 2003). Ondrus and Pigneur (2004) and Dahlberg et al. (2007)'s definitions were the same as the earlier stated definitions. Guo and Bouwan (2016b) updated the definition to include the initiation, authorisation, and confirmation of payment processes using wireless or other communication technologies. Based on the provided definitions and subsequent evolved understanding of mobile payments, it can be summarised that a mobile payment is any form of payment that is initiated, processed, and completed using

a mobile device through the wireless application protocol, SMS service, mobile wallet, or some form of application.

Ondrus and Pigneur (2004) compiled a list of business and technical issues for the mobile payment ecosystem to resolve, including device and network limitations, maturity of payment solutions, and consumer acceptance. However, the researchers did not refer to merchant acceptance as an issue worthy of debate or further research, and the literature suggests that merchants' acceptance of any new technology introduced was expected. Later literature by Dahlberg et al., (2007) called for merchants to be involved in the design process.

As mobile payments have grown in popularity, so too have the values processed using them. According to Statista (2018), an increase of 106% was seen between 2015 (450-million US dollars) and 2018 (930-billion US dollars), with an expected value of 1.479-billion US dollars in 2020 (Statista, 2020). Although Evans' (2016) prediction was lower than others (972-billion US dollars by the end of 2016), it concurred that the amount processed by mobile payments would increase yearly.

Role players in the mobile payment space have a direct impact on the adoption and success of mobile payments and include parties such as mobile network operators (MNOs), financial institutions (e.g., banks), technology companies (e.g. Google), merchants (e.g. SMEs), users (e.g. a Smartphone), and payment providers (Dahlberg, et al., 2007). Although failure to adopt mobile payment systems is an issue partly addressed by studies focused on the technology and consumer adoption, more inclusive research is required for successful adoption beyond Japan, China's Alipay, and Kenya's M-Pesa (where the 'M' represents 'money' and 'Pesa' means 'payment' in Swahili) (Dahlberg, Guo & Ondrus, 2015).

The systematic literature review by Dahlberg et al. (2007) focused specifically on developed countries to ensure that differences in financial and telecoms markets do not skew data surrounding the adoption of mobile payment in both developed and

undeveloped countries. Mallat and Tuunainen (2005) and Mallat and Dahlberg (2005) called for an evaluation of their results on merchant adoption, as they acknowledged that mobile infrastructures differ between countries and wanted to confirm the accuracy of their findings in various spheres. Research that has been conducted centred on the adoption of mobile payment systems by merchants (Boateng, Afeti & Afful-Dadzie, 2020) and actors in the mobile payments business models platforms (Jocevski, Ghezzi & Arvidson, 2020).

The literature review conducted by Dahlberg et al. (2007) identified only four research papers addressing merchants' adoption of mobile payments: van der Heijden (2002), Mallat and Tuunainen (2005), Ondrus and Pigneur (2004), and Teo et al. (2005). The fact that this is still an emerging technology may explain the sparsity of literature in the field of mobile payments (Ondrus, Lyytinen & Pigneur, 2009). The authors further stated that greater understanding and clarity on the diffusion process for mobile payments necessitates more research into providers and merchants in the market. The recommendations for more focus into merchant adoption or mobile payment ecosystem studies (with a focus on merchants) appears regularly in the research, but there has been limited response (Dahlberg et al., 2007; Guo & Bouwman, 2016; Liebana-Cabanillas & Lara-Rubio, 2017).

Dahlberg et al. (2015) identified that there was a lack of research output into the role of merchants in the context of mobile payments in the time period 2007 to 2014. Only four papers out of 188 studies produced in an eight-year period focused on merchant adoption. Van der Heijden (2002) ascertained that, in a complex ecosystem such as the mobile payment ecosystem, the acceptance of a system by one stakeholder depends on the acceptance of the system by other stakeholders. Ondrus and Gaur (2012) agreed, stating that the success of a mobile payment eco-system depends on ability to attain customers from various spheres (merchants and consumers). Pousttchi, Tilson, Lyytinen and Hufenbach (2015) argued that post-2011 research did not consider prior work in the field, leading to limited contributions in the mobile commerce field and the lack of strong theoretical foundations.

1.1 PURPOSE OF THE STUDY

The mobile device has become indispensable in modern society, serving as a gateway to various facets of our lives: our social lives through social-networking sites like Facebook, Instagram, Twitter, and Tiktok; our work lives through email and work applications like Zoom, Teams, and Skype; our personal lives through messaging applications, SMSes, and instant messaging services (Whatsapp); and our financial lives, Luno, Snapscan, banking apps (Davel, 2017; Gupta, 2011; Sagl & Resch, 2015). Although merchants are the providers of the goods and services that consumers will spend their money on, the importance of their acceptance and adoption of mobile payment methods is understudied. This research proposes a conceptual dynamic framework for mobile payment adoption by merchants in South Africa.

The outcomes of this study would give mobile payment service providers a holistic view of how they can improve the public's (merchants and consumers) acceptance of their mobile payment solutions. Van de Heijden (2002) argued that merchant and customer acceptance should be studied separately, despite the high interdependence between the two. After more than a decade, Dahlberg et al. (2015) echoed the recommendation made by van de Heijden (2002), confirming the importance of researching the role of a merchant in the mobile payments' ecosystem.

1.2 PROBLEM STATEMENT

South Africa is one of the largest economies in Africa and is exposed to international communities through trade, import and export, technology, foreign direct investment, and economic activity (United Nations, 2019). It is therefore exposed to technological changes that result in both opportunities and threats to businesses within the economy, and firms operating in such an environment must master dynamic capabilities to survive these environments (Teece, 2007).

From 2007 to 2020, researchers conducted mobile payment research in Asian countries such as Thailand (Phonthanukitithaworn, Sellitto & Fong, 2016), Indonesia (Bhimasta & Suprapto, 2017), Malaysia (Mun, Khalid & Nadarajah, 2017), Oman (Al-Saedi, Al-Emran, Ramayah & Abushan, 2020), and India (Talwar, Dhir, Khalil, Mohan & Islam, 2020). Research in developing countries (particularly Africa) is limited to occasional papers like Verkijika's (2020) study on consumers based on an effective response model and the merchant adoption of mobile payments in Ghana by Boateng et al. (2020). Research conducted by Mallat, Rossi and Tuunainen (2004) focused on the European market, while Ondrus and Gaur (2012) focused on mobile payments in developed countries, highlighting the failures and the role of banks in the mobile payment ecosystem (Gaur & Ondrus, 2012). Gannamaneni, Ondrus and Lyytinen (2015) carried out a review of the implementation efforts of mobile payments platform between 2005 and 2015. This was based on the repeated failure of mobile payment system launches in European markets (countries such as Holland, Spain, Germany, and Norway). The subjects of platforms and business models will be discussed in the literature review, expanding on the increased interest in business model research from a mobile payments' perspective.

Gannamaneni et al. (2015) viewed mobile payment systems as multi-sided platforms which join different users (i.e., consumers and merchants). Ondrus and Gaur (2012) argued that mobile payment solutions are part of a platform, given the number of parties that need to interact with each other before value is delivered to the consumer and merchant. In their review of the European market, they noted that the different actors involved in the mobile payments' ecosystem (including mobile network operators, financial institutions, content providers, credit card companies, and technology firms) resulted in an overly complex ecosystem (Mallat et al., 2004).

This study aims to add to understand reasons for limited mobile payment technology in South Africa and to add to the limited academic literature addressing mobile payment adoption in developing countries (especially in Africa). Gannamaneni et al. (2015) called for more research into the field of mobile payment systems to determine why they have not been as widely accepted as initially expected.

This study conducted a systematic literature review and found that there is limited knowledge and research regarding the role of merchants in the adoption of mobile payments, especially in the African context. A lack of knowledge regarding conceptual frameworks, developing African countries, and design science research from a merchant perspective shows that there is still much to be contributed to the body of work addressing merchants. Because the growth of mobile payment usage in South Africa presents opportunities for vendors, merchants, and consumers, it is crucial to address the gaps in knowledge specifically the merchant's role. By using existing research on mobile payments in Europe, Asia, and South America, this research aims to understand the reasons, the choice of payment technologies in the South African market and produce a dynamic conceptual framework that can increase understanding and adoption of mobile payment technologies by merchants in South Africa.

1.3 RESEARCH QUESTIONS

This study is guided by the research questions arising from the problem statement on mobile payments. The first research question focuses on theory and positions this research within the literature context.

1. What would the constructs of a framework for mobile payment adoption by SMEs in South Africa be?

Sub questions are posed to give further value to the framework and help answer the future research questions posed by Dahlberg et al. (2007) and Dahlberg et al. (2015) (with the focus on mobile payments in South Africa). The sub questions are as follows:

1. What is the current ICT profile of the merchant? The typical characteristics of adoption merchant. (This will look at the merchant, their setup, their environment)
2. Why do merchants adopt mobile payments?

1.4 RESEARCH AIMS

The research aim is to unpack the constructs, adoption factors impacting merchants and also produce a conceptual framework that can lead to the increased understanding and adoption of mobile payment technologies by merchants in South Africa. Smeyers (2008) ascertained that conceptual framework help a researcher understand a multitude of concepts or categories. This opinion was supported by Wixom and Todd (2005), who stressed the need for comprehensive guidelines to aid SMEs in the adoption of ICT (such as the use of mobile payment systems).

This research adds value to the academic body of knowledge through a comprehensive review of existing literature on mobile payments, conceptual frameworks, design science research, and dynamic capabilities, as well as by answering the research recommendations to provide more research into SMEs' roles in mobile payments. Further value is added by focusing on South Africa and facilitating knowledge of ICT adoption by SMEs in Africa; an area that has received less attention than more-developed countries. The researcher recognises the sense of urgency in providing a framework and guideline to enhance understanding of the role of merchants. This will directly impact adoption of mobile payments solutions and potentially improve ICT-adoption success rates.

The researcher did the following:

- Reviewed existing literature on SMEs, barriers and success factors for SMEs, developing countries' adoption of ICT, m-commerce, consumer adoption, business models, mobile payments, and barriers and drivers for adoption.
- Discussed the Technology-Organisation-Environment (T-O-E) theory and the dynamic capabilities framework and their relevant underpinnings for the study.
- Identified constructs and designed and created a framework to categorise the constructs posited to influence merchant adoption of mobile payments in South Africa.
- Developed the framework that is grounded in theory.
- Tested the validity of the conceptual framework with these merchants.

- Tested the framework using focus groups and interviews.
- Reported findings through recommendations based on the tested framework of adoption of mobile payments by merchants in South Africa.

1.5 ASSUMPTIONS AND LIMITATIONS

The study is based on the following assumptions and limitations:

- SMEs in the nine provinces are using electronic payments for their daily provision of goods and services.
- SMEs will be available to attend interviews and focus groups.
- The research will only include formally registered businesses.
- Due to financial constraints, the research will be limited to the main cities and towns in each province and might not include SMEs based in rural areas.

1.6 BRIEF CHAPTER OVERVIEW

Chapter 1: Background Information

This chapter gave a brief background of the research to be conducted. It described the research problem to be addressed and the lack of mobile payment adoption among SMEs in South Africa, giving the reader context by discussing the current state of mobile payments globally and locally. Outlines of the research questions and research objectives were given, as was an overview of the rest of the research paper.

Chapter 2: Literature Review

This chapter sets out to review the literature related to SMEs, dynamic capabilities, mobile payments, m-commerce, developing countries' IT adoption, and merchant and consumer adoption of mobile payments. The initial sections of this chapter comprise a review of literature and lay the foundation for discussions about the state of mobile payment technology adoption, both in general and in South Africa specifically. This serves to present known facts in the field of study and will establish the models and theories used

by researchers in the past. The initial literature review will allow the researcher to develop a draft conceptual framework, which will be revised and retested through interviews and focus groups after a first iteration through interviews.

Chapter 3: Research Methodology

This chapter introduces and reviews the philosophical issue pertaining to research in information systems. The positivist, interpretivism, and critical paradigms will be reviewed at a high level, and the interpretive paradigm will be discussed in more detail. This research methodology chapter discusses the framework and paradigm within which the research was conducted and explores Design Science Research (DSR) before concluding with the data collection process, the type of respondents, methods followed to collect the data, ethical and confidentiality issues, and how collected data was validated to minimise bias.

Chapter 4: Cycle 1: Semi-Structured Interviews

In this chapter the data collected through interviews in Cycle 1 will be discussed and analysed. Data analysis will be done using thematic content analysis, which depends on the transcription of the interviews being coded and themes being grouped together. The conceptual framework will be updated to reflect the findings from this cycle.

Chapter 5: Cycle 2: Survey

In this chapter the data collected through the survey in Cycle 2 will be discussed and analysed. Data analysis will be done using both thematic content analysis and statistical methods. The conceptual framework will be updated to reflect the findings from this cycle.

Chapter 6: Cycle 3: Focus Groups

In this chapter the data collected through the focus groups in Cycle 3 will be discussed and analysed. Data analysis will be done using In vivo and axial coding methods. The conceptual framework will be updated to reflect the findings from this cycle.

Chapter 7: Research Summary and Conclusion

This chapter will present the data analysis and interpretation of results, as well as a summary of the themes and findings of the study. The tested framework will be discussed based on the literature that was used to construct it and the findings from the interviews and focus groups. This final chapter will state the contribution of the study and present the conclusions drawn from the research undertaken and based on the research findings. A summary of the research questions will be given, as well as recommendations for future research. The limitations of the study will also be discussed.

This chapter has briefly explored mobile payments and research problems in context to South African merchants (SMEs'). The following chapters as detailed, present the literature reviewed, conceptual frameworks identified, and the approach taken to answer the research questions posed.

2 LITERATURE REVIEW

"If merchants are unable to accept mobile payments, it might be the end of the game"
(Dahlberg, et al., 2015)

2.1 INTRODUCTION

This chapter focuses on the literature review of developing economies to grasp were South Africa fits in globally. An overview of South Africa, its economy, and its business conditions will be followed by literature on SMEs and ICT in South Africa. This research was an exploration of the factors for success for SMEs, as well as barriers to ICT adoption and success as a business. Mobile commerce, mobile adoption by consumers and merchants, and the South African payments landscape will be discussed, as will the research's theoretical foundations; namely, the conceptual frameworks, technology-organisational-environmental (TOE) framework, and the dynamic capabilities framework. The literature review allowed for the development of a conceptual framework that was then tested through the design science research (DSR) process will then be tested. The findings from each cycle of the DSR process were used to augment the conceptual framework.

2.2 DEVELOPING ECONOMIES

All countries in the world are grouped into the following divisions: developed economies, economies in transition, and developing economies, with measures such as per-capita gross national income (GNI) (United Nations, 2020) being used to place countries in further categories such as high income, low income (World Economic Situation and Prospects, 2014). According to the World Economic Situation and Prospects (2014), every African country inclusive of large economies like South Africa, Egypt, and Nigeria are developing economies. South Africa is classified as an upper-middle-income country due to a larger per capita GNI, despite the well-documented economic disparity within the country index (World Economic Situation and Prospects, 2014). This is consistent with the research of the World Bank (2018), who classify South Africa as part of the low- and middle-income countries. South Africa, India, and Mexico are identified as emerging markets, in which innovations are key to the survival of firms in the long run (Gargi & De, 2014).

2.3 OVERVIEW OF SOUTH AFRICA

South Africa has the largest stock exchange by value in Africa, and the Johannesburg Stock Exchange (JSE) is in the top 20 in the world (CIA, 2018). According to the World Bank (2020), there are more than 8.23 billion mobile cellular subscriptions in the world, with South Africa having 147 mobile cellular subscriptions per 100 people in the population. This increased to 160 mobile cellular subscriptions per 100 people in 2018 (World Bank, 2020). Small businesses contribute significantly to employment creation, helping to counter the increasing unemployment rates (recorded at 27.2% by the Bureau for Economic Research in 2016). SMEs contributed 36% to the GDP of South Africa in 2015 (GEM, 2016), but rank very lowly in terms of ease of business start-up (74/190) when compared to other African countries such as Mauritius (49th), Rwanda (56th), and Morocco (68th) (Herrington, Kew & Alesimo, 2016). In the 2019 report by the Small Enterprise Development Agency (SEDA), SMEs contribute to 66% of the employment within South African economy (SEDA, 2019).

South African Payment Landscape

The South African National Payment System (NPS) has developed over time and, to comply with international standards, the South African Reserve Bank (SARB) developed the South African Multiple Option Settlement (SAMOS) (South African Reserve Bank, 2012). The SARB governs the entire NPS and ensures efficiency, regulation, and supervision of the process and connected matters (South Africa Reserve Bank, 2012). It is also mandated to hold a certain level of cash reserves for each bank within South Africa (South Africa Reserve Bank, 2012), allowing it to control liquidity and the amount of cash flowing into the economy. The SARB (2012) identified cards as a rapidly growing alternative form of cash payment, with their transaction value increasing from 150 billion rand in 2006 to 303 billion rand in 2010.

2.4 SMALL AND MEDIUM ENTERPRISES (SMES)

"Africa is in transition. This transition is driven by entrepreneurship." (Edoho, 2015)

The importance of SMEs cannot be overstated, especially in the African context (Jones, 2011). The impact they have on employment creation means that they can be seen as the building blocks of a society and its economy (Chiware & Dick, 2007; Steyn & Leonard, 2012; Habberton & Notcutt, 2014; Steyn & Kruger, 2019), and they are a critical factor in the building of an economy through economic and social development (Harris & Patten, 2014; GME, 2016). Rhodes (2017) discussed how SMEs are important in many economies in the world and how the adoption of ICT is seen as a factor in the growth of SMEs. Various studies consider the importance of SMEs in different countries, as well as the importance and impact of ICT.

Definitions of SMEs differ between countries and organisations. SMEs can be differentiated from normal businesses based on the formality in areas such as bank accounts, formal work contracts, and registration with a formal body (Esselaar, Stork, Ndiwalana & Deen-Swarray, 2006). According to Fathian, Akhavan and Hoorali (2008), the classification of SMEs can be extended by market sector, location, innovation rate, asset value, and organisation, and Mastercard (2014) noted the difference between countries. According to Rhodes (2017), micro businesses employ between one and nine people, small businesses have between 10 and 49 employees and medium businesses employ between 50 and 500 people.

The Department of Trade and Industry (DTI) (2020) in South Africa defines SMMEs (Small Medium and Micro Enterprises) according to their turnover and industry, as displayed in Table 2: DTI Enterprise sizes (StatsSa, 2018) below.

Table 2: DTI Enterprise sizes (StatsSa, 2018)

Industry Turnover	Large (ZAR Million)	Medium (ZAR Million)	Small (ZAR Million)	Very Small (ZAR Million)
Mining and Quarrying	370.5	95.0	38.0	2.0
Manufacturing	456.3	123.5	47.5	2.0
Electricity, Gas and Water	456.3	123.5	48.5	2.0
Construction	247.0	57.0	28.5	2.0
Wholesale Trade	608.0	304.0	57.0	2.0
Retail Trade	370.5	180.5	42.5	2.0
Motor Trade	370.5	180.5	42.5	2.0
Accommodation and Catering	123.5	57.0	48.5	2.0

While definitions of SMEs differ, their economic importance in terms of economic output, employment creation, advancement of society, and diffusion of certain technologies is undisputed, particularly when it comes to poverty reduction in developing economies (Esselar et al., 2007; GEM, 2016). SMEs account for 99% of all enterprises in the United Kingdom, with more than 5.7-million active businesses (Rhodes, 2017). These numbers remained stable in 2019, with more than 99% of 5.8-million active businesses classified as SMEs (Department for Business Innovation & Skills, 2019). According to the 2019 report given by the Small Enterprise Development Agency (SEDA), SMEs provided 66% of the employment in the South African economy (SEDA, 2019).

Table 3 below provides a breakdown of SMEs and the definitions that will be in use for each type of SME as per the National Small Business Act of 1996 (South African Government , 1996).

Table 3: Definition of SME (Mahembe, 2011) and National Small Business Act of 1996

Title	Definition	Employee Breakdown
Survivalist Enterprise/ Micro	This kind of business displays a lack of capital equipment and is mainly a cash business e.g., spaza shops, taverns	Typically run by owner and employ no more than 5 people
Very Small	The enterprise begins to display formal and established business processes	Less than 20 employees
Small Enterprise	The enterprise is more established and exhibits more complex business practices.	Between 50 and 99 employees
Medium Enterprise	The enterprise begins to have a distinguished hierarchy of authority and increase financial turnovers.	Between 100 and 200 employees

At the end of 2015 there were more than 2.2-million small medium and micro enterprises (SMMEs) in South Africa, with more than two thirds (1.49 million) of these classified as informal (Bureau for Economic Research, 2016). 2016 presented with 2.34 million SMMEs, but this decreased to 2.25 million by the end of 2017; a decline attributed to employment in formal-sector jobs (Small Enterprise Development Agency, 2018). The number of SMMEs grew to 2.56 million by the end of 2019 (SEDA, 2019).

2.4.1 Barriers to SME Success

The following section discusses barriers to success for SMEs. In the context of this study, an understanding of the current barriers will aid in understanding the environment that SMEs operate in. Challenges in terms of finance, skills shortage, location, and government regulations and processes will be discussed. Demographics and the psychological traits of SME owners will be considered in terms of their role in the success or failure of the enterprise.

Finance and Credit

The many barriers and challenges that SMEs in South Africa face include access to finance and credit is one of the many challenges faced by South Africa and is considered a critical barrier to entrepreneurial success worldwide (Kerr & Nanda, 2011). Countries like Ghana, Nigeria, Ethiopia, Malawi, Zambia, and Namibia all rate access to finance as one (if not the biggest) barrier to their progress (Herrington & Kelley, 2012) and the literature review of SMEs by Consoli (2012) identified it as one of the main reasons that SMEs do not invest in ICT. A literature review on African SMES reveals a consistent view of importance of finance and credit to the success of SMEs and how credit constrains SME growth (Bigsten, Collier, Dercon, Fafchamps, Guthier & Gunning, 2003; Hansen, Kimeria, Ndirangu, Shry & Wendle, 2012; Kuntchev, Ramalho, Rodriguez-Meza and Yang, 2013; Quartey, Turkson, Abor & Iddrisu, 2017).

South Africa has a large banking infrastructure however access to these financial services does not come readily available to all individuals (Arun & Kamath, 2015). This is seen as a financial exclusion issue – small businesses, especially those in rural areas, struggle with access to finance because they do not have enough collateral for the loans that financial institutions offer them (Mullineux & Murinde, 2014). The SEFA (2018) website requests businesses to screen themselves before applying for financing, with the words “you must have a business plan” appearing first on the website.

Business plans promote due diligence and governance and ensure that funding goes to the right individuals who have a higher chance of success. However, expecting rural businesses (located in areas that often lack access to basic amenities, electricity, education, and the internet) to produce business plans without training or guidance is counterproductive to the process of enabling businesses in the economy.

Location

Proximity to an urban area also affects how quickly and efficiently local municipalities render some of these services to local businesses. Galloway, Mochrie and Deakins (2004) discussed how rural businesses are disadvantaged by weak infrastructure and distance from markets. Meanwhile, SME owners in urban areas are likely to be more educated and have more exposure to challenges, technologies, and opportunities than their rural counterparts (Kyobe, 2009). Location is one of the challenges that small business face, with SMMEs in Mpumalanga and the Northern Cape finding it difficult to attain finance (Bureau for Economic Research, 2016). Small businesses located in rural areas suffer from financial exclusion due to the costs associated by financial institutions in bringing credit to the rural areas (Mullineux & Murinde, 2014).

Infrastructure

Businesses require infrastructural amenities such as electricity and water, and Consoli (2012) found that access to power, bandwidth, and reliable internet connections is a serious barrier to the success of SMEs investing in ICT. According to Herrington et al. (2016), if one applies to get electricity connected to their premises, in South Africa on average it takes up 84 days due to the procedures involved; a marked improvement from the 200 days it would have taken in 2010. Business start-up costs are significant, regardless of industries' varied requirements – while digitally based SMEs face expense constraints in implementing their digital operations, sectors such as agriculture and construction require large investments in infrastructure, presenting a high start-up cost for an SME (SEDA, 2012).

Skills Shortage

Skills shortage, the poor education level of many South Africans (especially those previously disadvantaged), and lack of technical and business-management skills were identified as serious barriers to SME survival (SEDA, 2012). Employee skill levels have an impact on the success of an SME, as well as any skills they obtain in learning to use new technology that an SME invests (Consoli, 2012).

The lack of skills and knowledge is a major hurdle in merchants' adoption of mobile payments technology (Cabanillas et. al., 2016) and (Boateng et. al., 2020). Steyn (2018) further advised how new technologies need to be used in simple and effective interventions that are easily accessible to the entrepreneurs to increase their chances of success in using these technologies in their businesses. Similarly, Gray (2006) argued that education level has an impact on the ability of an owner to innovate and adopt innovative technologies, with Omri (2020) suggesting that secondary and tertiary education levels have an impact on the formality of an enterprise and its survival.

Regulations and Permits.

SMEs exist within the boundaries of their countries of registration therefore they fall within the macro environment of government regulations and processes. Regulatory inefficiencies in government processes are factors that prevent some informal micro businesses from transitioning to the formal sector (Herrington & Kelley, 2012). Herrington et al. (2016) stated that South Africa ranks 131st in the world in terms of the ease of starting a business. Not all regulations are barriers, however: regulations such as the Consumer Protection Action (CPA) and the National Credit Act (NCA) aim to protect the customers and small businesses themselves (Arun & Kamath, 2015).

2.4.2 Success Factors for SMEs

The implementation of applicable remedies to allow small firms to achieve their intended innovative functions and growth requires an understanding of the reasons for gaps in knowledge, skills, and capabilities in these small firms (Gray, 2006). Jones (2011) argued that organisational readiness, financial support and owner-manager support will aid the adoption of ICT by SMEs. This section of the research details the SME success factors identified in the literature.

Strategy

A strategy is a set of activities that encompasses a unique position which brings value and involves trade-offs (Porter, 1996). Kyobe (2009) elaborated using a technology element, stating that a strategy is the process a firm undergoes in defining, selecting, and implementing technology to help it achieve its business outcomes. Kyobe (2009) further stated that, in most SMEs, the IT needs are not re-evaluated as the business grows, leading to outdated hardware and software that cannot fully support the business. Gray (2006) asserted that some of the challenges faced by SMEs include maintaining the firm's capabilities, maintaining resources, and continuing knowledge to remain updated.

An efficient IT system can effectively reduce the running costs of a business by enabling quicker decision making, buying, and selling of products (GEM, 2016). SME owners/managers who are innovative and aggressive when trying new products and technology are crucial to the adoption of technology in a firm (Mpofu & Watkins-Mathys, 2011). Guo and Bouwman (2016) concluded that merchants who adopt mobile payments in their operations show a different type of strategy, leaning towards customer service and product leadership or being seen as innovative in adopting new technology.

Location

In their study of ICT enablement in Scotland, Smallbone and Welter (2001) identified ICT as an important factor in overcoming business disadvantages arising from a rural location, stating that there is a slower uptake of ICT in rural areas. Rural business is disadvantaged by distance to markets and weak infrastructure (Galloway et al., 2004), prompting the question of whether distance from a metropolis area affects the growth of an SME. Limpopo and Mpumalanga were identified as poorer provinces in South Africa, and rural SMEs in these provinces were found to have more difficulty accessing finance than SMEs in other locations (SEDA, 2018).

Location affects time and money as well as, access to resources, customers and support. Only 15% of people who are aware of government support structures for businesses (such as SEDA) are in rural areas in South Africa (Herrington et al., 2016). This is a cause for concern because businesses in rural areas are more likely to have limited infrastructure and services (such as electricity and stable internet connections), while the clustering of government support arms around urban areas means that a business situated in an urban area will receive better support than one located in a rural area (Herrington et al., 2016). In their 2011 study, Mpofu and Watkins-Mathys showed how being based in an economy that is more developed has a direct impact on the value of ICT to a business, with firms in Botswana and Zimbabwe not faring as well as those in South Africa due to less government investment in ICT.

Government and regulatory support

For an economy and the businesses in it to thrive, government and regulatory support must be geared towards helping SMEs (Kabanda & Brown, 2017; Adomako, Frimpong, Danso, Amoah, Uddin & Kesse, 2020). Government determines a country's economic condition with policies and procedures, and these impact businesses. The following section discusses how government initiatives can impact SMEs in a positive way.

Kshetri (2014) and Sung, Kim and In (2016) explored South Korea's history of government incentives and schemes which were geared toward enabling start-ups and small businesses to survive as long as certain conditions were met, such as re-investing returns into local businesses. The United Kingdom (UK) is an example of government support yielding positive results for SMEs and, by extension, the economy. This was achieved by creating a Knowledge Transfer Partnership (KTP) scheme aimed at supporting SMEs in the commercialisation of new ideas, with the government providing the necessary technology, skills, and knowledge (Choudrie & Culkin, 2013). The success of the KTP is evident when considering the 1 000 partnerships and over 1 000 associate projects that have been supported by the scheme (Choudrie & Culkin, 2013).

The results of these initiatives only became apparent after several years through the rise in SME start-up and formation success. Every £1 million that the government invested in the KTP resulted in a £4.25-million increase in partnered SMEs' annual profit (Choudrie & Culkin, 2013). It can be argued that there is no direct causality, but the evidence makes it difficult to dispute the opinion that government support helps SMEs to prosper: the number of small businesses in the UK increased from 3.4 million to 5.7 million between 2000 and 2017 (Rhodes, 2017); a 64% increase that can be attributed to the more entrepreneur-friendly ecosystems in place (as described by GEM, 2016).

In South Africa, several government agencies have been created by the Department of Science and Technology to allow South African businesses to be more technologically competitive. These agencies are mandated to incubate, support, and develop small businesses, and include the Small Enterprise Development Agency (SEDA), National Empowerment Fund (NEF), National Youth Development Agency (NYDA), Small Enterprise Finance Agency (SEFA), Technology and Innovation Agency (TIA), and a ministerial arm known as the Department of Small Business Development (DSBD) (SEDA, 2018). Government's recognition of small businesses' importance and economic value also led to the formation of the Ministry of Small Enterprises in 2014. Government agencies like SEFA provide loans ranging from 500 rands to 3 million rands, while NEF's loan-amount range is between 250 000 rands and R75 million rands (Vukuzenzele, 2020).

Despite this, 90% of South African businesses operating in the country do not survive past the three-year mark; a problem which can be attributed to the various reasons discussed in the previous section (SEDA, 2018).

SME Owners

As already discussed in this study, an SME owner is affected by external and internal factors like employee skills, government regulations, location, and strategy. It is crucial to examine an SME-owner's intention regarding the adoption of technology, both in their individual capacity and in their capacity as owner and manager.

2.4.3 ICT Use in SMEs

Extensive research has examined the factors of adoption of ICT by SMEs ICT enablement for rural based SMEs (Galloway, et al., 2004); (Chiware & Dick, 2008); ICT Impact within the SME Sector (Jones, 2011); ICT adoption in developing countries (Aleke, Ojiako and Wainwright, 2011); Entrepreneurs in Africa; (Edoho, 2015); role of ICT use to the economic growth in Sub Saharan African region (SSA) (Albiman & Sulong, 2016). ICT adoption in small firms in Southern Africa (Mpofu & Watkins-Mathys, 2011), e-commerce adoption by SMEs in Tanzania (Kabanda & Brown, 2017), diffusion of innovation in a small firm (UK) (Choudrie & Culkin, 2013). The above-mentioned research has concluded that ICT does have a positive impact on the survival and success of an SME (Steyn & Leonard, 2012).

Lee and Tong (2005) in a review of a 20-year time-series analysis conducted from 1980 to 2000 discussed evidence that ICT had a positive impact on the gross domestic product (GDP) of newly industrialised countries. Although the increasing number of studies on the impact of ICT give the illusion that it is driving developing countries towards benefits like improved GDP and increased employment rates (Ahmed & Ridzuan, 2013; Sassi & Goaied, 2013), this is not the case. Harris and Patten (2014) argued that the diffusion of

internet among businesses (e-commerce capabilities) has allowed small businesses to be more competitive.

2.5 MOBILE PAYMENTS

This section of the study discusses the broad spectrum of Technology, Organisation, and Environment.

- **Technology:** Types of mobile payments, mobile payment solutions in South Africa
- **Organisational:** Business models, merchant adoption, barriers to adoption, adoption drivers
- **Environmental:** Mobile in developing economies, consumer adoption, barriers to adoption, adoption drivers

In addition to elaborating on topics addressing the business value of mobile payments, mobile in developing economics, business models, and consumers' adoption and impact in terms of the mobile payment ecosystem, this section will explore the history of merchant adoption studies and the role of the merchant in the mobile payment ecosystem. The payment process will be discussed at a high level to provide context regarding where mobile payments fit, and a summarised view of mobile payments will be given.

Mobile commerce is viewed as a subset of electronic commerce, which comprises transactions that employ some form of electronic means of communication for completion, processing, or initiation (Kreyer et al., 2002). The requirement of a mobile device identifies mobile payment as a subset of mobile commerce, which can be further seen as a form of e-commerce at a mobile level. The main difference between mobile commerce and e-commerce is the device and the mobility offered by the mobile device's technology (Mallat & Dahlberg, 2005). The most basic mobile commerce facilitated by mobile payment is the purchase of content such as ringtones, games, and music on a mobile device (Mallat & Tuunainen, 2005). There have been drastic changes on this front since the early 2000s – people can now purchase anything from movies to flight tickets online and streaming online content through mobile devices is a widely adopted practice. Al-maghrabi, Dennis, Halliday and BinAli (2011) stated that 'electronic shopping' includes a range of practices,

ranging from researching product information online to purchasing a product or service online.

Mobility is one of the main advantages that mobile devices have afforded users (Dastan & Gurler, 2016). Mobile devices have provided a ubiquitous channel for communication and, in becoming a distribution channel, have become a focal point of investment for financial institutions, service providers, and investors (Thraassou & Philip, 2008; Dastan & Gurler, 2016). Payment platform providers, merchants, and financial institutions all have high vested interests in the field of mobile devices and their evident potential, seeking to gain significant stakes and adoption of the device and its applications (Evans, 2016). Companies such as Samsung, Apple, Alibaba, and Econet have all realised the power of the mobile device and invest heavily in related development (Guo & Bouwman, 2016; Basera & Dhliwayo, 2013).

McKinsey (2017) reported that the USA processed 144.7 billion US dollars in non-cash payments in 2015, while France processed 19.4-billion US dollars through mobile payments. The World Economic Forum (2017) claimed that developed countries such as the USA, Australia, France, and Germany are accepting alternative forms of payments more than they are cash, with 77% of the surveyed USA population and 85% of their French counterparts using alternative payments. Germany has a near 50/50 split; an indication that the alternative forms of payment have not yet reached full adoption by the public. McKinsey (2017) detailed African statistics as one value and does not break it down as carried out with the developed countries in the report. However, Statista (2020) forecasts that mobile payments in Africa will reach just over 35 million US dollars in 2020 but are also projected to reach 80 million US dollars in 2023. South Africa is projected to process only 2.2 million US dollars in 2020, which leaves potential for growth for mobile payments (Statista, 2020).

Nearly 70% of the adult population in South Africa have access to a bank account, and it has the largest card circulation on the African continent (McKinsey, 2017). An argument could be made by countries such as Kenya, Rwanda, Tanzania, Ghana were that mobile

money has increased financial that mobile payments play a vital role in increasing access to financial services for the population. In Ghana, for example, there is more than 100% mobile penetration and over 35 billion US dollars was processed through mobile money transactions in 2015 (Gathii, 2018).

Consumers and customers demand greater convenience, accessibility to banking products, and information, which is why banks are looking at how to maximise the mobile device when interacting with customers (Thraassou & Philip, 2008). It is estimated that 38% of all digital commerce shopping will be done using a mobile device by 2030 (Evans, 2016). Renko and Druzijanic (2014) further noted that retailers are interested in technologies that reduce operational costs while making the shopping experience more exciting for customers. This can only be expected to increase if consumers' familiarisation with both mobile devices and the new way of shopping increases. It is expected that mobile payments will face tough competition at the checkout point, due to dominant, established forms of payment, such as credit card, debit card, and cash (Mallat & Tuunainen, 2005).

Despite alternative payment forms available in developed countries, the emergence of mobile payment technologies, and card payments, cash is still the predominant form of payment worldwide, accounting for 85% of the value of all transactions (Mastercard, 2017). In studies of developed countries like Germany, France, USA, Austria, Canada, and Netherlands, research showed that cash was still the predominant form of payment, and not only for lower-value/small transactions (Arango-Arango, Bouhdaoui, Bounie, Eschelbach & Hernandez, 2018). The European Central Bank noted that 75% of payments in the euro-zone are made in cash, despite the current digital age (Reuters, 2017). The model used by Arango-Arango et al. (2018) noted that consumers prefer to use cash for payment, despite the availability of alternative payment methods. Hazra (2017) proposed that, due to the anonymity cash provides, it is the easiest form of payment for consumers to use, as there are no pin numbers or account numbers to memorise, and because there are usually no limits.

The cost of handling cash affects both the banks (financial institutions) and the merchants, to whom the processing and transporting costs are passed along (Bill and Melinda Gates Foundation, 2018). The annual cost of cash handling in the South African economy is ZAR23 billion, with the low-income earners bearing the brunt of the costs as they lose 4.4% of their value, compared to the national average loss of 1.1% (Mastercard, 2017). Despite the increase in the banked population, cash still accounts for 50% of the total value of all consumer transactions in South Africa (Elliot, 2017).

2.5.1 Mobile in Developing Economies

SMEs in Africa continually face challenges in many spheres, ranging from technical infrastructure to access to funds, to lack of institutional support (Kabanda & Brown, 2017). Salahuddin and Gow (2016) found that internet usage has a positive impact on the economic growth of South Africa, with mobile device usage being one of the ways it is spread. Kabanda and Brown (2017) further noted that the mobile device has a gentler learning curve, is less intimidating, and requires less investment and maintenance than other forms of technologies (interactive websites, for example).

Bill and Melinda Gates Foundation (2018) claimed that access to digital means is highly effective in allowing the financial inclusion of poor people. Frimpong and Gyamfi (2016), Basera and Dhliwayo (2013) attribute the success of commercial ventures such as M-Pesa, MTN Mobile Money and Ecocash as these solutions have allowed entrepreneurs and small business owners to accept payments from anyone, anywhere, anytime. Harris and Patten (2014) discussed how mobile devices have allowed smaller businesses to compete and changed the way they can operate, supporting the claims of previous authors. This is supported by feedback from Kabbiri, Dora, Kumar, Elepu and Gellynck (2018), who found that mobile phones could have a positive impact in the agri-food sector in Uganda.

Such is the power and importance of the payment process that large retail chains in developed countries are designing their own mobile payment systems to counter what is offered by banks. Walmart and Target backed a mobile payment solution named Current C (World Economic Forum, 2017). Starbucks launched its own mobile order-and-pay application that accounted for 9% of its transactions by 2017, while mobile payments accounted for 30% of the in-store payments in their U.S. stores (Soper, 2017). These are just two examples of large-scale merchants who have noted the importance of the shopping experience and have opted to use mobile payments as a channel to facilitate payments. This is an indication of the opportunities that lie within mobile devices, with mobile payments being an opportunity that has seen the rise of applications such as Yoco and Snapscan, which are focused on payments technology (GSMA, 2017). Payments are the final process in a consumer's shopping process and can seem a friction point (a pain point in the shopping process), explaining the large number of start-ups moving to make it as frictionless as possible by using mobile payment solutions (Hedman & Henningsson, 2015; Ondrus & Pigneur, 2004).

In a 2017 report, the World Economic Forum stated that the launch of Apple Pay in 2014 was the revelation of mobile payments to the developed world. This is not entirely accurate, as mobile payments have been available since 1997 and, despite the lack of consumer and merchant acceptance, there are success cases in developed countries, such as Mobile Suica in Japan (Magnier-Watanabe, 2014). Japan and South Korea have demonstrated an ability to adopt mobile payments quickly, with companies such as Pasmo, iD, and Edy showing success (Gaur & Ondrus, 2012). M-Pesa is a mobile money service (originated in Kenya) that allows customers to use their mobile devices to send 'electronic money' to each other by registering for M-Pesa accounts with Safaricom; a process that does not require bank accounts (Hughes & Lonie, 2007; Cisco, 2013).

Contactless payments are on the rise in various forms, including mobile devices, tap-and-go card payments, one tap-pay-out options, and self-check-out options. Borzekowski and Kiser (2008) concluded that merchants enjoyed immeasurable benefits from the use of credits cards and that contactless payments would take the market share of payment transactions within a decade. A perfect example occurred in April 2018, when more than half of all London Underground pay-as-you-go trips were done using contactless mediums, equating to 17-million contactless journeys every week (Hosick, 2018). Merchants choose whether to accept the bill of instrument for payment displayed by a customer, but the customer has the choice depending on the instrument they decided to pay for the goods or services with (Borzekowski & Kiser, 2008).

A major benefit of mobile payments would be the speed and convenience offered at the checkout point (Ondrus & Pigneur, 2004). Given that consumers have their mobile phones with them all the time, impulsive shopping becomes increasingly popular, as they do not need to carry their credit card or physical cash. Technological shifts in the payment process have altered the shopping and checkout experience, with technologies such as cards, NFC, mobile wallets, and wearable technologies becoming more available (De Kerviler, Demoulin & Zidda, 2016). An example in the South African context is the popularity of ‘eWallet’, which allows the transfer of funds from mobile wallet to mobile wallet or mobile wallet to cash as a medium of exchange for goods and services.

In a study conducted across four developed countries, social influence was a significant factor in the purchase of goods and services, even after accounting for other factors such as price (Lee & Kacen, 2008). Social influence’s role in the diffusion and usage of a technology should be noted by both merchants and mobile payment solution providers.
Any means through which a service provider allows customers’ transaction with it is known as a distribution channel, which has the potential to increase availability and revenue (Pezzullo, 1988). Mobile devices are the most personal of channels and almost every financial institution in the world has an application (app) that can be downloaded from an app store, available via USSD or WAP banking offerings.

2.5.2 Business Models

It is necessary to understand mobile payments from a business model perspective to set the scene and ensure understanding from a technological and organisational perspective. Osterwalder, Pigneur and Tucci (2005) defined a business model as a conceptual map consisting of business modules and the relationships between them, presented in a way that presents how business brings value. Teece (2007) further state that business models dictate the approach to market for a business through either joint venture, partnerships, single. Pousttchi et al. (2007) further stated that six potential business models were created after research into the mobile payment systems using case studies in Europe: the market model, the value proposition model, the implementation model, the capital model, the distribution and communication model, and the threat model. Teece (2018) viewed the business model as a framework for how a business will achieve value for both internal and external customers.

Ondrus and Pigneur (2004) believed that it is in the best interest of mobile payment service providers to provide the best business model to encourage mobile users and merchants to adopt the mobile payment system provided. The business model views processes and incentives and how to best maximise returns for a firm (Teece, 2007). An organisational and financial architectural plan for the firm, this model is based on assumptions about environments and the internal functioning of the firm (Teece, 2007). Teece (2007) ascertained that the technology component is often overlooked in business models. When reviewing the framework for analysis and engineering of mobile payment business models by Pousttchi, Schiessler and Wiedemann (2009), the building pillars focus on business propositions and lack a technological pillar.

It is impossible to speak of business models in mobile payment terms without referring to the multi-sided platform market. The mobile payment ecosystem is a multi-sided platform (de Reuver et al., 2015) that involves two or more customer types and creates value for all customers (Jocevski et al., 2020). Market and adoption decisions are affected by multiple factors, and both types of customers (merchant and consumer) are critical to the

success of the ecosystem. Multi-sided platforms have the advantage of enabling a diverse set of users to interact in the same ecosystem, as well as network effects (Gannamaneni et al., 2015).

Haaker and Bouwman (2004) stated that the process of creating customer value in a business model is sometimes difficult because of the different interests of different stakeholders in the ecosystem (which are based on their strategic interests). De Reuver et al. (2014) ascertained that one of the major failings of mobile payment adoption might be because banks and telecoms have differing interests, strategies, and business models when it comes to innovation projects. This can be explained by examining the multi-sided nature of the mobile payment ecosystem. The ability to attract and retain a critical mass of customers on both sides of the platform has a big impact on the success of a mobile payment ecosystem (Gaur & Ondrus, 2012). Critical mass is crucial for the platform to reach an ignition stage (Ondrus et al., 2015) and is dependent on a mobile payment provider's business model (Iman, 2018).

The process of identifying an unmet customer need, identifying the technology to use to service that need, and the ability to structure the firm in a way to allow this are all factors for a business model (Teece, 2018). Merchants (small businesses/SMEs) will not invest in new technology like mobile payments without the guarantee of consumer adoption (Guo & Bouwman, 2016), and mobile payment platforms are crucial to the interaction between merchants and end-users (Guo & Bouwman, 2016). In their study on the success of Alipay in China, Guo and Bouwman (2016b) discussed how the merchants benefit from joining the Alipay mobile payment platform because of its large existing consumer base that has adopted the platform: the potential to increase their customer base is an incentive to take on the mobile payment system.

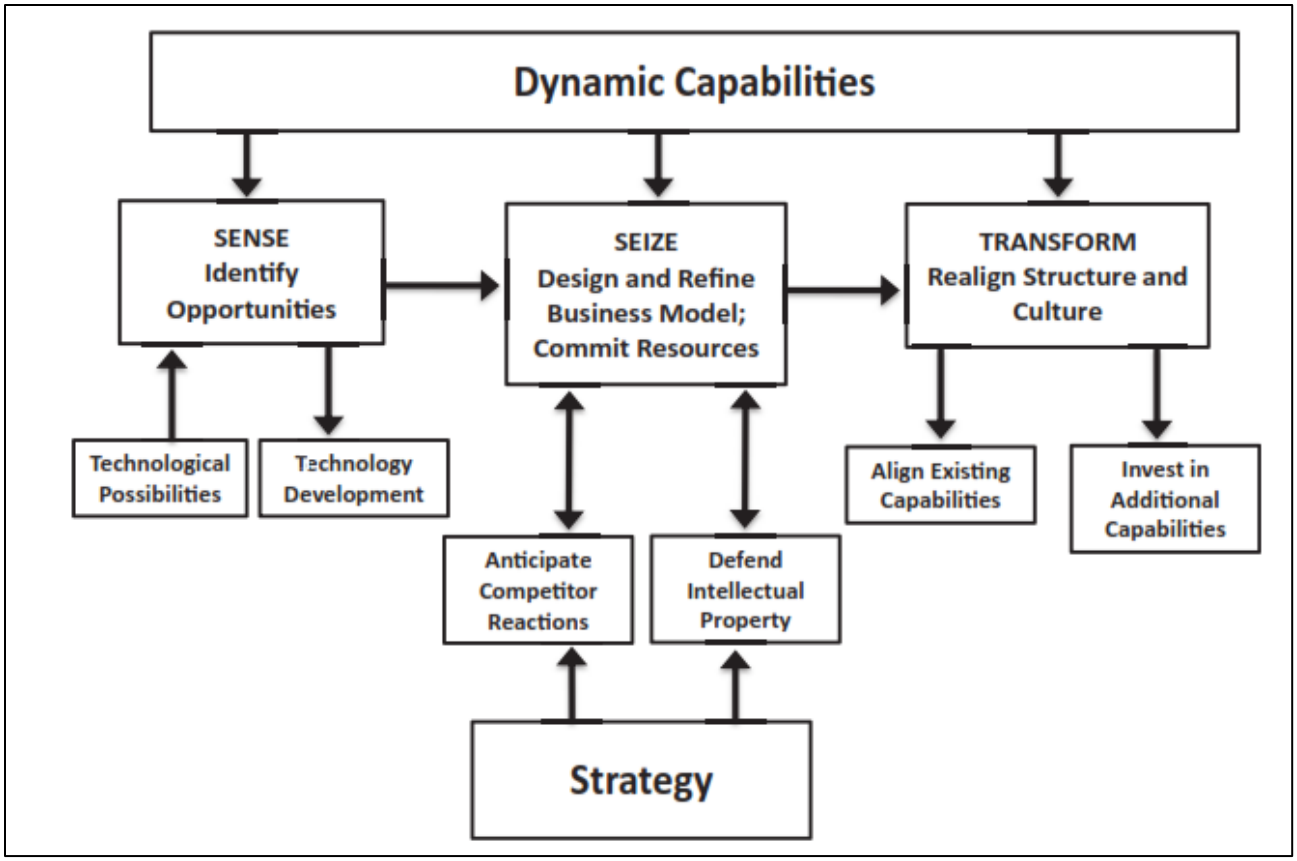


Figure 1: Dynamic Capabilities, Business Models and Strategy (Teece, 2018)

Teece (2018) deduced that business models, strategies, and dynamic capabilities are interlinked and have to work together to achieve optimal value for a firm. Teece (2018) depicted the combination of dynamic capabilities, strategy in a business model, and how a firm can use this to deliver a value proposition for customers as shown in the figure above. The capabilities (sense, seize, and transform) require the firm to be aware of the environment, looking to take advantage of technological changes. The strategy underpins this model and Shuen et al. (2014) shared those strong dynamic capabilities alone are not sufficient to result in competitive advantage; hence, strategy must match the capabilities. Through the seize capability, the strategy and business model form an ecosystem with the transform capability and the sense capability. This illustrates that a business model should be considered part of any ecosystem, given the factors that influence it and that are influenced by it.

Good business models are supported by a deep understanding of customer needs and the technology that a firm can use to enable the model. Teece (2018) further elaborated on how new business models are supported by new technological developments. Innovation is driven not only by technology: the business model that is selected to enable the capabilities of the innovation will have an impact on its success (Ondrus & Pigneur, 2009). Innovation is defined as a process wherein a new product or process is envisioned and then turned into reality (Robertson, 1967). Kreyer et al. (2002) identified that the merchant scenario (stationary merchant) generates the highest revenue potential and should be the focus of mobile payment providers in any form of a business model.

Ondrus and Lyytinen (2011) distilled the canvas model (figure below) (another strategic approach) into a basic form comprising the market aspects, the value proposition, the service/product that the customer will attain value from, other benefits such as loyalty schemes, and the infrastructure and financial aspects, in order to create the above dynamic model. Value proposition represents the value that the customer receives from the mobile payment proposition (Pousttchi et al., 2007). Osterwalder and Pigneur (2010) originated the canvas model as a shared set of perspectives that enable one to describe, imagine, and evaluate ever-evolving business models. The business canvas model has multiple building blocks, including customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structures. In August 2018, Absa and Samsung were involved in a collaboration to enable Samsung Pay for Absa's customers in Africa, before launching it commercially across South Africa (Absa, 2018). The collaboration approach that focuses on openness of the platform at the user level, results in greater market potential (Ondrus et al., 2015). The user base 's exposure is increased as a result of the intersection of different sets of user groups' exposure to the technology (Ondrus et al., 2015).

<table>
<tr><td rowspan="2">Key partners</td><td>Key activities</td><td rowspan="2">value propositions</td><td>Customer relationships</td><td rowspan="2">Customer segments</td></tr>
<tr><td>Key resources</td><td>Channels</td></tr>
<tr><td colspan="2">Cost structure</td><td colspan="3">Revenue streams</td></tr>
</table>

Figure 2: Canvas Model (BMI, 2020)

The involvement of merchants to attain critical mass in customers is deemed an essential milestone for success (Ondrus & Lyytinen, 2011). The authors further look at the value proposition for customers and their interaction with the manufacturers, as they are responsible for the interoperability to a certain extent. These processes and stakeholders are also key, as they fuel the demand side of the market. The model then explores the regulatory issues that the firm will have to deal with as part of the environment.

2.5.3 Consumer Adoption

Consumers have played, and will continue to play, a key role in the adoption of technology, as well as attaining any value proposition offered by businesses. Research literature about consumer adoption is most common for mobile payment adoption (Dahlberg et al., 2007; Ghezzi et al., 2010). To further understand mobile payment ecosystems, an exploration of the history of consumer adoption of mobile payments studies was conducted. The following section explores Asia-, Europe-, and Africa-focused studies on mobile payments from a consumer perspective.

Van der Heijden (2002) reviewed the factors impacting the adoption of internet payments and used this as the basis to review factors for adoption of mobile payments given the similarities in the channel of payments, costs, ease of use, security, and technical feasibility. Van der Heijden (2002) also proposed that cost and ease of use of mobile

payment systems are the key factors in its adoption, while Ondrus and Pigneur (2004) argued that security is critical to its mainstream adoption, as consumers want to use a system they can trust. Security can be categorised into the following dimensions: confidentiality, authentication, integrity, authorisation, and non-repudiation (Linck, Pousttchi & Wiedemann, 2006). Security looks at ensuring that the information of the payment and, more importantly, the card holder cannot be viewed by unauthorised persons or altered during the process (Linck et al., 2006).

Gao and Waechter (2017) found performance expectancy trust impact continuance usage of mobile payments in China. Perceived trust and perceived risk were identified as factors in study in Thailand (Phonthanukitihaworn, et al., 2016); In Indonesia, the attractiveness of the rewards associated to mobile payments influenced usage (Bhimasta & Suprapto, 2017). Perceived ease of use and usefulness were identified as drivers to consumer adoption of mobile payments in Bangladesh (Islam, 2016), while perceived risk and usefulness were identified as factors impacting user acceptance in China (Wu, Liu & Huang, 2017). From a South Korean perspective, assurance policy was identified as a key factor in consumers' evaluation of mobile payments services (Choi et al., 2020).

Based on research in USA and Europe, Pousttchi (2003) advocated that consumers' acceptance is the key to mobile payment system acceptance. The belief that understanding customer/consumer adoption factors will allow one to solve and explain the entire adoption framework for mobile payments is not the correct approach and is impeding understanding of the mobile payment ecosystem. While the consumer adoption research has aided understanding of intentions and factors impacting a consumer, it must be noted that the mobile payment ecosystem has multiple actors.

Silic, Back and Ruf (2014) found that in a European context, security was a critical factor in the success of mobile. This was supported by Liebana-Canillas et al., (2018) found similar results in France regarding contactless payments while, Oliveira, Thomas, Baptista and Campos (2016)'s study in Portugal supported this finding, adding that performance expectations, innovativeness, social influence and compatibility were

identified as key factors in recommending mobile payments to users. Liebana-Cabanillas et al. (2018) further found that perceived usefulness impacted Spanish smartphone users' intentions to use mobile payment services. These study findings are consistent with the findings of researchers in different countries and contexts, as detailed in Chapter 1.

The findings are somewhat similar in African countries: In South Africa, adoption of WeChat wallets is influenced by trust, security, and privacy (Matema & Li, 2018). Trust, risk, and habitual use impacted use of mobile payments by middle-class South Africans (Kilian & Kabanda, 2017). Verkijika (2020) found that affect and anticipated regret played a significant role in adoption of mobile payments, and factors such as costs, security, and convenience are the essential conditions to be met if consumer acceptance is to be ensured (Pousttchi, 2003). These factors are later expanded on in research conducted by Ondrus and Pigneur (2004). Gannamaneni et al. (2015) proposed that there is a need for significant added value that will allow consumers to take on mobile payments and move away from their current payment channels. In keeping with the multiple factors already identified as impacting consumer adoption, Dahlberg et al. (2015) identified 27 constructs in their literature review of mobile payments.

2.5.4 Merchant Adoption

Merchant adoption is key to further understanding of the mobile payments' ecosystem. As noted earlier, there is limited research in this field. The following section will detail the founding frameworks that have been used to understand mobile payments, their value, and merchant adoption.

The payment process is central to the provision and purchase of goods and services like electricity, food, water, taxes, healthcare, salaries, and education, all of which help an economy function. Merchants and other actors in the ecosystem serve customers, who are the end consumers of these services and products. Ondrus and Pigneur (2005) noted that the digitisation of the payment process would become essential due to the success of e-commerce, with mobile payments becoming part of the evolution of the shopping

process. Merchant adoption of mobile payments was seen as a challenging process, as merchants are the ones who have to pay the mobile payment provider for the service (similar to credit card fees) (van der Heijden, 2002).

The initial factors identified by van der Heijden (2002) were based on internet adoption by consumers as there was little research on mobile payments. In figure 3 below, three factors were identified: cost relative to substitutes, ease of use relative to substitutes, and perceived risk. Given that this would be a new technology, ease of use from both consumer and merchant perspectives is significant.

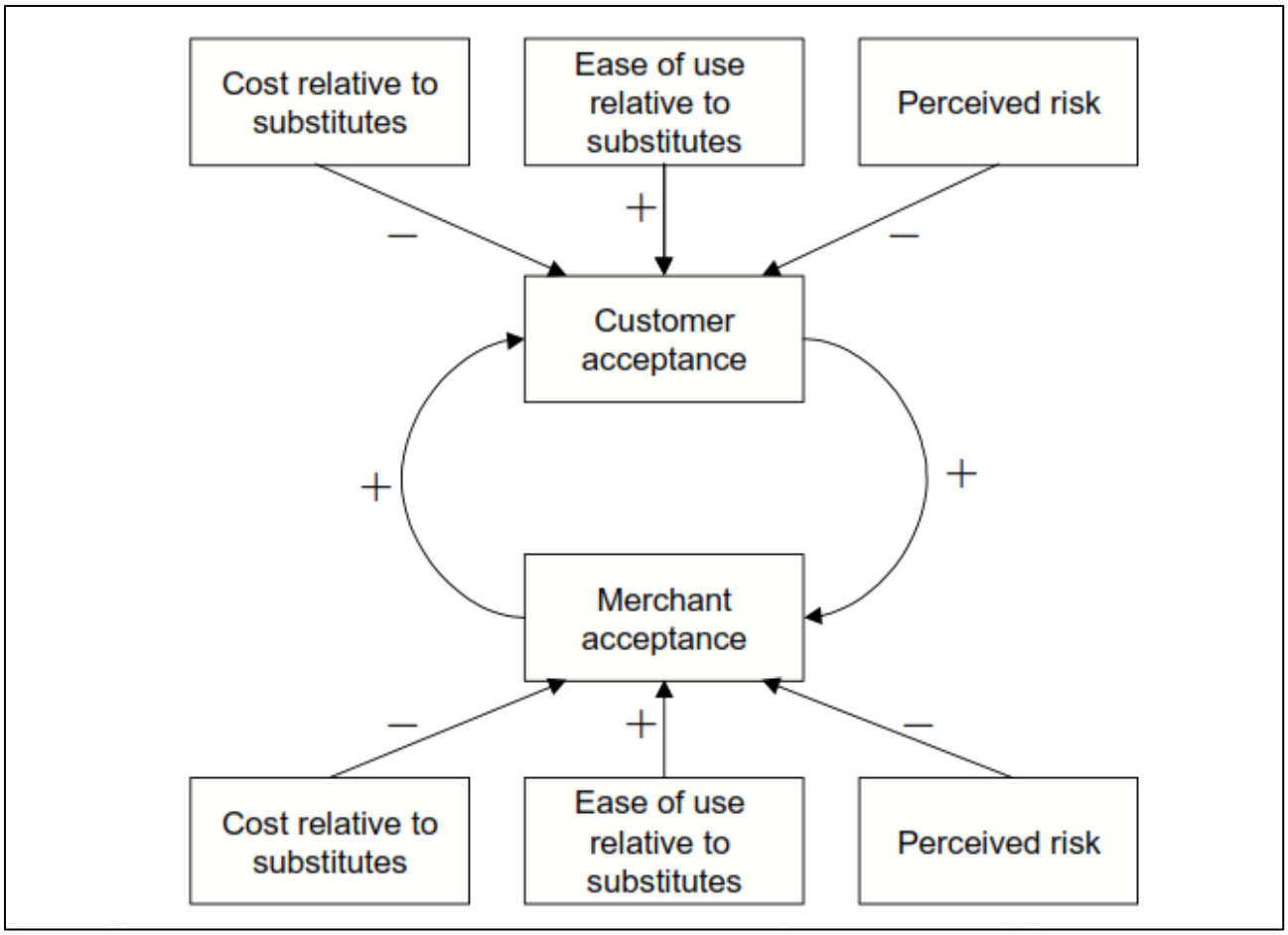


Figure 3: Mobile Payment Systems (van der Heijden, 2002)

In their initial studies, Teo et al. (2005) constructed the model shown in figure 4 below, building on the work by van der Heijden (2002). The model displays a basic view of the

stakeholders envisioned to be involved in a mobile payment process, with the key participants being merchants and customers. This was a high-level view of the ecosystem, with little to no view on the relationships between the stakeholders. It did, however, set the foundation for future research to build on this ecosystem view.

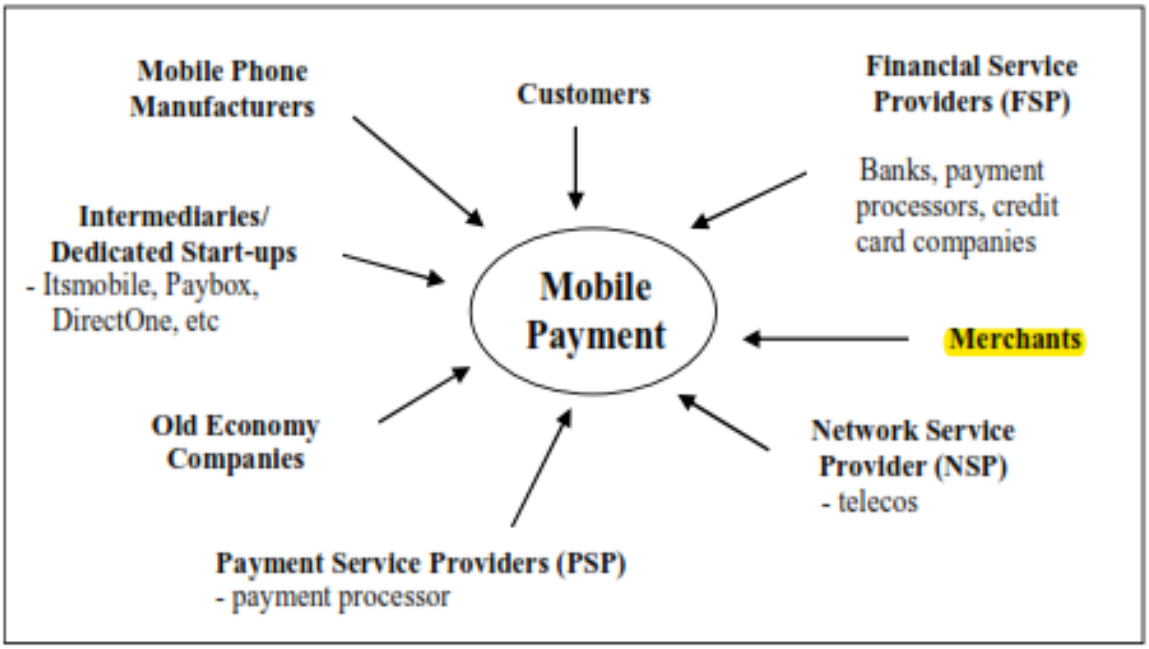


Figure 4: Mobile payment ecosystem (Teo et al., 2005)

The ecosystem show in Figure 4, identifies multiple stakeholders, starting with the mobile phone manufacturers providing the mobile device that a customer or merchant can use in the shopping process. The intermediaries/dedicated start-ups provide the software used by mobile devices or a proprietary hardware device used in the payment process. The financial service providers (such as banks) are the institutions holding financial value and are where transactions would eventually be settled. The merchants include businesses that offer products and services (examples include restaurants, kiosks, pharmacies, grocery stores, and bookstores). Telcos/MNOs are the owners and operators of the cell phone towers and software that allows for the communication of the mobile devices (Kreyer et al., 2002).

Dahlberg et al. (2007) refined the model constructed by Teo et al. (2005) and designed the framework below. This framework indicated that consumers and merchants have influence on mobile payment service provision and are all influenced by external factors, which can be cultural, technological, legal, regulatory, or commercial. From a theoretical perspective, this advanced mobile payment research field due to the all-encompassing view of internal and external stakeholders and the dynamics and constraints impacting each.

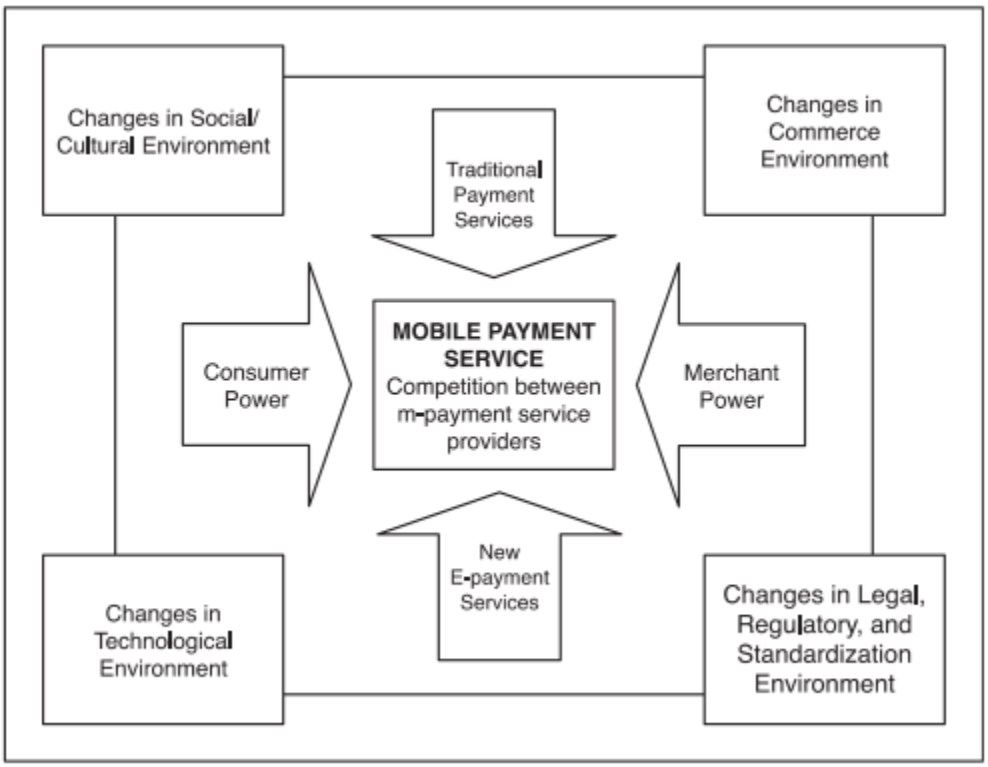


Figure 5: Framework: Mobile Payment Ecosystem (Dahlberg et al., 2007)

The four blocks in the corners shown in figure 5 above indicate the external factors that have an impact on the mobile payment ecosystem. Examples are listed below:

- Changes in social/cultural environment: Covid-19 impact on social lives (United Nations, 2020).
- Changes in technological environment: Vodacom's introduction of a smartphone costing less than R100.00 (Reporter, 2018).
- Changes in legal, regulatory, and standardisation environment: Commencement of the POPI Act in South Africa in June 2020 (South African Government, 2020) or the Competition Commission and Vodacom's settlement agreement on data prices (Competition Commission South Africa, 2020).
- Changes in commerce environment: Impact of the Steinhoff collapse (Mittner, 2017) and the lockdown impact on the South African economy (South African Reserve Bank, 2020).

2.5.5 Payment Process

The following section will detail the mobile payment types, mobile wallets, and other mobile-related payment processes, in addition to exploring the payment process with the aim of gaining a deeper understanding of it and where the mobile payment process fits into this process. Ondrus and Pigneur (2006) classified mobile payments as based either on card schemes or on smart phones. Figure 6 below is a simplified view of the payment process involving a customer, a merchant, an issuing bank, and an acquiring bank.

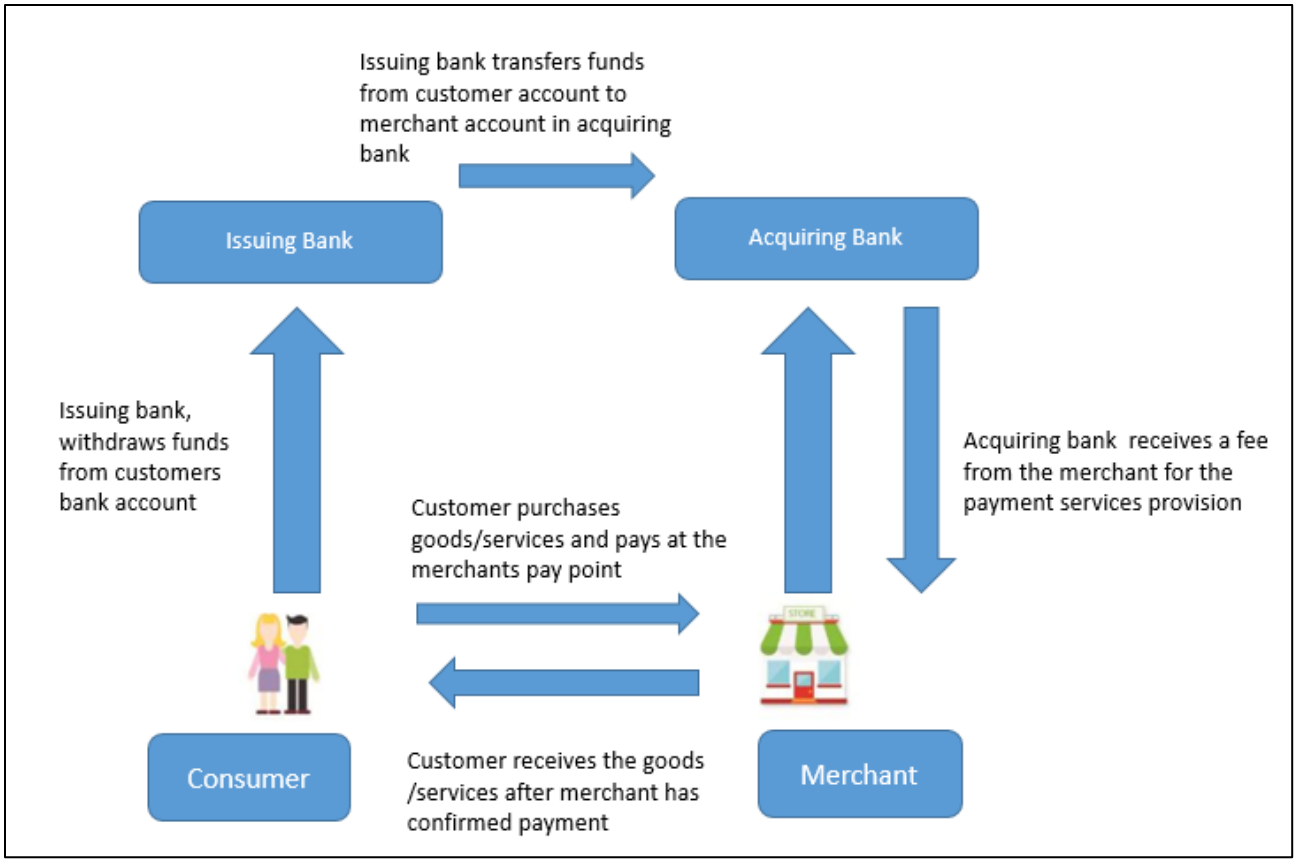


Figure 6: Payment Process Overview (Ondrus, 2003)

The following shows the chronological order of the process when a customer makes a payment using a mobile payment device:

- A consumer shops for product and proceeds to make a payment.
- The payment process is initiated by the consumer at the merchant's pay point (POS) by scanning the barcode or by tapping the mobile device.
- The merchant receives the payment from the consumer.
- The issuer is the financial institution that holds the customers funds, and the acquirer is the financial institution that holds the merchant's funds (Ondrus, 2003)
- The consumer enters the payment amount into their application on their mobile device and a PIN.
- The consumer confirms the payments, and a confirmation of payment is sent by the issuing bank to the merchant's mobile device (Ondrus & Pigneur, 2006).

The mobile payment market in South Africa can be categorised according to who initiates it: the customer or the merchant. The two categories are defined as follows:

Customer initiated refers to a situation wherein customers have full control of the payment process (specifically the initiating and processing of the payment). Using Snapscan as an example, customers enter the amount that is to be paid and merchants receive immediate notifications on their mobile devices when the payment is complete. Merchant initiated refers to situations wherein merchants initiate the payment process on their devices, hand this to the customer, and then complete the payment process. This is a friction point in the experience and can be improved.

Mobile payments can be categorised into two sectors based on their transaction value: micro-payments and macro-payments (Pousttchi, 2004).

Macro-payments: These are payments that are typical of normal transactions and have a value of £2.5 or higher. Examples include purchasing plane tickets, paying bills, and effecting remittances (Kreyer et al., 2002). Transaction costs have been identified as an inhibitor to the mobile payment process and in macro payment these costs are not as prohibitive as they can be in micro and pico payments (Kreyer, et al., 2002).

Micro Payments: These comprise payment values of up to £2.5 (less than R50) (Kreyer et al., 2002). Dahlberg et al. (2015) and Ondrus and Pigneur (2004) defined micro payments as peer-to-peer (P2P), low-value transactions which are usually paid using cash or debit cards and which have a low value of less than R200. highlighted that micropayments have a problem in terms of cost efficiency, whereas macro-payments require a higher level of security and claims management. Merchants are often reluctant to accept credit cards for micropayments because of the transaction fees (Ondrus & Pigneur, 2004).

Mobile Wallets

Mobile wallets are defined by Shin (2009) as a form of store of payment carried out through a mobile device where their physical wallet is replaced by a virtual wallet. Mobile wallets can be sub-divided into digital wallets and mobile wallets, as described below:
Digital wallets: Value is stored in digital form and they can be used to store information from credit and debit cards, plane tickets, and health cards, among other (ENISA, 2016)**.**
Mobile wallets: Similar to digital wallets, mobile wallets such as Android Pay and Apple Pay comprise proprietary hardware and software.

Ondrus and Pigneur (2004) proposed that mobile phones will replace wallets, allowing customers to shop and pay for their goods and services using their devices. With an increase in the use of their services on mobile devices, PayPal boasts a higher checkout rate (88% of users) on its wallet than those of other mobile-wallet operators (55%) (Paypal (b), 2018).

Mobile Banking

Mobile banking is the provision of banking services on mobile devices like phones, and includes USSD, Web, and app channels (Zhou et al., 2010). Banking and financial services can be provided through mobile apps where customers can carry out financial transactions (Khiaonnarong, 2014).

The economic impact of the mobile device is well documented, especially in developing and African countries. Alibman and Sulong (2016) showed that mobile phones and access to the internet have facilitated economic growth in sub-Saharan countries. In addition, the penetration of mobile phones is growing faster in Africa than in any other region in the world: there were more than 420-million unique mobile subscribers by the end of 2016 (GSMA, 2017).

Near Field Communication (NFC)

Near Field Communication (NFC) is a data-transmission process with a specific frequency that enables the interpretation of an inactive circuit (Ortiz, 2006). It involves data transmission without the use of a wireless network (Pal, Vanijja & Papasratorn, 2015). NFC-enabled mobile devices comprise an NFC controller, an antenna, and the secure element located in the phone, allowing a consumer to initiate and complete the payment by holding their mobile device close to the NFC-enabled payment terminal (de Reuver et al., 2015)

NFC has encountered challenges resulting from interoperability issues, especially in Japan, but South Korea proposed a solution through the implementation of platforms for mobile payment firms to develop on. The widespread use of NFC can be observed in the use of tap-and-go cards, such as those used for the Oyster bus and train pass in London. Locally, the Gautrain in Johannesburg allows customers to make contactless payment for access to the train using their NFC-enabled bank cards (Gautrain, 2019). Based on their review of the Swedish market, expert findings agreed that NFC technology is best placed to give increased customer value and experience due to factors such as flexibility, ease of use, and convenience (Ondrus & Pigneur, 2009).

Remote

According to Evans (2016), remote or proximity payments account for most payments made in developed countries. This method allows a customer to pay for goods or services in a merchant store using a mobile device instead of cash or cards. Given the similarity in definitions, it can be argued that the term ‘remote payments’ encompasses all mobile payments. Remote payments for digital content can be done using SMS or the Internet (Gannamaneni et al., 2015).

2.5.6 Types of Mobile Payments

Table 4 below categorises the identified mobile payment systems according to the classification by Ondrus (2003). The list is not exhaustive but details the well-known, mobile-related payment technologies locally and internationally.

Table 4: Classification of Mobile Payment Systems

Payment technology	Mobile payment technology type
Absa Pebble	External card reader linked to merchant's mobile device
Samsung Pay	Payment software built into the phone (mobile wallet)
Apple Pay	Payment software built into the phone (mobile wallet)
Android Pay	Payment software built into the phone (mobile wallet)
Alipay	Mobile wallet
Blu Mobi (Standard Bank)	External card reader
Ecocash (Zimbabwe)	Mobile wallet
FNB Geopayments	Mobile wallet using mobile number of customers
FNB Scan To Pay	Mobile Payment enabled through NFC on mobile phone
Gustpay	Wearable payment band
IKhokha	External card reader
Sureswipe	External card reader linked to merchant's mobile device
Snapscan	Digital wallet
Square	External card reader
Master pass QR	Mobile wallet
Masterpass (Digital Wallet)	Digital wallet
MPesa	Mobile money using mobile number of customers
Nedbank PocketPos	External card reader
WeChat Pay	Payment software built into the phone
WapPoint	External card reader
Yoco	External card reader linked to merchant's mobile device
Zapper	Mobile wallet activated by scanning of QR code and customer pin
Zip zap	External card reader linked to merchant's mobile device

The Blu Mobi device, Nedbank Pocket POS, and Absa Pebble are mini-POS (Point of sale) devices used in conjunction with an application on a merchant's smartphone to accept payments from customers. Ondrus et al. (2015) encouraged platform providers to initiate a strategy to achieve critical mass as quickly as possible to avoid the platform losing value. Such strategies include the extensive marketing campaigns that Samsung implemented for the launch of Samsung Pay in South Africa in August/September 2018.

2.5.7 Mobile Payment Solutions in South Africa

The following section details some of the mobile payment solutions listed in table 4, with a focus on South African mobile payment solutions. South Africa has an increasing number of fintech's and payment providers who are providing mobile payment services, mobile wallets, and other mobile-related transaction services. Payment services such as FNB e-wallet, Snapscan, and Samsung Pay are becoming more visible in merchant displays at markets and stores. To provide contextual evidence of the South African mobile payment landscape, the following sections detail some of the mobile payment services available in South Africa.

Snapscan

Website: https://www.snapscan.co.za/user.html
Merchants: 50 000+
Costs: R250 once off and 3% transaction fee

Snapscan is a mobile application available on Android and iOS stores for both consumers and merchants to download and use on most smartphone mobile devices. Once the application is downloaded onto a user's smartphone, Snapscan (2019) claim it will take less than five minutes for a user to register and start using it. As part of the registration process, the customer captures one or more credit cards, which are encrypted into the application (Snapscan, 2019). The customer also sets a PIN number that they will use

every time they want to pay using the application. The Snapscan payment process involves the user opening the application on their mobile device, scanning the QR code displayed by the merchant, entering the amount and confirming payment using the PIN number (Snapscan, 2019). An SMS is sent to the merchant when the payment has been processed. Each Snapscan QR code is unique to a merchant, allowing Snapscan to identify them.

Snapscan allows e-commerce shopping sites to have the QR code on their websites, creating a payment channel. Some of these sites are those belonging to Spree, Superbalist, and Yuppie Chef (Snapscan, 2019). Snapscan is powered and backed by the Standard Bank Group. The application has been integrated into the bank's services and allows customers to pay various municipalities for everything from speeding fines and traffic infringement penalties to electricity bills (Snapscan, 2019).

Zapper

Website: https://www.zapper.com/merchant
Merchants: 50000+
Costs: R0-199 per month or 2.2-2.9% transaction fee

This is a mobile application that is available on both Android and iOS stores for both consumers and merchants to download and use on most smartphone mobile devices. Zapper assigns a unique QR code to the merchant, which the customer scans when they want to initiate and complete a mobile transaction (Zapper, 2019). As part of the registration process, the customer captures one or more credit cards which are encrypted into the application (Zapper, 2019). The customer also sets a PIN number that they will use every time they want to pay using the application. The Zapper payment process involves the user opening the application, scanning the QR code displayed by the merchant, entering the amount and confirming payment using the PIN number (Zapper, 2019).

Zapper also serves as a digital wallet: customers can store their loyalty cards in the application instead of holding cards in a physical wallet (Zapper, 2019). Zapper offers a POS device and system that is integrated to the Zapper QR codes.

Zapper offers a differentiated proposition by engaging in capital provision for small businesses through its Quick Capital (Zapper, 2019). This funding is available to the merchant and is based on the merchant's record of sales through the application. Funding is granted within 24 hours and payment terms are based on the projected future sales based on sales trends. Zapper claims that there is no compound interest on the cash advance funding provided (Zapper, 2019).The business is, in essence, borrowing from itself for its growth.

FNB Geopayments

Website: https://www.fnb.co.za/ways-to-bank/digital/banking.html
Merchants: Data unavailable
Costs: None

First National Bank (FNB) provides its customers with the option to make payments to any other individual without adding their banking details, as long as they are within 50 metres of each other (FNB, 2019). The individual receiving the funds must download the FNB Banking App to withdraw them, or they can withdraw the funds through an e-wallet that they must have created with FNB. An e-wallet can easily be created by dialling a USSD code and following the instructions, and the e-wallet is based on the individual's mobile number. The individual can proceed to an ATM and withdraw the funds.

Flickpay

Website: http://www.flickpay.co.za/
Merchants: Unknown as company is no longer operational
Costs: No longer operational
Flickpay (2016) would generate a unique code for each customer's transactions that was then linked to the merchant's code when they initiated the payment process. Flick Pay (2016) had to be integrated into the merchant's point-of-sales to inform the cashier when the payment had been completed, as the response was sent to the point-of-sale directly.

The customer also set a PIN number to use every time they wanted to pay using the application. The Flickpay payment process was similar to that used by Zapper and Snapscan: it involved the user opening the application, scanning the QR code displayed by the merchant, entering the amount and confirming payment using the PIN number. All of these steps were carried out on the customer's mobile device. Unfortunately, Flickpay was closed at the beginning of 2017, although their applications are still available in the Android and Apple stores.

Yoco

Website: https://www.yoco.co.za/za/
Merchants: 30 000+
Costs: R499 per month OR 2.95% transaction fee

Yoco is a fintech in South Africa that specialises in the acceptance of card payments using a mini point-of-sale device. There are no binding contracts or monthly fees for the use of the device, but the fees depend on what the merchant transacts through the platform.

Yoco offers devices that a merchant can purchase or rent. They provide a business portal where a merchant can create an account, log in, and begin to track and view spending

patterns and analytics that are provided free of charge. The insights are tailored to each business and are based on the sales and pricing models implemented by the merchant (Yoco, 2020). Like Zapper, Yoco has a cash-advance program for merchants using Yoco and meeting certain criteria. Capital offer is the product offering and is available to all merchants. A merchant just has to login and check to see if they qualify for an offering and a decision will be made instantly for them (Yoco, 2020).

2.5.8 Mobile Payment Adoption Factors

The following section will detail the factors of merchants' adoption of mobile payment, as identified in the limited literature. These factors will be analysed before the barriers to adoption are discussed. It should also be noted that some factors are identified as both barriers and drivers of adoption.

Customer Service

More customers can be serviced if there are multiple payment channels to meet their preferences (for example customers using cash and customers using more advanced mobile payment). This can contribute to enhanced customer service, which could increase merchant adoption of mobile services (Mallat & Tuunainen, 2005). Given the low survival rate of SMEs in South Africa, the aspect of customer service is critical to ensuring repeat customers, referral business, and a good public image for the business.

Pilot Testing

Mallat and Dahlberg (2005) indicated that a precondition for successful payment-method adoption by merchants is the successful pilot testing thereof. A pilot study is like testing the market's receptiveness before the launch of a product or service. It would be advantageous if mobile payment solution providers could pilot the solution with merchants and receive feedback that they can use to improve the product and service.

Pilot testing was not identified as factor in any other research on mobile payment adoption and would likely need to be tested in a different context to confirm applicability. Australia

conducted mobile payment trials in 2001 and 2004 (Telstra (dial a coke) and mPARK (mobile parking payment)) and these were deemed successful (Teo, et al., 2005). Coca-Cola Amatil (CCA) successfully pilot tested the use mobile payments on vending machines using QuickTap on NFC enabled smartphones and implemented this technology across Australia based on the successful pilot (Tung, 2014).

The level of merchant adoption of a payment method will impact how and if a consumer will use it (Mallat, 2007). Gannamaneni et al. (2015) argued that merchants should be involved early in the design process as they are the key users and interaction point for customers. Merchants and the payment options in their place of operation can ideally direct customers to a payment of channel of choice if they so wish. Merchants are in a position to promote the use of mobile payments (Gannamaneni et al., 2015), and technology firms such as Tencent have used this principle by testing features with merchants before carrying out a large-scale rollout (Jao, 2019)

Impulse Purchase

Impulse purchasing or impulse buying refers to the act of purchasing a product based on sudden urge, despite no prior intention to do so (Beatty & Ferell, 1998), or as a persistent and sudden desire to buy something (Rook, 1987). The topic of impulse buying is explored because of the nature of a shopping experience: if a customer gives in to a sudden urge and selects an item to buy, the payment or check-out point is the last step at which they could stop the purchase. A merchant who offers multiple payment options, including mobile ones, could benefit from impulse purchases as the availability of multiple payment options reduces the chance of a customer reconsidering. Lai and Chuah (2010) ascertained that mobile devices can influence the shopping habits of customers by allowing them to make payment anytime and anywhere. The spread of smartphones means that impulse shopping is no longer an in-store phenomenon: it can now occur in the mobile commerce world as well (Euromonitor International, 2013).

Mallat and Dahlberg (2005) stated that impulse purchases are a convincing reason for merchants to have mobile payment options available. Mallat and Tuunainen (2008) explored the benefits of mobile payments for merchants and discussed the potential to increase impulse purchases. Mobile phones are arguably the most rapidly distributed devices in the world: there are 150 mobile devices for every 100 people in South Africa (CIA, 2018). Abbamonte (2018) found that 77% of shoppers had engaged in at least one impulse purchase over a three-month period, with Kreis (2019) noting that 73% of shoppers had purchased unplanned food items on their shopping trips. Kreis (2019) further noted that 65% of respondents indicated that discounts influenced their decisions to make an impulse purchase. More than 50% of purchases initiated by 18–24-year-olds was due to impulse buying (Bedford, 2020). Mallat and Tuunainen (2008) ascertained that there is an increased likelihood of consumers making a purchase if mobile payments are available. Lee and Kacen (2008) further shared that the internet and mobile devices make the purchasing process easier, increasing the likelihood of a consumer purchasing products and services.

New Customers

The addition of an extra payment channel will likely attract more customers for merchants, which will increase the likelihood of sales (Mallat & Tuunainen, 2005). Mallat and Dahlberg (2005) found that introducing mobile payment services will likely attract younger customers, teenagers, people who do not have cash on hand, and technologically orientated individuals who are more inclined to use mobile devices. It is the opinion of the researcher that new forms of payment will continue to attract new customers of all natures.

The topic of new customers has been discussed in the literature review section specifically the consumer adoption section. In the South African context, Matema and Li (2018) found that adoption of WeChat wallets is influenced by trust, security and privacy. Further evidence by Killian and Kabanda (2017) showed that factors such as trust, risk,

and habitual use impacted the use of mobile payments by middle class South Africans. Verkijika (2020) found that affect and anticipated regret played a significant role in influencing adoption of mobile payment methods. Two important aspects to consider when discussing new customers or consumer adoption are network effects and the role of critical mass in enabling adoption by new customers. The critical mass aspect and network externalities are discussed below.

Network externalities

Network externalities play a role in the diffusion and adoption of a product or service (Gallaugher, 1997), including that of mobile payments among merchants (Pisani & Moormann, 2018). Zmijewska and Lawrence (2005) share that network externalities can improve the success and diffusion of mobile payments. Katz and Shapiro (1985) shared that there are different types of network externalities to consider: direct and indirect externalities. Direct externalities are associated with the benefits that a customer gets from consuming a particular good or service (Katz and Shapiro, 1985).

Witt (1997) further noted that network externalities are a major feature of the diffusion process of innovative technologies, as well as an indication of market penetration. The author further elaborated on the demand and supply sides of network externalities. In the context of this study, merchants can be considered on the supply side (as they have the mobile payment systems in their operations) and consumers on the demand side.

Network externalities are defined as the benefits that consumers get from using particular goods (Kats & Shapiro, 1985; Church & Gandal, 1991) or benefits a customer will enjoy due to the presence of a network (Dahlberg & Mallat, 2002) – the more a customer base grows, the more the value and adoption of a product or service (Gallaugher, 1997). Katz and Shapiro (1994) elaborated on the definition of network externalities or network effects, sharing that the importance and value derived in an ecosystem is positively impacted by more actors joining the ecosystem and expanding the network.

Standardisation

In the mobile payment ecosystem, standardisation can lead to limited adoption by merchants (van der Heijden, 2002; Haaker & Bouwman, 2004; Mallat & Tuunainen, 2005). This is because mobile payment systems require proprietary software or extra hardware that cannot be used for anything else. This issue was raised by Mallat and Tuunainen (2005) in their research on merchant adoption, while Haaker and Bouwman (2004) stated that the level of integration required between a merchant's systems and the mobile payment system impacts the levels of adoption of mobile payment solutions. Standardisation is identified as a crucial element for successful business-to-consumer adoption of mobile payments (Ondrus & Pigneur, 2006; Kreyer et al.,2002), making it important for standards to be established before merchants and consumers readily adopt mobile payments (Lai & Chuah, 2010).

Ondrus and Pigneur (2006) further stated that the combination of immaturity and a lack of standards in the market is affecting adoption. Because networks are a form of exchange, standardisation is crucial and ensures that customers experience the additional benefits of a larger network (in other words, that they have access to the same or improved services or products from a larger base of merchants (Gallaugher, 1997). The continued lack of standardisation (despite its identification in early mobile payment research) can be attributed to the different types of technology that can be implemented to facilitate it from NFC (near field communication) to RFID (radio frequency identifier). Katz and Shapiro (1985) highlighted that a central tenet of markets (enabling products from different firms to be used together) displays the principle of standardisation. Authors have further examined the impact of network externalities on the standardisation of an ecosystem.

Japan has a flourishing mobile payment ecosystem wherein merchants and customers reached a critical mass for the adoption of the service. The ecosystem has multiple mobile payment providers working off the technology platform provided by Osaifu-Keitai through NTT Docomo, which allowed firms to create their own mobile payment platforms (Ondrus et al., 2015). This collaboration facilitated an increase in the number of users exposed to mobile payments and allowed market potential to be exceeded, with more than 1.4-million POS devices able to accept mobile payment across Japan by 2014 (Ondrus et al., 2015).

Mobile payment systems that are linked to particular mobile-network operators or financial institutions and which do not allow interoperability, pose a challenge to merchants by reducing the number of customers able to use the method of payment (Mallat & Dahlberg, 2005). Solutions on offer therefore need to be capable of working in conjunction with merchants' existing cash registers, hardware, and software (Mallat & Dahlberg, 2005). An increasing number of solutions and the lack of standardisation may confuse both consumers and merchants and lead to a lack of adoption by the latter (van der Heijden, 2002; Mallat & Tuunainen, 2005; Mallat & Dahlberg, 2005).

Ondrus and Lyytinen (2011) stated that there is limited understanding of factors ensuring the success of mobile payment services and identified a sparsity of cases displaying adoption success. Markets are different and there are inherent complexities within each environment and hence payment markets will differ in line with the markets they operate (Ondrus & Lyytinen, 2011). In an analysis of failed mobile payments companies in Europe and Asia, it was highlighted that merchant swere not given enough incentives to move away from their existing payment channels to the new alternative of mobile payments (Gannamaneni, et al., 2015).

Incompatibility with business practices

Perceived lack of incompatibility was identified as a significant barrier to merchant adoption of mobile payment services, indicating that any new technology or process that a business takes on should, at the very least, augment its practice, and must fit into current business processes. For example, the suitability of mobile payments for the purchase of digital content may not extend to supermarket checkouts (Mallat & Dahlberg, 2005). Indeed, Mallat and Tuunainen (2008) found that 36 of 104 consumer respondents would use mobile payments for purchases that involve a checkout process.

The South African mobile payment market is fragmented and displays a lack of interoperability between system providers; for example, both Absa and Nedbank provide proprietary external devices to use for accepting payments, while Snapscan requires an application to be downloaded by both consumer and merchant. This situation differs from that in Japan, where Docomo created a platform allowing firms to create different, interoperable mobile payment solutions thereby creating a platform standard.

Katz and Shapiro (1985) discussed the nature and importance of incentives prompting firms to produce compatible products, while Kreyer et al. (2002) addressed the complexity and difficulty of securing agreements and negotiations between various stakeholders in the mobile payment ecosystem. This is likely a result of the revenue sharing and risks associated and could explain why there are limited joint ventures in the South African ecosystem, as well as why there are failures like that of MTN Mobile Money (Chutel, 2016). The mobile payment system market is younger than other technologies, especially payment options such as cash and card. Katz and Shapiro (1985) proposed that firms (including mobile payment system providers) decision to make market compatible products depends on the size of the externalities and the benefits associated with making that decision.

The study conducted by Ondrus and Pigneur (2005) indicated that financial institutions' failure to launch the CASH mobile payment method could be attributed to a weak partnership between the merchants (the adopters of the system) and the financial institutions. The realisation that partnerships can lead to greater synergies has led financial institutions in South Africa partnering or acquiring payment solution providers. Such partnerships increase the chances of success of a mobile payment solution due to the credibility associated with financial institutions. In South Africa, Samsung Pay was launched in collaboration with Absa, Snapscan was launched in collaboration with Standard Bank after FireID was acquired by the bank.

Katz and Shapiro (1985) suggested that firms collaborate to enable interoperability and compatibility of their products in a bid to reach a level of standardisation. An example of this in the field of mobile payments would be Zapper and Snapscan working together to enable a shared platform that both customers and merchants can use regardless of the mobile payment application on their smartphones.

Mobile payment solutions must increase efficiency in the shopping process and decrease time spent by employees on payments processes in store. Mallat and Dahlberg (2005) proposed that mobile payments can reduce costs and improve efficiency by reducing the amount of time that consumers spend in the checkout process and leading to unmanned checkout points. Mobile payments were supposed to reduce transaction costs for merchants and allow customers to purchase goods and services at any time and place (Mallat & Tuunainen, 2005).

In terms of compatibility, another perspective to discuss is the compatibility of the systems: Incompatibility between mobile payment systems and existing business systems and processes hinders merchant adoption (Mallat & Tuunainen, 2005), and possible incompatibility issues with existing POS and ICT infrastructure is noted as a managerial concern for mobile payment adoption (Lai & Chuah, 2010). The big investments made by small businesses in payment systems (POS devices and the associated accounting software) make incompatibility a potentially disastrous risk. Mobile

payments are considered unsuitable for high-value transactions and merchants prefer to use them for low-value transactions (Mallat & Tuunainen, 2005). The researcher argues that this is also a matter of merchants' trust and risk assessment – losses in low-value transactions are easier to cope with than those of high transaction values. In Mallat and Tuunainen's (2008) study, surveyed businesses revealed using mobile payments for lower-priced goods and services such as lunch, food, ringtones and logos, vending machine products (drinks, photos), betting, and entering the lottery. The factors noted by Mallat and Tuunainen (2008) laid the foundation for future discussions about constructs for the adoption of mobile payment services by small businesses (i.e., merchants).

Lower commission, costs and charging model.

Mallat and Tuunainen (2005) stated that lack of a suitable charging model (revenue flow) inhibits merchant adoption of mobile payments, as does the level of technology available at the time (Mallat & Tuunainen, 2008). Mallat and Tuunainen (2008) stated that mobile payments involving phone calls and SMSs are vastly different to the mobile payments offered currently (post-proliferation of smartphones and applications on smartphones), which can be made using apps (mobile wallets such as Google Pay and Snapscan, for example), plug-in devices, QR codes, and USSD.

SMEs are cost sensitive. This study's literature review discussed the impact of finances and access to credit on the survival and success of an SME. Any process that will reduce costs and increase sales will interest merchants. According to Salomann, Kolbe and Brenner (2005), retailers adopted new technologies to reduce operation costs and expected a quicker return on investment from these technologies. Mobile payment systems which cost more than (or even the same as) could impede merchant adoption (Mallat & Dahlberg, 2005).

High costs (exceeding or even equalling those of incumbent methods such as credit cards) of extra hardware and software, commission, subscription fees, and any other expenses can hinder merchants' adoption of mobile-payment services (van der Heijden, 2002; Teo et al., 2005; Mallat & Tuunainen, 2005; Li, 2018). While high set-up costs were a significant problem in the early days of mobile payment systems, the advancement of mobile devices offers low-cost mobile payment systems that do not always require extra devices (Mallat & Dahlberg, 2005). While Cabanillas et al. (2016) also found that the chances of merchants' adoption of mobile payment systems improves with their familiarity and acceptance of costs related to using these services, Boateng et al. (2020) indicated that cost was still a major factor (concurring with earlier findings by Mallat and Tuunainen, 2005 and Mallat and Dahlberg, 2005).

Although mobile payment system fees need to be more competitive than the existing commission and service fees that merchants are paying for other payment services (eg. credit cards), merchants noted that they received little support and enticement from mobile-payment providers (Mallat & Dahlberg, 2005).

Complexity

Cabanillas et al. (2016) state that the multi-sided market (with its various stakeholders and processes) of the mobile payment ecosystem is more complex than that of other payment ecosystems, including the current standardised methods of cash (local scenario) and cards (be it a credit card or a debit card). Mallat and Tuunainen (2005) found that complexity can be a hindrance to merchant adoption, stating that "Mobile payments should be able to compete with cash and card payments in terms of ease of use" (Mallat & Tuunainen, 2005). More recently, Cabanillas et al. (2016) argued that, although complexity was an issue in 2008 and earlier, the widespread use of mobile technologies has alleviated this concern.

Critical Mass

Mallat and Tuunainen (2005) discussed critical mass as a part of network externalities: because cash is one of the main forms of payment in South Africa, merchants deem it difficult to introduce a new payment option if there is a large affinity to the existing channels. Widespread enquiry about a payment option could convince merchants to adopt and offer it (Teo et al., 2005). Merchants only adopt mobile payments if critical mass is reached by consumers in accepting mobile payments (Ondrus et al., 2015; Mallat & Tuunainen, 2005). High usage rates in the long term are identified as a consumer pattern that would likely convince merchants to adopt mobile payments (Mallat & Dahlberg, 2005). One of the reasons for the failure of new payment innovations is lack of merchant involvement in the development process. Merchants seek a process that is easy to use and trust (Dahlberg & Anssi, 2007).

Ease of Use

Ease of use in terms of technology adoption has been widely studied using the Technology Adoption Model (TAM). Studies on consumer adoption of mobile payment technology indicate that perceived ease of use and perceived usefulness were strong indicators to intent to adopt mobile payments (Kim, Mirusmonov & Lee, 2010).

Merchants value the speed and ease of use of a mobile payment solution at check-out points, and but no solutions available met these requirements (Mallat & Dahlberg, 2005). Findings from mobile payment research support Davis' (1989) theory of technology adoption and the impact of ease of use, with Salomann et al. (2005) stating that customers who do not have prior knowledge regarding the use of a technology (innovative or not) may find the experience challenging and stressful. Aspects of design (such as small user interface) are identified as causes of difficulty in using mobile payment technologies (Zmijewska & Lawrence, 2005)

Trust and Security

Trust involves an intrinsic belief that a consumer will have a positive experience with a mobile payment service provider based on goodwill and honesty (Patil, Tamilmani, Rana & Raghavan, 2020) and that all parties will be ethical in both the short term and in the long term (Gefen, 2002). Tamilmani et al. (2020) further found that trust plays a major role in consumers' attitudes towards adopting mobile payments. Wang, Ngamsiriudom and Hsieh (2015) concluded that trust underpins the development of a successful relationship between two or more entities, such as merchants and consumers.

Problems in trust and security are deemed inhibitors to mobile payments if not addressed (van der Heijden, 2002), as in the case of mobile payment adoption in Ghanaian SMEs (Boateng et al., 2020). Studies in adjacent areas of e-commerce and online shopping show that trust is a significant factor from a consumer perspective (Gefen, Karahanna & Straub, 2003), address the effect of word of mouth on trust in an online shopping environment (Awad & Ragowsky, 2008), and investigate the impact of trust on satisfaction with online vendors (Fang, Qureshi, Sun, McCole, Ramsey & Lim, 2014). Wang et al. (2015) further added that a consumer's increased trust increases adoption in the e-commerce and m-commerce spaces. Large telecommunication companies and financial institutions are trusted more than small firms and start-ups (Mallat & Tuunainen, 2005). Reuver, Verschuur, Nikayin, Cerpa and Bouwman (2014) argued that the Trusted Service Manager (TSM) is critical for mass acceptance by both consumers and merchants as it provides authentication.

Security is identified as a significant factor for adoption and mass acceptance from both a consumer perspective and a merchant perspective. Ondrus (2003) and Zmijweska and Lawrence (2005) deemed security an important factor for success of mobile payments. Further study by Lai and Chuah (2010) noted that despite the advance in technology, security was a concern for mobile payments. Teo et al. (2005) revealed that over 50% of the responses elicited in their study cited security as an issue in adoption. Ondrus (2003) further identified authentication, availability, data integrity, and confidentiality as some of the criteria relating to security that would need to be examined.

Summary

In 2016, Current C (a mobile payment app that was backed by Walmart, Target, and Wendy's) was forced to shut down due to lack of consumer and merchant adoption (World Economic Forum, 2017). This highlights that, despite the adoption and support of large franchises and access to thousands of merchant points, successful mobile payment requires an entire systemic adoption by all parties (World Economic Forum, 2017). China's Alipay serves as an example of success due to acceptance by the majority of parties involved in the mobile payment ecosystem, including banks, financial institutions, consumers, and merchants (Guo & Bouwan, 2016b).

Although this research was conducted more than a decade ago, the constructs for adoption are still valid. Given the rapid pace of change in mobile devices and technology, these constructs need to be tested and validated in the context of South Africa's economic situation, the differing levels of SMEs in the country, and the education levels of SME owners and consumers.

Mallat and Tuunainen (2005) identified two main points regarding merchant adoption: The first is that mobile payments have a different value proposition to other payment options, and the second is that only a few of the merchants interviewed could associate mobile payments with advantages such as reduced costs, indicating that mobile payments were not being sufficiently exploited to bring value to the businesses.

2.6 CONCEPTUAL FRAMEWORK

Despite the limited direct literature on the merchant mobile payment adoption factors, there is a common thread that is apparent in the works reviewed and discussed in the earlier sections. The following section will identify the main constructs that have emerged from the literature. Teece (2007) indicated that a framework is derived from reality and attempts to classify constructs and depict their relationships in a meaningful way. The framework that will be proposed here will be underpinned by the theoretical lens of the T-O-E and the dynamic capabilities. A conceptual framework is a useful way for a researcher to express ideas and concepts and to present findings (Smyth, 2004).

Teece (2007) proposed that the use of an analytical framework can help entrepreneurs to identify important identified threats and opportunities. Feiler and Teece (2014) elaborated by stating that, in some markets, management should develop models and test the models based on customer insights to understand future demand. This is applicable to firms that have the resource base to carry out the activity. This research proposed to produce a conceptual framework as part of the process so as to further the understanding of the role of the merchant within the mobile payment ecosystem. The conceptual framework produced in this research is based on prior research and persona as proposed by Maxwell (2013) and experience of the researcher with the technology and their experiences with merchants with mobile payment devices.

This study contributes by developing a framework of factors that are relevant in the adoption of mobile payments by SMEs in South Africa. This conceptual framework allows for better understanding of drivers and barriers to mobile payments by SMEs in South Africa and adds the context of a developing country. Mallat and Tuunainen (2005) combined their drivers and barriers to draw up the conceptual framework in Figure 7 below to depict mobile payment adoption by merchants. The conceptual framework identifies the prerequisites for implementation of a mobile payment solution as they are fundamental in ensuring the successful adoption of mobile payments. This aids in solving a real world problem as required of conceptual frameworks.

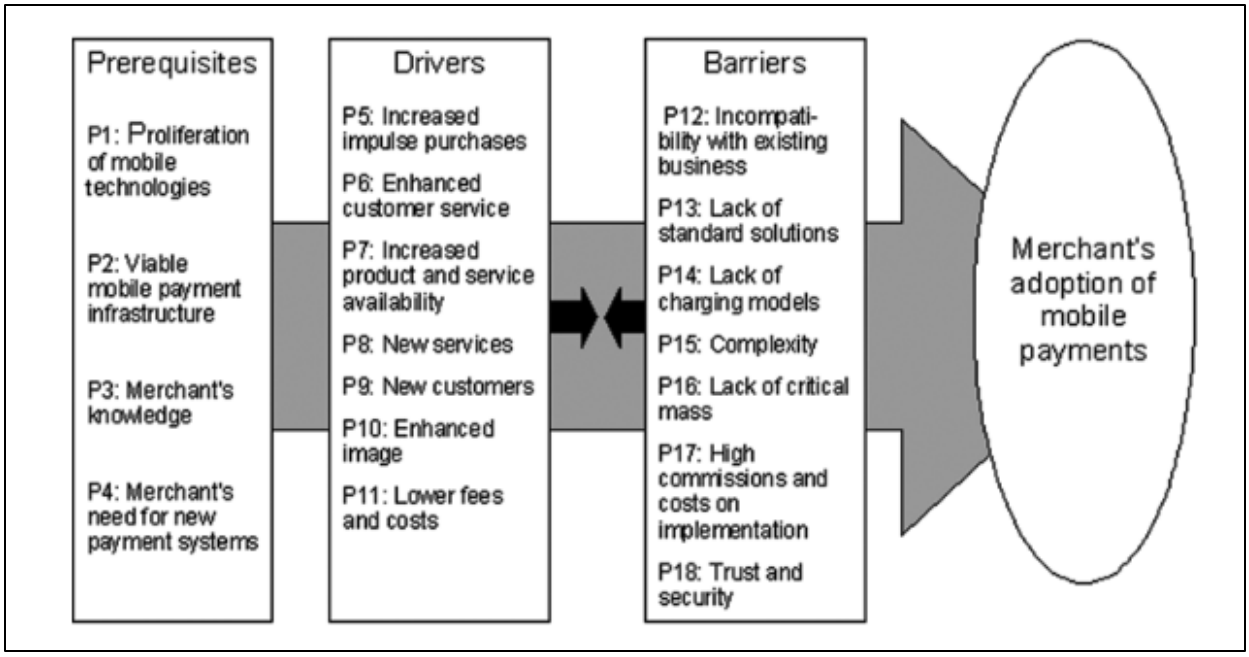


Figure 7: Framework for Merchant Adoption (Mallat & Tuunainen, 2005)

Mallat and Dahlberg (2005) called for an evaluation of the results related to the framework in Figure 7 because they acknowledged that mobile infrastructures differ from country to country and wanted to confirm their findings in different countries. Their research was carried out in the early 2000s and there have been few additions to it, explaining the gap in literature. While insightful, the research was localised in developed countries such as Finland, Sweden and Netherlands and little has been done since these seminal articles to confirm or dispute the factors and constructs discussed (Mallat and Dahlberg, 2005; van der Heijden, 2002).

Transaction fees are regarded as critical in impacting adoption of mobile payments by merchants (van der Heijden, 2002; Teo et al., 2005). Van der Heijden (2002) stated that most merchants are small and medium enterprises and would prefer a cheaper alternative such as cash payments. Large retailers can afford the cost of investing in mobile payment technologies and rolling out devices, but SMEs are already under significant financial pressure and cannot afford this extra overhead.

The prospect of increased sales and reduction in transaction costs were found to positively influence adoption of mobile payment methods (Mallat & Tuunainen, 2005). Ease of use on the merchant's side was identified as a cause for concern: an employee that did not understand how the mobile payment system worked would be unable to deal with potential problems experienced when a customer wanted to pay using a mobile device (van der Heijden, 2002).

Van der Heijden (2002) stated that, since most mobile payments are micropayments (also known as low-value payments), financial loss would be limited to low-value transactions in the event of a system breach. However, this perspective does not consider credit and debit card details that can be exposed in a security flaw.

Mallat and Tuunainen (2005) identified lack of trust by merchants in any of the parties involved in the payment process as a significant barrier to adoption. Mallat and Tuunainen (2008) further stated that few studies have examined security in mobile payments from the view of merchants. These constructs are a decade old and limited research has been carried out to validate this limited set of constructs.

Network externalities refers to the benefits provided to consumers by the presence of a network (Dahlberg & Mallat, 2002). Universal usage and acceptance were identified as important prerequisites for mobile payment penetration. Table below summarises the constructs that will be used in this research, based on the literature review undertaken in the previous section that has detailed the identified constructs.

Table 5: Identified Constructs

Identified Constructs	Sources
Incompatibility with existing business	Mallat & Dahlberg (2005) and Mallat & Tuunainen (2005)
Trust and Security	Mallat & Dahlberg (2005), Mallat & Tuunainen (2005) and Pousttchi, (2004); Pidugu, (2015); Mhlongo (2016)
Perceived lack of standardisation	van der Heijden (2002), Mallat & Tuunainen, (2005), Ondrus & Pigneur (2006) and Ondrus & Pigneur, (2005); Pidugu, (2015)
Cost (relative to substitutes)	van der Heijden (2002), Mallat & Dahlberg (2005), Mallat & Tuunainen (2005), Teo et al., (2005), Pousttchi (2004) and Ondrus & Pigneur (2006); Abebe and Lessa (2020); Mhlongo (2016)
Ease of Use (relative to substitutes)	van der Heijden (2002) and Ondrus & Pigneur (2006); Pidugu, (2015); Kalan (2016); Abebe and Lessa (2020)
Perceived Risk	van der Heijden (2002)
Network effects	Pousttchi (2004); Pidugu, (2015)
Network externalities	Van Hovve (2001); Pidugu, (2015)
Business model	Mallat & Dahlberg (2005), Mallat & Tuunainen (2005), Ondrus & Pigneur (2005); Pidugu, (2015)
Technology compatibility	Mallat & Dahlberg (2005), Mallat & Tuunainen (2005) and Ondrus & Pigneur (2005); Pidugu, (2015)

A literature review and assessment of the T-O-E provided a basis for categorising these constructs within the dynamic framework to provide a theoretical basis for the furthering of the research. The proposed Merchant Mobile Payment Conceptual Framework (MMPCF) is a conceptual framework based on the seminal literature discussed in this chapter (Chapter 2). Based on the constructs from literature, the bars on each side represent macro- economic factors as detailed in the Mobile Payment Ecosystem by Dahlberg et al., (2007). This view gives the ecosystem that merchants exist, noting the

other actors such as customers, financial service provider and mobile payment system system providers.

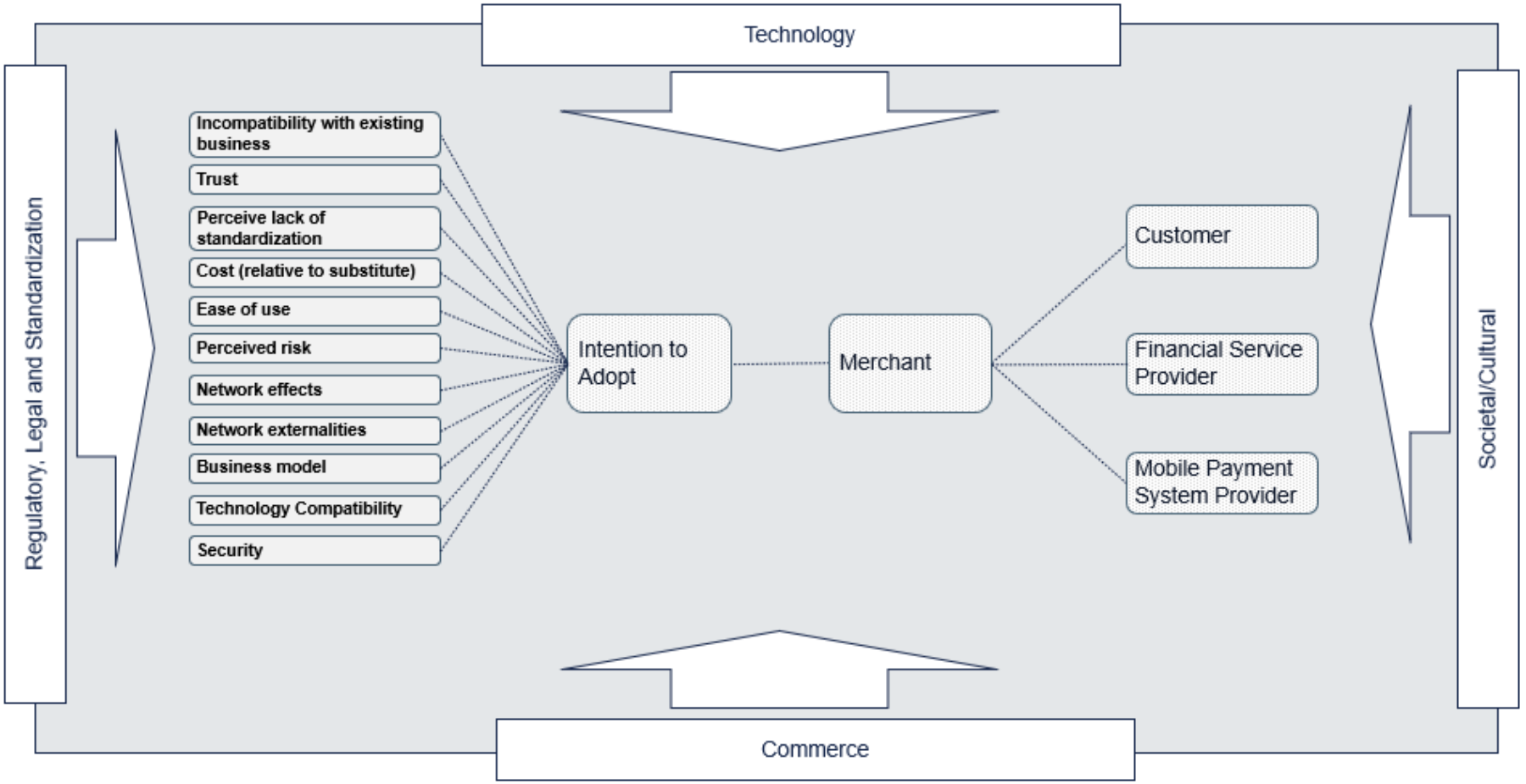


Figure 8: Merchant Mobile Payment Conceptual Framework (MMPCF)

2.7 THEORETICAL FOUNDATIONS

All research questions have theoretical underpinnings, and theory can either shape the questions or the questions can emerge from the theory (Agee, 2009). The Technology Acceptance Model (TAM) (Davis, 1989), The Mobile Technology Acceptance Model (MTAM) (Ooi & Tan, 2016), The Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), The Theory of Planned Behaviour (Ajzen, 1991), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003) have all been used extensively in explaining technology adoption and various variables in the field of mobile commerce (Chhonker et al., 2017). As discussed earlier, most research was carried out using the TAM model, with researchers aiming to add constructs or test the model in different countries and settings. Ooi and Tan (2016) updated the TAM to form the MTAM, with a particular focus on explaining consumer adoption of mobile payment systems.

More than 91% of the research conducted in the mobile commerce field between 2008 and 2016 used quantitative methods indicative of a strong positivist paradigm (Chhonker et al., 2017). Despite calls by Dahlberg et al. (2015) to diversify the research methods and to enrich the data of mobile-based research, the quantitative trend continues. The following sections and sub sections will discuss two theories and their applicability to this study. Given the setting of the MMPCF and exposure to various external and internal forces, the T-O-E theory provides a complementary lens into the ecosystem for this research. Given the early stages of mobile payments, maturing business models, and two-sided market views, the Dynamic capabilities framework enables deeper understanding of business models in the mobile payments' ecosystem.

2.7.1 Technology-Organisational-Environmental (T-O-E)

Developed in 1990 by Tornatzky and Fleischer (1990), the T-O-E framework views a firm's pursuit of innovation adoption in three contexts: technology, organisation, and environment (Alharbi, Atkins & Stanier, 2016; Piaralal, Nair, Yahya & Karim, 2015). The technology context refers to technology's impacts (both internal and external) on the firm (Baker, 2011); the organisation context provides an internal view of the firm by referring to its structure, formality, and size (Baker, 2011); and the environment context refers to the external ecosystem that a firm interacts with, particularly competitors, government and regulatory bodies (Tornatzky & Fleischer, 1990). These contexts are expanded on as follows:

Organisational context refers to internal factors that a firm control (including employees and top management) and to changes in organisational structures caused by incoming technology (Tornatzky & Fleischer, 1990; Alharbi et al., 2016). Piaralal et al. (2015) stated that organisational context examines other factors that affect decision making and how quickly and easily a new technology is introduced into the company, including factors like the quality of human resources, organisational support in decision making, and the company's size. Angeles (2014) deduced that the organisational context involves management structure, both formal and informal linkages within and outside the firm, while Lutfi, Idris and Mohamad (2016) incorporated other factors like owner/manager support. Lai and Chuah (2010) further found that organisational factors play a critical role in the intention to adopt mobile payment systems.

Environment is the area around a firm which consists of stakeholders, industry members, competitors, suppliers, customers, community (Angeles, 2014), structure of industry, and service providers (Baker, 2011). The environment has a direct impact on the success or failure of any technology that the firm decides to adopt, with Baker (2011) stating that firms in industries that are growing rapidly tend to be more innovative and adopt innovative practices. Customer behaviour, change in spending patterns, change in methods of payments, and competitor offerings all impact customer offerings and the

technology that an SME uses. Government regulations (for example the lockdown in South Africa), macro-economic conditions (for example repo-rate reductions in South Africa during lockdown), and political tensions are factors impacting the environment that a business operates in (Baker, 2011; Hoti, 2015 & Alharbi et al., 2016). The factors mentioned above are summarised under competitive pressure, government support, regulatory pressure, and customer pressure (Piaralal et al., 2015).

Herrington and Kelly (2012) argued that regulations and inefficiencies in the government processes are factors that prevent some micro businesses (informal) from moving to the formal sector. Kabanda and Brown (2017) found that the success of an economy and the businesses in it depends on government and regulatory support.

Technological context examines a firm's technology choices internally and externally (Baker, 2011). The technological lens of the T-O-E examines both internal and external technologies and how these can be used to improve an organisation, addressing aspects from the use of emails to the rollout of fibre technology in a city (Hoti, 2015). Technological factors include relative advantage, complexity, compatibility, adoption cost, and the company image (Piaralal et al., 2015). Hoti (2015) asserted that the Diffusion of Innovation (DOI) provides the important aspects of technological innovation and complements the T-O-E, as the T-O-E adds the environmental perspective and leads to a more holistic view.

Complexity relates to the level of difficulty of the technology (Rogers, 1983). Awa et al. (2017) defined compatibility as the alignment of technology both within and outside of the firm with procedures, existing infrastructure, values and norms to improve the firm and make it more competitive.

Relative advantage considers how superior a technology is to its predecessor. In this study it would examine how mobile payments are better than the payment options they are replacing (cash and credit/debit cards).

The T-O-E framework has been used extensively in explaining organisational adoption of information systems and new technologies, including cloud computing adoption by Saudi SMEs (Alharbi et al., 2016), adoption of green practices in SMEs (Piaralal et al., 2015), and e-Government (electronic government services) in Jordanian companies (Thi, Lim & Al-Zoubi, 2014). The framework has been used in different research strategy approaches with both qualitative and quantitative data collection methods (Hoti, 2015). In their conceptual model, Awa et al. (2017) proposed the inclusion of the individual as an extension of the T-O-E, looking specifically at subjective norms and hedonistic drivers when looking at the adoption factors using T-O-E.

Piaralal et al. (2015) argued that there are few firm level theories that can be used to study the adoption of IT in firms. Alharbi et al. (2016) then stated that a combination of T-O-E and DOI has proven most effective given the consistency and applicability of the DOI. Maduku, Mpingajira and Duh (2016) added that the T-O-E is more suited to studies of firm than the DOI is, as it considers the environmental context. Due to the nature of mobile payment innovation and the fact that this research the author carried out is a firm level research, the T-O-E is the most appropriate framework to use (Alharbi, Atkins & Stanier, 2016). Environmental and organisational factors have been shown to influence e-commerce adoption by SMEs in Tanzania (Kabanda & Brown, 2017).

Table 6 below provides a summary of some studies that were theoretically steeped in T-O-E and which showed significant results across the different adoption studies.

Table 6: Technology-Organisation-Environment (T-O-E) Studies

Title	Notes	Authors
Drivers and Inhibitors Impacting Technology Adoption: A Qualitative Investigation into the Australian Experience with XBRL	Australian organisations involved with XBRL	Troshani and Doolin (2005)
Technological, Organisational and Environmental Antecedents to Web Services Adoption	772 IT professionals surveyed	Lippert and Chittibabu (2006)
Using the Technology-Organization-Environment Framework for Analysing Nike's "Considered Index" Green Initiative, a Decision Support System-Driven System	Nike	Angeles (2014)
Influence of T-O-E factors on Accounting Information Systems (SIDU) among Jordanian Small and Medium-sized Enterprises	Owner / Manager commitment, organisational readiness, competitive pressures and government support were found to have a significant impact on the usage of AISU in SMEs	Lutfi, Idris and Mohamad (2016)
A model of adoption determinants of ERP within T-O-E framework	**SME's in Port Harcourt, Nigeria**: Adoption of ERPs by SMES is more dependent on technological factors than the other factors	Awa and Ojiabo (2016)
Factors affecting hotel's adoption of mobile reservations systems: A technology-organisation-environment framework	**Hotels in Taiwan:**	Wang, Li, Li and Zhang (2016)
An Integrated Perspective of T-O-E Framework and Innovation Diffusion in Broadband Mobile Applications Adoption by Enterprises	Adoption of broadband mobile applications by enterprises	Chiu, Chen and Chen (2017)
Revisiting technology-organisation-environment (TO-E) theory for enriched applicability	**SMEs in Port Harcourt, Nigeria**: Innovation adoption is driven more by T-O-E factors than by individual factors	Awa, Ukoha and Igwe (2017)
The Role of Competition in the Adoption of Mobile Payment among Merchants	**Merchants with physical POS devices in Germany**	Pisani and Moormann (2018)
Smart Contracts and Internet of Things: A Qualitative Content Analysis using the Technology-Organisation-Environment Framework to Identify Key-Determinants	-	Schmitt, Mladenow, Strauss and Schaffhauser-Linzatti (2019)
Critical success factors of green innovative: Technology, organisation and environment readiness	**SMEs in China**	Zhang, Sun, Yang and Wang (2020)

Summary

Bhattacherjee (2001) stated that the success of an information system depends on continued usage, rather than on initial acceptance. Dahlberg et al. (2007) argued that there is already significant research on consumer adoption using the well-established TAM and UTAUT, yet little is known about merchants. The TAM, UTAUT, DOI, TRA, and TPB have been reported in studies and their constructs are well defined and tested regarding consumer adoption (Dahlberg et al., 2015). Ondrus & Pigneur (2009) identified that one of the technology reasons that mobile payments was facing issues in the Americas and a majority of the European countries was because the mobile payment system firms were using SMS, WAP and IVR technologies compared to Asia that was enabling RFID technology. The impact and understanding of local technology and environmental factors are vital to increased understanding of adoption factors in the mobile payment ecosystem.

2.7.2 Dynamic Capabilities

Teece et al., (1997) states that although the dynamic capabilities framework was compiled to analyse a firm's wealth creation, several studies have considered its use in different fields like entrepreneurial capabilities (Roudini & Osman, 2012), semi-conductors, information services, software (Teece, Pisano & Shuen,1997), and oil and gas (Teece, 2014). Teece (2007) viewed dynamic capabilities as the foundational elements delivering competitive advantage to a firm. Ambrosini and Bowman (2009) further stated that dynamic capabilities are based on the proposition that resources are valuable, rare, imperfectly imitable, and imperfectly substitutable, attributes which may lead to a competitive advantage.

Gargi and De (2014) argued that there is inadequate research on dynamic capabilities and their impact on firm performance. Fernandes, Ferreira, Gimenez and Rese (2017) stated that there is not enough research into the role that entrepreneurs and managers play in dynamic capabilities with regards to small firms.

Dynamic capabilities are rooted in asset positions, processes, and paths, with 'paths' referring to the strategic processes selected to create dynamic capabilities (Pisano, 2015). The words 'disruption' and 'hyper-competition' are currently used to describe the present-day environment; however, Pisano (2015) argued that most environments are relatively stable with well-defined markets, relative rivals, and competition. Pisano (2015) further proposed that dynamic capabilities are not limited to dynamic 'product' markets and are equally important in stable markets.

There are many definitions of dynamic capabilities, and each serves a different purpose (Helfat & Peteraf, 2009). For a clear understanding of dynamic capabilities, both 'dynamic' and 'capabilities' must be defined and understood separately and in context. In their works, Teece et al. (1997) referred to 'dynamic' as the ability to evolve with the changing business environment and defined 'capabilities' as a role that management plays in optimising resources, skills, and processes through integration, adaptation, and reconfiguration to match the changing environment. Ambrosini and Bowman (2009) proposed that 'dynamic' refers only to change in the resource base and does not include the environment. Teece et al. (1997) further defines dynamic capabilities as:
"a firm's ability to integrate, build and reconfigure internal and external competences to address a rapidly changing environment".

Winter (2003) proposed that dynamic capabilities are a high-level routine combined with its processes that results in a firm's management possessing options for producing an output. Ambrosini and Bowman (2009) argued that the various definitions have resulted in an agreement that dynamic capabilities refer to a firm's ability to modify its resource base in such a way that it creates a new resource that provides competitive advantage.

Hashim, Raza and Minai (2018) identified entrepreneurial competencies as a set of competencies affecting the performance of a firm. Teece et al. (1997) stated that the key element of competences lies in firm processes, and that it is within these processes that a firm's dynamic capabilities and competitive advantage lie. These processes are combined with a firm's position and the path it takes. 'Path' in this context refers to the

strategic options that a firm can choose depending on the return of investments (Teece et al., 1997). Pisano (2015) asserted that if capabilities are to be of strategic importance, they must be shaped by management decisions. Teece et al. (1997) viewed competencies and capabilities as one concept referring to the way a firm operates.

Capabilities are the intangible aspects of a firm that are hard to replicate but are unique to a firm firm (Teece, et al., 1997). Capabilities allow a firm to reconfigure, integrate and build internally when faced with an external change that threatens its' position or offers an opportunity for expansion or growth(Teece, et al., 1997). Teece (2007) built on this research by proposing that micro foundations like distinct skills, processes, organisational structure, and decisions underpin the dynamic capabilities process of sensing, seizing, and reconfiguring.

The use of new payment technologies (including mobile payment, crypto currencies, and wearable payments) can lead to the creation of new dynamic capabilities through creation of knowledge in these processes. Management should note that technology adoption is not a static process and is enabled by dynamic capabilities (Arifin & Frmanzah, 2015). Table 7 below lists some technology-related studies conducted using the Dynamic Capabilities framework.

Table 7: Technology Related Studies in Dynamic Capability

Research	Authors
Technology Acquisition through Convergence: Capabilities	Hacklin, Marxt and Inganas (2005)
Role of Dynamic Capability and Information Technology in Customer Relationship Management: A Study of Indian Companies	Desai, Sahu and Sinha (2007)
Building Dynamic Capabilities in Web Start-ups	Gran-Jansen, Rygh and Sahlen (2014)
The impact of ICT utilisation and dynamic capabilities on South Africa SMEs	Xu and Kim (2014)
Achieving Dynamic Capabilities with Business Intelligence	Adeniran and Johnston (2016)
Analysing Dynamic Capabilities in the Context of Cloud Platform Ecosystems – A Case Study Approach	Rudolph (2017)
Mobile apps usage and dynamic capabilities: A structural equation model of SMES in Lagos, Nigeria	Owoseni and Twinomurinzi (2018)
Transforming entrepreneurial posture into a superior first product market position via dynamic capabilities and TMT prior start-up experience	Ahmadi and O'Cass (2018)

Figure 9 below was constructed by Ambrosini and Bowman (2009) and shows how dynamic capabilities have a direct influence on the resources within a firm and how this directly impacts competitive advantage. The value creation process (the process of transforming resources) is influenced by factors such as managerial behaviour, social capital, and organisational knowledge. This framework proposes and acknowledges that dynamic capability is not a static concept – it is influenced by both internal and external factors of the firm (Ambrosini & Bowman, 2009).

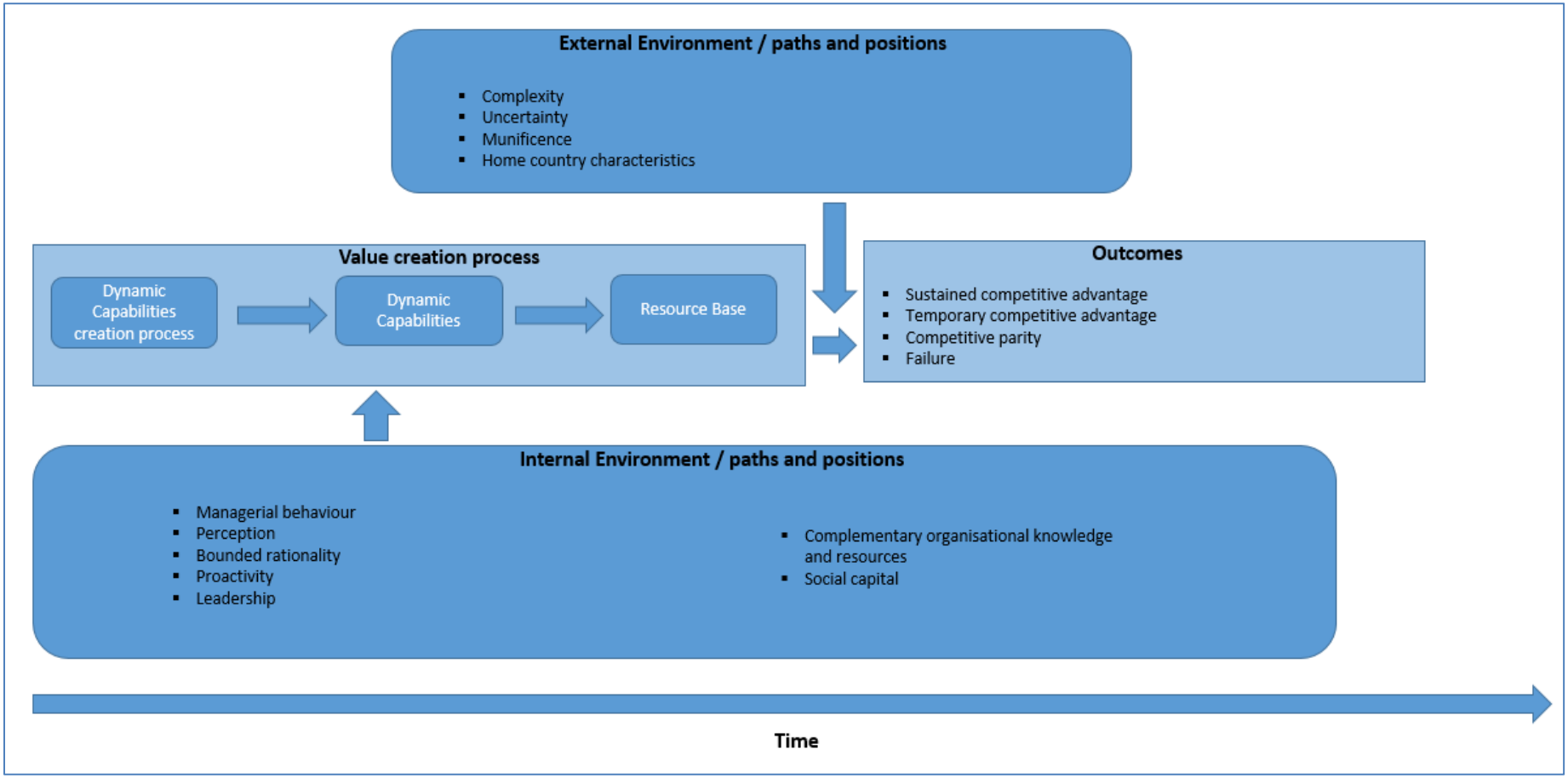


Figure 9: Dynamic Capabilities (Adapted from Ambrosini and Bowman, 2009)

Capabilities have been categorised into levels as follows:

- 'Zero-level' capabilities: these are a firm's ordinary capabilities (Winter, 2003). An example would be the way that a firm sell its products and services to customers.
- First-order level capabilities: Any new creation of a product, process or service is defined as as there is an intentional change to the resource base (Winter, 2003). An example is the introduction of Samsung pay into the South Africa market, financial institutions that upgraded their POS machines are now offering this i.e. a new service/ product. Teece (2018) also describe second-order capabilities that involve activities such as new product development, expansion into new regions; this is any action linked to managerial decisions made consciously in turbulent times. Every firm has a continuum of capabilities and the pursuit of dynamic capabilities is about the strategic choice to deepen or expand their resource base to create the new set of dynamics (Feiler & Teece, 2014). Dynamic capabilities can be grouped into three categories of activities; sensing, seizing and transforming (Teece, 2007) and these will be detailed in the forthcoming sections.

Sensing

Teece et al. (1997) stated that sensing is the detection of opportunities and threats in the environment and can be done by probing customer needs, understanding suppliers, evaluating competitors, understanding technological possibilities, and understanding the entire value chain that the firm is involved in. This allows a firm to identify how these opportunities and threats will impact it (Teece, 2007). Nonaka, Hirose and Takeda (2016) proposed that sensing is an interactive process involving the external environment and should be carried by front-line employees, as middle management cannot sense and seize opportunities. Torres, Sidorova and Jones (2018) stated that sensing is a strategic process which, on its own, is not sufficient to allow a firm to adapt to the changing environment.

Fernandes, et al., (2017) proposes that despite opportunities and threats being present in the environment, some firms are not capable of dealing the changes and hence miss out on the chance to react to the market. A firm should be able to note changes in customers preferences and attitudes in the market. Sensing allows firms to take advantage of changes in customers' preferences (Owoseni & Twinomurinzi, 2018).

Seizing

Teece (2007) proposed that seizing involves the ability to capture and maximise on a technological or market opportunity, new processes, services, or products introduced into an environment. The study done by Helfat and Peteraf (2009) agreed, stating that the introduction of an opportunity leads to new paths and positions for a firm and can improve a firm's competitive advantage. Seizing involves the firm combining resources and processes to allow the organisation to seize opportunities that arise (Feiler & Teece, 2014). This stage involves a firm's decision to invest in resources, processes, or services, depending on the technology available. Nonaka et al. (2016) stated that this stage involves sub processes of combinations and externalisation from all parties in the organisation. There needs to be a process of strategic focus when an opportunity or threat is imminent so that the firm can formulate how to reconfigure its asset and resource base best (Teece, 2007).

Transforming

Not every firm can transform despite sensing the changing environment. The process of transformation involves activities such as enhancing, mixing, protecting, and reconfiguring a firm's tangible and intangible assets (Feiler & Teece, 2014; Teece, 2014), allowing it to take advantage of changes in the environment. According to Teece (2007), this process involves the selection process, technologies to use, business model to follow, and commitment of financial resources, leading to firm growth and profitability.

The process of transforming and gaining competitive advantage involves a firm's selection and assimilation of the right people, processes, and technologies (Desai et al., 2007). A firm can ask the following questions:

- Is the adoption of mobile payment technology right for it?
- Will the adoption allow the firm to pursue some form of competitive advantage?

The field of capabilities has evolved and there are multiple ways to view and define them. The below paragraph briefly touches on some of the other capabilities identified in the literature. One can argue that leveraging is the extension of a capability to other parts of the business: for example, the application of an existing brand to a set of different products (Ambrosini & Bowman, 2009). Creative integration is the combination of resources to create a new resource as part of the dynamic capability formation process (Ambrosini & Bowman, 2009). Nonaka et al. (2016) further added that the process of transforming is a creative stage in the dynamic capability formation process.

Learning is an outcome of the process of repeating activities and allows firms to perform tasks more effectively (Shuen et al., 2014). Further research classified dynamic capabilities into three dimensions: adaptive; absorptive, and innovative (Wang & Ahmed, 2007). Owoseni and Twinomurinzi (2018) discussed the flexibility of a firm in rapid change and obtaining objectives as adaptive capability. The ability to create new products and services in response to threats through the use of strategic initiative and innovative approaches is known as innovative capability (Owoseni & Twinomurinzi, 2018 & Wang & Ahmed, 2007). Figure 10 below summarises the processes of dynamic capabilities based on the transformation process discussed above.

Figure 10: Dynamic Capabilities Processes

Roudini and Osman (2012) identified the following capabilities to discuss when referring to a business; entrepreneurial, organisational and personal. Lin et al. (2016) identified multiple capabilities beyond the three mentioned by Teece et al. (1997). The dynamic capabilities include:

- Sensing capability for directional change
- Relational capability for relationships and social capital acquisition
- Integrative capability for communication and coordination
- Coordination capability
- Alliance management capability
- Learning capability
- Entrepreneurship capability

The figure below is a summary of the literature review conducted by this author. It depicts the dynamic capabilities as part of the firm and affected by the suppliers, customers, and regulations. The capabilities that were stated by Teece (2007) (sensing, seizing, and transforming) are built on the base of micro foundations such as processes, organisational structure and procedure. The capabilities stated by Teece (2007) have led to the study of other capabilities, including those of absorptive, adaptive, and innovative natures.

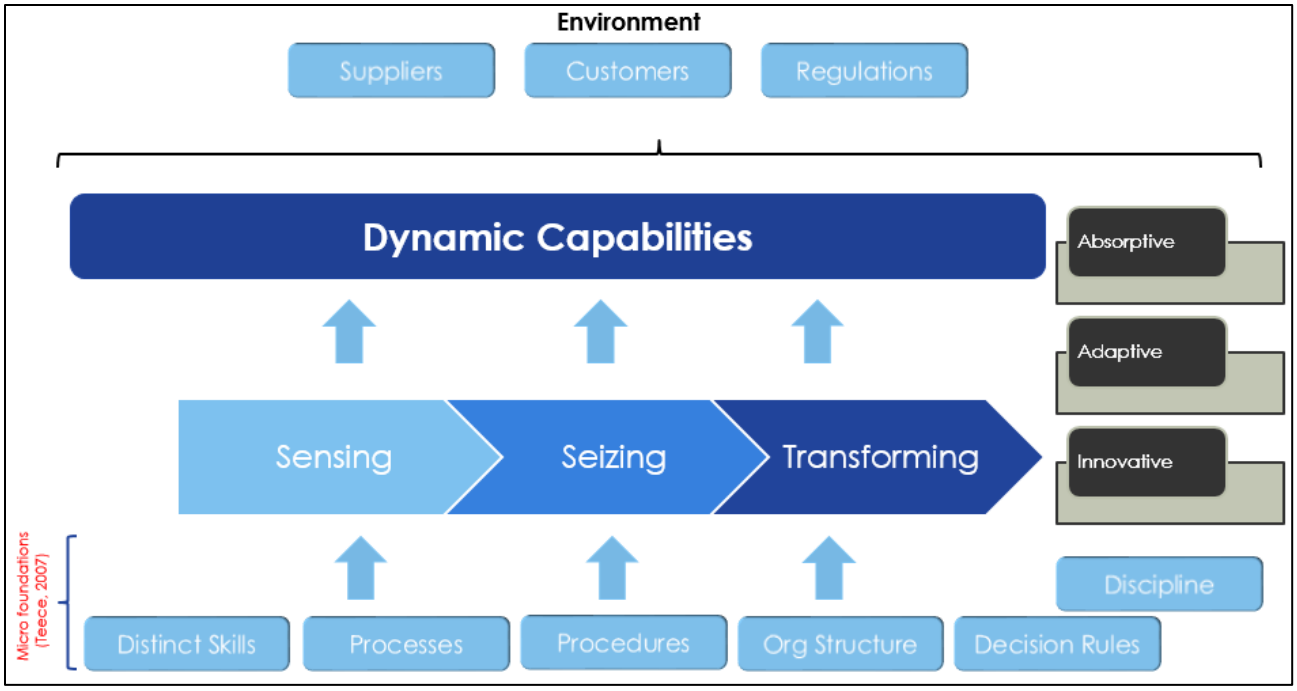


Figure 11: Dynamic Capabilities Conceptual Framework

Dynamic capability theoretical overview

Teece (2007) identified the indication that dynamic capabilities are not always well understood, stating that the adoption of 'best practice' in management and practice is not a dynamic capability. Helfat and Peteraf (2009) explored the notion that, as a theoretical tool for strategic inquiry, the theory is still in its infancy stage, explaining the amount of research that is conceptual and focused on foundational level issues. However, they noted that theory evolves slowly, especially if it is attempting to simplify a complex process (Helfat & Peteraf, 2009). Pisano (2015) further opined that concepts of the dynamic capabilities' framework (including its definitions) remain open to interpretation and that little theoretical progress has been made. Teece (2007) proposed that dynamic capabilities are embedded in people in management positions and are limited or empowered by the organisational processes, procedures, and systems.

Helfat and Peteraf (2009) argued that dynamic capabilities are not yet a theory at this point and that more work needs to be done into its development further stating that it is

not ideal that dynamic capabilities be judged according to the criteria set for a fully developed theory. While Ambrosini and Bowman (2009) also stated that dynamic capabilities lack a strong theoretical base, Helfat and Peteraf (2009) argued that the level of research shows the complexity of issues that are under consideration and is not a reflection on the theory itself.

Despite the criticism levelled, it is noted that dynamic capabilities are best positioned to answer the strategic questions of competitive advantage sustainment in changing environments (Helfat & Peteraf, 2009). The research findings show that dynamic capabilities have a critical role to play, even in markets not considered as hyper competitive (Desai et al., 2007). This opinion is echoed by the current research, which argues that dynamic capabilities have a critical role to play, even in the context of an emerging market like South Africa's. To obtain a better understanding of dynamic capabilities, Ambrosini and Bowman (2009) encouraged more studies looking at firms over a period.

Conclusion

Studies have shown the impact that dynamic capabilities have on a firm's competitive advantage in the market (Fernandes et al., 2017). Fernandes et al. (2017) stated that, due to the ever-changing nature of the political, economic, societal, and regulatory environments, a firm must combine specific resources to be able to manage challenges posed by these changes. This research uses the T-O-E to explain the phenomenon of mobile payment adoption while considering a firm's dynamic capabilities. These models were selected because they have environmental, internal, and external aspects. They also provide an approach which is suitable to the organisational aspects of the target group (SMEs). Awa, Ukoha and Igwe (2017) further stated that, due to the highly differentiated nature of technological innovations, no one theory or model can be all encompassing in its explanation of the adoption of innovations by firms.

3 METHODOLOGY

“Good research questions do not necessarily produce good research, but poorly conceived or constructed questions will likely create problems that affect all subsequent stages of a study.” – (Agee, 2009)

3.1 INTRODUCTION

The previous chapter discussed some theoretical concepts and an extensive literature review on SMEs, mobile payments, business models, consumer adoption, merchant adoption, and adoption factors. This chapter discusses the research design strategy with a focus on philosophical considerations, research method choice, and research technique and procedures. The chapter then moves on to the Design Science Research (DSR) and its applicability to this study, followed by a view of the research instruments, target population, data collections, and ethical considerations. Chapter 3 highlights a detailed approach of how and why the specific research method for the study was selected with regards to data collection and analysis for SMEs and mobile payment adoption. The motivation for the selected research approach will be discussed, followed by a conclusion. When a researcher conducts research, it is important that they are aware of the different research paradigms, namely ontology and epistemology (Flowers, 2009). This is important as it affects the way a researcher thinks about the world and the reality around them, which ultimately affects their research and the conclusions they will draw from the data (Klein & Myers, 1999).

3.2 RESEARCH PROCESS

Research design strategy is about planning the process through a funnel-like approach of how a researcher is going to carry out their research (Saunders, Lewis & Thornhill, 2007). Research design ensures that a plan is in place and allow the researcher to work in a way that produces results that are validated based on solid theoretical understanding. This aids the accomplishments of the research goals as set out in Chapter 1.

The onion framework proposed by Saunders et al. (2007) was applied for this research design as it depicts a process of moving from the outer layer inwards. This approach was used to understand philosophical underpinnings to research techniques and procedures used in this study. Different philosophies, approaches, and strategies were reviewed, with the selected discussed later in the chapter based on its applicability to the research.

3.2.1 Philosophical Considerations

Philosophical assumptions are the way we inherently think and deduce meaning about and from the world around us, with different interpretations made by each individual (Myers, 2009). Myers (2009) stressed the importance of highlighting and discussing the philosophical assumptions as part of any research that is to be conducted. A researcher needs to understand their paradigm and how it will affect their research perspective. The different concepts of how human beings perceive and generate knowledge based on the world around them leads to the assumptions that will be discussed in the following order: ontology, epistemology, axiology, and methodology (Lee & Lings, 2008), all of which are expanded on in the following paragraphs.

Ontology

Ontology describes a human being's views, beliefs on reality (Rehman & Khalid, 2016). It examines the assumptions around reality, specifically whether it is subjective or objective reality, study of existence (King & Kimble, 2004). Lee and Loings (2008) further state that ontology examines the existence of facts and objects. Researchers need to be aware of their ontological perspectives to avoid being blinded to certain views and aspects of the study (Lee & Lings, 2008). The researcher and author of this study needs to consider his relationship with the reality of the study, as it impacts perception in terms of the knowledge being garnered.

Epistemology

Epistemology is defined as the study of our beliefs, theories of knowledge about how we know and what we can know, nature of knowledge and reality (King & Kimble, 2004). King and Kimble (2004) stated that epistemology addresses research methods with perspectives that can be subjective or objective, meaning that researchers need to be aware of their epistemological views and their effects on the conclusions and choices made in the research process. Ontology and epistemology are closely linked and inform

one another, with ontology guiding epistemological assumptions (Rehman & Khalid, 2016). An understanding of ontology and epistemological views aids the researcher in attaining a solid understanding of the philosophical grounding required for research.

3.2.2 Research Paradigms

Positivist Paradigm

The positivist paradigm views knowledge as being scientific, tangible, something that can be quantified through empirical measurements (Crotty, 1998). Crossan (2003) add that the positivist paradigm allows for a quantitative approach to observing and researching phenomena. The belief is that phenomena can be observed or measured without any interference from the researcher (Ponterotto, 2005). According to Myers (2009), this is the most common paradigm and approach to information system research studies. Orlikowski and Baroudi (1991) shared a similar view when they reviewed studies in top journals, finding that over 97% of studies adopted the positivist paradigm.

Positivists view reality in an objective manner that allows phenomena to be explained and quantified through fixed relationships, with researchers and their instruments falling outside these parameters (Myers, 2009; Orlikowski & Baroudi, 1991). The positivist seeks to test theories about phenomena in a replicable manner that can increase understanding thereof (Orlikowski & Baroudi, 1991; Myers, 2009). In the context of an organisation, a positivist believes that the organisation's structure and reality is independent of its employees (Orlikowski & Baroudi, 1991). Williams (2011) indicated that, when it comes to research strategy, the positivist paradigm researcher will use data collection techniques like laboratory experiments, field experiments, and surveys to maximise the collection of quantifiable data (Williams, 2011) and to better understand the phenomenon under observation (Pham, 2018). One of the main advantages of the positivist approach is its reliability and validity (Pham, 2018), but criticism of the positivist paradigm indicates its lack of suitability to social phenomena (Rehman & Khalid, 2016). This is a valid concern considering the social nature of humans: reducing phenomena to statistical enumerations is unlikely to yield optimal results, especially in the context of this study.

Interpretive Paradigm

An interpretivist approach is applicable to this study as it can highlight findings that would not be obvious given a positivist approach as per previous studies (Kroeze, 2011). Interpretivism opines that there is no one universal reality or truth (Allen-Collinson, 2012) and that a single event has multiple perspectives to it depending on the observer (Pham, 2018). The process of gaining knowledge from a subject and their experiences through the interview process involves the process, the context, and the social setting (Alvesson, 2003). Because the researcher is attempting to understand which mobile payments are adopted by merchants and why, an interpretivist paradigm approach is most suitable.

The interpretive paradigm is mainly used in the study of social and organisational contexts wherein the researcher views reality through social constructs like language and shared meaning (Myers, 2009), as well as through participants' perceptions and experiences (Thanh & Thanh, 2015). For this thesis, the interpretivist paradigm is used. Interpretivism is a philosophical system that counters positivism and states that human construction can be understood subjectively and not through statistics and hypotheses (Kroeze, 2011). Greener (2008) stated that the interpretive paradigm involves understanding a phenomenon through the eyes of the people in the organisation. Rehman and Khalid (2016) further add that the interpretive paradigm involves understanding a phenomena and interpretations of the individual's engagement and interaction with the phenomena. It considers how cultural changes can be studied and interpreted through people's actions and ideas and, more importantly, the meanings that people attribute to those changes (Saunders, Lewis & Thornhill, 2007; Thanh & Thanh, 2015).

The interpretivist approach to research would use methods such as unstructured interviews and inquiry to gain perspectives and construct reality based on the actors' (interviewees') perceptions (Greener, 2008). The interpretivist approach to seeking deeper understanding of a specific context can draw criticism based on the notion that one study's approach cannot be generalised to other contexts, leading to doubt regarding the validity perspective (Pham, 2018). The researcher followed the interpretivist philosophical paradigm as it would allow a deeper understanding of the SME merchants

in the study. The research was seeking to go beyond a statistical understanding and accounting for the SMEs interactions with the technology from an environmental and organisational perspective.

3.2.3 Research Approach

Creswell and Plano-Clark (2007) viewed the deductive approach as a top-down approach, noting that the research employs an exploratory nature to understudied aspects. The deductive approach involves viewing and understanding previous themes before commencing data collection: the data analysis will seek codes and themes that match the themes already identified in the research (Rehman & Khalid, 2016). A deductive approach was followed in this research process, using existing theories and frameworks to create a conceptual framework. The deductive approach is most suited when existing theories are used to build a conceptual framework. Primary data will be collected using semi-structured interviews, surveys, participant observation, focus groups, and document analysis. Deductive studies often employ qualitative data collection through open-ended interviews (Rehman & Khalid, 2016). Given the limited literature regarding mobile payment adoption by merchants, a deductive approach was employed in this research.

3.2.4 Research Method Choice

This section investigates the qualitative and quantitative methods used in the research. Research methods are data-collection processes (Rehman & Khalid, 2016) of which a researcher must always be aware, both in terms of the method chosen and the extent to which it will be used (Saunders et al., 2007). Two methods are identified: the mono method uses either a qualitative method or a quantitative method, while the mixed method uses both qualitative and quantitative methods to collect and analyse data. An advantage of the latter is that it provides a rich data source (Saunders et al., 2007). A mixed method approach was selected to better improve the research outcomes while noting that the

majority of previous research into mobile payments had been primarily focused on quantitative methods.

This study employed a mixed method approach of both qualitative and quantitative nature, focusing on the following:

- Interviews
- Surveys
- Focus groups.

3.2.5 Research Timelines

Research timelines can be cross-sectional or longitudinal. Cross-sectional studies measure the aspects of a group or individuals at a single point in time (Saunders et al., 2007), while longitudinal studies are conducted over a longer period of time. This study's data collection was carried out over a two-year period (2019 to 2020).

3.2.6 Research Technique and Procedures

According to Myers (2009), "Qualitative research methods are designed to help researchers understand people and what they say and do". Myers (2009) further stated that the main advantage of qualitative research is that it gives insight by allowing people to express their thoughts and feelings.

Mallat and Tuunainen (2008) advised the use of qualitative methods in mobile payments research; advice which aligns with the findings of Jamshed's (2014) study. A qualitative study is best used when investigating phenomena in a relatively new field or when a researcher is trying to understand prominent issues (Jamshed, 2014). This researcher argues that despite mobile payments being in operation for nearly 20 years, this area is still immature given the lopsided research into consumers and lack of research into merchants.

While it does offer valuable insight, Castillo-Montoya (2016) indicated that qualitative research fails to ensure reliability in interview protocols and does not apply a similar language that details the interview process and the steps involved. This research detailed the interview process in section 3.2.8 with a view of ensuring that the steps taken, and language used are consistent and repeatable. The current research used a mixed method approach: a qualitative approach was used for interviews and the focus groups, while a quantitative approach was used for the survey questionnaire.

3.2.7 Design Science Research

This section of the study details the Design Science Research (DSR) approach, artefacts, importance, guidelines, and process. According to Baskerville, Baiyere, Gregor, Hevner and Rossi (2018), DSR is a research paradigm with the practical component of delivering an artefact, either in the form of addition to design theory or useful artefacts. Hevner, March and Ram (2004), Peffers, Tuunanen, Rothenbergger and Chatterjee (2007), Gregor and Hevner (2013) share that DSR is grounded in the creation of a successful artefact where the term ‘successful’ speaks to the usefulness and thorough evaluation of the artefact to meet knowledge-addition criteria. Hevner and Chatterjee (2010) remark that research output by DSR should increase or display usefulness to the field of information technology and information systems. DSR is a process that can be used to investigate a phenomenon and comprises three cycles: the relevance cycle, the design cycle, and the rigor cycle (Hevner, 2007).

Hevner et al. (2004) set out to create a conceptual framework and guidelines on the execution of the DSR process. The researcher used the DSR’s orderly process to test a framework. Given that the main research question is aimed at the merchant user base of the mobile payment field, the DSR approach can yield useful insights. Basson and Prozesky (2015) ascertained that a variety of methodological research approaches play positive roles in the research field.

Table 8 provides a simplified summary of the different research perspectives and where DSR fits in. Vaishnavi et al. (2004) argued that there is a significant difference between the interpretive stance and DSR, as the latter has multiple world states which differ from the multiple realities that interpretivist research seeks. From an epistemological perspective, the information obtained in the research is known to be factual, and the meaning is obtained through the circumspection process and the reflection seen in the artefact (Vaishnavi et al., 2004). DSR is more pragmatic in nature as it delivers an artefact to solve real world problems (Hevner & Chatterjee, 2010). The DSR paradigm is seen as relevant to information-system research as it addresses the issues of discipline and, more importantly, the issue of an IT artefact (Hevner & Chatterjee, 2010).

Table 8: Research Perspectives (Baskerville et al., 2018)

	Positivist	Interpretive	Design
Ontology	A single view of reality, factual	A social construction of realities with multiple realities being a source of truth	Reality depends on the context being studied in the world
Epistemology	Researcher is separate from the phenomenon being studied	Subjective: the researcher acknowledges their impact on the research and knowledge emerges participant-researcher interaction	Objectivity and subjectivity dependent on the phase of the process. Iterative process of reflection reveals meaning
Methodology	Usually based on quantitative, statistical nature based on observation of phenomena	Participation, qualitative in nature	Developmental and incremental in nature. Impact of artefact is measured to determine success

DSR has the ability and capacity to assist with disseminating the knowledge gained from research and applying it to real world problems. Domains such as healthcare, e-commerce, and biology are areas where artefact output from the DSR process is of great value (Hevner & Chatterjee, 2010). Baskerville et al. (2018) proposed that the aim of DSR is to add to the knowledge base, thereby improving understanding of the natural world, the behaviour of human beings, and how the world works (Baskerville et al., 2018). Van

der Merwe, Gerber and Smuts (2017) proposed that DSR can be applied as a strategy in post graduate studies and has been accepted as a research method in the field of Information Systems.

Hevner and Chatterjee (2010) highlighted the difference between DSR and the field of design, with the latter defined as the application of existing knowledge to organisational problems. The fundamental difference is that DSR focuses on solving the unsolved problems through unique and innovative ways to reach the objective of DSR being an artefact that is unique and novel and which adds to the knowledge base (Hevner & Chatterjee, 2010).

Mettler, Eurich and Winter (2014) proposed that a project led by design science has multiple iterations that include the activities of building and evaluating the artefact being built. The process of DSR is primarily built on the foundation of an artefact or process being produced and evaluated as an addition to the knowledge base (Hevner, 2007), wherein scientific theories, methods, and artefacts are expected to be instantiated. In the context of this research, a validated conceptual framework was delivered as the output of this design science research process.

Design Science Research Artefact

The DSR process revolves around the creation of an artefact, which Van der Merwe et al. (2017) viewed as an output of the DSR process. The DSR artefact is meant to improve an identified problem. This could be an improvement to an existing artefact or the creation of a new artefact that resolves or lessens the problem identified (Hevner et al., 2004). The artefact is a means of disseminating knowledge gained through the DSR process (Baskerville et al., 2018). DSR artefacts can be classified into four categories: construct, model, method, or instantiation (Baskerville et al., 2018). Vaishnavi et al. (2004) expanded on the artefacts that DSR can produce, identifying them as architectures, design principles, theories, and frameworks. This differs from outputs identified by Hevner et al. (2004), which are limited to the design artefacts listed in Table 9.

Table 9: Design Artefacts

Design Artefacts	
Constructs	The language and concepts used to define and explain the problem, factors and solution at hand (Hevner et al.,2004, Baskerville et al, 2018 and Mettler et al.,2014). These arise during the awareness of the problem phase and are refined during the DSR process (Vaishnavi, et al., 2004).
Models	A relationship views of the constructs in a real-world context representing the problem and solution (Baskerville et al.,2018). Vaishnavi et al., (2004) states that a model is a proposed view of how constructs and relationships should be and a model's intent is different from a theory's intent which focuses on truth versus a model in DSR which focuses on utility.
Methods	Process definition for the solution of the problem, through the form of an algorithm or guidelines (Baskerville et al., 2018 and Vaishnavi et al., 2004). Methods differ from models in that they are used to solve a particular problem and they are goal oriented with repeatable actions (Mettler, et al., 2014).
Instantiations	Instances of use of constructs, models and methods depicting the feasibility and use of the constructs, methods and models (Baskerville et al., 2018). Vaishnavi et al., (2004) further states that this is the complete state of constructs, methods and models through the DSR process and is the outcome of the artefact.

The functioning of an artefact is a result of the dynamics of relationships between elements that make up the artefact (Vaishnavi et al., 2004). Vaishnavi et al. (2004) opined that there needs to be a thorough understanding of an artefact's elements and their relationships if an increased understanding of the theorised relationships is to be accomplished.

Guidelines for Design Science Research

The guidelines set out by Hevner et al. (2004) are summarised in Table 10, and have been augmented with output from other authors to make them more robust. The researcher was able to use this as a base for the DSR process of this study.

Table 10: Design Science Research Guidelines (Hevner et al., 2004)

Process	Description	Applications in this research
Design as an artefact	An output in the form of an artefact must be produced. This can be a construct, a model, a method or an instantiation (Hevner, et al., 2004).	A conceptual framework was created and taken through the DSR process.
Problem Relevance	The problem identified must be relevant and when solved, must have a real-world impact. Kuechler & Vaishnavi, (2008) state that the artefact must be relevant to the problem under investigation. Hevner et al.,(2004) state that a technology oriented solution must be the outcome of the DSR process to solve the identified problem.	The researcher was aiming to answer the following problem statement: What would the constructs of a framework for mobile payment adoption by SMEs in South Africa? Relevance of the problem was explored in chapter 1 and 2.
Design Evaluation	Hevner et al.,(2004) discusses the efficacy of the proposed solution, the quality, completeness, accuracy and if the solution adheres to certain standards that are applicable to artefacts of its nature. Kuechler & Vaishnavi, (2008) are in agreement to this point stating that an evaluation process of the artefact should formal	The design artefact was created using these guidelines provided. The design artefact was evaluated against the criteria which is elaborated later in this chapter and discussed in Chapter 7.

Research Contributions	Novelty is a requirement for the artefact as this is a distinguishing factor between DSR and design practice (Kuechler & Vaishnavi, 2008). The contribution of the artefact must be clear and undisputed, and the artefact is the medium for this (Hevner, et al., 2004).	A Merchant Mobile Payment Conceptual Framework consisting of literature and research designed constructs was created and evaluated.
Research Rigour	Due and diligent research process must be carried out to achieve the state of the artefact (Hevner, et al., 2004). Hevner et al., (2004) state that rigor is exemplified through the effective use of the knowledge base.	The conceptual framework is based on the existing knowledge base of mobile payments. The constructs in the framework are pre-existing constructs from mobile payments knowledge base.
Design as a Search Process	Design science is an iterative process whose objective is is to identify a worthy solution through a search process (Hevner, et al., 2004). Kuechler & Vaishnavi (2008) state that the functionality of the artefact is of more importance than the theoretical development.	The DSR process was followed inclusive of the three cycles. The artefact was validated in the focus groups that included merchant SMEs.
Communication of the Research	When communicating the results to both professional and academic audiences, both rigour and relevance requirements from both industries need to be demonstrated (Kuechler & Vaishnavi, 2008 and Hevner et al.,2004).	The results have been detailed in the formal thesis and will be shared as part of journal articles and conference proceedings.

The outcome of the DSR process is not solely to contribute to design theory or the artefact at the expense of understanding the DSR process (Baskerville et al., 2018). The process of DSR that the researcher conducted, as well as the artefact delivered, improve understanding of how the world and humans (merchants) can work better. The implementation of constructs and models is deemed sufficient knowledge contribution without the process of theorising or adding to the design principles (Baskerville et al., 2018).

Design Science Research Process

Baskerville et al. (2018) proposed that the DSR process involves an inspection to identify weakness and areas of improvements in the process. A cyclical approach in the DSR approach improves the outcomes from process, knowledge, and design perspectives. It is important to understand both Hevner and Baskerville's variations of the process for a detailed understanding of the process undergone by the researcher. The DSR process listed below reflects that of Baskerville (2018) in Figure 12:

- Awareness of the problem (identification).
- Suggested solution.
- Development of an artefact.
- Evaluation of the artefact.
- Conclusion based on the evaluation.

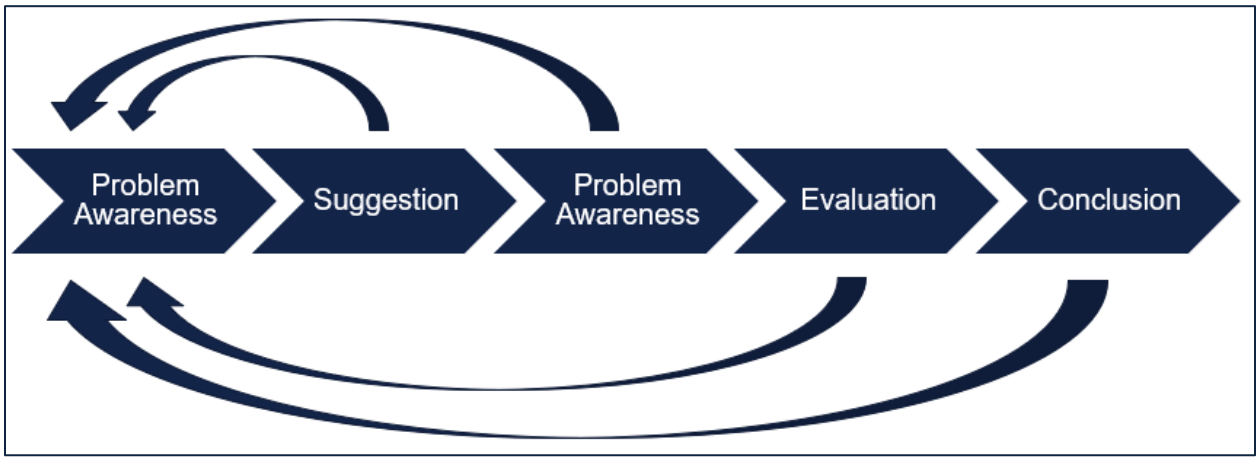


Figure 12: Design Science Research Process (Baskerville et al., 2018)

Vaishnavi et al. (2004) and Peffers et al. (2007) stated that the DSR process has six steps: problem identification, definition of the objectives for a solution, design and development, demonstration, evaluation, and communication. Baskerville et al. (2018)'s approach has the exception of a demonstration step implied in the five-step process that other DSR authors have detailed. Demonstration as a step in the process allows for the practical aspects of 'show and tell' of the artefact's usability.

A fundamental difference noted from the Hevner et al. (2004) approach to the DSR is the concept of the rigour, relevance, and design science research cycles. There are similarities between Hevner et al. (2004) and Vaishnavi et al. (2004) in that they encourage the use of multiple iterations to refine and evaluate the artefact for rigour. They both encourage the communication of the DSR process results to both technology-orientated audiences, academia and to businesses stakeholders. Venable (2010) noted that Hevner et al. (2004) do not include theory as an artefact of the design theory, while Vaishnavi et al. (2004) stated that theorising and improving theories should be outputs of the DSR process.

Awareness of the Problem

Vaishnavi et al. (2004) proposed that this stage involves problem identification and refinement, with Van der Merwe et al. (2017) stating that this can come from real-world issues or from other scientific or social academic disciplines. The result of this step should be a research proposal (either formal or informal) formed by a detailed analysis to justify the process of DSR (Peffers et al., 2007). Peffers et al. (2007) stated that the researcher needs to have thorough knowledge of the problem to be studied. The main research question addressing the problem being solved is as follows:

1. What would the constructs of a conceptual framework for mobile payment adoption by Merchants in South Africa be?

The following sub-questions address the future research questions proposed by Dahlberg et al. (2007) and Dahlberg et al. (2015) towards mobile payments in South Africa:

2. What is the current ICT profile of the merchant? The typical characteristics of adoption merchant. (This will look at the merchant, their setup, their environment)
3. Why do merchants adopt mobile payments?

Suggestion

This step is strongly related to the awareness step, as a tentative design is put forward as a solution to the problem (Van der Merwe et al., 2017). Solutions for the identified problem are drawn from the existing knowledge base through an abductive process (Vaishnavi et al., 2004). At this stage, the evaluation criteria for the solution considers its functional aspects (explicit and implicit).

This is the creative part of the DSR process, where a solution (based on existing or new constructs) is envisioned (Peffers et al., 2007). Vaishnavi et al. (2004) claimed that the innovative nature of humans' creativity processes is poorly understood and is the subject of criticism of this step in the process. It is expected that insights into the problem will start to emerge as the researcher begins to understand the problem more thoroughly by exploring different solutions that could be applied and tested (Peffers et al., 2007). A literature review and assessment were conducted by the researcher, and the framework in Figure 13 is a first iteration of the conceptual framework based on the literature. This framework was then taken through the DRS process.

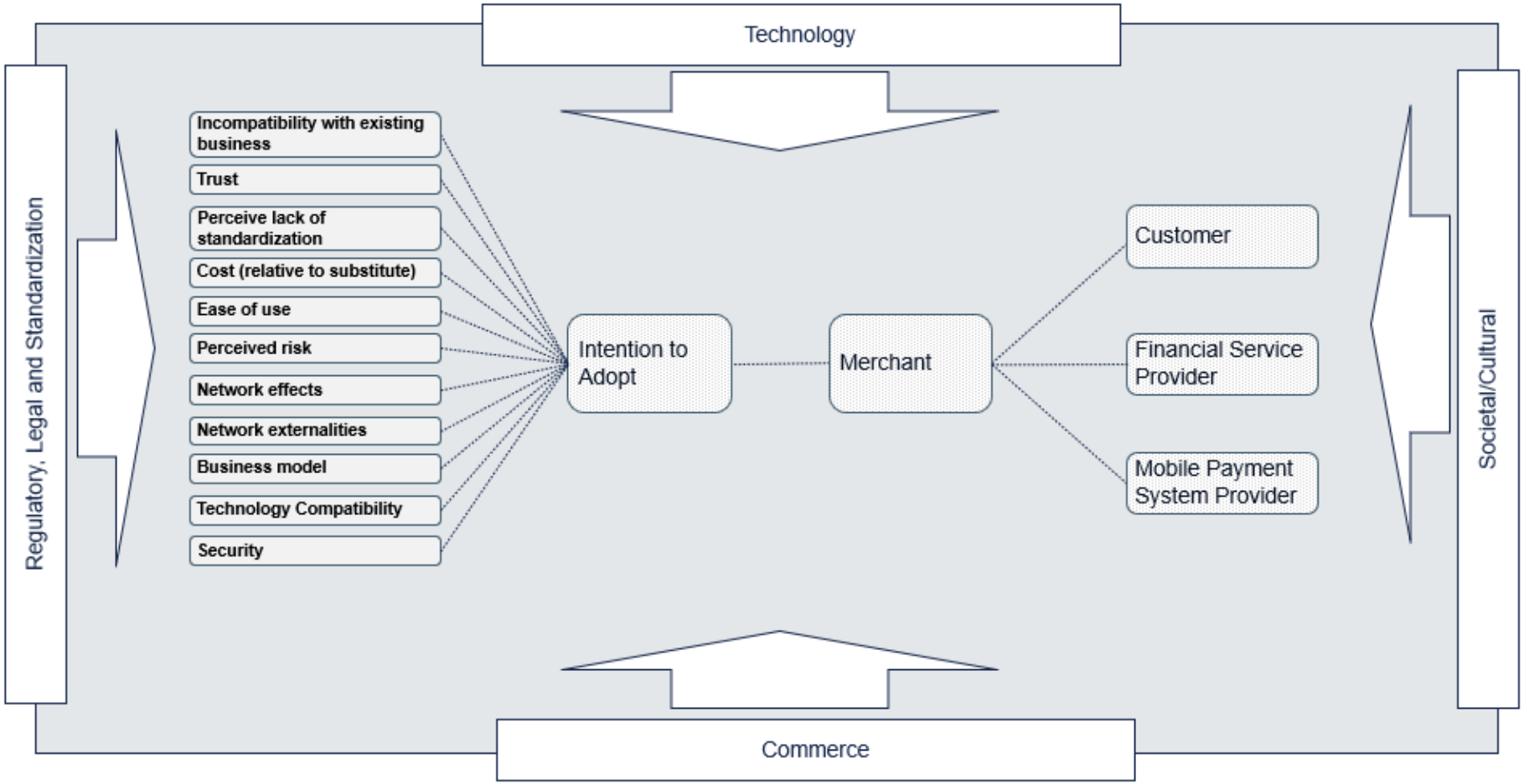


Figure 13: Merchant Mobile Payment Conceptual Framework

Development

The implementation of the proposed design artefact is carried out in this stage. The techniques differ and depend on the context of the research (Van der Merwe et al., 2017). This is a partial implementation of the suggested solution. The proposed design or the prototype is further refined in this phase using techniques which depend on both the researcher and the artefact to be developed (Baskerville et al., 2018). Peffers et al. (2007) opined that this is the process of moving from the knowledge of the problem being researched to the solution in the form of an artefact that can be a model, theory, construct, or instantiation.

Evaluation

At this stage, a researcher decides whether to refer to suggestions with new knowledge or proceed to conclusion (Peffers et al., 2007). This is the assessment of whether the artefact and process carried out has added to the knowledge base (Mettler et al., 2014). In the evaluation phase, further refinements of the artefact take place and there is an increased awareness of the problem (Baskerville et al., 2018). These are explained in Chapters 4,5, and 6 for each cycle that was undertaken. Any feedback is received and undergoes another DSR process for another iteration from the suggestion phase onwards (Peffers et al., 2007). Vaishnavi et al. (2004) argued that many cycles of evaluations take place every time a design-detail decision is taken and tested in different environments, leading to an improved artefact. Any differences from the expected results should be explained from both quantitative and qualitative perspectives (Peffers et al., 2007).

Van der Merwe et al., (2017) propose that the evaluation process may consist of several steps that detail the outcome of evaluation criteria, adding that the evaluation process can be carried out through processes such as focus groups or interviews. Mettler et al. (2014) stated that the usefulness of an artefact is determined by the users and their capabilities, leading to subjective evaluation. The success of the artefact depends on

whether it is deemed to have added new knowledge and is assessed on factors such as technology, aesthetics, economics, and ethical considerations (Mettler et al., 2014).

Process Conclusion

Baskerville et al. (2018) stated that the conclusion joins the process to the codification of an evaluated artefact that delivers operational knowledge and possibly adds to theory. Peffers et al. (2007) stated that the conclusion summarises the artefact: its novelty, its usefulness, the rigour, and the process used to qualify the artefact. Hevner and Chatterjee (2010) concurred with the above statement, stressing the importance of the utility and effectiveness of an artefact. Vaishnavi et al. (2004) proposed that the implementation of the artefact might be slow; however, the novelty or value lies in the design of the artefact. The conclusion must be tailored for parties such as practitioners and researchers, as they each seek different outcomes and meaning from the DSR process (Peffers et al., 2007).

The process of reflection allows for induction of knowledge throughout the entire process of the DSR, and the data gained in every process can lead to refinement of the earlier steps and better understanding of the knowledge base (Baskerville et al., 2018). New knowledge is gained through the iterative process of the DSR through circumscription and operational and goal knowledge (Vaishnavi et al., 2004). Vaishnavi et al. (2004) argued that the iterative cycles that come from circumscription and force the process back to awareness of it result in the contribution of constraint knowledge to the existing but incomplete understanding of theories and identified problems.

Design Science Research Process: Design Cycles

The following section details the approach of Hevner et al. (2004) to DSR. They viewed DSR according to three main cycles: relevance, rigour, and design.

Relevance Cycle

This provides the problem or the requirements that can be addressed through an application of the DSR process. It also defines the acceptance criteria in the method used to evaluate the output of the DSR process (Hevner, 2007). Hevner and Chatterjee (2010) stated that this cycle is a good way to begin the process and involves the identification of a problem that exists in the business environment, indicating an opportunity to add value to the environment.

The output of the iterative cycles in the DSR must be tested and validated in the environment (Hevner, 2007). This ensures that there is value added and given back into environment where the problem was identified. Hevner (2007) further stated that, as part of the relevance cycle, returning the artefact into the environment will determine if more iterations are required to solve it.

Rigour Cycle

This cycle is tied to past research's knowledge regarding the current problem and how this can be used as the research base for new research (Hevner, 2007; Herjee, 2010). This study includes an extensive literature review on the issues regarding merchant adoption of mobile payments. It also identified a sparsity in the literature. The design outputs from this research are not routine and based on the repetition of an existing process – they are additions to research knowledge. A researcher's skill set impacts the rigour that is applied in this cycle through the theories and methods selected (Hevner & Chatterjee, 2010). Hevner and Chatterjee (2010) argued that additions to the knowledge base and to theory are vital in this cycle.

Design Cycle

This is the critical cycle of the DSR and involves more iterations in the construction of the artefact, as well as testing and implementing feedback to modify the artefact (Hevner & Chatterjee, 2010; Hevner, 2007). There is a strong relationship between the design cycle and the two cycles mentioned, rigour and relevance (Hevner, 2007). The artefact needs to undergo rigorous evaluation to ensure validity, which can be done using multiple iterations and the feedback incorporated. The evaluation criteria were based on the literature reviewed. Baskerville et al. (2018) argued that the artefact must be useful and contribute to design knowledge. This researcher's artefact has undergone multiple iterations and was evaluated by merchants.

The research was carried out in iterations which have been referred to as cycles going forward. Each cycles' data collections and results are discussed in separate chapters.
A brief description of the objective, processes and outcomes of each cycle are detailed below.

Chapter 4: Interview Data Analysis and Construct Mapping

Chapter 4 presents the initial framework that was tested on selected participants through a semi-structured interview process. The data collected using interviews in this first cycle are discussed and analysed. Data analysis was carried out using in vivo coding, axial coding, and thematic content analysis. The conceptual framework was updated to reflect the findings from this cycle and then underwent a second cycle.

Chapter 5: Survey Data Analysis and Construct Mapping

The updated conceptual framework from the first cycle was taken through another cycle based on the findings of the survey analysis. In chapter 5, the process and research results of the survey are discussed and analysed. The data analysis involved statistical analysis, in vivo coding, axial coding, and thematic content analysis. The conceptual

framework was updated to reflect the findings from this cycle and then underwent a third cycle.

Chapter 6: Focus Group Data Analysis and Construct Mapping

Chapter 6 discusses and analyses the research results and data collected through the focus groups in Cycle 3. Data analysis was done using in vivo and axial coding methods. The conceptual framework was updated to reflect the findings from this cycle.

Design Science Research Artefact Evaluation

Relevance and rigour are vital to the credibility of the research process (Kuechler & Vaishnavi, 2008). One of the main ways to apply rigour is through the application of evaluation or presentation of the artefact to the real world in organisational environments (Hevner & Chatterjee, 2010), and Hevner et al. (2004) proposed evaluation methods for the artefacts based on the methodologies used. The current study's researcher used observational methods as a case-study approach to study the artefact in a business environment.

Venable (2010) and Vaishnavi et al. (2004) asserted that conceptual work might not be evaluated because there is more emphasis on research that produces artefacts that are implemented and evaluated. Venable (2010) found a lack of consensus on the guidelines to be used for evaluation of DSR from criteria and standards perspectives.

The relevance aspect of the DSR was found to be a significant factor when considering the importance of an in-depth understanding of the problem (Venable, 2010). Hevner et al. (2004) proposed that the artefact must answer, through evidence presented by this researcher, the following questions regarding utility:

1. What utility does the artefact provide?
2. What demonstrates that utility?

The two focus groups (comprising SMEs) involved in this study were used to evaluate the usefulness and accuracy of the dynamic conceptual framework artefact. Hevner and Chatterjee (2010) encouraged the use of the framework and checklists as depicted in Table 11. A completed version of table 11 is provided in the concluding chapter.

Table 11: Design Science Research Evaluation (Hevner and Chatterjee, 2010)

	Questions	Answers
1.	What is the research question (design requirements)?	
2.	What is the artefact? How is the artefact?	
3.	What design processes (search heuristics) will be used to build the artefact?	
4.	How are the artefact and the design processes grounded by the knowledge base? What, if any, theories support the artefact design and the design process?	
5.	What evaluations are performed during the internal design cycles? What design improvements are identified during each design cycle?	
6.	How is the artefact introduced into the application environment and how is it field tested? What metrics are used to demonstrate artefact utility and improvement over previous artefacts?	
7.	What new knowledge is added to the knowledge base and in what form (e.g., peer reviewed literature, met artefacts, new theory, new method)?	
8.	Has the research question been satisfactorily addressed?	

The DSR is an ideal method for this research as it is a rigorous approach and provides an evaluation criterion that ensures the value of output from both a practical perspective and theoretical perspective. The cyclical nature of the process allows the researcher to adopt the outputs, better understand the research problem, and produce an artefact based on a real-world scenario. Baskerville et al. (2018) indicated that the DSR approach is longitudinal and will result in various contributions emerging, which makes for interesting findings given the dynamic environment that the merchants of South Africa are based in.

Vaishnavi et al. (2004) stated that a researcher using the DRS approach should expect ambiguity in their research and indicated that the outcome may be poorly understood but still considered a success by the community. Peffers et al. (2007) argued that interpretive research's output is mainly explanatory (not problem-solving), making it helpful in solving real-world problems. Baskerville et al. (2018) viewed design as a separate research perspective which is bound to have its own philosophical considerations.

3.2.8 Research Instruments and Process

Research strategies are used to generate data that the researcher will interpret and use to answer research questions. In the qualitative process, the researcher is encouraged to use multiple sources of information and attain knowledge from observations, document sources, and interviews (Creswell, 2007), and Saunders et al. (2003) ascertained that using mixed methods is beneficial to the research process. The following section details various research instruments, starting with documents, and then observations.

Documents

Bowen (2009) defined document analysis as a detailed process for reviewing and evaluating documents for both printed and electronic media. Document analysis is best used for discovery and context setting, allowing a reader the opportunity to find themes, patterns, and other underlying data (Altheide, 2000). It also allows for exploration of social phenomena and can be used to show relationships between themes, processes, and categories (Watkins, 2012). In terms of documentation sources, Myers (2009) identified archived data such as magazine articles, emails, blogs, web pages, audio recording, photographs, and memoirs (can be recordings of what people have said), while Bowen (2009) listed background papers, brochures, diaries, and journals. Personal document examples are letters, memoirs, and diaries, while private documents are internal business-meeting minutes, budgets, and memos (Myers, 2009). O'Leary (2014) further sub-divided documentation into three primary categories: public records, personal documents, and physical evidence.

Documents can be analysed using methods such as content and thematic analysis or electronic software, which also allow the identification of themes. Data collection from documents is generally cheap and allows for public scrutiny if available in the public domain (Myers, 2009). In the context of this study, various documents across the primary types as identified by O'Leary (2014) were used such as company websites, company reports, news articles and others. Detailed document analysis using coding or other analytical coding practices was not carried out on the documentation. However, the data was used to provide context and understand SMEs and the various technologies in use, as well as how mobile payment solution providers marketed their products to the merchants. The objective of document analysis is not to generalise, but rather to obtain supplementary research data (Altheide, 2000).

There are disadvantages and advantages to using document analysis as a research method. While Bowen (2009) noted that documents provide contextual data such as historical insights, they can also prompt more questions for the research to answer. An important advantage is that documents provide a view of the changes across time and

how certain phenomena have developed and can serve to corroborate findings. Bowen (2009) further noted that document analysis is an efficient method because it involves data selection, and not necessarily data collection.

One of the main disadvantages is that access to certain documents can be expensive. In the context of this study, the researcher reviewed documents from websites, reports, and other sources in the public domain. These are applicable specifically to the selected interview participants.

The document analysis process can be done in a similar manner to focus group and interview analysis by using ethnographic methods such as in-vivo analysis. Bowen (2009) detailed processes (such as thematic analysis) that involve deep reading and reviewing of data to allow coding and categorisation to identify themes. Owen (2014) identified other actions in the coding process; namely finding similar codes, grouping them together, and writing memos based on the information. This method was not selected for this study.

Observation

This involves viewing what respondents do and say in their natural environment from an outsider perspective Myers (2009), with Oates (2006) defining ‘observation’ as the act of watching and paying attention to an act in the environment. Myers (2009) detailed the difference between participant observation and observation, stating that participant observation involves the researcher taking part in some of the observed individuals’ day-to-day activities to gain more understanding. Observation can be categorised based on the length of the observation, the focus (broad or narrow), and whether the facts of observation are known or unknown (Oates, 2006). One of the main disadvantages of this approach is that boundaries can become unclear: for example, the researcher can begin to identify with the participants being observed and become part of them, which Oates (2006) described as ‘going native’.

Cycle 1 – Interviews

In this cycle, the initial framework (which was designed based on the literature review) was tested on selected participants through a semi-structured interview process. The participant selection was based on the theoretical framework in use and the research questions the research was trying to answer (Sargeant, 2012). The research was conducted on SMEs already engaged in e-commerce or m-commerce activities, and who possessed at the least, a Point-of-Sale device. Contact was made with SMEs owners in the urban and semi-urban areas of the nine provinces of South Africa (Gauteng, Northwest, Northern Cape, Western Cape, Eastern Cape, Free State, KwaZulu Natal, Mpumalanga, and Limpopo).

Interviews provide an opportunity to gain in-depth detail (Gill, Stewart, Treasure & Chadwick, 2008). Castillo-Montoya (2016) further states that interviews allow the sharing of experiences and depending on the structure of the interview; semi structured or structured to gain real world understanding. The subjective nature of the process and the interpretation of language, as well as the researcher's bias and inseparability from the process, are some of the concerns discussed in the interview process (Dumay & Qu, 2011). Social and linguistic complexities are other issues that need to be addressed in the interview process (Alvesson, 2003).

Agee (2009) opined that, because an interview is part of an inquiry process, the questions should not be leading. Given the nature of the interview process, Dumay and Qu (2011) identified that careful planning and due preparation is required for the interview process, and skills such as intensive listening and note taking are prerequisites for the interview. They further stated that researchers must develop expertise in the practice of interviewing so they can ask informed questions. However, they fail to consider the novice researcher, who might not develop this expertise in the short amount of time available but can limit the effect by having their process validated by experts.

Creswell (2007) stated that qualitative research is an inquiry process and makes it difficult for researchers to extricate themselves from the process, as they need to interpret what they hear, observe, and understand. A researcher's background, context, history, and prior understandings have an impact on the interpretation of the data at hand. Castillo-Montoya (2016) discussed how to ensure validity of the interview process, with aligning questions being the first step in their Interview Refinement Protocol (IRP). This is carried out by mapping the interview questions against the research questions and ensuring that the questions that best answer the research questions are placed in the middle of the interview process, as per Table 12 below.

Table 12: Interview Protocol Matrix (Castillo-Montoya, 2016)

	Background	Research Question 1	Research Question 2	Research Question 3
Interview Question 1	X			
Interview Question 2	X			X
Interview Question 3		X		X
Interview Question 4		X	X	X

For the purposes of this research, semi-structured interviews were used for data collection. Semi-structured interviews are one of the three types of interviews (the others being structured interviews and unstructured interviews). Steyn (2015) noted that semi-structured interviews have a preliminary set of questions; however, the researcher allows for expansive discussion and responses given by the participants. Semi-structured interviews allow for flexibility in the data collection process by allowing respondents to

elaborate on certain aspects, which may not have been possible in a different method for data collection (Gill et al., 2008). Semi-structured interviews have been selected as the research instrument.

How did this happen (data collection)?

The interviewees were informed of the nature of the research and were given a detailed form stating the purpose of the research and their rights as participants. This included the right to withdraw and how their data will be used for the research. The researcher travelled to various urban centres (detailed in Table 13) that hold markets on weekends, as this is where small businesses gather to sell their goods and services. The researcher introduced themselves to the market-stall owners, engaged with them about the research, and asked if they would be interested in taking part in the research. The researcher also walked through the streets of Johannesburg (CBD, Parkmore, Melville, Rosebank, Illovo), Hammanskraal, and Cape Town (V&A Waterfront, Kuilsriver), making a list of businesses and contacting them to gauge their interest in being participants in the research.

Table 13: Market Locations

Johannesburg	Fourways Farmers Market 27 Boxes, Melville	Brownsense Market Neighbour goods Market
Pretoria	Irene Market	Boeremark
Durban	Heart Market Morning Trade Market	Victoria Street Market Stables Lifestyle Market
Cape Town	Woodstock Market Watershed V&A Market	Bay Harbour Market Green Market

Mobile payment providers like Yoco, Zapper, and Snapscan provide GPS locations of merchants that use their services. The researcher used these tools (the researcher already had these applications on their smartphone) to locate merchants that used these services, as well as to locate potential participants. This process resulted in 18 interview participants for the first cycle of this research.

The concept of data saturation is noted, and the researcher selected 18 interviewees as suggested by studies indicating that most constructs in a study can be found in a study with less than 20 respondents (Baker & Edwards, 2012). To increase the number of themes to be found, the researcher used a mixed method approach that involved focus groups, survey questionnaire and the interview process in discussion.

In this cycle, the MMPCF were tested on selected participants through a semi-structured interview (the interview questions are detailed in Appendix A). Participants gave consent for the interviews to be recorded on a digital device, and field notes will be transcribed and anonymised. Each participant was given the transcripts so that they could confirm an understanding of the events that transpired. Interviewing SMEs with no mobile payments gave insight into why merchants are not using mobile payments. The interviews were conducted on the premises of the SMEs and were timed to ensure that they were not too lengthy (60 minutes) and to avoid fatigue. A semi-structured interview allowed the participants to speak their minds within the context of the themes provided and allowed for deeper investigation than a structured interview would (Oates, 2006).

The researcher transcribed the data verbatim after listening to it numerous times to gain an understanding of the conversations and begin the coding process. The data was interpreted using in vivo analysis, which involves the use of codes and themes to make contextual meaning of the data (Tarrant, Leslie, Bion & Dixon-Woods, 2017). The researcher used a template to capture and justify each code, ensuring suitability and validity in the analysis process (Nowell, Norris & White, 2017). The coding process involves identification of key words mentioned by respondents, as well as combining and subdividing the codes into separate categories (Nyumba, Wilson, Derrik & Mukherjee, 2018). Breen (2006) noted that axial coding includes the process of assigning reference numbers to themes and stated that assigning codes to sentences allows one to calculate the frequency of each code.

This process was repeated numerous times and the analysis was sent to another researcher for validation before the themes were written up. The codes were placed according to themes and sub-themes, and codes without themes were kept for further analysis, as recommended by Nowell et al. (2017). The themes were then reviewed and named and detailed analysis produced based on this. As part of the DSR process, the MMPCF was updated according to new findings and then taken into a second cycle as detailed below.

Cycle 2 – Survey Questionnaire

The updated mobile merchant payment conceptual framework was taken through another cycle, which comprised a survey questionnaire as per the DSR process. The objective of the second cycle of the design process was to test the framework findings from the first cycle. This was accomplished using quantitative measures using a survey instrument that is detailed in coming sections. The survey instrument was distributed across South Africa and data was collected over a three-month period using both digital media and manually completed forms. Three post-graduate students were part of the process, assisting with manual form completion, collecting them from the SME respondents, and sharing the survey via digital media.

The participants were randomly selected using the ‘snowball method’. A survey questionnaire was created using Google forms, which allowed an unlimited number of surveys to be sent out and made it possible for responses to be exported to Microsoft Excel for analysis. The survey questionnaire was based on the constructs identified in the findings from the first cycle. The survey questionnaire items were referenced from literature, as well as from studies by Steyn (2015) and Ooi and Tan (2016). Some of the items in the survey were adapted from the constructs and converted into questionnaire format (for example, the cost construct was asked as the following question: “How important are costs of fees to you?”). The format of the survey questionnaire grouped the questions into technological, organisational, and environmental sections to ascertain a contextual view of the participants’ businesses. The majority of the questions in the survey

instrument were gauged using the Likert scale, looking at aspects of 'Importance' (options ranged from ***Very Important*** to ***Not Important***) and 'Frequency' (options ranged from ***Always*** to ***Never***). The survey was sent to the initial list of 18 interview participants, who then shared it in their social circles. The survey was also posted on a Facebook page and set to be displayed to South African SMEs who met the criteria for the research purposes. There were 177 responses.

Oates (2006) defined a questionnaire as a set of selected questions compiled in a specific structure with the aim of obtaining data from a select sample of a population. Jansen, Corley and Jansen (2007) further defined electronic surveys as a method whereby the computer facilitates the delivery and collection of the survey to the sample population. However, given the prevalence of devices that can be used to access content from the internet, the researcher has modified the definition to be inclusive of all digital devices, and not just computers. Jansen (2010) further elaborated on the purpose of surveys to explore the diverse opinions within a population sample.

Andrews, Nonnecke and Preece (2003) found that electronic surveys can be used to access difficult-to-reach portions of a population if quality criteria are setup in the process. Jansen et al. (2007) noted that some of the advantages of using the electronic survey instrument to collect data is that the process is cheaper and receives quicker responses (although response rates are affected by the type of questions being asked). Vicente (2010) discussed the challenges posed by web surveys, noting possible coverage bias resulting from the fact that not everybody has access to the internet. Jansen et al. (2007) further noted that potential technology-related issues may hamper the response rate. The researcher has mitigated some of these issues by using both electronic surveys and paper-based surveys.

HOW?

The survey began with a brief explanation of what mobile payments are, the objective of the study, who qualified (small business owners), and criteria to continue the survey. The survey form included an option for the respondent's email address to be shared with the researcher. All respondents opted to share their email addresses. It was stated that their data would be kept private and confidential and that emails would only be used if there was a need to contact the respondent to validate information gathered. In the data collection process of the survey, Andrews et al. (2003) discussed the issues of participant privacy and confidentiality. Eysenbach and Wyatt (2002) shared that web-based surveys have the advantage of offering anonymity to respondents. In the context of this research, the survey tool did not collect personal identifiable information except for the email addresses of respondents, for which consent was given. The email addresses were collected to allow the researcher to contact the respondents regarding the results.

Pilot

The survey was sent to five associates of the researcher, all of whom were operating small businesses, to test it out. Feedback was provided by the five business owners regarding the structure and meaning of questions and subsequently the survey was updated.

After about 30 responses, an adjustment was made to the question, "What type of business are you operating?". An extra option of "Other" was added, including the question "If other, please write down what business you operate". This was because the researcher had not provided an exhaustive list of industries that SME respondents could be operating in. The researcher then added more options and allowed a free-text form for the SME respondents to capture their industries.

WHERE?

The survey instrument was shared on the researcher's social media, including on the survey page created by the researcher. This page was run as a Facebook campaign using Ad Managers with certain filter conditions that ensured the campaign reached those running small businesses in any of the provinces in South Africa. The researcher opted for the survey to be displayed to participants of all genders and ages but limited to South African Facebook users who had registered SMEs. Key words that were added as tags were 'SME', 'merchants', 'baking', 'food markets', and restaurants. The Facebook campaigns were run over a two-month period, with specific campaigns catering to potential respondents in each province.

According to feedback from the Facebook campaign, the survey link reached 31 403 people, with 341 people clicking the link that took them to the survey. A total of 177 SMEs responded to the survey link, which gives a response rate of 0.56%. Of these 177 SMEs, two respondents did not provide consent for the study to use their data, despite completing the survey questionnaire. These responses were not included in the analysis.

Applicability to the Study

A survey instrument was selected for this study and some of the issues noted in the literature were remediated by selecting a sample size that fell within the parameters of the research. The survey instrument is detailed in Appendix B. (Eysenbach & Wyatt, 2002) noted that although electronic surveys can be part of the qualitative research process, the results can be analysed quantitatively. The researcher applied this process to the results of the qualitative web survey to unearth statistical relevance to the data analysis using the SPSS software.

The following methods were applied during analysis of the data collected using the survey instrument:

1. Frequency analysis per question
2. Cross tabulations analysis
3. Graphical analysis: pie charts and bar charts

The process is further detailed in Chapter 5. The data/output of this cycle resulted in the MMPCF being updated as part of the DSR process before being taken into a third cycle, as detailed below.

Cycle 3 – Focus Group

A focus group is a form of interview that is set in an environment where participants are encouraged to engage in debate to generate new ideas (Kitzinger, 1995). Focus groups have been proven to stimulate conversation and information sharing in a group setting (Aleke et al., 2011). According to Nyumba et al. (2018), focus groups use a qualitative approach to solve and explore social issues. They have many uses and bring people together to discuss their understanding of certain phenomena and their attitudes toward them (Leung & Savithiri, 2009).

Harker and Van Akkeren (2002) used focus groups when exploring the factors of innovation adoption by SMEs, noting that they allowed a view of the significant differences between people and their views and use of technology. Morgan (1984) posited that focus groups employ an appropriate qualitative method that can improve research by adding to the variety of techniques available to researchers, while Kitzinger (1995) indicated that they are ideal for gaining an in-depth understanding of people's motivations, why they think the way they do, and their knowledge and experiences. Oates (2006) noted the benefit of participant interaction in noticing new knowledge and understandings that may otherwise have been overlooked.

Nyumba et al. (2018) stated that there are multiple types of focus groups, including mini focus groups, online focus groups, respondent-moderator focus groups, duelling moderator focus groups, two-way focus groups, and single focus groups. The researcher used online focus groups to ensure participant safety in light of the worldwide restrictions put in place due to the COVID-19 pandemic and lockdown in South Africa. Although this form of focus group excludes potential participants who do not have the internet access necessary to partake in the discussion, this was the best option for the context.

Focus groups do have limitations like groupthink; a result of individuals influencing each other's thoughts and views (Harker & Van Akkeren, 2002; Jamshed, 2014), and there will always be a dependency on the researcher and how they carry out the process of a focus group. Reliability of the thematic analysis and getting participants to the same venue at

the same time are examples of challenges involved in the focus group method (Breen, 2006). Leung and Savithiri (2009) noted that assertive individuals can potentially dominate the focus group session, requiring the moderator to have the skillset necessary to facilitate and ensure that all participants are equally included.

Nyumba et al. (2018) stated that one of the major advantages of focus groups is the vast amount of data that can be collected in a short period of time, while hosting interviews for the same number of participants can lead to limited results. Kitzinger (1995) ascertained that focus groups create an environment that allows participants to explore various aspects of a topic that might not have been possible in an interview. A major difference between focus groups and interviews is that the former can be used to generate new ideas in a social setting (Breen, 2006).

A quantitative study can be used to overcome some of the limitations of focus groups and to add more details to the study outcome (Harker & Van Akkeren, 2002). Morgan (1984) discussed that, in terms of triangulation, focus groups offer views which complement their quantitative counterparts, and Breen (2006) identified the advantage of gaining a detailed understanding of the phenomenon under study, with potential for new insights. While Kizinger (1995) discussed how past research has sometimes combined focus groups with other data collection techniques, Breen (2006) explained how focus groups compliment the statistical insights provided by quantitative methods. The combination of focus groups and other data collection methods can complement the research process. For example, Fayolle and Linan (2014) advocated for a mixed method approach in studies involving entrepreneurs.

The focus group of this study encouraged SME participants to discuss challenges and success in terms of mobile payments and allowed them to swap ideas on how their businesses operate using these technologies. The focus group participants were selected from the initial set of participants who took part in the first and second cycle of the data collection. Two focus groups were conducted with a total of nine participants. Nyumba et al. (2018) noted that, although there is much debate regarding participant-recruitment

methods, the most important aspect is the effect that participants have on the discussion. The first focus group had six participants while the second had three.

Focus groups can be successful with as little as three participants and avoid the chaotic nature of larger groups (12 people or more) (Gill et al., 2008). It can be difficult to control these larger groups, often leading to separate discussions among the respondents (Nyumba et al., 2018). Guest, Namey and McKenna (2017) further found that more than 80% of themes were discoverable using just two or three focus groups. The issue of limited discussion in smaller groups can be overcome by both participants and a moderator who encourages debate (Gill et al., 2008). Leung and Savithiri (2009) detail contrary characteristics of a focus group noting that it must have 7-10 persons per group**.**

In terms of where the focus groups should be conducted, Breen (2006) discussed the importance of aspects like timing, incentives, and the number of focus groups required by the research. This study's focus groups were conducted on Fridays between 16:00 and 18:00 and were attended according to participants' choice of timing. These details were shared in an explanatory email describing the research, the objective of the focus group, and the process and outcomes. Because physical meetings were not possible during the COVID-19 lockdown, electronic focus groups were conducted through scheduled Zoom meetings and WhatsApp calls. Each participant was compensated for the airtime and data used during the focus groups. Although the use of video was not mandatory, some participants chose to make themselves visible during the Zoom meetings.

An email detailing the research and its objectives was sent to focus-group participants. Breen (2006) stated that the creation of a focus-group schedule should first welcome participants; then give an overview of the topic, group rules, and questions to be asked; and then obtain background information. Leung and Savithiri (2009) proposed a similar process: opening questions, introductory questions, transition questions, key questions, and concluding questions. The researcher followed most of the steps listed by Breen (2006) and Leung and Savithiri (2009) but excluded background information (including age and gender) that was not part of the study's scope or focus.

The focus group comprised a section wherein the researcher introduced themselves, welcomed participants, and asked participants to introduce themselves. Although most participants were on time and could introduce themselves prior to the commencement of the session, the researcher had to interrupt the session to allow two late joiners to introduce themselves. Ground rules like not interrupting each other and preserving confidentiality were discussed, and participants' permission for the focus group to be recorded was confirmed in the welcome and discussions sections. Breen (2006) and Leung and Savithiri (2009) noted that the research process includes electronically recording and transcribing the focus group.

According to Leung and Savithiri (2009), focus groups should use semi-structured or open-ended questions to encourage debate and a variety of responses; a strategy that was employed by the researcher of this study. The participants were referred to by their names during the focus groups, but the transcription used only the first letter of a participant's first name. The questions were structured in a way that eased participants into the session by initially focusing on them and detailing their businesses (how long they had been operating, type of business, etc.) before progressing to questions related to the mobile payment solution problem statements and the conceptual framework. Gill et al. (2008) discussed the role of the moderator (and this researcher) in guiding the discussion without expressing their explicit opinions in the process.

Target Population

The researcher attempted to use the respondents from the first cycle (semi-structured interviews) in the focus group. Due to timing, availability, and interest, a lot of the initial respondents from the first cycle were not able to be part of the focus groups. Overrecruiting is advised when seeking research participants for focus groups, as some participants may not be able to attend or take part (Stewart & Shamdasani, 1990). Some of the initial respondents in the first cycle had gone out of business or pivoted and were no longer in positions to partake in the focus groups. Participants who were available at the needed times were selected from both the first cycle and the second cycle groups.

Kitzinger (1995) advocated that a focus group should have a homogeneous mix of participants as this encourages them to share each other's shared experiences. The focus group participants operated in different industries and were at different stages with their businesses, which proved valuable as it encouraged dialogue among the participants.

How was the Data Analysed (process followed)?

Due to the qualitative nature of this data collection method, the process of analysis used for the focus group transcriptions is similar process carried out used on the interview data in the first cycle. Breen (2006) discussed the reliability of focus group data and how a researcher should note points of agreement and disagreement between participants and treat them with caution when interpreting them.

The process is further detailed in Chapter 6. The MMPCF was updated and finalised according to the findings of this data collection cycle. As part of the DSR process, the MMPCF was updated using the new findings and formed the basis for final conclusions drawn.

3.3 POTENTIAL RESEARCH ISSUES

During the process of collecting data (especially in the qualitative process), a researcher's point of view and questions can change with the development of a deeper understanding of the situation (Agee, 2009). Before conducting the interviews, the interview questions were sent to three experts for validation and verification, looking specifically at the instrument in use and the wording in the questions. Revisions were carried out in accordance with the corrections and suggestions provided.

Rigour in Qualitative Research

This section will discuss the methods used to ensure rigour during data collection and interpretation. Dependability is the equivalent of reliability in positivist quantitative studies and is a measure of how the research can be replicated by another researcher to reach the same conclusions (Bhattacherjee, 2012). Bhattacherjee (2012) detailed how researchers should ensure that they provide enough context of the social setting and the phenomena of interest to allow researchers to come to independent interpretive conclusion.

Credibility is the equivalent of validity in the positivist quantitative realm. A researcher should be able to maintain a clear and concise log of all interactions with the participants which, if necessary, can be used for an independent audit (Bhattacherjee, 2012). The researcher must be able to show how they carried out data triangulation to maintain credibility (Bhattacherjee, 2012).

Transferability allows researchers to carry out the same research in a different setting, given that the information supplied in the research is dense and detailed (Bhattacherjee, 2012). A criticism or limitation of some qualitative research is the lack of generalisation, which speaks to transferability. It could be argued that the increased specificity regarding context is why some research is not transferable or generalisable when using qualitative interpretivist approaches.

Questions created should be focused and specific to optimise the research process. All interviews were recorded on a digital transmission recorder and transcribed for analysis. The recording will ensure that no data is lost and is backed up to a secure cloud server. Agee (2009) discussed the importance of having someone other than the author (the student) looks at the first set of questions posed in a qualitative study, especially in the case of doctoral students.

The issue of reliability of qualitative data can be addressed by explaining how the research addressed the following questions raised by Breen (2006):

1. Did you get an independent researcher to cross-check your codes?
2. Did you look at the level of agreement or disagreement between participants?
3. Did you assess the frequency of opinion change among respondents?

To examine the reliability of the data, the above questions were posed at the ends of Cycle 1 and Cycle 3, where interviews and focus groups had been interpreted and analysed.

Limitations

Agee (2009) identified that novice researchers are prone to using leading questions in their research designs, which might lead to problems in the research process. This can be prevented by ensuring that the research questions are validated by other researchers and are tested in a pilot process before the actual interview process. The researcher is aware that they carry certain assumptions and biases based on their background as an IT consultant and researcher.

3.4 ETHICS

Myers (2009) summarised ethics as an attitude to “do unto others as you would have them do unto you”. Similarly, Agee (2009) stated that a researcher represents the lives of the research subjects and can view, feel, and understand the implications of the situation by carefully considering the questions in terms of the impacts they have (both long-term and short-term.

Honesty in research is a top priority. Myers (2009) recommended that all researchers be honest in their findings, data, and research methods, while Agee (2009) noted that any inquiry into a person’s life is an exercise of ethical practice. Myers (2009) further recommended that the researcher observe and respect the following rights of research participants:

- The right not to participate.
- The right to withdraw at any point before or during the study and can request that the information captured not be disclosed or used for the study.
- The right to give informed consent.
- The right to anonymity.
- The right to confidentiality. The privacy of the subjects being studied is of top concern and must be maintained throughout the study and after the research has been conducted.

3.5 CONCLUSION

Although the amount of financial information processed through mobile devices is increasing, there is limited research from a South African context (specifically merchants). Even though SMEs provide the goods and services that users will spend their money on, the importance of their acceptance of payment methods is understudied. The purpose of this study is identifying and developing the framework for mobile payment adoption by merchants in South Africa, including a theoretical contribution to information systems (particularly mobile payment) literature. This research aims to answer questions raised by Dahlberg et al. (2015) regarding unexplored areas of the mobile payment ecosystem and the merchants involved.

4 CHAPTER 4: CYCLE 1: SEMI-STRUCTURED INTERVIEWS

The objective of Chapter 4 is to detail the analysis of interviews conducted. Cycle 1 of the research process entailed 18 interviews with SMEs across South Africa and resulted in an updated framework for merchant mobile payment adoption factors. An overview of the SME merchants who participated in the interviews is followed by a detailed profile of each. The codes, categories, and themes emerging from the analysis are discussed, whereafter an updated merchant mobile payment conceptual framework is given.

4.1 OVERVIEW

Interviewees provided permission for the recording of the interviews. These interviews were then transcribed and read through several times to ensure a thorough understanding of the data. The interview questions are provided in Appendix A – Interview Questions. Interviewees' responses to questions about employee numbers, line of business, and ICT profile are summarised below (categorised by merchant). By investigating the current profile of these entrepreneurs, one can determine the historicity of hermeneutics to see what their background and current situations are. Chapter 4 is used as the baseline for the questionnaire and interviews conducted to see if there are any similarities between entrepreneurial literature and the actual South African entrepreneur.

At the time of interviewing most of the SMEs had been in operation for less than 10 years (the exception operated for 12 years, predominantly in the e-commerce space before migrating to the brick-and-mortar space). Table 14 below depicts the years of operation at the time of the first cycle of data collection. At the time of the data analysis, SME E had shut down due to declining sales and increased rental costs. As noted below, 33% of the interviewees had been operating for less than three years and were still in the critical phase of survival for a small business in South Africa – Nemaenzhe (2010) showed that 43% of small businesses in South Africa do not survive more than three years, while Bowler, Dawood and Page (2006) estimated that 60% of small businesses do not survive more than two years.

Table 14: Company Overview

Company	Industry and business focus	Number of Years in Operation
SME A	Healthcare – Online Health store	5 Years
SME B	Publishing – Comic books and novels	3 Years
SME C	Retail – Natural hair products	3 Years
SME D	Retail – Shoe accessories	2 Years
SME E	Hospitality – Fast food outlet	2.5 Years
SME F	Hospitality – Restaurant	2 Years
SME G	Hospitality – Restaurant and catering	5 Years
SME H	Retail – Clothing	12 Years
SME I	Hospitality – Restaurants	6 Years
SME J	Retail – Women's clothing	2 Years
SME K	Retail - Women's clothing	7 Years
SME L	Retail - Women's clothing	2 Years
SME M	Education – 2nd handbooks store	7 Years
SME N	Hospitality – Street food	6 Years
SME O	Retail – Clothing	6 Years
SME P	Education - Book store	2 Years
SME Q	Hospitality – Restaurant	2 Years
SME R	Manufacturing – Handbags	2 Years

Table 15 gives an overview of the SMEs and the mobile payment technology that is in use. The researcher has included the average number of customers using the device within a specific time period.

Table 15: Company - Mobile Payment Type

Company	Type of Mobile Payment in Use	Average Number of Customer using device per day
SME A	Snapscan and Yoco (and e-Wallet)	5-6 per month
SME B	Yoco	More than 10 per day when selling at markets
SME C	None	None
SME D	Nedbank Pocket POS	More than 15 per day when selling at markets
SME E	None	None
SME F	Zapper	2-8 per day
SME G	Yoco and iKhokha (used to have Absa Payment Pebble)	30% of their transactions were through Yoco and iKhokha
SME H	Snapscan and Yoco	2-3 Snapscan transactions while the Yoco and Bank swiping machines split the rest of all the transactions
SME I	Snapscan and Yoco (used to have Zapper)	Less than 5% of transactions are via Snapscan. Snapscan and Zapper only used when the there is a power outage, with Yoco being the preferred process
SME J	Yoco (used to have Snapscan)	1 Snapscan transaction since obtained. Most use Yoco and a bit of cash
SME K	Snapscan and Yoco	30-40 Yoco transactions per month. No Snapscan transactions since it was bought.
SME L	Nedbank Pocket POS	Sporadic usage
SME M	iKhokha (used to have Snapscan)	All transactions processed via iKhokha as this is the only device in store
SME N	Snapscan, Yoco and Zapper	All transactions processed via Yoco
SME O	Yoco	All transactions processed via Yoco

Company	Type of Mobile Payment in Use	Average Number of Customer using device per day
SME P	Yoco	7/10 transactions via Yoco and the other transactions in cash
SME Q	Yoco	All transactions processed via Yoco
SME R	Zip Zap	Split between EFT and Yoco

As discussed in this research's literature review, there are several ways to classify SMEs (number of employees, revenue, turnover, etc.). Table 16 below is a reminder of the definition of SMEs as applied to this study by Mahembe (2011) and National Small Business Act of 1996.

Table 16: Definition of SME

Title	Definition	Employee Breakdown
Survivalist Enterprise/ Micro	This kind of business displays a lack of capital equipment and is mainly a cash business e.g., spaza shops, taverns	Typically run by owner and employ no more than 5 people
Very Small	The enterprise begins to display formal and established business processes	Less than 20 employees
Small Enterprise	The enterprise is more established and exhibits more complex business practices.	Between 50 and 99 employees
Medium Enterprise	The enterprise begins to have a distinguished hierarchy of authority and increase financial turnovers.	Between 100 and 200 employees

The researcher did not discuss the turnover or revenue of each business as this was not relevant to the study, but the researcher did find that only three of the SMEs had more than 10 employees. It was also noted that some employed family members to assist in business operations. Table 17 gives an overview of this information.

Table 17: Company - Number of Employees

Company	Number of Employees	Company	Number of Employees
SME A	4	SME J	1
SME B	3	SME K	20
SME C	1	SME L	3
SME D	1	SME M	3
SME E	9	SME N	6
SME F	9	SME O	7
SME G	10	SME P	1
SME H	1	SME Q	9
SME I	108	SME R	0

4.2 PROFILE OF THE MERCHANTS (SMES)

The SMEs were examined under the four constructs recommended by Fink and Disterer (2006) when they noted that the adoption of ICT in SMEs is influenced by social aspects. After the SME introductions and reviews, the data will be analysed based on the main research areas listed below. This research will add to the body of knowledge concerning ICT usage and practices in small SMEs. Primary data was collected through the interviews that were conducted. The four constructs by Fink and Disterer (2006) are detailed below:

Affiliation: This refers to the relationships and networks that link individuals and organisations to each other, even across industry. Fink and Disterer (2006) viewed it as social networks created and fostered in organisations by ICT.

Environments: This construct looks at the fact that organisations are affected by larger forces in the environment (beyond organisational issues), which need to be considered

when explaining ICT use (Lamb & Kling, 2003). Fink and Disterer (2006) added that this construct refers to constraints imposed by the location of a firm.

Interactions: This refers to the communication between individuals in an organisation using IT. Fink and Disterer (2006) placed focus on the communications between individuals in groups and among groups within the organisation, as well as different roles in the organisation (Lamb & Kling, 2003). The importance of this construct is that it can better explain how individuals use ICT to further their individual and organisational activities (Lamb & Kling, 2003).

Identities: This construct refers to how employees create identities for themselves, the firms they work in, their competitors, and customers (Lamb & Kling, 2003; Fink and Disterer, 2006). A generic perspective also notes that identities consider both the self and individual profiles assigned in an organisation, and how this leads to individual and collective entities (Lamb & Kling, 2003).

4.2.1 SME A – Snapscan and Yoco

At the time of this research, SME A had been in operation for five years and had evolved from selling one health care product via activation launches to offering more than 560 products on an e-commerce website. The owner uses a personal smartphone for business activities – apart from the payment device, there is no smartphone or other digital device dedicated to the business. They do not have an IT department and outsource their IT needs to a part-time employee, who manages the website via Woo Commerce System, Google, and a WhatsApp business account. The business operates mostly digitally but deliveries are done by linking to couriers who pick up and deliver to customers. The owner noted that customers would specify the type of payment they prefer by asking if a card machine could be sent along with the delivery or if they can make a payment on Snapscan.

Affiliation: The entrepreneur uses social networks maintained through social media to enhance their business.

Environments: The entrepreneur went above the environmental constrictions of a brick-and-mortar store by creating an e-commerce site that has trusted payment options enabled.

Interactions: There is a great communication network that the entrepreneur uses for business. The use of WhatsApp is strong, and the entrepreneur has gone on to state that payment is the only missing feature in his conversations on WhatsApp. The entrepreneur communicates with clients and service providers via WhatsApp and phone calls.

Identities: The SME had part-time employees; however, little was discussed on this factor as part of the thesis.

4.2.2 SME B – Yoco and Cash

SME B is a sole entrepreneur who occasionally gets assistance from their family. At the time of the study, the business had been in operation for three years and had evolved from drawing art to writing comics, facilitating workshops, and writing novels. Business is sourced from social media (such as Twitter and Instagram), where the owner advertises and commissions their work. They regularly attend fairs and marketplaces to sell the artworks and books. There is limited infrastructure as they do not operate a physical store front or maintain a website.

Affiliation: The entrepreneur uses social networks maintained through social media to enhance their business such as Twitter and Instagram. The entrepreneur relies heavily on the financial support of his mother and brother, especially for assistance operating at the marketplaces they frequently travel to.

Environments: Although there is no website for the business, this entrepreneur operates mainly in the digital environment by managing stock of their books using the Yoco device

Interactions: The use of WhatsApp is prevalent, and the entrepreneur engages on many platforms at the marketplaces to engage with potential customers.

Identities: There were no full-time or part-time employees apart from the entrepreneur and family members

4.2.3 SME C – Cash and EFT

SME C is a sole entrepreneur who had been operating in the natural hair care business for just over three years at the time this research was conducted. The entrepreneur sells products at markets but mainly depends on online orders through their website. Customers make orders using the website and, when the order is received, the entrepreneur generates an invoice for the customer. Once paid for, the hair products are either delivered to customers or collected by them.

Affiliation: This entrepreneur advertises mainly on their website, as well as on Instagram. This is how they maintain a social network.

Environments: This entrepreneur operates digitally; however, they mentioned that they do not do anything specific to keep up with IT trends or to understand new technologies. The level of technology at their disposal allows them to facilitate their processes.

Interactions: The primary form of communication is email, which is used to facilitate orders and get feedback from the customers.

Identities: This is a sole entrepreneur, so interaction with technology is based on their experiences.

4.2.4 SME D – Nedbank Pocket POS

SME D is a full-time consultant but operates this business on a part-time basis. The business had been in operation for two years at the time of this research and was inspired by the entrepreneur's desire to make shoes a more interesting item to wear. SME D employs their brother (a student) to assist with aspects such as management of the delivery process of shoes and accessories. The entrepreneur stressed the technological issues they had faced, including their Google account being hacked and customers sending fake proof of payments.

Affiliation: This entrepreneur advertises products mainly on their website, which was created using Shopify, as well as on Instagram and Facebook. This allows them to

maintain a social network, while a WhatsApp business account is used to engage in online business when taking orders.

Environments: This entrepreneur operates from their home garage and through the above-mentioned digital presence. They have outsourced development of the shoes to a group of ladies (for this outsourcing they qualify for government funding that they are in the process of attaining). The processing of orders and banking are functions carried out on mobile devices and laptops.

Interactions: The primary form of communication is email, and both orders and receipts are processed using it. Some orders and invoices are received via a WhatsApp business account. The combination of automation and manual processing causes issues when it comes to reconciliations at the end of each month: *"I have a little black counter book and I give you the invoice…. I am so embarrassed"* (SME D, 2019).

Identities: The entrepreneur has employed a brother but stated that they deal with all IT-related components. The outsourced component of the business mainly deals with the development of the shoes through a manual process and limited technological aspects.

4.2.5 SME E – Traditional Bank POS Device and Cash

SME E was in a rural area bordering Mpumalanga and Gauteng and operated a fast-food establishment in a developing mall. This business had been in operation for two and a half years but was closed by the time this research was conducted: it was no longer viable, and the entrepreneur was unable to pay rent. The business was part of a franchise and adhered to certain decisions regarding technology use, including standard point of sale software and devices. The ordering and delivering processes were run using the franchise-mandated systems, allowing standardisation in the process.

Affiliation: This entrepreneur did not use technology to enrich social connections or entrepreneurial ambitions. The franchise network was maintained through email communication.

Environments: This entrepreneur operated in a rural setting. It is a small mall/shopping centre and hence there is plenty of foot traffic especially on the weekends when workers

who travel to Pretoria for work return home to families. attaining). The processing of orders and processes was carried out on a till device except when there was no electricity, where orders are then written down on paper as such.

Interactions: The primary form of communication was face-to-face, and email, orders and receipts are received via this method. The entrepreneur had a technology background and hence implemented some processes based on excel to manage some stock taking processes that the franchise systems were not carrying out.

Identities: The entrepreneur had employed 9 people who deal with duties ranging from the front of the store (taking orders) to back office (making the food and managing deliveries). From discussion, some of the employees were IT literate and had operated till machines, POS devices in previous employment before they were hired at the new business. They still had to undergo training with the franchise on its systems and operations.

4.2.6 SME F – Zapper and Traditional Bank POS

At the time of this research, SME F had been in operation for two years after taking over the business from the previous owner. The entrepreneur is quite technologically competent and stated the following:

> *"I got my eyes very much on technology myself and that is where it goes, wallets is very much a thing of the past. I think that wallet is going to become part of our cell phones at the end of the day."* (SME F, 2019)

The business hosts dance classes on Monday evenings, which encourages exposure. The entrepreneur has their team deliver meals to the people in the business park. The business owner is confident that, even when people forget their wallets, their mobile device is always with them and supports the use of Zapper. The entrepreneur stated the following: "so the one thing that they don't forget to take with them is the cell phone, so it is always with them, so it's easy."

Affiliation: Despite claiming to be technologically savvy, this entrepreneur only uses the technology required to operate the business. They do not engage with clients by offering points or vouchers once the sale has been made. The network is maintained by their

position as the only place in the business park that offers food – the existing ecosystem ensures stability.

Environments: The business is in an urban setting in a business park in high-end Johannesburg. It is the only restaurant in the business park and has a loyal clientele.

Interactions: There are eight employees but only three of them interact with technology (primarily the waiters when they are settling orders). The primary forms of communication are face-to-face and email (orders and receipts are received via this method). The entrepreneur purchased a point-of-sale system that is integrated to the Zapper system.

Identities: The entrepreneur has employed eight people who deal with duties ranging from the front of the store (taking orders) to back office (making the food and managing deliveries).

4.2.7 SME G – Yoco, IKhokha, and Cash

SME G had been in operation for five years (but only on a full-time basis for two years) at the time of this research. The entrepreneur's business is located near construction sites, with a restaurant located in a business park as well. In the early days of operating their business, they had used the Absa pebble device but encountered multiple user-experience issues and stopped using the device. An example of these issues happened when they were serving food at a church conference. Customers got frustrated with the security features involved – the keypad scrambled every time a user entered a digit in their PIN number. The customers got so frustrated that they resorted to asking the entrepreneur to enter their PINS on their behalf.

Affiliations: Given the nature of the business, there is significant of face-to-face communication. The restaurant is in a business park with a form of ecosystem in terms of customer base, but the entrepreneur revealed that this was not yet yielding a steady income. The business that is located by the construction site has a steady stream of customers due to the nature of the food they serve and the needs of the construction workers.

Identities: The entrepreneur's wife co-operates the business – she works at the business on a full-time basis while the owner works in corporate. They have 10 employees who

work full time; however, most of them work in cooking and cleaning aspects of the business and have minimal contact with technology.

Interactions: Given the nature of the business, there is plenty of face-to-face communication, while work schedules and updates are communicated with employees via SMS and WhatsApp. As a result of his career in the computer science field, the entrepreneur is technologically knowledgeable and manages communication for the restaurant business using both email and Instagram.

Environment: The entrepreneur's business is located near construction sites, with a restaurant located in a business park as well. In the business park there is access to the internet (WhatsApp), but the entrepreneur stated that they must purchase data for the 3G Wi-Fi device so that the IKhokha and Yoco devices can work at the construction site.

4.2.8 SME H – Yoco, Snapscan, Traditional Bank POS, and Absa Pebble

SME H is in a busy business district on a long street comprising mainly businesses in an upper-class neighbourhood. The business has been in operation for 12 years, although it was primarily digital before the owner decided to move into a brick-and-mortar store at the current location. The entrepreneur imports the clothing they sell from other countries.

Interaction: Given the amount of time the entrepreneur spent operating digitally, email and phone calls were the main form of communication with customers and suppliers. Even with the opening of the physical store, email is still the main form of communication.

Environment: The business is in a very busy street and does not stand out from other businesses offering the same products.

Affiliations: As there is only one employee, this is not a factor in this business. However, from a community perspective, the entrepreneur maintains a website and still sources customers using this channel and the community formed by their digital presence.

Identities: This is not a major factor as the entrepreneur operates with just one other employee.

4.2.9 SME I – Snapscan, Yoco, Traditional Bank POS (and Zapper previously)

SME I operates multiple restaurants in high-end suburbs in Johannesburg, with over 100 employees across the multiple locations. At the time of this research, it had been just over six years since the entrepreneur started the businesses. The entrepreneur faced multiple challenges with continuous electricity shortages in their area, as well the having a payment system crash on a busy Friday night, in which they lost three-years' worth of data. The entrepreneur's frequent cussing clearly expressed the frustration felt.

Interaction: This entrepreneur relies on technology and has stated that they have a computer screen in the office showing a live view of payments/transactions as they happen across his businesses. The entrepreneur and his accountant rely on technology to ensure that the finances across the four businesses are managed.
Environment: The main concern noted by the entrepreneur was the electricity outages, as these affect the payment devices. This has necessitated the purchase of devices that do not depend on direct connection to a power source.
Affiliation: The entrepreneur is a chef by profession and worked in hospitality and still maintains contact with other chefs and entrepreneurs in the same business to understand the challenges they face.
Identities: This entrepreneur previously had a partner in the business but now operates alone, with the assistance of managers in different shops and the accountant to address the finances. Communication with employees is face-to-face and through SMS, with the owner stating that "About 65% of the employees use some form of IT besides the barmen".

4.2.10 SME J – Yoco (and Snapscan previously)

SME J is a sole entrepreneur operating from home. She manufactures and sells high-end ladies' clothing. She has attended an entrepreneurial course for clothes design and shows great passion in the work. Although she designs the clothes, manufacturing has been outsourced to an external team of ladies. The business had been in operation for just over two years at the time of the research, and the entrepreneur's nanny assists with some of the administration work. The clothes are sold via social media and at weekly markets.

Interaction: The entrepreneur relies heavily on technology daily. Social media platforms and WhatsApp are used to interact with customers and the clothing manufacturers.
Environment: The entrepreneur works from home, where she has an office for designing and client interaction. The digital environment presented by WhatsApp is used to communicate with fellow entrepreneurs and for the exchange of feedback, referrals, and knowledge.
Affiliations: The entrepreneur uses social media extensively, relying on direct messaging, WhatsApp, and Facebook messaging for orders.
Identities: Being a sole entrepreneur, there is limited scope for discussion about the identities factor.

4.2.11 SME K – Yoco and Snapscan

This is a high-end fashion boutique outlet that specialises in clothes made from natural fibres. At the time of this research, the business had been in operation for seven years and has sister shops in Johannesburg. The business owner and another designer design the clothing, with a focus on simplicity and environmental friendliness.
Interaction: Given the spatial distance between the shops, technology is essential for communication and ensuring alignment between them. Functions such as stocktaking are carried out on tablets that are synced to the same system so that managers in the other shops have a view of what is available across the shops.
Environment: The shops are located in high-end areas. The Cape Town shop is at the V&A Waterfront, and all of the areas have high volumes of tourists and higher LSM

clientele. These areas have access to fibre and Wi-Fi, although they are not immune to the electrical shortages which have plagued the country.

Affiliations: Emails are used to keep the two offices connected, to send receipts, and to contact customers. The business is environmentally friendly and minimises the printing of receipts.

Identities: This entrepreneur has 20 employees working in the businesses. The eight seamstresses have limited technology interaction other than that used by the sewing, cutting, and material-pressing machinery.

4.2.12 SME L – Traditional Bank POS (and previously Nedbank Pocket POS)

SME L is a high-end fashion boutique located in the heart of Sandton City in Johannesburg. They specialise in ladies' clothing and operate via website and online store before moving into a physical presence. The move to a physical store was driven by the realisation that e-commerce in South Africa is still in its early stages and that the LSMs they were targeting would prefer a walk-in store and experience.

Interaction: The business operated digitally before moving to its physical nature and location. The online store uses Payfast as a payment gateway and communication with customers, suppliers, and customs is done via email.

Environment: The physical store's location (in the heart of Sandton City) affords it access to some of the best and undisturbed power, fibre, access, and customer bases that suit the LSMs the entrepreneur is targeting.

Affiliations: The entrepreneur is part of a WhatsApp group with other entrepreneurs who took part in the design course with her. The group shares referential knowledge, research, and encouragement.

Identities: There are only two employees in the shop (besides the entrepreneur) and they both deal with IT components of the business. Communication with the employees is face-to-face, given there are so few.

4.2.13 SME M – IKhokha (Previously Traditional Bank POS and Snapscan)

SME M had been operating second-hand bookstores for more than seven years at the time of this research's conduction. Other stores had been closed and this was the last one in operation. There is limited automation in the bookstore and, when asked, the entrepreneur stated that they had received two quotes to create a book-inventory location system. However, the quotes were too high, and they continued to use a spreadsheet listing all the titles in the shop. There is no web presence maintained for the bookstore.

Interaction: There is limited technology interaction beyond the payment device and use of Microsoft Excel. One employee is an elderly gentleman with an aversion to technology, specifically mobile devices.

Environment: The shop is in a high-traffic area. Electricity shortages were common, and the current payment device alleviates the payment process when there is no electricity.

Affiliations: There are no social networks created using the limited technology employed by this business.

Identities: One employee, thus not applicable.

4.2.14 SME N – Traditional Bank POS, Yoco, Snapscan and Zapper

SME N operates in food markets in suburbs in Johannesburg and had been in operation for six years at the time this research was conducted. The SME had recently acquired a liquor licence to diversify the business offerings at markets. They have six employees who mainly work on the weekends. The entrepreneur operates this business with their life partner. They split places of operation if there are multiple markets at the same time.

Interaction: The entrepreneur has limited technology in use besides the payment systems in place. The entrepreneur works in IT on a full-time basis and has created a website to maintain a domain name for the business.

Environment: The SME operates at food markets and fairs on weekends. The entrepreneur has subscribed to mailing groups to receive updates on markets.

Affiliations: There are no social networks created using technology. The entrepreneur mentioned that they maintain a website just to show that they exist.

Identities: Communication with employees is mainly through WhatsApp, through the week and on weekends, there is more face-to-face when they are working together.

4.2.15 SME O – Yoco

SME O is based in Cape Town and has multiple stores operating around the main cities in South Africa. At the time of this research, the business had been operating for six years and had seven full-time employees, with others on an ad hoc basis when they operate pop-up stores. The business specialises in retail, especially men's undergarments.
Interaction: The business operations are fully integrated with technology. The entrepreneur contacts customers mainly via cellular phone (email and phone calls).
Environment: The businesses are in high-end suburbs in the main cities in South Africa. The environment does not seem to limit the organisation's capabilities. The shops are connected to fibre and Wi-Fi, as most of the technology depends on internet connectivity.
Affiliations: There is extensive email usage, inclusive of mailing groups and an extensive social media network.
Identities: With the seven employees there is face-to-face communication, and email communication with the teams across the country.

4.2.16 SME P – Yoco and Cash

SME P had been operating a bookstore in a student-centred neighbourhood for just under two years at the time of this study. This is a husband-and-wife-operated business with one employee, as both husband and wife work in corporate during the week. The entrepreneurs then work alternate weekends.
Interaction: The business is small and recovering from a flood, so technological interaction is limited to just emails and the Yoco stock system.
Environment: The entrepreneurs' premises are in a trendy and arty student area. They moved from the centre of Johannesburg after the flood and for safety reasons.
Affiliations: This is limited as there is no social media marketing and the communication is between the couple and the one employee via WhatsApp.

Identities: Not applicable as there is only one employee.

4.2.17 SME Q – Yoco

SME Q is an African cuisine restaurant and had been in operation in Cape Town for just over two years at the time of the study. It is a family-run restaurant with the eldest son playing a more prominent role in the business than the youngest son. The eldest son works in the field of software development and maintains that aspect of the business and its social media, while the parents focus on the operations of the restaurant. The business was started as a joint family operation as the parents have experience in the hospitality and tourism industry.

Interaction: The business is well integrated into various platforms for delivery, including Uber Eats, Mr Delivery, and Orderin, allowing them a wider reach to customers and better service. Suppliers and customers communicate via email where necessary.
Environment: The business is in a market-friendly neighbourhood between the central business district and university campuses. The location allows for easy access with the intersection of bus, rail, and public transport, leading to significant foot traffic. The area is well serviced in terms of access to electricity, fibre, and Wi-Fi.
Affiliations: There is a large social media drive on both the SME's accounts and the family's personal accounts whenever they host people or teams at the restaurant. A network has been created and the organisation benefits from being rated on traveller and trip forums due to this exposure.
Identities: This is a family-run business that does interact with technology, although there is significant face-to-face interaction with the nine employees. The parents mainly handle the payment process while the employees handle the food-preparation aspects.

4.2.18 SME R – Zipzap and EFT

At the time of this study, this entrepreneur had been operating the business for just under two years and specialises in boutique bags for ladies. The business operates mainly from her house and from markets and fairs. The manufacturing of the bags is a separate function that is outsourced: “Manufacturing is a separate entity and I hire them for each task and not as employees”.

Interaction: The entrepreneur primarily uses email and WhatsApp to communicate with both manufacturers and customers when it comes to orders and payments. She prefers to interact with EFT and cash to reduce transaction costs.
Environment: The entrepreneur operates from familiar environments.
Affiliations: The entrepreneur has a social network based on the time spent at the fairs and markets.
Identities: Not as applicable as this is a sole entrepreneur.

4.3 DATA ANALYSIS

The above view detailed the entrepreneurs that were interviewed. The following section details the analysis of the in vivo coding and axial coding carried out on the interviewees’ feedback. The feedback from Cycle 1: Interviews resulted in an updated Merchant Mobile Payment Conceptual Framework (referred to as the MMPCF) that is discussed in this section. The objectives of the analysis are to delve deeper into the transcribed interviews to understand and find meaning from the words shared by the interviewees. Table 18 summarises the constructs that were used in this research, based on the literature review from Chapter 2.

Table 18: Identified Constructs.

Identified Constructs	Sources
Incompatibility with existing business	Mallat & Dahlberg (2005) and Mallat & Tuunainen (2005)
Trust and Security	Mallat & Dahlberg (2005), Mallat & Tuunainen (2005) and Pousttchi, (2004); Pidugu, (2015); Mhlongo (2016)
Perceived lack of standardisation	van der Heijden (2002), Mallat & Tuunainen, (2005), Ondrus & Pigneur (2006) and Ondrus & Pigneur, (2005); Pidugu, (2015)
Cost (relative to substitutes)	van der Heijden (2002), Mallat & Dahlberg (2005), Mallat & Tuunainen (2005), Teo et al., (2005), Pousttchi (2004) and Ondrus & Pigneur (2006); Abebe and Lessa (2020); Mhlongo (2016)
Ease of Use (relative to substitutes)	van der Heijden (2002) and Ondrus & Pigneur (2006); Pidugu, (2015); Kalan (2016); Abebe and Lessa (2020)
Perceived Risk	van der Heijden (2002)
Network effects	Pousttchi (2004); Pidugu, (2015)
Network externalities	Van Hovve (2001); Pidugu, (2015)
Business model	Mallat & Dahlberg (2005), Mallat & Tuunainen (2005), Ondrus & Pigneur (2005); Pidugu, (2015)
Technology compatibility	Mallat & Dahlberg (2005), Mallat & Tuunainen (2005) and Ondrus & Pigneur (2005); Pidugu, (2015)

A literature review and assessment of the TOE provided a basis for categorising these constructs within the dynamic framework, as per Figure 14, to provide a theoretical basis for the furthering of the research.

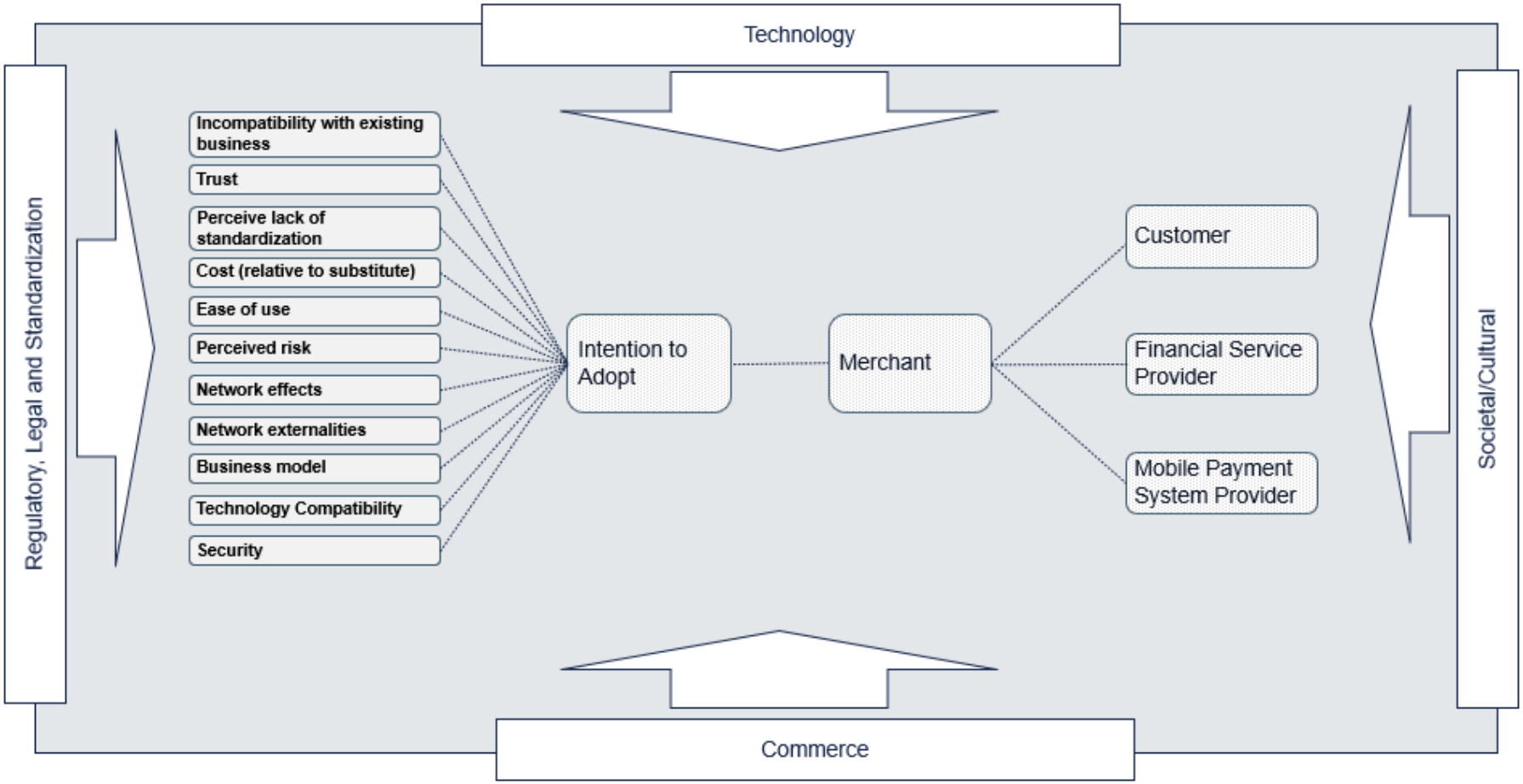


Figure 14: Merchant Mobile Payment Conceptual Framework (MMPCF)

Process

The questions were based on these constructs within the context of the TOE framework. The in vivo coding process was carried out on the transcripts before axial coding was carried out; this was an iterative process to get a better understanding of the data. Saldana (2016) recommended axial coding as a complement to a process such as in vivo to enable a deeper understanding and bring out the connections, causalities, and relationships between the codes. The initial in vivo coding yielded more than 500 unique codes and, through the process of re-reading the transcripts, a deeper understanding of the text was attained. This is elaborated on in the next sections.

The process of finding the connections, causalities, and relationships between entities is a subjective process (Gibbs, 2010). This research carried out the process at code, category, and theme levels. The researcher read through the transcripts during the axial coding process and identified the relationships and causalities that seemed common through the feedback provided by the interviewees. The following statement below is an example of the logical process that the researcher followed to produce relationships and causalities among the identified entities:

“No electricity”, (as identified code) resulted in compromised merchant service with customers not being able to pay, necessitating a backup solution for power cuts being a common occurrence in some areas in South Africa. The process of coding resulted in codes, categories, and themes linked to the data. The following sections detail each of these, grouped according to the themes that resulted from the data analysis.

A manual process of axial coding can be time consuming but enabled the researcher, who is new to this research technique, to get a deeper understanding of the process and an appreciation of the data. The process of looking for relationships between the codes yielded interesting findings as the researcher delved back into the transcripts to make the links and gain a better understanding. This process was difficult at the code level due to the numerous codes that were identified. The researcher used code numbers and

highlighted cells to keep track and to make tracking the codes easier. The process of establishing relationships and causalities involved asking the question “When does this happen?” and searching through the transcripts. The same process was carried out at a category level and at a theme level. This process resulted in refined codes, categories, and themes.

The researcher then combined the categories that had a similar tone to create the five themes listed below:

1. Business decision making and impacts.
2. Customer access and marketability.
3. The impact of payment systems and payment process on the business.
4. Infrastructure setup, support, and connectivity.
5. Operating a business and its processes.

Figure 15 is a view of the culmination of the coding and category process simplified into five themes. The researcher reviewed the categories, looking for similarities and alignment and placing them together as part of a larger theme. The naming of the themes was based on the overarching factor that was coming through the categories that were grouped together.

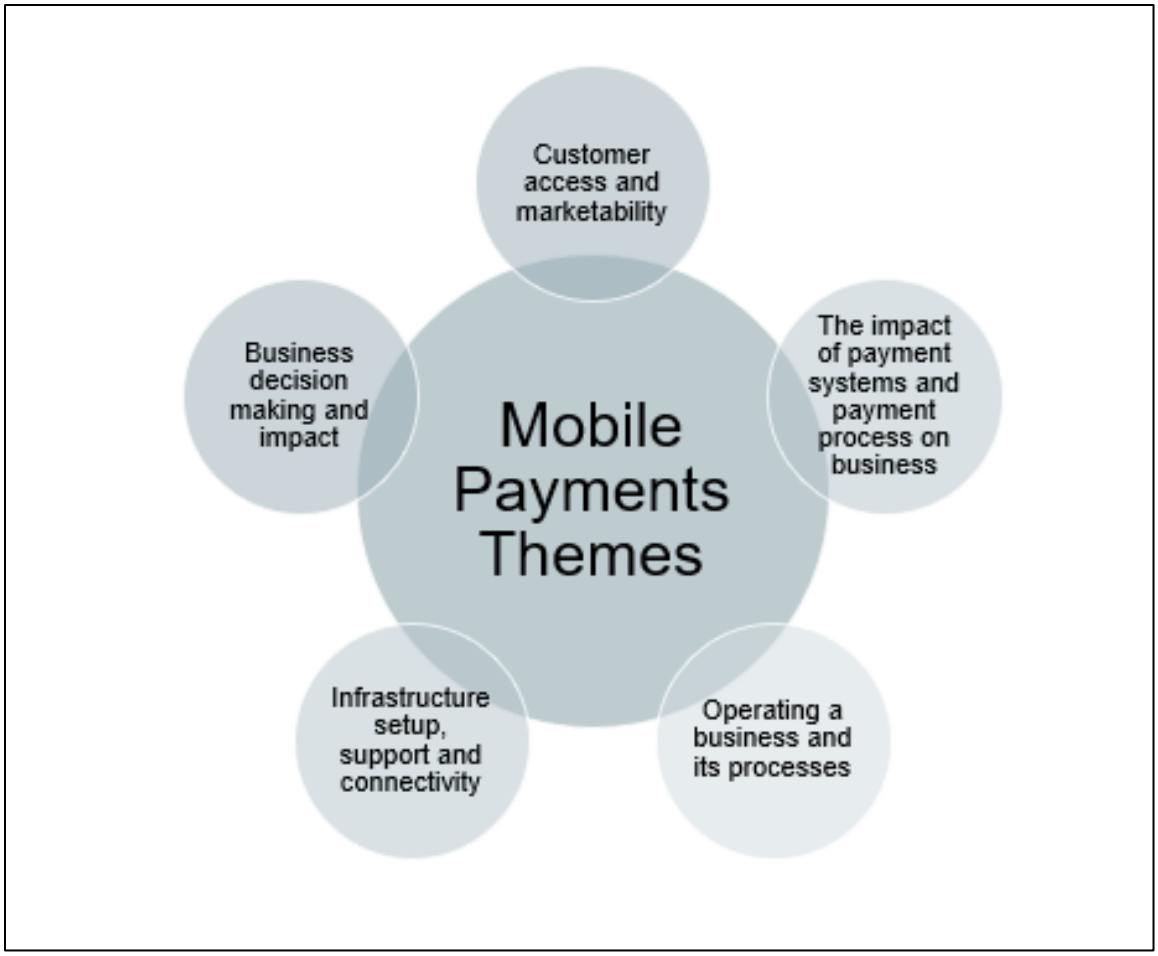


Figure 15: Cycle 1 Themes

Infrastructure setup, support, and connectivity is linked to the impact of payment systems and payment processes on the business. The payment systems depend on infrastructure of some nature (Wi-Fi, broadband) and connectivity. Operating a business and its processes has a certain impact on customer access and marketability. Customer access and marketability was an underlying theme, as merchants mentioned that the lack of customer awareness of payment providers such as Zapper hindered the process.

Infrastructure, setup, support, and connectivity are critical for the success of mobile payments. Support is a crucial element and allows entrepreneurs to focus on the core aspects of the business, instead of spending time dealing with technical issues.

4.3.1 Codes Analysis

The in vivo coding process initially yielded 586 codes which were then further refined in terms of codes that spoke to the same factor. This was achieved by re-reading the transcripts and further interrogating the data to look for links through similarities. This resulted in a total of 383 unique codes. The process of axial coding then further refined these codes and involved looking for similarities, repetitions, relationships, and causalities. The process was refined as some of the codes were too narrow (only one instance) or too broad (on further examination there were two or three codes). The axial coding refined the number of codes to just under 150.

Figure 16: Top 20 Codes depicts the top twenty codes, including customer experience and being easy to learn, to codes with higher mentions, such as trust in service providers. Some of these codes already stand out as they mirror what the literature review and previous findings have detailed. Others are new and will be expanded on (these could arise due to local context).

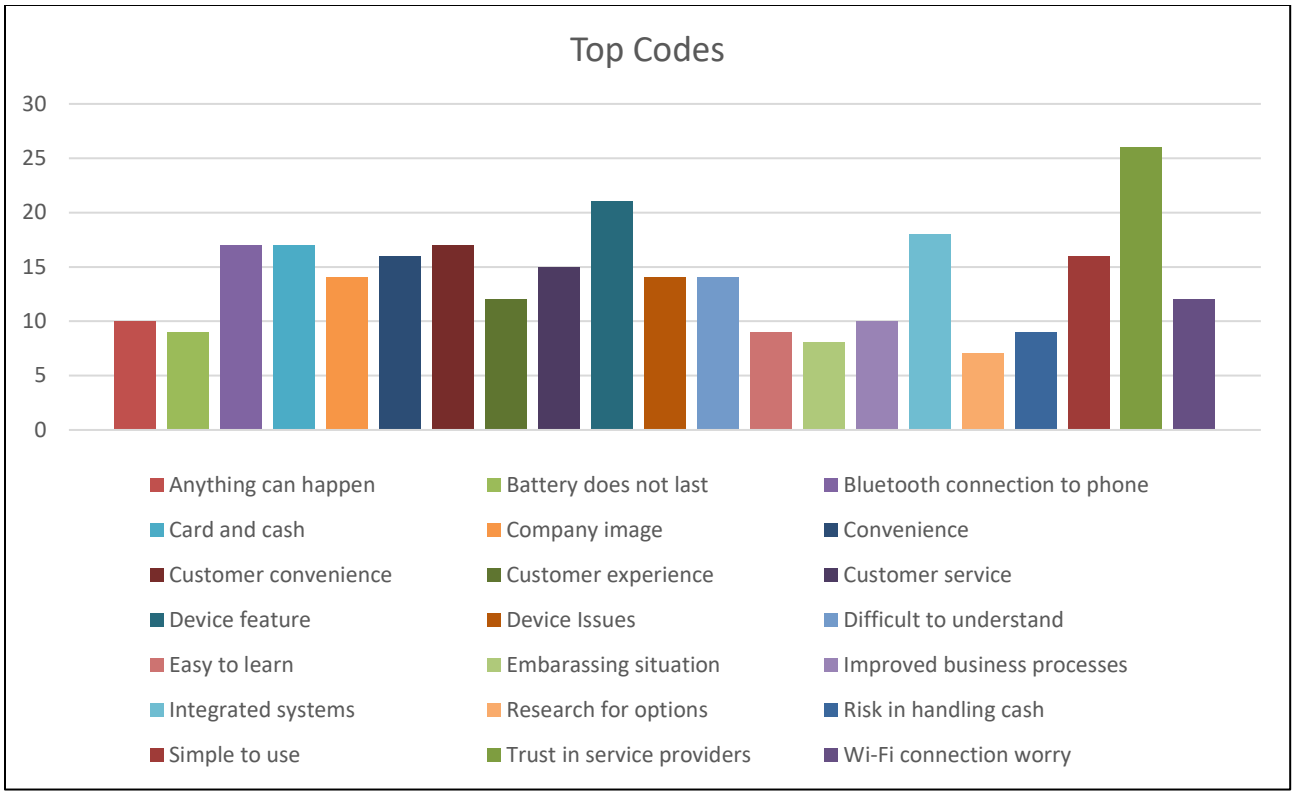


Figure 16: Top 20 Codes by Frequency

Figure 17 depicts the top ten codes (codes with the most mentions) and is a more detailed view of Figure 16. The researcher used the top ten codes to focus the scope of the research. Trust in service providers and device features were the codes with the most mentions.

Figure 17: Top 10 Codes by Frequency

The following section details the codes, relationships, and causalities identified with in each theme.

Theme: Business decision making and impacts

The code 'anything can happen' implied that the entrepreneurs were aware that malfunction, data loss, and business failure were a real possibility. One owner stated that they are not aware what the data is used for: *"I don't think Yoco uses the contact details, beyond…you never know actually, think of it, they could easily be selling the customers details, you never know"* (SME J, 2019).

The codes of 'community support and entrepreneur community support' related to the support structures of other entrepreneurs when seeking advice on products, prices, and processes. There was inference of a strong network as a reference point:

"We share pretty similar opinions because we are all on a group (WhatsApp), so we all send our messages there and we kind of learn from each other" (SME K, 2019).

'Trust in service provider' was a consistent discussion point in the interviews, as indicated in the fact that it was the most prevalent code in the transcripts. This supports the previous research carried out by Mallat and Dahlberg (2005), Mallat and Tuunainen (2005), and Pousttchi (2004), who noted trust in the service provider as a crucial element in the adoption of mobile payment by merchants. There was mention of trusting smaller companies providing the service if they have proven themselves in the market: *"I trust the service providers, because they have been in the market long enough"* (SME A, 2019).

There was mention of a lack of trust in 'unknown' companies, *"There is that reputation as a bank unlike that App, which Joe Soap decided to do in his garage"* (SME D, 2019). There was a strong element of trust in established brands providing the service, and therein lay a sense of comfort in a trusted brand such as a bank or a financial institute: *"Unlike IKhokha and Yoco, it is a bank product, I guess that is where my comfortability comes from"* (SME D, 2019). This code is impacted by the reference power and the community support that is generated in the networks that the SMEs are part of. It can be espoused that the community support is affected by network externalities, as the customers support the small businesses in their area by purchasing goods and services and paying for them using the methods available at the pay point. As mentioned, some of the entrepreneurs share information and advice on which products to use. This impacts the trust of a specific service provider.

Theme: Operating a business and its processes

The process of operating a business includes supply-chain management, operations, finance and accounting, employee management and performance, budgeting, tax and other activities, as well as regulatory and legal obligations. The research, decision making, purchase and use of a technology-related payment solution has an impact on the processes and how a business operates. This overarching theme came through based on the codes and categories and relationships. This theme had many codes (with 159 codes mentioned). At a category level, business processes, risks, and shopping experience had the most codes. In the axial coding process, business processes were

combined with the manual process category, as these codes all spoke to the processes in a business.

The code 'anything can happen' is noted here, as well as in the theme: business decision making and impacts**,** leading the researcher to note this as a further code for exploration. 'Risk' as a category has a list of codes ranging from fraud to failure. These codes were then combined under the code of risk for simplicity but were noted as a code for further exploration. The risks included being uninsured, damaged stock, and failure, with the more specific risks to the payment process being fraud, handling cash, theft, and the inherent risk of the unknown in the process. Boateng et al. (2020) identified risk as a major barrier, with merchants noting how it would impact their business transactions and operations. This is exemplified in feedback by SME A (2019), who stated that *"You really don't want to handle cash"*. SME B (2019) shared that, *"Non-payment is the greatest risk"* and SME D (2019) noted that, *"Risk is still there regardless of using mobile payments".*

The 'competitor' code is a minor code and factor regarding the decision to adopt mobile payments. Some of the interviewees did not even assess the competition or areas of location when deciding on the choice of business or payment choice but focused on their business processes instead. This can be attributed to a lack of sensing capabilities, be this a result of choice or a lack of resources. However, given that all the interviewees had access to internet and smartphones, it can be postulated that it could be a lack of training and understanding how to carry out research to enable one to sense the environments and competitor capabilities. There were others who were more observant and reactive to what competitors were using. SME J (2019) shared that, *"I was reacting to the competition"* the same SME further states that,
"I reacted to my competitors who are more established than I am". This was supported by SME N (2019) who noted.
"We saw other traders with the device, and we made the decision to get it".

The above behaviour is detailed by Teece et al. (1997), who referred to 'dynamic' as the ability for any competence to evolve with the changing business environment. They

further referred to ‘capabilities’ as a role that management plays in optimising resources, skills, and processes through integrating, adapting, and reconfiguring to match the changing environment. This is exemplified by SME N and SME J, who reacted to the environment by observing and noting change and seeing the possible impacts on their businesses. Boateng et al. (2020) found that merchants in Ghana reacted to competitors in adopting mobile payments.

‘Costs of fees’ had the largest number of codes (with 43 codes in the category). This factor was mentioned under various themes and categories. Cost of fees was deemed important due to the nature of the business and the phases they are in. This code is linked to the risk of operating a business and many of the SMEs noted this as a factor in their operations. The opinions ranged from those who felt the fees were too high, such as SME A (2019):

*“Yes, the fu**ing fees, the fees are too high”.*

to SME C (2019), who felt that the use of mobile payments.

“Reduced transaction fees”.

Whereas SME D (2019) still showed concern that,

“It is not a hefty fee, but it sucks that it is per transaction”.

Cost is a major concern for small businesses and where they can, the entrepreneurs will reduce costs.

“I am more interested to see costs cause right now that is my concern” - (SME P; 2019) gives credence to the mentioned view. Banking and transactional costs are some expenses that the entrepreneurs stated they look to reduce.

“We needed to reduce the operational costs” - (SME: G 2019).

This is supported by feedback shared by SME J (2019) noting that,

“The lower transaction fee swayed me”.

Training was not offered in all cases, especially with barcode-related mobile payment products – this could be because the service providers believed their processes and devices were intuitive enough. The literature findings note that employee skill set has an impact on the success of an SME, as do any decisions to invest in new technologies

(Consoli, 2012). The implementation of new technology in a business would require some form of training, regardless of the ease of use or intuitiveness that the mobile payment providers believe their solutions possess.

The *'customer experience'* code under the category of shopping experience. SME L (2019) emphatically stated that, *"It has allowed us to keep the same level of service when our merchant services are down'.* The same SME further highlighted that their LSM expects a physical presence which is accompanied by a need for a 'swiping' facility. *"Our customers in South Africa still required for us to have a physical presence before making a purchase".* SME G (2019) had an unpleasant experience using the Absa Pebble device which led to inconvenient shopping experiences and bad customer experience. This was due to the design of the device as it entailed a digital numeric keypad that would randomly rotate when a customer was entering their PIN. This was designed as a security feature but ended up frustrating customers in terms of ease of use. *"We had issues at the times we used it…People would be like 'Okay here is my pin, please enter it for me' as they got frustrated with the PIN pad"* (SME G, 2019).

Customer experience and security features were deemed essential but not at the expense of ease of use, as this aspect is linked with customer experience and, in turn, the business process. As noted above, the shopping and payment process was continually interrupted as the SME owner had to assist customers with the actual payment process.

Theme: The Impact of payment systems and payment processes on the business

There were few codes in this theme; however, the impact on the payment process was significant given the friction point in the shopping experience. Codes such as challenging and difficult to understand had a direct impact on shopping experience, business processes, and customer interaction.

The 'payment options' code was mentioned 23 times. The SME owners were looking to offer or use multiple payment options to cater to their customer bases. For some of the SMEs this was part of the strategy:
"Part of strategy is to offer as many payment options as possible" (SME A, 2019) and to some it complemented their location due to the clientele in the locations, *"Our location has lot of tourists, and they don't like carrying cash"* (SME P, 2019).
Not all SMEs see the value in this additional payment option and some view it as just another channel with no added value, as per SME A (2019)'s feedback, *"They are just payment platforms; they don't add value".* SME M (2019) further shares that, *"I would prefer cash instead of losing the 2.75% on bigger sales but cash has risk",* indicating that the cost of transaction is still a large factor in the business operation, despite the other benefits of mobile payments.

In some instances, the installation and initial operation of the mobile payment systems was found to be difficult. The code 'difficult to understand' occurred 17 times, as per feedback below. SME D (2019) shares how:
"I could not figure it out after installation". SME D (2019) had to resort to multiple phone calls with the provider as the device and app were not intuitive. The same SME states that, *"The most challenging part was trying to figure it out".*
The sentiment and feedback were shared by SME G, who encountered difficulties operating the mobile payment devices. These frustrations could be due to a lack of ease of use of the applications and devices. These challenges were especially significant when faced in a restaurant scenario, where service is meant to be superior, *"At the restaurants, it was quite challenging to use the Pebble device".*

This resulted in frustration for the SME owners, the staff, and the customers, who could not understand how to use the device and resorted to sharing their PIN numbers with the SME owner, *"People would be like 'Okay here is my pin, please enter it for me"* (SME G, 2019).

Most of the SMEs interviewed operated with at least one system, be it Shopify websites, payment systems, or till systems. The code 'integrated systems' occurred 18 times in the analysed text. SME C (2019) shared that, *"It allows me to keep track of orders, payments and cashflows in one platform".* The use of a mobile payment system worked well for some SMEs in being the one source of truth for stock, receipts, and payments. SME K (2019) shared how their systems. *"are seamlessly linked".* In contrast, SME A (2019) shared that their systems are not integrated, leading to manual processes.

The issue of interoperability is discussed in previous literature and findings as a barrier to adoption. This is exemplified in the feedback above, as is the fragmentation of the South African mobile payments market in that there are so many payment solutions that are not interoperable. A customer has to download different applications, depending on what is offered at a merchant's place of operation, and these are not integrated with each other.

Theme: Customer access and marketability

The codes under this theme were 'customer' and 'market focused'. The code 'brand fit' is an example of such a code. Even though it was not frequent, this was an interesting code to note in terms of the criteria of some SMEs in selecting a payment system. SME K (2019) states that, *"We are a sustainable brand and receipts cannot be printed cause of the paper they are on".* When the business was looking at a payment system, they needed to align with the company's ethos of being sustainable and environmentally friendly.

Also linked to 'brand fit' is the code 'company image', which was mentioned 20 times. 'Company image' and 'tech savviness' were deemed important, and the ability to process electronic payments was seen to improve ''company image' and show tech savviness. *"It improves our company image"* (SME N and SME P, 2019). For some of the SMEs, the use of mobile payments and ability to accept card payments was a differentiating factor, *"It makes us look professional as a lot of African restaurants operate on a cash only basis"* (SME Q, 2019). SME J (2019) shares that, customers have a sense of relief and comfort when they are able to pay using their cards*, "here customers are like more relieved when they ask, 'Do you have a card machine?' and you do".*

The code 'convenience' is mentioned 20 times. 'Convenience' is a two-sided factor referring to customer convenience in the shopping process and merchant convenience in dealing with business processes and reconciliations. This code is consistently mentioned across the different categories and themes and is noted in many of the transcripts. SME I (2019) encapsulated this well when they stated,

> *"that there is a convenience cost so the fact that we are never down, so you tell the customer sitting with a R4000 bill, "Sorry, the machine has gone down, would you mind going down to the ATM" It is half past 4 in the morning, so it is nuisance costs and customer value".*

In this instance, SME I (2019) had decided to have multiple, different mobile payment systems available (QR Code and device options) to ensure that their customers are not inconvenienced when there are electricity outages. The above is echoed by SME L and

SME P (2019), who shared that the use of mobile payments, *"it is more convenience and faster, the better, I am open to it"* and *"It is always a concern, it is trade-off between convenience and safety".*

The inconvenience and security risk that carrying cash poses to both customers and merchants is verbalised by SME I (2019), *"It was not about risk, it was about customer convenience, most people don't like to carry cash".*

Demand and supply are opposite, attracting forces, and the SMEs will only offer a payment channel if customers demand it. However, this is not enough to convince SMEs to change their payment options and offer mobile payments. Customer requests was mentioned 10 times, with SME A (2019) noting that they only offer it, *"only when the customer requests it or when people ask, "can I make a payment on Snapscan?"*

Other SMEs noted that, even though they do not offer certain brands of mobile payments, customers will still request them, *"We don't offer Snapscan at the moment although some customers have asked about it"* (SME Q, 2019).

The 'embarrassing situations' code had few mentions; however, the impact of the perception and emotions attached to the situations caused by the mobile payment solution made this code worthy of discussion. The difficult situations that they had to deal with was shared by SME D (2019), *"It was a difficult situation as there was people".*

One SME felt embarrassed due to the length of time that the devices would take to pair with the cell phone, stating that, *"Customers would wait while the two devices were trying to connect"* (SME L, 2019). SME I (2019) experienced an embarrassing situation that affected their reputation, sales, reporting, and business operations, *"They gave us a second PC that was corrupted and on a Friday night it crashed, and we lost 3.5 years' worth of data".* During the narration of the above, the SME L (2019) was extremely agitated and swore as they recalled the incident. The impact was further exacerbated by the fact that Friday nights are the busiest periods for their business.

A sizeable number of codes referring to the 'customer experience' under different categories were combined and noted – there was mention of loss of sales and frustrations

due to a lack of technological solutions when the SMEs were accepting only cash or when the devices failed to work at point of purchase. 'System down time and unscheduled updates' have a direct and dual-sided impact on convenience. 'Instances of downtime and upgrades to software' while merchants were operating their businesses or at the markets was mentioned as a problem leading to inconveniences. SME K (2019) shared how they would have to wait for the devices to update while customers were in the shop, *"We had few issues where they would update in the middle of the day".*

Theme: Infrastructure setup, support, and connectivity

The device is the focal point of the payment process and SMEs noted multiple issues, with several mentions of device issues and unstable devices. There were 37 instances of codes pertaining to 'device issues and device instability'.
"There was the problem of sales not recorded and commission issues. Technology issues were bad at the beginning as we were learning, now it is effortless" (SME I, 2019). This was corroborated by SME N and SME Hungary (2019), who noted that the main issues that they faced were, *"Loss of internet connections and faulty devices".* In the case of SME H (2019), this resulted in them changing to another provider as the devices were constantly faulty, even after replacement.

All of the devices used some form of 'Bluetooth connection'. This was reflected in discussions with the SMEs, with over 17 mentions of the Bluetooth connection code across the different themes as well as its own category. This reflected the importance of this function in the mobile device and mobile phone pairing process. This code, 'smartphone dependency', and 'Wi-Fi connectivity' were key requirements to successfully operate mobile payments. This was often a point of contention, as noted by SME Beta (2019), *"Ensuring that the machine and mobile devices are paired correctly".*
as an ongoing process every time there was a sale, as well as SME N (2019) who noted that, *"there are delays between the phone and device, so you think the transaction has failed".*

Such friction at a crucial point in the shopping process can lead to a negative customer and merchant experience. SME G (2019) supported this when they stated that, *"the other challenge is that the Bluetooth needs close proximity, which may affect the process as well".* SME D (2019) shared that, *"connecting via Bluetooth, I had issues with that".*

The code 'battery does not last' was a consistent factor in the discussions with SMEs, especially the SMEs who were using devices and not just the QR code scanning. This meant that they either had to charge the devices regularly or leave them plugged in when they were not using them. According to SME K (2019), *"The card reader dies quickly, and the battery dies after a day by itself".* The same SME went on to suggest that the use of a portable battery provided by the manufacturer would aid in reducing the downtime experienced. SME A (2019) also shared that*, "the device always has to be charged, dies quickly".*

4.3.2 Category Analysis

The axial coding process resulted in 47 categories under which the codes are placed. These have been detailed below.

Table 19: Category Analysis

Absence of thought	Absence of worry	Accessibility for use	Bluetooth connection	Business awareness	Business Processes
Cashflow	Community	Company Image and Credibility	Competition	Convenient	Cost of Fees
Customer Feedback	Customer Service	Customer Request	Customer Usage	Device Features	Device Issues
Difficult to understand	Embarrassing Situation	Employees	Franchise Rules	Government Support	Innovation and Technology
Market Options	Market Requirements	Marketing and exposure	No comfort	Payment options	Payment processing
People mobile connection	Portability	Purchase costs	Referrals	Research options	Risks
Sales	Secure	Shopping experience	Simple to use	SME Financing	Social media
System features	System integration	Training	Trust in Service provider	Wi-Fi and Internet Connectivity	

Figure 18 gives a view of which category has the highest number of codes. This indicated to the researcher that these codes and categories were worthy of further exploration in second cycle of data collection. This is a visual summary of the categories detailed in Table 19. Immediately, what stands out are the categories of cost of fees, device issues, and risks, with most codes associated with them. The following sections detail links, associations, and relationships at a category level under each identified theme. The process of finding links, associations, and relationships is unique to each researcher and based on their own view (Saldana, 2016).

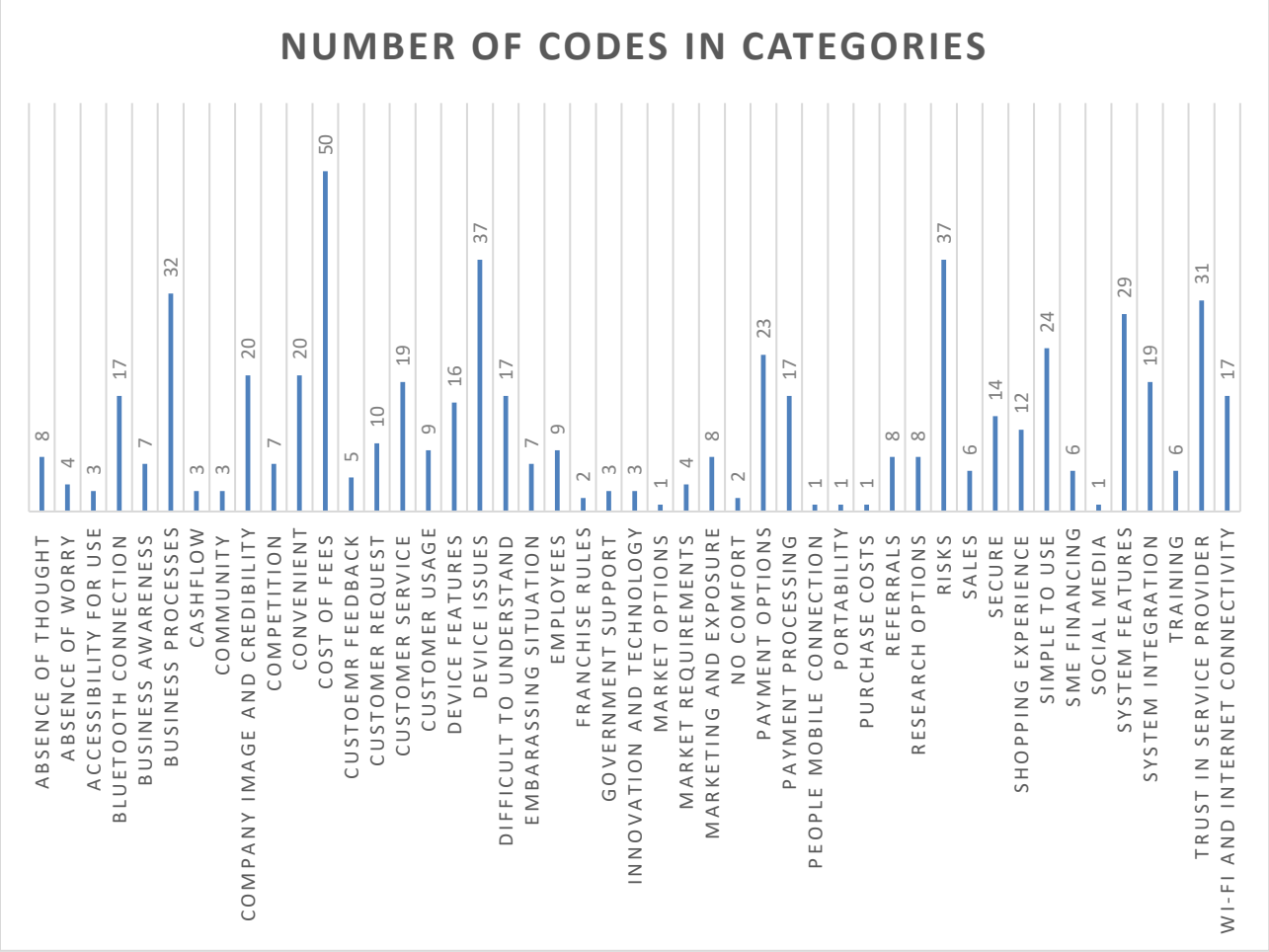


Figure 18: Codes per Category

Figure 19: Top 10 Categories below depicts the ten categories with the highest number of codes. The cost of fees category has the highest number of codes (50) followed by the codes ‘device issues’ and ‘risks. Trust in service providers as a category is also among the top categories, aligning with the fact that, at a code level, trust in service providers was also amongst the top codes as shown below.

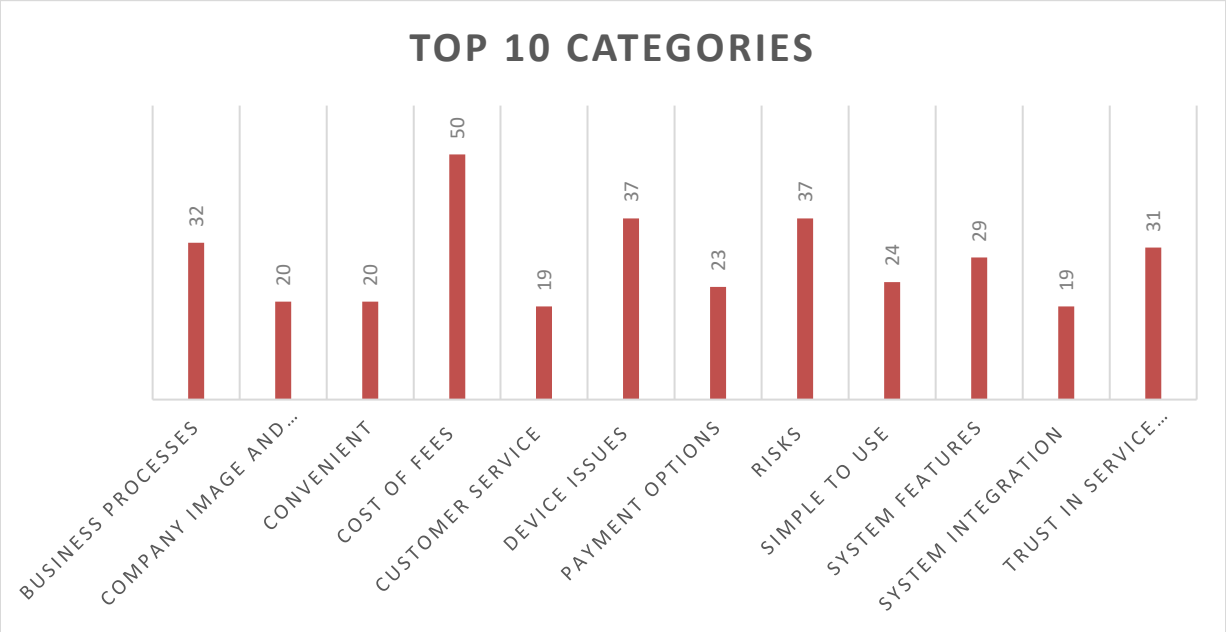


Figure 19: Top 10 Categories

Theme: Business decision making and impacts

Figure 20 below details the categories that are associated under the theme of business decision making and impacts. At a category level in the process of analysing the data, the category of 'absence of worry' was associated with 'absence of thought', which indicated a carefree attitude of some entrepreneurs to certain aspects of the business operations. *"No, to be honest, it is not really my information (laughs). I worry about my information and getting disseminated…I am joking."* (SME J, 2019) and another stated, *"No worry regarding loss of customer information."* (SME N and SME Orion, 2019). There was an inherent trust factor, as shown by 'trust in service provider', which was based on the referrals and the impact of the community. This has been expanded upon at the code level in the previous sections detailed above (refer to Codes). Some entrepreneurs showed that they did carry out research regarding payment processing before settling on an option.

This research process is linked to the 'referral' process, as the entrepreneurs consulted their communities as part of the research process and referrals were a strong factor. Referrals came mainly from the community (friends, family, social networks, other entrepreneurs). This was indicative of the power of the network effect.

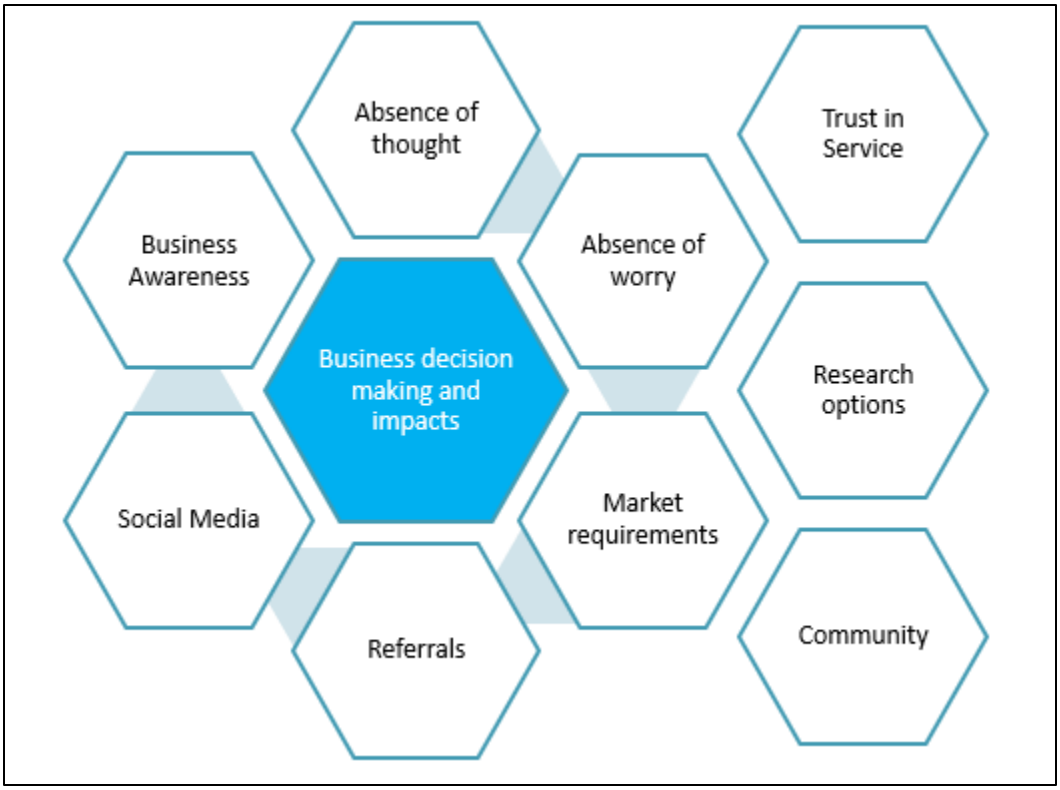


Figure 20: Categories - Business decision making and impacts.

Theme: Operating a business and its processes

Figure 21 below details the categories that are associated with the theme of operating a business and its processes. The numerous codes and categories under this theme are interlinked and indicate its importance. The category titled ‘no comfort’ spoke to a sense of lack of comfort and trust in the system and payment process. This feeling was also attributed to the nature of the industries and the entrepreneurship role in that there was no certainty of success. Additionally, some of the SMEs were still under three-years-old and still in the early stages of their businesses surviving.

The researcher combined the ‘business processes’ and the ‘manual processes’ categories because they shared the same objectives. This category is associated with ‘franchise rules’, ‘training’, ‘sales’, ‘safety’, and ‘cashflow’ categories. These categories are sub processes of business operations, hence the association.

'Employees' were categorised, this was a result of all of the SMEs (barring 1) employed at least one person and this person interacted with the payment channel. Employees are directly affected by the 'training' that they must undertake to be able to perform their jobs and process the payments as part of the shopping experience for customers. The feedback shared, noted how this varied on the type of mobile payment process offered with the QR code-focused payment providers providing less training as compared to those that dealt with devices as a form of transacting. SME G (2019) states, *"there was not much training on Snapscan. For Yoco, I haven't received any training for Point of Sales portal*".

This is corroborated by SME H (2019) sharing that, *"Yoco yes, there was training offered. Snapscan not. We used to bank with Standard Bank, so their merchant services guys dropped it off. They were like "We will set you up, here is your little 3210" and that was it. We then had to explain to the guys, that here is Snapscan".* 'Cost of fees' category noted in multiple themes such as Customer Access and marketability and this one. This category had the largest number of codes (50). This is indicative of the reality of the cost of operating a business, indicating the importance of costs to the survival of a business. In chapter 2, finance and credit were noted as a significant barrier to the survival of SMEs especially in the African context and hence any extra costs or fees that can be incurred due to implementing any IT devices and processes has to be considered seriously and this is reflected in the codes in this category.

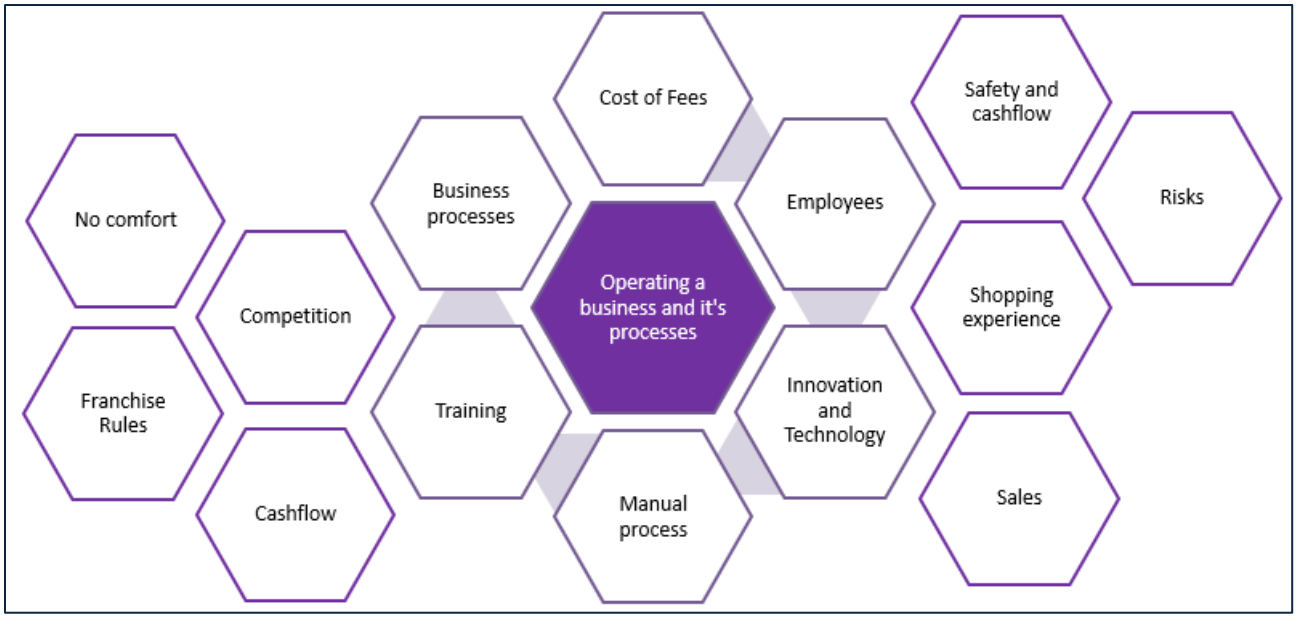


Figure 21: Categories - Operating a business and its processes.

Theme: The Impact of payment systems and payment processes on the business

Figure 22 below details the categories that are associated under the theme of The Impact of payment systems and payment processes on the business. The codes and categories under this theme are interlinked to lead to this theme. This theme has the least number of categories but vital categories such as 'difficult to understand and security'. The category 'system integration' had several discussion points, what came to light was that the selected mobile payment systems in some instances could be linked to stock taking systems that the businesses were using. SME O (2019) encapsulates this stating that,
"We don't have to use traditional credit card machines, so no high bank charges. Yoco integrates with Vend, so all works nicely together, very few issues."
This was a widely shared opinion, and this shows the diversity and variety in terms of setups that small business experience. SME G (2019) shares that, *"It was never integrated; it was almost like a step in the process was added."*
In some instances, though, given the nature of the system and profile of the entrepreneur, no integration was available, and this causes some issues for the business operations as that meant the entrepreneur had to operate separate business process for the mobile payment system, *"Our systems are not merged, they are separate."* (SME D, 2019).

Figure 22 below has the category 'difficult to understand', the codes in this category speak to "challenging" and difficult to understand and aspects of ease of use. Several entrepreneurs stated that it was not straight forward process to know how to operate the devices that they had in their business. 'Purchase costs' is causally related to the category of 'cost of fees', which is under the theme of Operating a business and its processes in the previous section. The above to categories show that these categories do not exist in isolation and are interrelated and hence when viewing or speaking about these themes, not to view them in isolation but as a collective and their impact on the SME merchant.

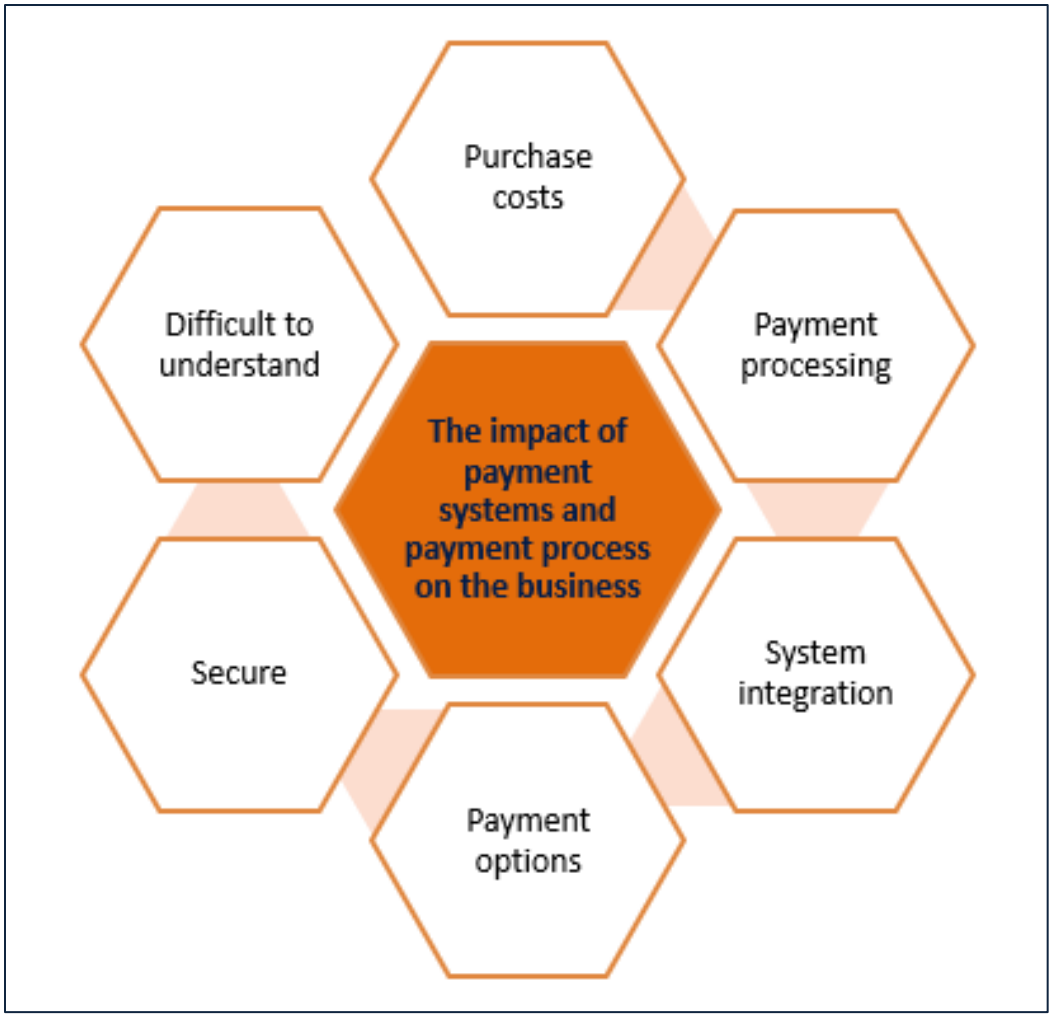


Figure 22: Categories - Impact of payment systems & payment process on the business

Theme: Customer access and marketability

Figure 23 below details the categories that are associated under the theme of The Impact of payment systems and payment processes on the business. The codes and categories under this theme are interlinked to lead to this theme. There are a significant number of categories in this theme such as convenience, customer service and a lot more related to customers and market access.

'Company image and credibility' are linked to the category of 'embarrassing situations. The ability to deal with technology issues showed a sense of savviness that uplifted the company image. The situations that these SMES experienced when dealing with mobile payments led to embarrassing situations that affected their image.
'Customer service', 'customer request' and 'customer feedback' are tied to the process of the experience that a customer receives while shopping at the SMEs place of operation. Customer service is strongly linked to the 'convenience' category, a customer service is increased, it directly affects the convenience factor for a customer. This is exemplified by the SME that offered multiple forms of payment as they noted that they have electricity shortages in the area, and it was unsafe for customers to withdraw large amounts of cash late at night to pay their bills. SME I (2019) encapsulate this well when they state: "that *there is a convenience cost so the fact that we are never down, so you tell the customer sitting with a R4000 bill, "Sorry, the machine has gone down, would you mind going down to the ATM" It is half past 4 in the morning, so it is nuisance costs and customer value".*
The 'cost of fees' drives the acquisition of the devices, the transactional charges associated with the payment system and other items that the business may need to enable this channel of payment. This was a common category and code across the transcripts. The category 'simple to use' is linked to another category in a different theme, mainly the category of 'device features' as well as the shopping experience and convenience categories. Simple to ease as described as ease of use is a well-researched factor in the field of information technology and hence it is not a surprise that given there are technology devices in use, that this would be a category that would emerge from the discussions with the SMEs.

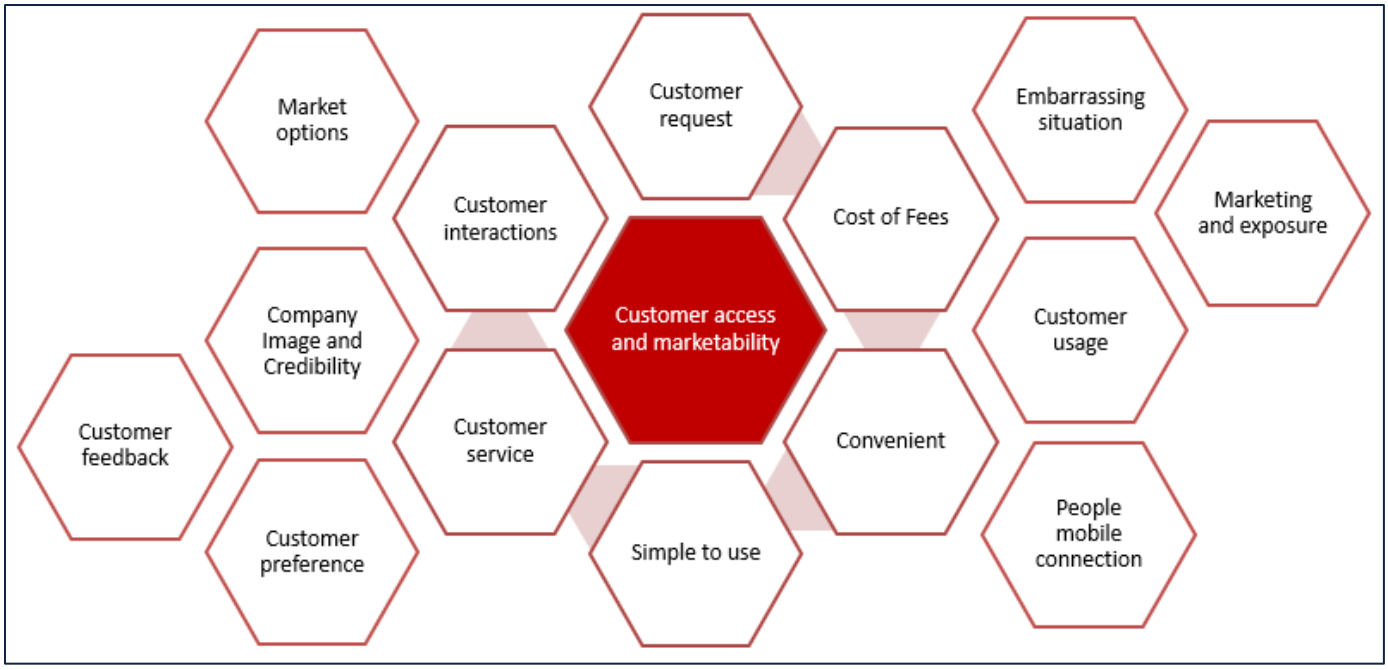


Figure 23: Categories - Customer access and marketability

Theme: Infrastructure, setup, support and connectivity

Figure 24 below details the categories that are associated under the theme of Infrastructure, setup, support and continuity. The codes and categories under this theme are interlinked to lead to this theme which is about the support given when the SME has the mobile payment solution as well as support from regulatory bodies regarding the success of their business. There are a significant number of categories in this theme such as convenience, customer service and a lot more related to customers and market access.

Some categories were combined as they were related to the same functions, these primarily devices, rented devices were combined with 'device features'. This enabled for a more compact category that spoke to the same issue of devices. The category has a direct relationship to the category of 'simple to use' which directly impacts the shopping experience and 'convenience' for a customer and the merchant. Both shopping experience and convenience were noted as prevalent codes in the text.
'Device pairing' and 'blue-tooth connection' were combined as part of the axial coding as these categories and the codes in each category related to the same function. As stated earlier, blue tooth connection exists at a code and category level.

'Government support' and 'SME financing' have a direct relationship to each other and are well documented on their impact on the success/lack of success of SMEs especially in South Africa. SME G (2019) shares their experience that,
"SME financiers usually want to see how much is coming into the account and the biggest of them Retail Capital are called Merchant…. Financing, so they check what is coming through your card. So, if your card is not bringing in anything, they will just be like "No, we won't give you loans and things like that".
This gives the view that the ability to accept card payments, legitimises the business to a certain degree and increases the probability of attaining funding if financiers have a view of one's financials through the reporting offered by the payment platforms.
The discussed categories are deemed critical both as stated in the feedback and from a process perspective. The infrastructure that enables the payment process from the mobile

phone, mobile payment device, Wi-Fi, electricity, internet connectivity are critical elements to lay the foundation for the uptake of mobile payments adoption by SMEs.

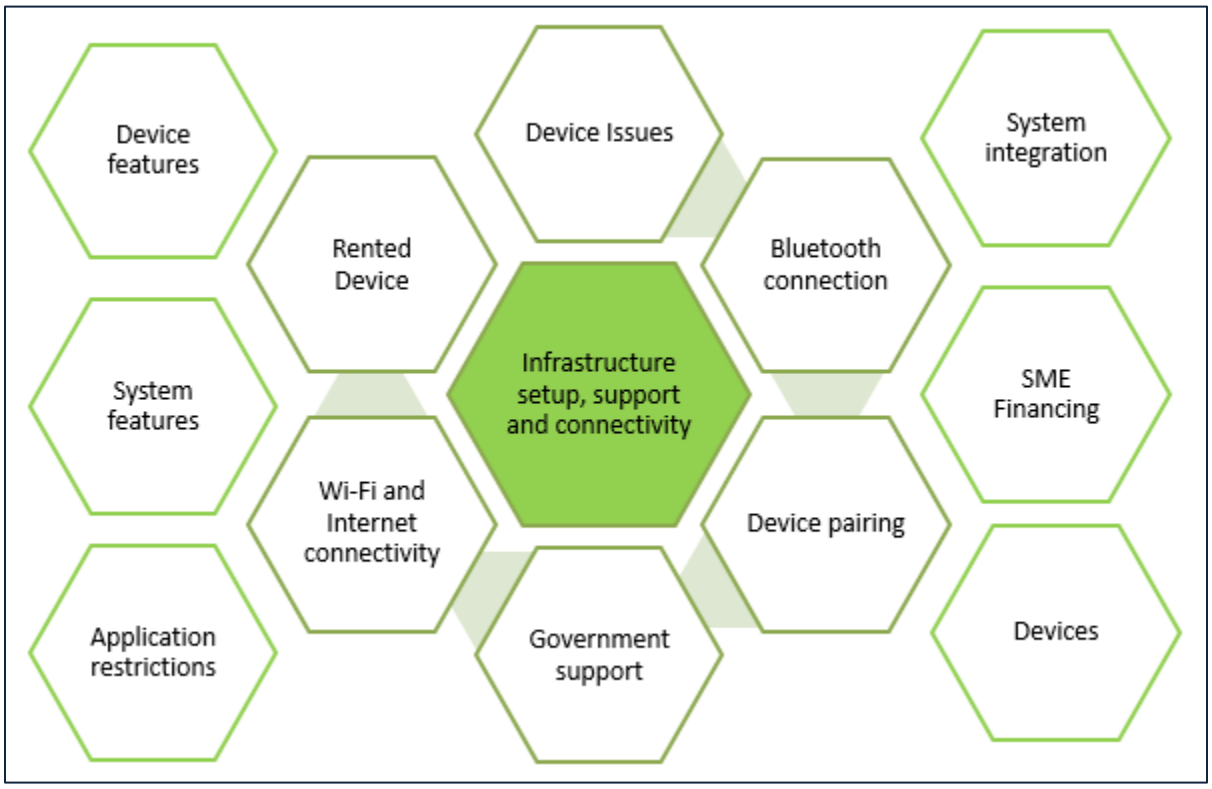


Figure 24: Categories - Infrastructure setup, support and connectivity: Categories

4.4 CONCEPTUAL FRAMEWORK

A literature review and assessment of the T-O-E provided a basis for categorising these constructs within the dynamic framework to provide a theoretical basis for the furthering of the research. This is depicted below in Figure 25.

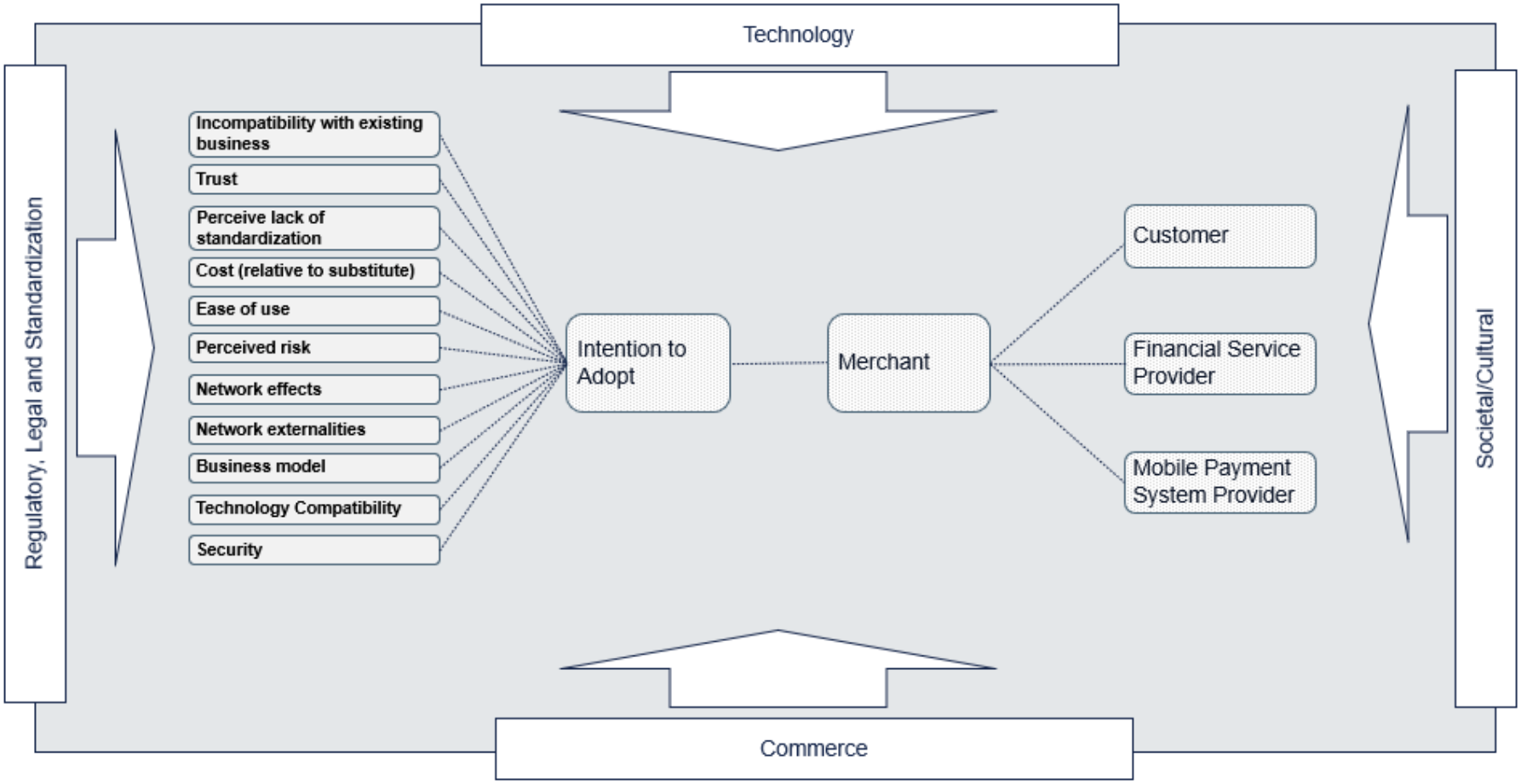


Figure 25: Merchant Mobile Payment Conceptual Framework (MMPCF)

Table 20 below indicates the updated construct based on the initial cycle 1 interview data from the SMEs that took part in the study.

Table 20:Constructs – Cycle 1

Initial Framework Constructs	Updated Constructs after Cycle 1
Incompatibility with existing business	System features
Trust and Security	Trust in service providers
Perceived lack of standardisation	Device features Device Issues
Cost (relative to substitutes)	Cost of Fees
Ease of Use (relative to substitutes)	Simple to use Difficult to understand
Perceived Risk	Risks
Network effects	Company image and credibility
Network externalities	Device Issues / Bluetooth connection
Business model	Business Processes Payment options strategy Customer service
Technology compatibility	Integrated systems
	Convenient

The updated constructs details in the right-hand column in the table above are based on the output of the data analysis. The grey blocks indicate new constructs as result of the findings from cycle 1. As per the code, category and theme analysis, these factors had a more significant impact on an SME's use, decision making process than the initial set of constructs in the framework. These constructs are then tested for validation in the 2nd cycle of the design science research process. This was carried out through the use of a survey instrument to an SME population across South Africa. The section below details the identified constructs in more detail as well as presenting an updated MMPCF for discussion.

4.4.1 System Features

System features play an important role in the themes described by the interviewees as they enable the business operations, payment processes as well as aspects such as customer experience. System features have a link to the customer experience and hence ease of use factor. As noted by the interviewees regarding the features available on the mobile payment systems, *"Reporting is an issue as we only receive SMS notifications, so we go through those one by one"* (SME D, 2019). Some of the mobile payment systems facilitated their processes manually before the introduction of the mobile payment systems and hence the positive mentions as per below in terms of the system features, *"It allows us to track stock and orders"* (SME K, 2019).

However, the evidence is not consistent as different SME merchants had alternative experience. This was not consistent feature available on all systems and hence resulted in some manual processes in the stock taking process remaining. In the instance of the feedback shared by SME K, this was noted as they had two mobile payment solutions (Yoco and Snapscan) and hence the feel below feedback referred to Yoco. *"Yoco does not manage stock so right now we use excel spreadsheets"* (SME K, 2019). As a construct, system features had both positive and negative mentions from the transcripts and hence features as a construct in the updated model.

4.4.2 Trust in service providers

Trust as a construct is noted as a strong factor in mobile payment acceptance literature. In this research, it is still a strong factor and featured strongly in the feedback from the interviewees such as SME D (2019) sharing feedback such as, *"It is a bank approved product".* This is indicative of the strength of the company brand and the inherent trust since the provider is a bank, an established financial entity. SME Hungary (2019) shared that for them, "*The trust is inherent until there is an issue."*

This contrasts other feedback that indicated that the type of a service provider whether they were a bank, or an independent/private mobile payment system provider played a role in terms of being trusted.

4.4.3 Device features / issues

Device issues had a very high frequency in the codes and categories as per the output of the In-vivo and axial coding analysis. There was evidence that the interviewees who had mobile payment systems that involved the interaction between the mobile phone and the mobile payment device had this construct as a common code in the feedback.
*"It does go down, I had issues when it went down" (*SME G, 2019).
Instances of mobile payment applications crashing were noted with a high frequency and given that entrepreneurs exist within an eco-system, this feedback is shared to other entrepreneurs when inquiring about payment systems to use. Hence this was noted. As this extended to physical devices; where it was noted that the device and the app did not sync in some instances, *"Well, it crashed the one time when I was at a pop-up market, it was not syncing"* (SME D, 2019). In this instance, this resulted in the business owner cancelling that particular vendor and opting for a traditional point of sale from a bank due to her frustrations with the payment system. The device features and frequency of issues with the system influences as shown above, however this can also be viewed as poor customer service from the mobile payment system provider as well.

4.4.4 Cost of fees

Cost is a construct noted highly in the literature, this was mirrored in the feedback as this construct resonated strongly with the interviewees. In the analysis, cost of fees was noted as a code and as a category with the highest number of codes. The evidence shared by the interviewees ranged from positive, in terms of the use of mobile payment systems that was based on a need to reduce costs, "*The cost of using these devices is less than the cost of depositing cash*" (SME F, 2019). "*The most important thing that I look at these mobile things is really the fees*" (SME A, 2019). This is mirrored by similar feedback that was consistent throughout the interview as, one interviewed was very passionate and incensed about the costs of fees as they operated four restaurants and hence, "*Yes, the ****** fees, the fees are too high, too high*" (SME A, 2019).

The evidence suggest that costs are considered very seriously before deciding on the type of payment system to use in the business. These costs are both the once off costs of the device and system as well as the monthly / transactional costs associated with using the system. The persistence of the cost of fees contrasts with Cabanillas, et. al., (2016) who found that costs were less of a barrier to merchant adoption of mobile payments., however this is consistent with the earlier works by: van der Heijden, (2002), costs to merchants, Teo et al., (2005) can be hindrance to the adoption by merchants.

4.4.5 Simple to use / Difficult to understand.

The evidence from the interviewees indicated that the simplicity of use of the mobile payment devices was not as straight forward. The most dominant feedback was that the systems were a bit more complex to use and were not as intuitive or easily understood when in operation. One SME stated that the type of mobile payment system that they had taken up from a financial institution required that they use a certain version of smartphone and this forced them to incur more costs by buying new smartphones for the business: "*So, it meant you had to have proper phones and everything, which is a challenge*" (SME G, 2019).

"*That was the most challenging part, trying to figure it out from the start, it was not straight forward*" (SME D, 2019). Which spoke to the lack of intuitiveness of the devices and processes once the mobile payment devices were in operation and hence posed a challenge to the SME merchants.

4.4.6 Risks

Risk as a factor was another consistent factor in the feedback from the interviewees, with risk factors ranging from data breaches, security, loss of cash and physical security. These factors had a positive impact on the decision to use mobile payment systems with evidence shared, "*It was to reduce cost and to give the customer the option of not carrying cash"* (SME G, 2019). It was also noted that the use of electronic devices came with a risk and hence this was viewed as a two-sided factor. There were positive reasons to consider in the use of mobile payment devices that mitigated risks such as the theft, physical harm in cases of robbery. The risks noted with the use of mobile payment devices was encapsulated in statements such as,*"There is always a risk when you give credit card information to a third party like Zapper*" (SME D, 2019).

Statements such as the one above also speak to an earlier mentioned construct of trust. There seems to be evidence that constructs such as risk and trust go hand in hand in influencing the decision to acquire a mobile payment solution.

4.4.7 Company image and credibility

The use of electronic payment systems seems to be an indicator of better company image and some level of credibility compared to the use of cash in the business transaction. This was an interesting aspect to note as this can be noted as the view of the SME P (2019) stated that the use of mobile payment technologies does improve the image that their business portrays, "*Yes, it does improve my company image, that is the first thing people ask, when they walk into the shop."* This is supported by further evidence in terms of feedback by SME Q (2019), an owner of an African cuisine restaurant stating that, "*Yes. A lot of African Restaurants operate on a cash only basis. It makes us look more professional that people can pay via their cards using Yoco.*" The evidence was not as consistent how this indicated that some SME merchants were thinking of customers perceptions based on the technology in store.

4.4.8 Bluetooth connection

A large majority of the more well-known mobile payment systems that involved the pairing of a smartphone to an additional payment device involved the use of Bluetooth. The Bluetooth connection factor raised issues and resulted in instances where there was failed connections at vital points at markets. This resulted in lost sales as customers would not wait for the devices to pair up. This was as sticky issue in a process that already involves friction in the payment instance at check-out / sale process, "*I wish I didn't have to pair it with my phone to work*" (SME D, 2019). There is evidence of issues linked to the blue tooth connection factor leading to misunderstandings in the process in instances where the business owners thought the device had failed in the transaction process, "*There is always like a delay between the phone and the machine, so you don't ehm, you don't take that into consideration, so you think the transaction has failed, in the meantime it hasn't, it is just a delay*" (SME N, 2019).

4.4.9 Business processes / Customer service / Payment options strategy

This is a new construct and speaks to the impact that the mobile payment system has on the business process and customer service. The evidence shows linkages in the three constructs, payment strategy, business processes and customer service. SME D (2019), shared that, "*It hasn't improved business processes (laughs)".* This indicates that the interviewee had expectations of an improvement in business processes that could have resulted in quicker operations times, improved customer service, improved sales and this was not materialising. SME I (2019) saw mobile payments as part of their strategy as the economy toughened and they were affected by electricity shortages, sharing that, "*I think it became part of our adaptive strategy, so when we first opened, no one thought we would have rolling black outs so often.*" The emergence of this construct is partly based on the environmental factors that have impacted businesses in South Africa such as increased power outages. To increase or continue offering the same customer service, there is evidence of use of payment solutions that can be used in the cases of load shedding (power outages).

4.4.10 Integrated systems

The implementation of another system had cost and complexity implications and what was coming through was that the addition of another device and system impacted the existing business processes. This resulted in additional processes or amendments to an existing process, "*Our systems are not merged, they are separate*" (SME A, 2019)
The interviewee noted that there was a need to integrate the systems so that reporting could be carried out from one place. "*If there was some-way to integrate everything holistically so that you get all of your statements through one portal per se*" (SME A, 2019)
SME D (2019) noted that she had to use a book and write down her sales while scanning the phone for the SMS's that confirmed payment as the system had no reporting function. This summarised that, integrated system was a note of concern in the payment process, and this is in line with Lai and Chuah (2010) who stated that a firms infrastructure and resources have an impact on their willingness to adopt mobile payments.

4.4.11 Convenience

Given that most of the mobile payment systems involve the use an additional device and this impacts a friction point in the sales process such as the payment point. This construct was driven by the need to ensure that customers did not suffer in the process of making a payment. SME L (2019) shared that "*So, it was more the convenience that you were offering to your customer that as a form of payment".* SME N (2019) further adds that *"I think that from a convenience view you are able to accept credit cards, debit cards for any event, any market, any time so that's it."* So, the convenience construct is also a two-sided factor as it impacts both the customer and the SME merchant in the process.

4.5 CHAPTER CONCLUSION

This chapter set out to detail the analysis of the interviews were conducted. 18 interviews were conducted with SMES based around South Africa as part of Cycle 1 of the research process with the output being an updated framework for merchant mobile payment adoption factors. This section details the MMPCF that is updated Figure 26 below and provides a conclusion to the first cycle of DSR process. Graham (2010) details a set of question as an evaluation method to the axial coding process that a researcher can carry out. These questions are detailed below and responded to in context of this research.

Causal conditions - what influences the purchase and use of mobile payments? (causes, events)

The above-mentioned construct: system features, trust, device features, costs of fees, simplicity in use, risks, company image and credibility, Bluetooth connection, business processes, integration of systems and convenience play a part in influencing the purchase and use of mobile payment systems. Although some factors show greater influence than others such as costs of fees and risk, they cannot be considered in isolation to others such as business processes and company image as they are interlinked as discussed in the conceptual framework section.

Phenomena - what is happening here - the use of mobile payments, the purchase, what do people do to manage this, how do people relate to this? expand on who is involved

The phenomena at study is the use and factors impacting adoption of mobile payment technologies by small businesses in South Africa. The study encompasses the process of researching and selection of the mobile payment device by the small businesses for their operations. The business owners relate to the use of mobile payments as most of them have interacted with some form of mobile payments in their personal capacity as individuals when making purchases and payments outside their establishment. The employees and accountants who support these small businesses are involved in some way with the mobile payment systems, be it directly in the use or in getting reports for financial reporting.

Strategies - what are they trying to do?

Some of the interviewees were trying to reduce costs as a strategy, create as many alternate payment channels as possible and some were aiming to ensure customer convenience as part of a broader business strategy.

What strategies do they implement in these situations.?

For some of the interviewees, the use of mobile payments was not part of their business strategies but a means to an end. In the situations where power cuts were creating an uncomfortable situation, the use of mobile payments was seen as a critical choice to ensure the continuance of business while ensuring the safety of customers. The interviewees did not want to place their customers at risk by having them pay for goods and services using cash.

How do they achieve the change when implementing mobile payments?

The introduction of mobile payment into their business environments does introduce a change element and for some this was managed by the vendors providing the devices as they provided training. For some however, there was no training or change management

and the interviewees had to find out on their own as the business progressed with limited vendor support.

Action /Interaction - strategies devised to manage, handle, carry out, respond to the phenomenon under a set of conditions.

The feedback has shown SMEs using different strategies to cope with the varying issues regarding the payment process. Ranging from having different multiple payment devices, to renting devices from other SMEs, the SMEs have employed different strategies to ensure that they are able to offer payments as an option to their customers.

Consequence - outcomes and results of using mobile payments, of using mobile payments, buying mobile payments.

The consequences of using mobile payments have not been as clear cut, from an in improvement in process perspective, this has seen neither an improvement or deterioration. The feedback indicates that risk/fear or risk associated factors has reduced due to the reduction in cash handling.

Figure 26 below is an updated MMPCF based on the findings from the 1st cycle of the research cycle. The constructs are updated from the interviews and are different from the findings from literature. The next chapter details a 2nd cycle of the research process, where the MMPCF then undergoes another cycle to have the constructs identified, tested for validation.

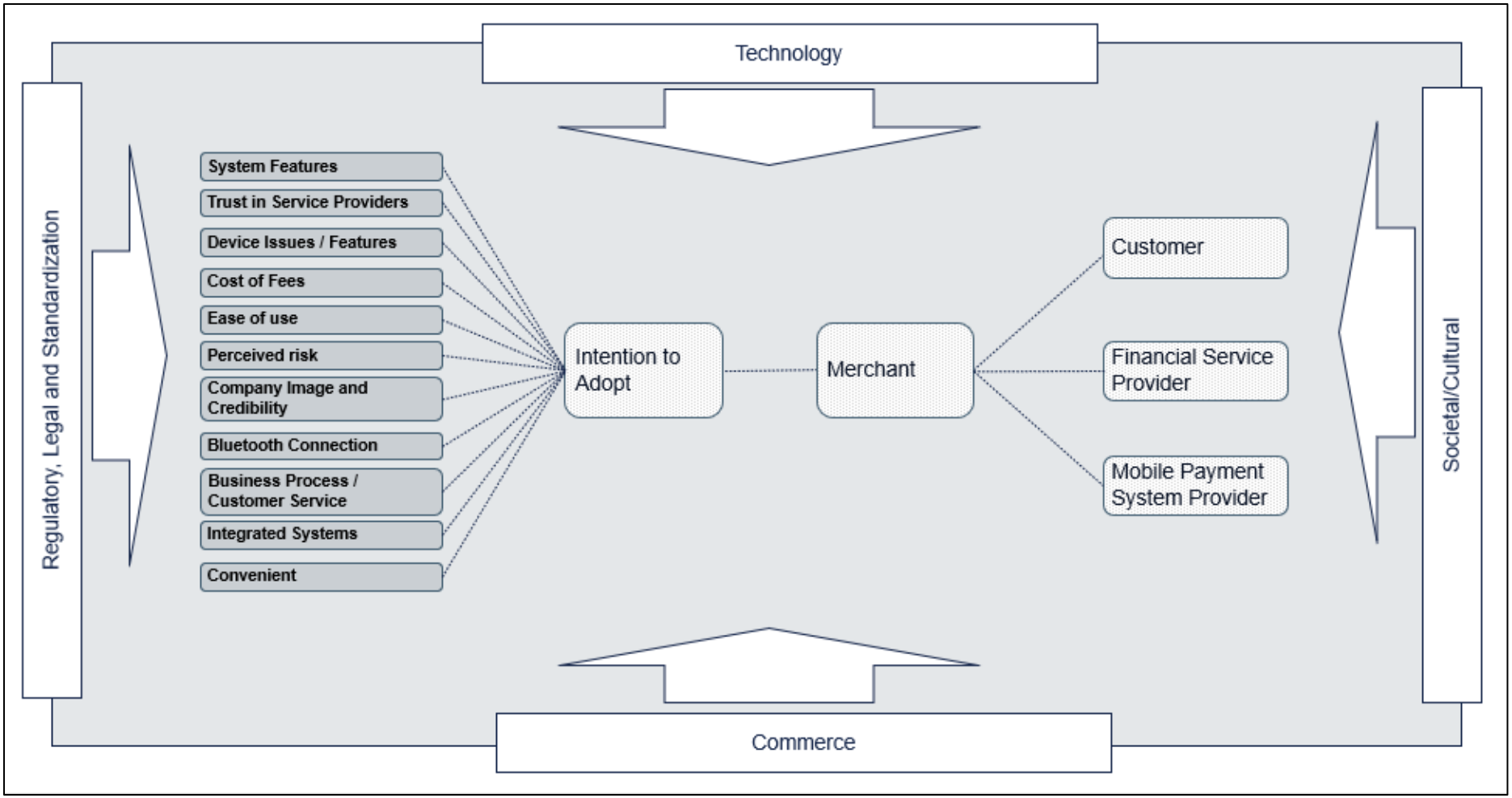
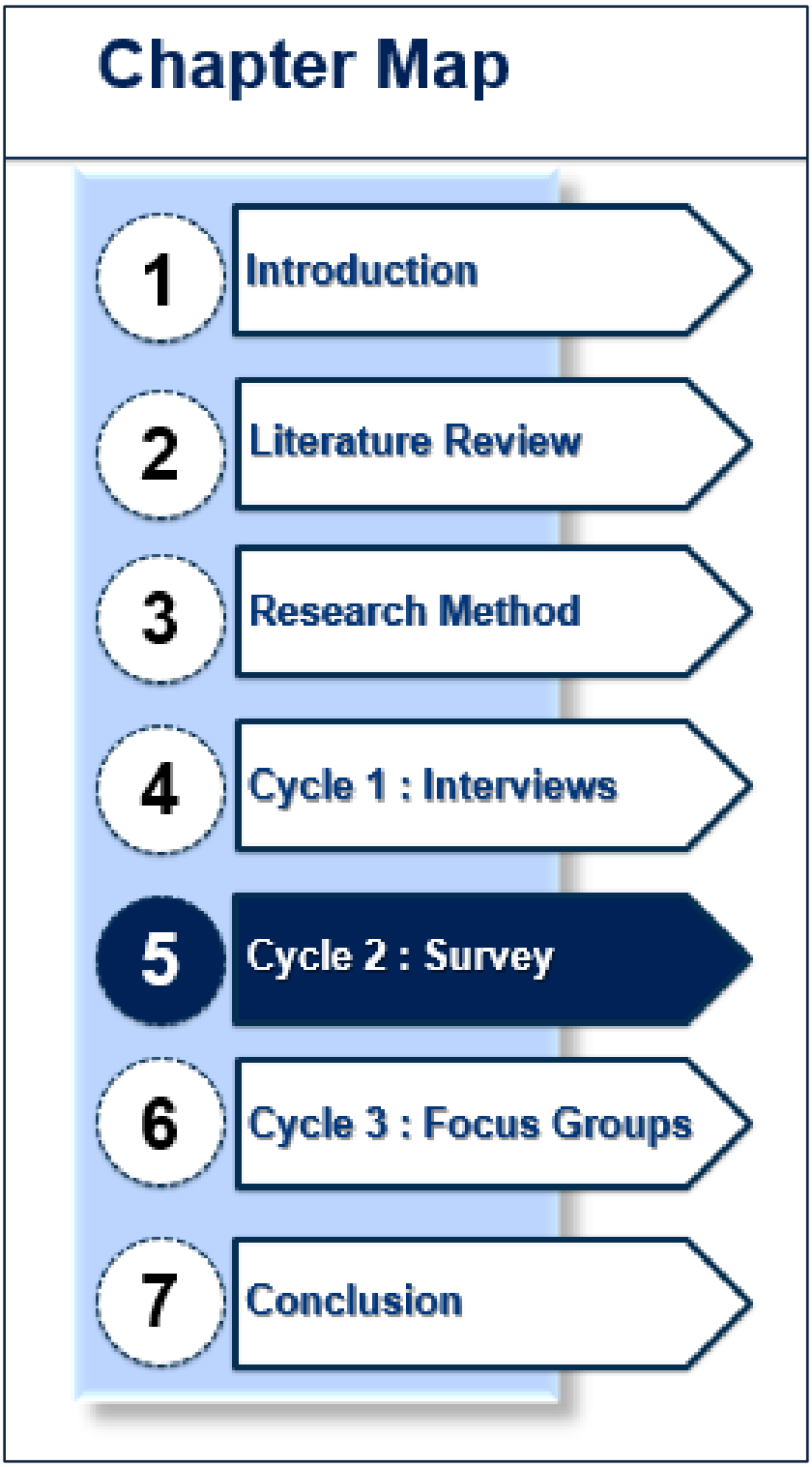


Figure 26: Updated Merchant Mobile Payment Conceptual Framework (MMPCF)

5 CHAPTER 5: CYCLE 2: SURVEY



5.1 INTRODUCTION

The objective of the chapter is to detail the analysis of the second cycle of the DSR process. This was based on the output of the data collected and analysed in Cycle 1, which produced a crude framework with constructs both from the literature and others found in the data analysis of the interviews that were conducted with South African SMEs. Appendix B – Survey lists all the questions that were asked as part of the survey instrument. These questions were based on the findings of the framework from the first cycle of the design process. This cycle detailed the testing of the framework constructs by surveying a large sample of SMEs across the country.

5.2 SURVEY RESPONSE ANALYSIS

As mentioned previously, 177 responses were received from a survey invite sent out to SMEs across South Africa. The survey instrument was structured in such a way that some questions related to the SME respondents and built a view of how the business operates. The remaining questions were grouped into questions focused on technological, organisational and environmental issues within the context of the framework findings. The questions that related specifically to the framework used a Likert scale as response options so as to provide a standard response form. Each question that was detailed in the survey was discussed and analysed, followed by a conclusion, as well as a minor overview on the updated framework.

1. **Do you consent for this information to be used for this study (only)**

A total of 177 SME respondents responded. All 177 SME respondents responded Yes to giving consent to the study.

2. **What type of business are you operating?**

There was a diverse response in terms of the industries that the SMEs operate in, from videography, recycling to farming and funeral parlour businesses. This diverse response provides significant coverage in terms of gathering diverse opinions of SMEs across various sectors of the economy. From the predefined list of 18 options, the Beauty/Hair Care/Hair Salon category had 23 responses. There were 14 respondents who operated in each of Consultancy Services (IT, social media, design, blogging and vlogging) and Tutoring and Educational Services. The list presented to the SME respondents was not an exhaustive list, given the wide variety of fields in which SME businesses operate, and hence 72 of the 177 SME respondents selected the ***Other*** option in terms of type of business they operated. These 72 options were then analysed and grouped according to their sectors as defined by StatsSA (2019) as a guideline to produce the consolidated view in the table 21 below.

Table 21: Breakdown of types of business

Type of business	Number of SMEs operating in that type of business/sector
Accommodation, Catering and Other	7
Agriculture	3
Business and Finance Services	7
Beauty/Hair Care/Hair Salon	23
Construction	1
Consultancy Services (IT, social media, design, blogging, vlogging)	11
Healthcare	9
Other	22
Restaurant/Cafe/Bistro/Food market stall	5
Retail – Bathroom ware	1
Retail – Bookstore	5

Type of business	Number of SMEs operating in that type of business/sector
Retail – Boutique Clothing/Clothes	10
Retail – Boutique Clothing, Food and Drinks	2
Retail – Curios/Music/Arts and Crafts	7
Retail – Food and Drinks	10
Retail – Motor Trade and Repair Services	11
Consulting and Professional Services	36
Wholesale	7
Total	**177**

3. How many years has the business been in operation?

Table 22 below shows that nearly 66% of the businesses had been in operation for fewer than three years, with 19% of the respondents having been operating for less than a year. Of those who had been operating fewer than three years, nearly 68% had been operating for fewer than two years. Thirty-eight respondents had been operating for more than five years.

Table 22: Years in Operation

Years in operation	Total no. of SMEs	% Total of SMEs	Cumulative total of SMEs	% Cumulative total of SMEs
Less than 1 year	33	19%	33	19%
Between 1 and 2 years	46	26%	79	35%
Between 2 and 3 years	38	21%	117	66%
Between 3 and 5 years	33	12%	139	79%
More than 5 years	38	21%	177	100%

According to Bushe (2019), nearly 70% of small businesses in South Africa collapse within the first five years of operation. The data confirm this, with only 21% of the respondents having been in operation for more than five years. SEDA (2018) found similar data, stating

that the number of small businesses in South Africa that have been in existence between two and three years have been dropping year on year, and there are indications that small businesses are not surviving their first years of existence. It is clear from Table 22 that most businesses are younger than five years. This will make an interesting follow-up study in a few years' time.

4. How many employees (full time and part time) does your business employ?

Given the economic value of SMEs from a GDP and employment point of view, this question was asked to better understand the type of SME that would respond. As shown in the table below, 28% of the SME respondents did not have employees and operated the businesses by themselves. When compared to the previous question, **How long have you been in operation?** 45 of the 49 SME respondents (no employees) had been in operation for fewer than three years, with 19 of them being in operation for less than one year.

Mahembe (2011) says that, based on size alone, an enterprise with fewer than five people would be classified as survivalist or a micro-entrepreneur. Noting this definition, 71% of the SME respondents had fewer than five employees and this is most of the respondents. Only 26 SME respondents had more than 10 employees. When this data was cross-referenced to the previous question, **How long have you been in operation?** what emerged was that 15 of the 26 SME respondents who employed more than 10 people in the business had had been in operation for more than three years.

Table 23: Number of Employees

Number of employees	Total number of SMEs	% Total number of SMEs	Cumulative total of SMEs	% Cumulative total of SMEs
None (just myself)	49	28%	49	28%
1 Employee	14	8%	63	36%
2 Employees	27	15%	90	51%
3 Employees	13	7%	103	58%
4 Employees	21	12%	124	70%
5 Employees	1	1%	125	71%

Number of employees	Total number of SMEs	% Total number of SMEs	Cumulative total of SMEs	% Cumulative total of SMEs
6 Employees	15	8%	140	79%
7 Employees	2	1%	142	80%
8 Employees	5	3%	147	83%
9 Employees	4	2%	151	85%
10 or more, fewer than 20	13	7%	164	93%
20 or more, fewer than 50	4	2%	168	95%
50 or more, fewer than 100	3	2%	171	97%
100 or more	6	3%	177	100%

According to SEDA (2018), SMEs in South Africa provide employment for nearly 10 million people and the numbers are increasing year on year, with 11.5 million in SEDA's 2019 report. Table 24 below serves as a reminder of the definitions and breakdown of SMEs in relation to the above, with 93% of the respondents that would be classified as very small enterprises as they have fewer than 20 employees, including themselves. Based on size alone, fewer than 3% of the SME respondents would qualify to be labelled as medium-sized enterprises.

Table 24: Definition of SME (Mahembe, 2011)

Definition	Size/Number of employees	
Survivalist enterprise/ micro	This kind of business displays a lack of capital equipment and is mainly a cash business, e.g., spaza shops, taverns	Typically run by owner and employs no more than five people
Very small	The enterprise begins to display formal and established business processes	Fewer than 20 employees
Small enterprise	The enterprise is more established and exhibits more complex business practices	Between 50 and 99 employees
Medium enterprise	The enterprise begins to have a distinguished hierarchy of authority and increased financial turnovers	Between 100 and 200 employees

5. **Which area is your business located and operating in?**

The objective of this question was to ensure a view of the environment in which the SME respondents operate. According to SEDA (2018), 35% of SMEs operated in Gauteng province, and fewer than 1% operated in the Northern Cape province. This mirrors the findings of this data gathering, as 33% of the SME respondents operated businesses in Gauteng and fewer than 1% of the SMEs operated businesses in the Northern Cape. As shown in Table 25 below, 39% of the respondents operated their businesses in the Western Cape and another 38% operated their businesses in Gauteng. Some of the SME respondents operated businesses in multiple provinces. There was one SME respondent who operated in all provinces, including having a digital presence.

There were a limited number of SME respondents who operated from the Northern Cape, with only one business with a presence there. Mpumalanga, North-west and KwaZulu-Natal had fewer than five SME respondents each who stated that their business operated in those provinces. Sixty-two of the SME respondents operated exclusively in the Western Cape, followed by 57 who operated exclusively in Gauteng. Most of the respondents operated in one province, with only 19 SME respondents operating businesses in multiple provinces.

Table 25: Location of Business

Province	Total number of SMEs	% Total number of SMEs
Northern Cape	1	1%
North West	3	2%
Mpumalanga	3	2%
Free State	3	2%
KwaZulu-Natal	7	4%
Limpopo	11	6%
Eastern Cape	16	9%
Gauteng	71	38%
Western Cape	72	39%

SEDA (2018) states that the Northern Cape and Western Cape different from other provinces from an industry perspective, with the Northern Cape being dominated primarily by farming. Location has been cited as a factor among the challenges that small business

face, with SMMEs in Mpumalanga and the Northern Cape finding it difficult to obtain finance and the Bureau for Economic Research (2016) argues that one of the main reasons could be the nature of where the businesses are located in these provinces, which are deemed more rural than others. One of the explanations for the lack of respondents from the Northern Cape and North-west provinces might be related to the poor mobile data and network coverage and the cost of data. A view of the network coverage of South Africa is shared in the figures below, depicting poor coverage in the North-west and Northern Cape provinces, even when factoring for GSM, 3G and LTE services for Vodacom, MTN and Cell C (Bartholomew, GSMA, Mapbox and OpenMaps, 2019).

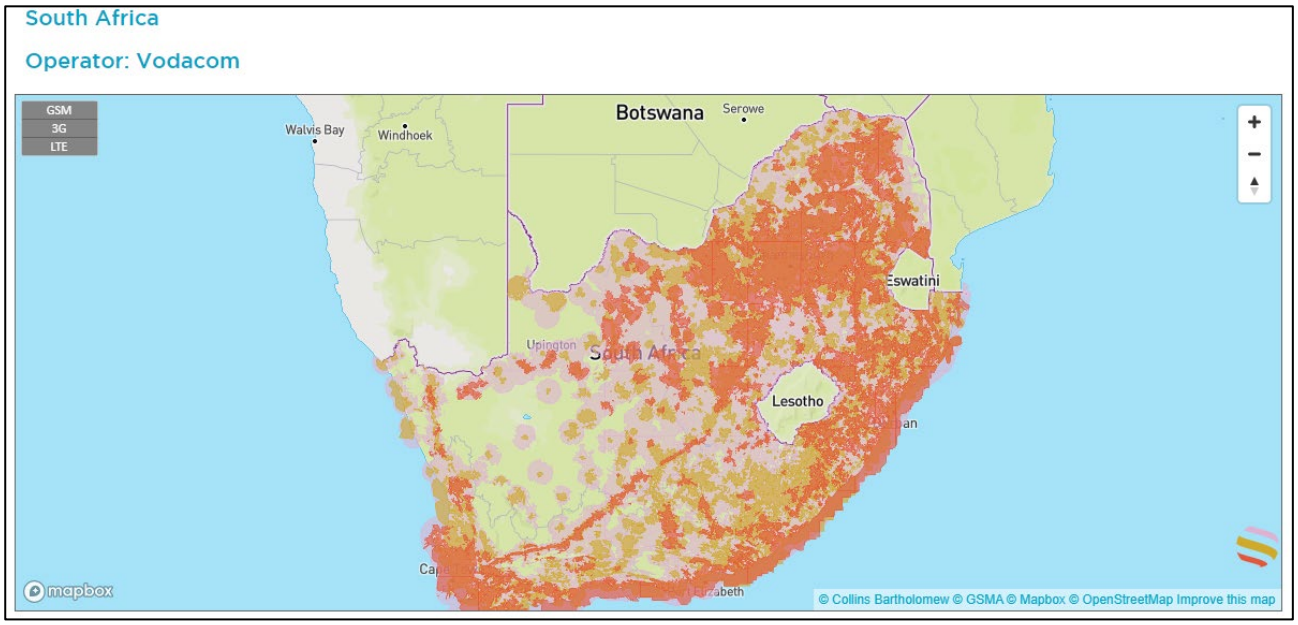


Figure 27: Vodacom coverage in RSA

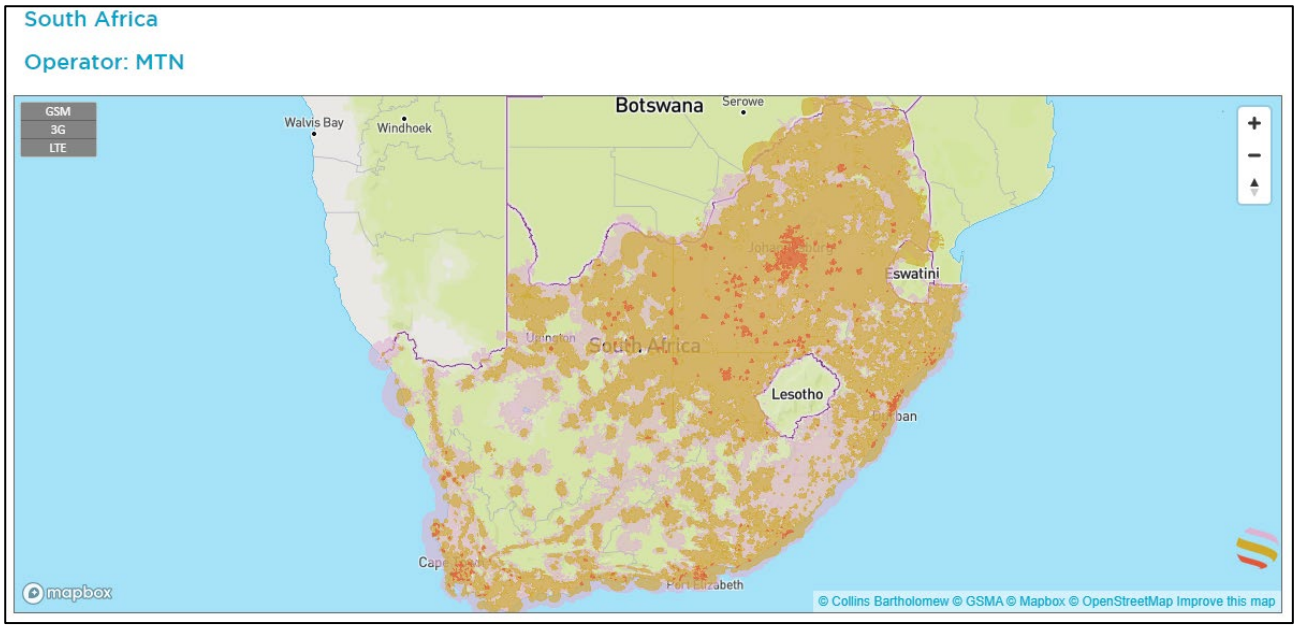


Figure 28: MTN coverage in RSA

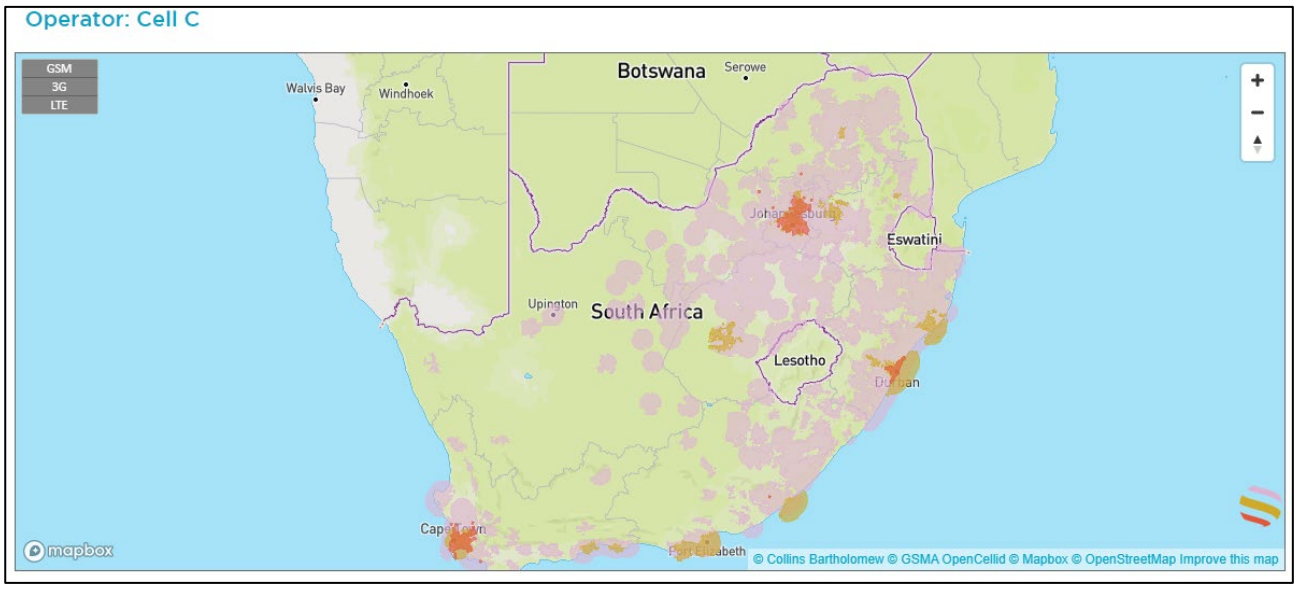


Figure 29: Cell C coverage in RSA

6. Where is your business situated?

The objective of this question was to ensure a view of the environment in which the SME respondents operated. 88% of the SME respondents' businesses were situated in urban settings. For the purposes of the survey, this was defined as a city or town, for example Pretoria and Kimberley. The remaining 12% of the SME respondents stated that they operated in rural areas. Galloway, Mochrie and Deakins (2004) discuss how rural business is disadvantaged by the distance to markets and weak infrastructure. Small businesses

located in rural areas suffer from financial exclusion due to the costs charged by financial institutions for bringing credit to these areas (Mullineux & Murinde, 2014).

Table 26: Rural vs Urban Location

Area	Total number of SMEs	% Total number of SMEs
Rural	21	12%
Urban	156	88%
Total	**177**	**100%**

Four of the nine SME respondents who operated businesses in Limpopo operate in the rural areas of the province. Five out of the 16 SME respondents who operated businesses in the Eastern Cape operate from rural areas. However, eight of the SME respondents in the Western Cape operated in rural areas.

7. **Do you regularly experience power outages at your business premises (electricity cuts)?**

The objective of this question is to understand the environment in which the SME respondents' businesses operated. According to Schoeman (2018), nearly 66% of businesses in the City of Johannesburg experienced between one and three electricity shortages in any given month. The PSA Report (2015) discusses how Eskom power outages have resulted in millions of job losses and opportunities and had a severe impact on the businesses, as power shortages stop production and lower the competitiveness of businesses. Schoeman (2018) adds that power shortages resulted in fewer customers on those day, and hence the businesses earn less revenue when there is an electricity shortage. Seventy-one percent of the SME respondents indicated that they experienced regular power outages in any given month, as shown in Figure 30 below.

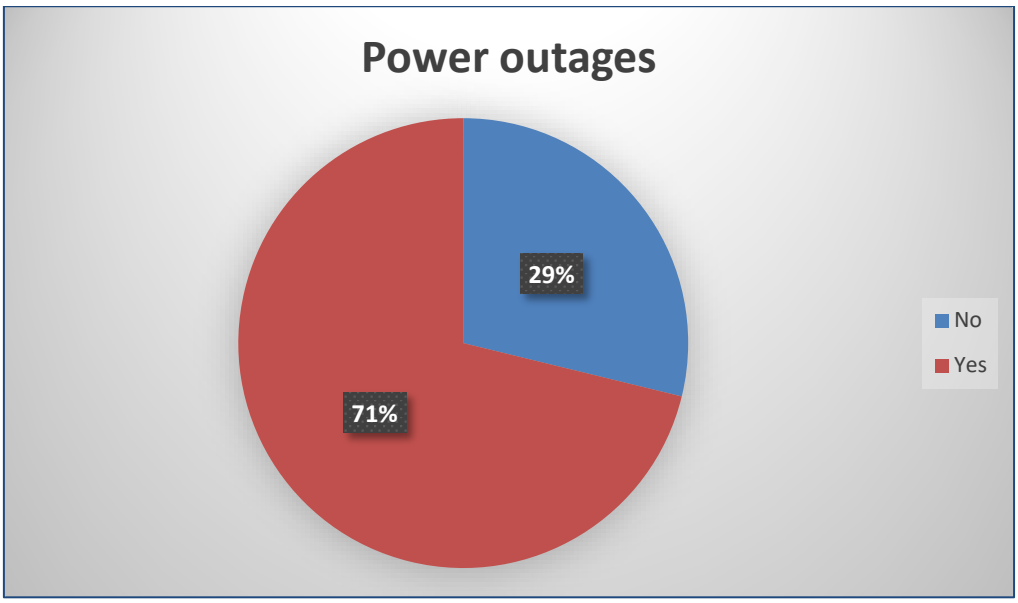


Figure 30: Experience of Power Outages

Of the 126 SME respondents who indicated that they experienced power outages, 110 operated their businesses in urban areas. Of the 51 SME respondents who indicated that they did not experience regular power outages, 46 operated their businesses in urban areas, as shown in Table 27. Even though power outages were common in urban areas, not all areas were affected the same, given the large number who indicated that they did not experience regular power outages.

Table 27: Power Shortage vs. Business Location

Area	Total number of SMEs	
NO	51	
Rural setting	5	
Urban setting	46	
YES	126	
Rural setting	16	
Urban setting	110	
Total	177	

8. **Do you have access to a mobile phone or tablet (smartphone or basic feature phone)?**

The objective of this question was to understand the environment as well as the technology setup in which the SME respondents' businesses operated. Unsurprisingly, the majority of the respondents had access to a smartphone or feature phone. According to Statista (2020), nearly 40% of the South African population has access to a smartphone. A total of 174 of the SME respondents, which represented 98%, indicated that they had access to a mobile phone or tablet for use in the business (see Figure 31 below). This is in line with the data from Pew (2018), who notes that nearly 91% of the South African population had access to a smartphone or a feature phone.

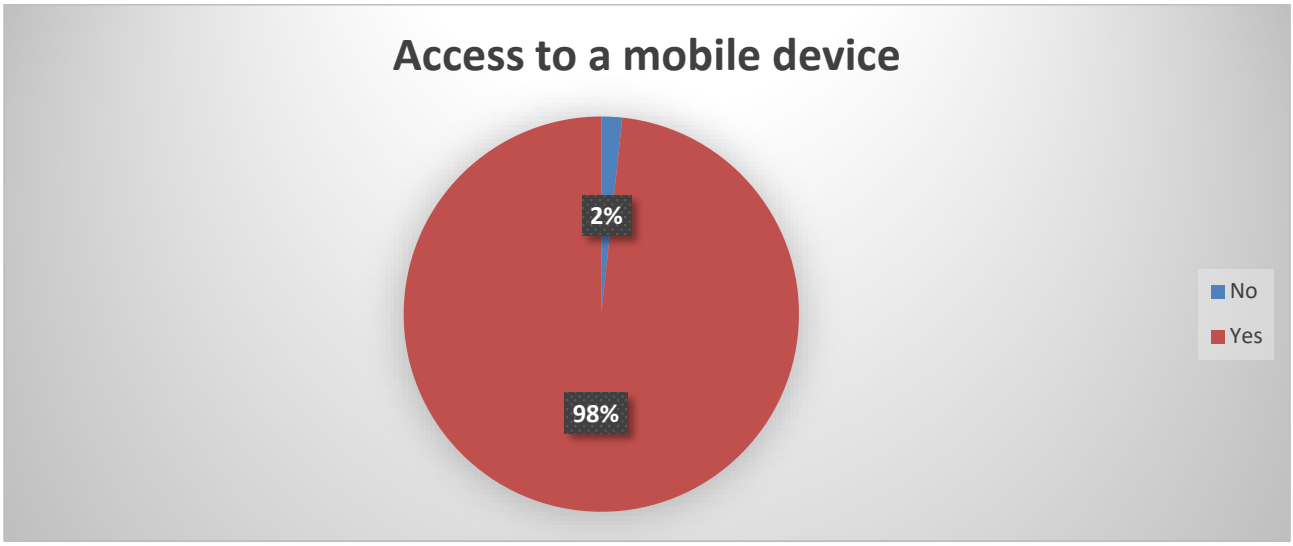


Figure 31: Access to mobile device

9. **Can you access the internet using your mobile phone?**

The objective of the question was to understand the technology in which the SME respondents' businesses operated. All of the respondents noted that they could access the internet on their mobile devices. This had a 100% positive response. Even though GSMA (2019) points out that only 24% of the population in Sub-Saharan Africa had used or had access to mobile internet, South Africa is ranked as being more mobile ready than other African countries. Statista (2020) states that there are more than 90 million mobile connections from devices in South Africa, including feature phones, which are more affordable. This would explain why all SME respondents had access to the internet using their mobile phones.

10. Do you have access to the internet (Wi-Fi / fibre / ADSL / 3G) for business use?

The objective of this question was to understand the technology with which the SME respondents' businesses were operating. Nearly 88% of the respondents had access to some form of internet, either Wi-Fi, fibre, ADSL or 3G. A minority of the respondents had no access to the internet aside from internet connection via their mobile phones.

When the data is broken down to look at the locations of the SME respondents' businesses, there does not seem to be a pattern in terms of rural vs. urban. As displayed in Table 28 below, nearly 92% of the respondents who selected Yes to having access to the internet for business use are in urban areas, and the remaining 9% are in rural areas. For those SME respondents who selected that they did not have access to the internet, 65% of them operated their businesses in urban areas.

Table 28: Access to Internet for Business Use

Access to internet for business use	YES	NO
Rural	13	8
Urban	141	15
Total	154	23

11. What is your position in the business?

The objective of this question was to understand the organisational framework in which the SME respondents' businesses were operating. Seventy percent of the SME respondents are the owners of the business, while 12% of the SME respondents were managers of the businesses. 27 of the respondents were employees, who responded to the survey because the managers and owners were not always available. Table 29 below summarises the breakdown of the SME respondents.

Table 29: Position in Business

Position in business	Count	% of total
Employee	30	17%
Manager	22	12%
Owner	125	71%
Total	177	100%

12. Have you heard, seen or interacted with any of following? If yes, select the ones that you are aware of

The objective of the question was to understand the awareness of the SME respondents about their environment regarding the available payment options. The SME respondents were able to select multiple options in terms of the mobile payment solution that they were aware of. Of the respondents, 109 were aware of Snapscan (a QR code-driven payment method). This represented nearly 62% of the SME respondents, and was followed closely by Yoco; 94 respondents had heard, seen or interacted with Yoco (which is a mobile point-of-sale device). There were less well-known mobile payment systems, such as WAPPoint, with four SME respondents, Zip Zap, which nine SME respondents, and Flickpay, which had gone out of business, although five SME respondents were aware of it (see Table 30 below).

Table 30: Awareness of Mobile Payment Options

Mobile payment option	Knowledge of this mobile payment option (including others)	% of respondents who knew of this mobile payment option
Absa Payment Pebble	23	13%
Absa Smartpay	20	11%
Standard Bank Blu Mobi	17	10%
FNB Geo Payments	48	27%
FNB Scan To Pay	53	30%
iKhokha	43	24%
Nedbank Pocket POS	33	19%

Mobile payment option	Knowledge of this mobile payment option (including others)	% of respondents who knew of this mobile payment option
Yoco	94	53%
Sureswipe	17	10%
Zip zap	9	5%
Snapscan	109	62%
Zapper	80	45%
FlickPay	5	3%
Standard Bank Master Pass	21	12%
WAPPoint	4	2 %

Breaking down the awareness of the SME respondents of mobile payment systems, we can look at the types of entities offering these solutions, i.e. bank vs. independent private firms (see the table below). 56% of the mobile payment solutions were owned, supported, provided or had been acquired by banks at the time. In the case of Snapscan, Standard Bank acquired a majority stake in FirePay, the company that created Snapscan in late 2016 (Fin24, 2016). In the case of Absa, they launched Absa Smart Pay to replace the Payment pebble in 2019, and both solutions currently are on the market (Moosa, 2019).

Table 31: Mobile Payment System, Bank vs. Independent Mobile Payment Provider

Mobile payment option	Total	Bank / owned / acquired	Independent private company
Absa Payment Pebble	23	23	-
Absa Smartpay	20	20	-
Standard Bank Blu Mobi	17	17	-
FNB Geo Payments	48	48	-
FNB Scan To Pay	53	53	-
iKhokha	43		43
Nedbank Pocket POS	33	33	

Mobile payment option	Total	Bank / owned / acquired	Independent private company
Yoco	94	-	94
Sureswipe	17	-	17
Zip zap	9	-	9
Snapscan	109	109	-
Zapper	80	-	80
FlickPay	5	-	5
Standard Bank Master Pass	21	21	-
WAPPoint	4	-	4
TOTAL	576	324	252

The majority were aware of mobile payment solutions provided by banking institutions, which is no surprise, given that when entrepreneurs start their operation, they are likely to go to banks for their financial needs and the payment options are then likely upsold to the entrepreneur. The lack of awareness of the mobile payment solutions of the independent private companies could vary from a lack of marketing and exposure to the general public. This is unlike banking institutions, which run adverts and campaigns with the launch of every product and offering, and hence chances are higher that entrepreneurs will be aware of them.

13. **Please select which payment options you are using for your business (If you are not using any form of mobile payments, please select 'submit form' to end the survey)**

The objective of the question was to understand the payment technologies in use by the SME respondents. This question lays the base for answering the research objectives of this research paper, as it seeks to understand the awareness that merchants have of their environment and technology options in terms of payments. As per the table below, 18 different payment options were presented to the SME respondents, inclusive of well-established methods such as electronic funds transfer (EFT), cash and swiping using the traditional point-of-sale bank devices.

What is immediately obvious from Table 32 below is that the most dominant form of payment on offer by the SME respondents is electronic funds transfer (EFT) and cash, with 142 and 134 respondents respectively. This translates into 80% and 76% of the SME respondents, respectively. The dominance of cash is not surprising, as 50% of transaction value in South Africa is carried out using cash (Calleo, 2018; BankServAfrica, 2018). At a continental level, there is even more emphasis on cash, as 95% of transactions on the African continent are carried out with cash (Mastercard, 2019). The use of EFT could be explained by the type of businesses that the SME respondents operate in, where that is the norm when customers make a payment for an order, e.g., farming, funeral parlours, courier companies as well as those offering a digital presence.

Only 115 SME respondents offered mobile payment solutions as a payment option to consumers. This represented just under 65% of the SME respondents. Yoco and Snapscan were the most popular, with 24% and 18% of those who offered mobile payment solutions offering these as a payment option respectively.

Table 32: Payment Options in Use

Payment option	Use of this payment method (and others)	Use of only this payment method
Absa Payment Pebble	2	0
Absa Smartpay	6	0
Standard Bank Instant Money	20	0
Standard Bank Blu Mobi	1	0
FNB GeoPayments	10	0
FNB Scan to Pay	10	0
FNB eWallet	40	0
iKhokha	3	0
Nedbank Pocket POS	6	0
Yoco	27	1
Sureswipe	3	0
Zip zap	4	0

Payment option	Use of this payment method (and others)	Use of only this payment method
Snapscan	21	0
Zapper	15	0
FlickPay	1	0
Standard Bank Master Pass	5	1
WAPPoint	1	0
Electronic fund transfer	142	21
Cash	134	15
Bank swiping device / point of sale	44	1

Very few of the respondents used only one form of mobile payment, as shown in the table above. Most of the respondents used a combination of payment methods. When isolating payment method used as isolated in the third column, there was limited to no usage of a single payment method by the SME respondents. This can have multiple reasons that were unpacked as part of this research. Fewer than 1% of the SME respondents offered a mobile payment solution as the only payment option in their business operations, compared to 12% who offered only EFT and 8% who offered only cash. Interestingly, only one SME respondent offered the traditional bank point-of-sale device as the only payment option in their business.

Table 33 below gives a breakdown of bank-driven mobile payment solutions and independent private mobile payment solutions. Of the 115 SME respondents who offered mobile payment solutions as options, 61 offered bank-owned mobile payment solutions. This is compared to the 54 SME respondents who used mobile payment solutions provided by independent private companies. In the light of the total number of SME respondents, this represented 34% and 31% of the respondents respectively, with the remaining using EFT, traditional bank point-of-sale devices and cash. An interviewee shared the following in explaining why she chose a bank-driven product as her payment solution -

> *Well for me, I think it is because unlike iKhokha and Yoco, it is a bank product. I guess that is where my comfortability comes from, the fact that it is a bank approved product. The pocket POS comes from Nedbank so there is that reputation as a bank unlike*

> *that app that Alick decides to do in his garage and his busy doing other things on the sides. I know it should be regulated by the FSPs and the what nots so yes* (SME D, 2019)

The comfort and ease of mind knowing that there is a bank was the driving factor compared to an independent private company. What is obvious is that multiple payment methods are being offered by the SME respondents for their customers to use.

Table 33: Payment Options in Use

Payment option	Total	Bank-supported/owned/ acquired	Independent private company
Absa Payment Pebble	2	2	-
Absa Smartpay	6	6	-
Standard Bank Blu Mobi	1	1	-
FNB GeoPayments	10	10	-
FNB Scan to Pay	10	10	-
iKhokha	3	-	3
Nedbank Pocket POS	6	6	-
Yoco	27	-	27
Sureswipe	3	-	3
Zip zap	4	-	4
Snapscan	21	21	-
Zapper	15	-	15
FlickPay	1	-	1
Standard Bank Master Pass	5	5	-
WAPPoint	1	-	1

As shown in the table above, bank-provided mobile payment solutions made up 53% of the SME respondents, while mobile payment solutions offered by independent private companies were used by 47% of the SME respondents. This mirrors the findings of Cabanillas et al. (2016), who found that 60% of the merchants they surveyed preferred a mobile payment solution provided by a financial initiation. The most popular in-store combination of payment methods was cash and electronic fund transfers (EFT), with 39 respondents using this combination. Based on the table above, there seems to be a correlation between how well a payment method is known and its usage. Cash and EFT are the de facto methods of payment in society, and hence it is no surprise that they are used most.

14. Why did you choose the forms of payment you offer at your business? (You may select multiple reasons from the list below)

The objective of this question was to understand the choices that the SME respondents had made in selecting a payment option for their businesses. The options presented are from the refined framework that was the result of the set of interviews in the initial cycle of research from an organisational and technological perspective. The SME respondents could select multiple options. Table 34 below shows the reasons selected by the respondents.

Table 34: Reason for payment option selection

Reason for choosing payment option	Number of SME respondents
Alignment to business strategy	18
Customer service	57
Convenience factor	79
Company image (business image)	22
Cost of fees	86
Device features	18
Ease of use	147
Integration of the system with existing systems in your business	14
Impact of payment systems on business processes	21
System features	39
Risks (risk of holding cash, fraud, etc.)	54
Other	

Ease of use was the main factor selected by the SME respondents for the selection of the payment solution, with 147 respondents selecting this factor. This is supported by Van der Heijden's (2002) earlier works, which identified ease of use as a major factor in the adoption of mobile payments. This represented nearly 84% of the SME respondents. This was closely followed by cost of fees, at 49%, and convenience, at 45%. Alignment with business strategy and device features were selected by 10% of the SME respondents, which were the least

out of all the options. There were respondents who selected the 'Other' option and proceeded to share their reasons that were not included in the framework, such as:

"Yoco have excellent support."

"Having a portable POS makes it easy and confident for travelling."

Ease of use as a factor alone was the reason that 19 of the SME respondents selected their payment method. This was followed by cost as a factor alone, which was selected by eight respondents. Cost of fees and ease of use were selected by 17 respondents as a combination. The above data supports the conceptual framework constructs that are detailed in the Merchant Mobile Payments Conceptual Framework (MMPCF).

15. What frustrates or concerns you about the current payment methods on offer in your business?

The objective of the question the question was to understand the context and organisational environment of the SME respondents in the current choices of payment methods that they had in their businesses. This was a free-text field in which the SME respondents could capture their responses. Only five SME respondents did not populate a response. The responses were collated, and the researcher looked for similarities and grouped these together, such as

- Bank charges
- Charges too high
- Fees
- Fees are too high.

This was repeated throughout the text to come up with a smaller subset of themes around which the responses centred.

Table 35 below summarises the subsets that centred around the SME respondents. Some of the text captured by the SME respondents provided multiple reasons, and these were split and grouped accordingly. This explains why there are more than 177 responses.

Table 35: Frustrations and Concerns with Payment Method

Frustrations and concerns with current payment methods	Number of SME Respondents
No response	5
Bank charges	10
Card machine – Network issues	10
No concerns	10
Funds take time to clear	20
Risk (cash handling)	17
Inconvenience	4
Device fees	4
Lack of system functionality	8
Power outages cause system issues	11
Internet connectivity	13
Device issues and malfunctions	15
Customer knowledge	15
Processes (recons, etc.)	13

A total of 36 respondents stated that they had **No concerns** with their current payment method. One SME respondent shared that "I have many payment options that pretty much services all types of customers so am happy."

In the subset of **Funds take time to clear**, some of the respondents stated that:

"Sometimes payment processes are delayed".

"EFT system takes long to reflect on business account".

"EFT takes three to five takes to reflect whereas pocket POS is immediate".

These were among the reasons that gave rise to frustration. These findings mirror the results discussed in the subset of **Risk (Cash handling)**, in relation to which one SME respondent shared that, *"My sub-contractors need to be paid in cash at all times",* which then imposes an inherent risk on the process. Another went on to say that *"My clients pay from R10 000 upwards, now keeping such amount at the premises is very risky."*

Regarding **Customer knowledge**, some comments shared by the SME respondents include that *"Not a lot of customers are open and willing to make use of the many payment options available", and "many are resistant to change and prefer a cash basis only"*. These comments indicate that customer awareness and understanding are key to ensuring that payment options are used. Even if they are available from the merchants, this does not guarantee that customers will use them. This speaks to the symbiotic relationship in which awareness and willingness to use must reach a certain threshold in the consumer.

Figure 32 gives a view of all the words that the SME respondents used and groups them according to frequency. Cash payment is a recurring theme. This is followed by **nothing**, which relates to SME respondents who stated that 'nothing' frustrated them about the current payment options that they used. 'Eft' and 'reflect' speak to the process of the money transfer process between bank accounts and the time it takes for the funds to reflect.

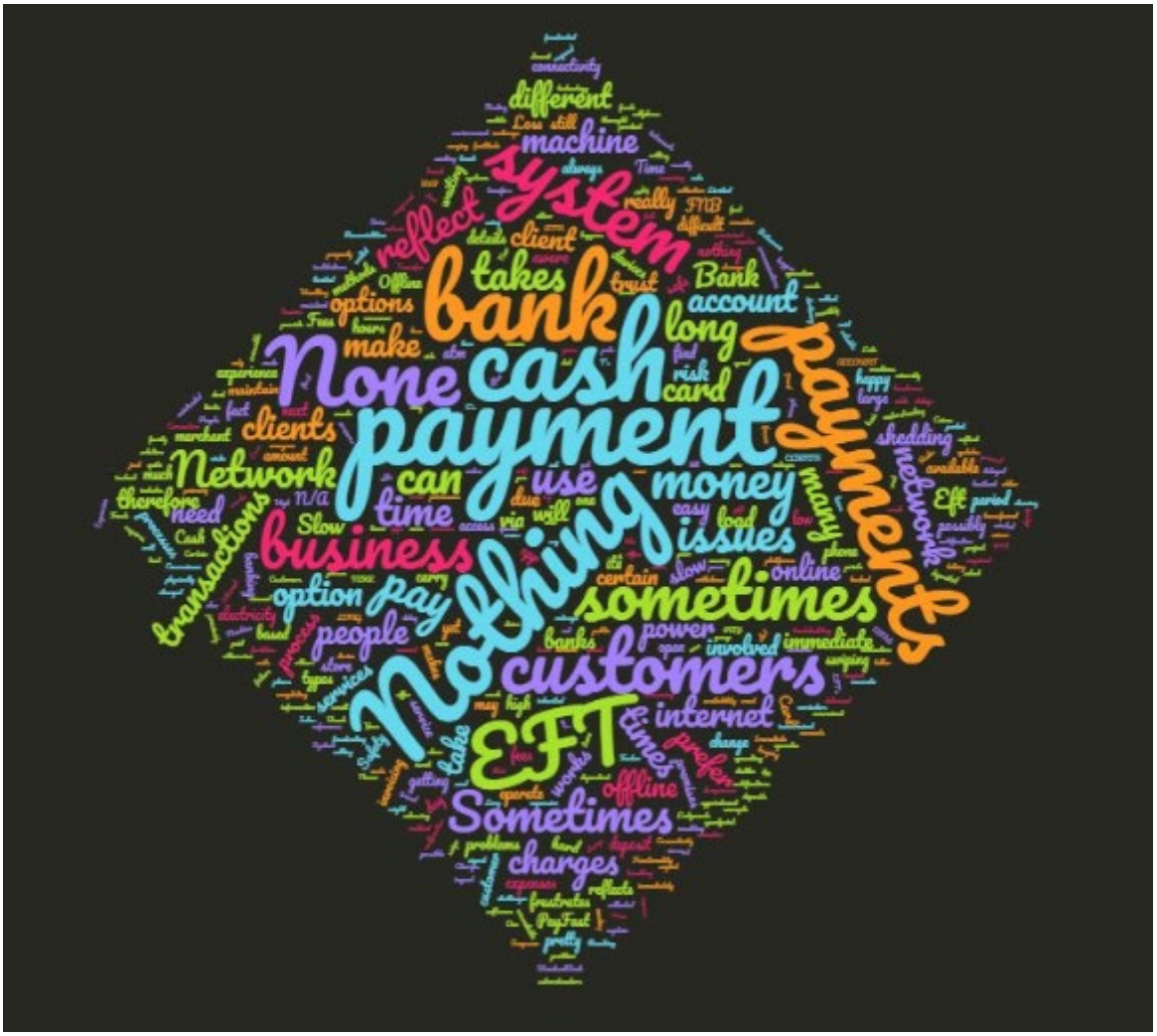


Figure 32: Frustration word cloud

16. If you use technology for business, who helps or supports you?

The objective of this question was to understand both the technology and organisational context in which the SME respondents operated. This question speaks to the ICT skillset of the SME and its business, and also how they have structured their operations. The SME respondents could select multiple options. Figure 33 below summarises the responses provided by the respondents. Only one respondent stated that they did not use technology in their business operations, hence did not need IT support. Eight percent relied on their employee's skills to help with IT issues, while 56% of the respondents performed the diagnostics and attempted to fix any technology problems encountered. This number rises to 73% when including multi-selection, i.e. they tried themselves and other times they asked for help from family or friends. Nearly 20% preferred to outsource this function to IT professionals.

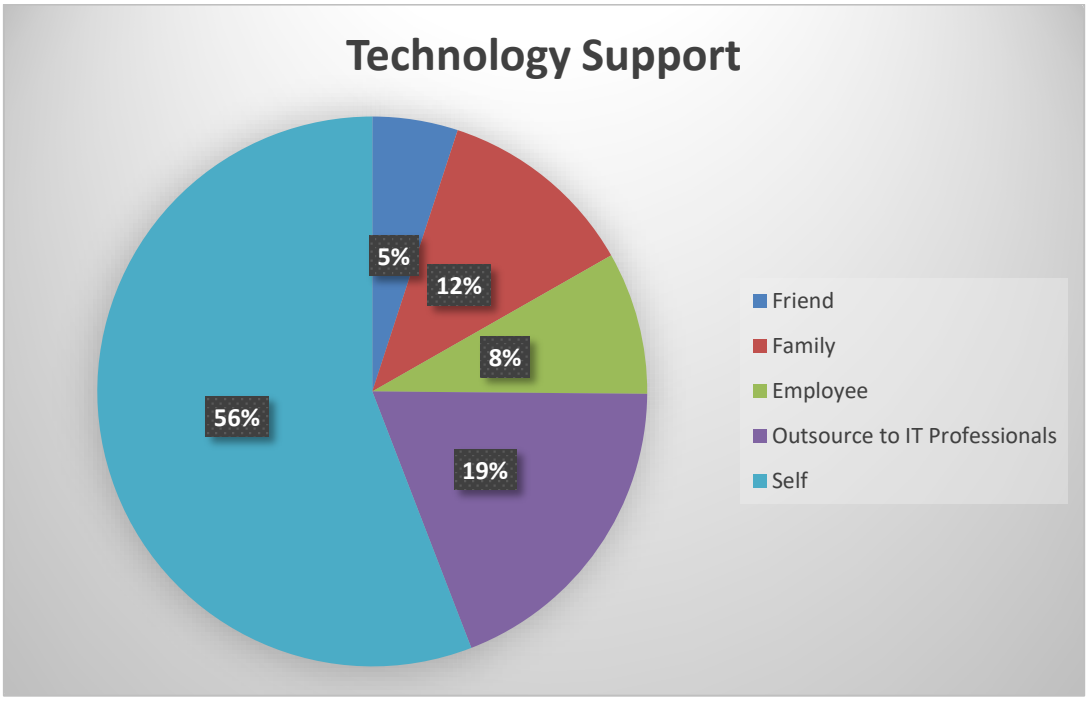


Figure 33: Support for technology issues

Interestingly, when you compare the data output from this question with the data from the question, "How many employees do you have?", nearly 65% of the SME respondents who said they self-supported in terms of technology issues have employees. Table 36 details the breakdown of the number of employees against the 97 respondents who selected "Self" to

the support questions. This may be related to trust issues or that the SME respondents already have the know-how to fix the issues, and hence do not rely on their employees to assist. 49 of the SME respondents stated that they did not have employees, and 34 of these respondents elected to diagnose issues themselves, while the remaining 15 sought assistance from friends, family and IT professionals.

Table 36: Technology Support

Number of employees for SME respondents who stated they carried out the support for technology issues by themselves	Number of SME respondents
1 Employee	8
2 Employees	14
3 Employees	8
4 Employees	7
5 Employees	0
6 Employees	7
7 Employees	0
8 Employees	4
9 Employees	2
10 or more employees (fewer than 20)	8
20 or more employees (fewer than 50)	2
50 or more employees (fewer than 100)	1
100 or more employees	2
None (just myself)	34
Total	**97**

17. How do you communicate with your employees?

The objective of this question was to understand the organisational context of the SME respondents from a communication technology perspective, as well as the technological aspects of the internal firm processes. 22% of the respondents did not have employees and hence this question was not applicable to them. As shown in the table below, the most used form of communication was WhatsApp, with more than 120 SME respondents communicating with their employees using this method. In a report by MyBroadband (2016), the slow decline of SMS usage on Vodacom's network was detailed from 2011 onwards. This has been explained by the increase in the number of smartphones and feature phones

in South Africa, which has enabled the spread of WhatsApp usage, as it is a cheaper communication alternative (MyBroadband, 2016). This was followed closely by face to face, with 113 SME respondents. Unsurprisingly, there was only 28% of the SME respondents who communicated using SMS. This could be explained by the ubiquitous nature of WhatsApp and cheaper costs for messaging using this channel than traditional SMSs.

Table 37: Communication with Employees_A

Communication method	Number of SME respondents
Email	71
SMS	49
WhatsApp	120
Phone call	87
Face to face	113

Only 1 SME respondent used email only to communicate with their employees. This is in comparison to nine SME respondents who used only used face-to-face communication. No SME respondents used SMS communication only. As per the table below, the most used combination was face to face, WhatsApp, phone calls and SMS, with 19 SME respondents using these methods to communicate with their employees. This was followed by WhatsApp, face to face, phone calls and email, with 18 SME respondents using these methods to communicate with their employees.

Table 38: Communication with Employees_B

Communication method	Number of SME respondents
Face to face, WhatsApp	14
Face to face, WhatsApp, phone call, SMS	19
Face to face, WhatsApp, phone call	13
N/A (no employees)	40
Face to face, WhatsApp, phone call, email	18

18. **Does the use of swiping machine in your business, make your business seem more legitimate (as compared to just accepting cash)?**

Table 39 summarises the responses of the SME respondents. The factors company image and the use of a swiping machine featured prominently in the results of the data analysis of the first cycle of data collection. Sixty-five percent of the respondents stated that the use of a swiping machine made their business seem more legitimate, while the remaining 35% stated that they did not believe that it made their business seem more legitimate.

Table 39: Swiping Machine Legitimacy

Response	Number of SME respondents
No	62
Yes	114
No response	1
Total respondents	177

When the SME responses are overlaid with the location responses, 29% of the SME respondents who said No to the use of swiping devices affecting their company image operated their business in urban areas, while 59% of the SME respondents who said Yes to the use of swiping devices affecting their company image operated their businesses in urban areas.

When the SME responses are isolated to only those who offered cash as a form of payment, 60% of the SME respondents said Yes to the use of swiping devices influencing their company image. 40% of the SME respondents said No to the use of swiping devices affecting their company image.

Table 40: Swiping Machine Legitimacy - Cash Respondents

SME respondents who only accepted cash as a method of payment	Number of SME respondents
Yes	9
No	6
Total	15

19. Does the use of mobile payments and acceptance of cards improve or affect your company image?

From Question 19 onwards, the analysis was done by cross-referencing responses to the use of mobile payments versus those who were not using mobile payments in their environments. The reason for this was to gain deeper insight and move beyond the numbers as they are presented.

Table 41 summarises the responses shared by the SME respondents. The factor of company image and the use of mobile payments featured prominently in the results of the data analysis of the first cycle of data collection. The objective of this question was to test if the factor applied to a larger sample audience and the importance of customers' perceptions of the firm based on the payment technologies in use. The SME respondents could only select one option from the list.

Table 41: Swiping Machine Legitimacy - Cash Respondents

Response classification	Number of SME respondents
Major effect	37
Minor effect	19
Moderate effect	41
Neutral	39
No effect	40
Total	**176**

One respondent did not answer this question and hence there was a 99% response rate. The responses were evenly spread over the options selected. 22% stated that the use of mobile payments or acceptance of cards did not improve the company image. This was mirrored by 21%, who stated that this did have a major effect on their company image, while 22% of the respondents gave a neutral response to this question and the other 23% shared that this factor had a moderate effect on their company image.

Table 44 is a breakdown of the type of payment methods offered by the SME respondents. 60% of the SME respondents did not offer a mobile payment solution to their customers, while the other 40% offered some form of mobile payment option. As shown earlier, among

the SME respondents who did not offer mobile payment options at all there was a subset that only accepted cash as a form of payment.

Table 42: Breakdown of Payment Methods

Payment method	Number of SME respondents
Mobile payment method offered	70
Mobile payment method NOT offered	107
Total	**177**

The table below provides a detailed breakdown into the two categories of mobile payments system (MPS) offered to customers versus mobile payments not offered. 50 SME respondents who offered mobile payments as an option to customers selected that the use of mobile payments and accepting card payments had a positive impact on their company image. This represented 28% of all the SME respondents. In contrast, 47 SME respondents did not offer mobile payments but offered a traditional bank point of sale, EFT and cash options to customers. They stated that accepting cards had a positive effect on their company image. Meanwhile, 22% of the SME respondents across the entire sample shared that this factor did not have an effect, while 22% were neutral.

Table 42: Company Image – MPS vs. Non-MPS

Response classification	Mobile payment offered	% of total respondents	Mobile payment NOT offered	% of total respondents
Major effect	17	9.7%	20	11.4%
Minor effect	7	3.9%	12	6.8%
Moderate effect	26	14.7%	15	8.5%
Neutral	12	6.8%	27	15.3%
No effect	7	3.9%	33	18.7%
No response	1	0.6%	-	-
Total	**70**		**107**	

Table 43 details the responses of the SME respondents who only accepted cash from their customers as payment option. When the SME responses are isolated to those who only

offered cash as form of payment, 60% of the SME respondents said the use of mobile payments, and the acceptance of cards, had an effect on the company image. This mirrors the response to the previous question regarding the use of swiping machine. 4 of the SME respondents were neutral in this regard, while the remaining 2 said that the use of mobile payments and the acceptance of cards had no effect on the company image.

Table 43: Company Image - Cash Respondents

Response classification	Number of SME respondents
Major effect	5
Minor effect	2
Moderate effect	2
Neutral	4
No effect	2
Total	**15**

20. **What is the estimated frequency of use of the mobile payment device in your business on a weekly basis?**

The objective of this question was to understand how often the payment options offered are used. This is specific to those SME respondents who offered mobile payment options to their customers. Table 44 shows that 70 SME respondents offered mobile payment options to their customers.

Table 44: Breakdown of Payment Methods

Payment method	Number of SME respondents
Mobile payment method offered	70
Mobile payment method NOT offered	107
Total	**177**

Of the SME respondents who offered mobile payment options, 40% responded that the solution was used **Almost every time** when a customer was making a payment. Nearly 82% of the SME respondents responded positively, with **Every time** and **occasionally** being selected as well. This indicates even though those who offered mobile payment

solutions were a minority of the SME respondents, there was considerable usage of the mobile payment options offered by the SME respondents.

Table 45: Frequency of Use of Mobile Payment Solutions

Response classification	Mobile Payment offered	% of respondents that offer MPS
Almost every time	28	40%
Every time	8	11.4%
Occasionally	21	30%
Rarely	10	14.3%
Never	3	4.3%
Total	**70**	**100%**

The objective of breaking down the SME respondents into those who used bank-supported mobile payment options and those that used private independent mobile payment options was to understand if there was a difference in service and usage, and if this was a factor to be considered. The table below gives the breakdown of those who offered mobile payment options into bank-supported and private independent supported options. It is noted that some SME respondents offered both types of options to their customers, and hence there is no exclusivity in the responses. Of those who offered MPS, if we look at the bank devices against the private MPS, the numbers are roughly the same across the responses, with 43% selecting **Almost every time** for bank supported, and 41% for private independent supported. This trend continued even for the SME respondents who selected **Rarely** and **Never** as options. There does not seem to be a marginal difference in the frequency of use, whether the mobile payment solution is bank supported or from a private independent company.

Table 46: Frequency of Use of Mobile Payment Solutions (Bank vs. Private)

Response classification	Bank supported mobile payment offered	% of respondents who offer MPS	Private independent mobile payment offered	% of total respondents
Almost every time	22	43.2%	17	41.5%

Response classification	Bank supported mobile payment offered	% of respondents who offer MPS	Private independent mobile payment offered	% of total respondents
Every time	8	15.7%	6	14.7%
Occasionally	13	25.5%	12	29.3%
Rarely	6	11.8%	5	12.2%
Never	2	3.9%	1	2.4%
Total	**51**	**100%**	**41**	**100**

The objective of breaking down the SME respondents into those who used QR Code + App mobile payment options (such as Snapscan, Zapper) and those that used mobile payment device + App mobile payment options was to understand if there was a difference in service and usage, and if this was a factor to be considered. Table 47 gives the breakdown of those who offered mobile payment options into QR Code + App and Mobile payment device + App. 48 SME respondents offered a mobile payment device + App option, compared to 39 SME respondents who offered QR Code + App option. There was a significant difference in the numbers for the SME respondents who selected **Almost every time**, with 21 SME respondents who offered the mobile payment device + App option compared to the 15 SME respondents who offered QR Code + App mobile payment.

Table 47: Frequency of Use of Mobile Payment Solutions (QR Code vs. Device)

Response classification	QR + App mobile payment offered	% of respondents who offer MPS	Device + App mobile payment offered	% of total respondents
Almost every time	15	38.5%	21	43.8%
Every time	6	15.4%	6	12.5%
Occasionally	12	30.8%	13	27.1%
Rarely	5	12.8%	6	12.5%
Never	1	2.6%	2	4.1%
Total	**39**	**100%**	**48**	**100%**

21. **What is the level of desirability to have a mobile payment system in your business?**

The objective of this question was to understand the desire of the SME respondent to take on and offer a mobile payment solution to their customers. 24% of the respondents were **neutral** in their responses to obtaining a mobile payment system, with another 7% stating that it was **undesirable**. However, 68% stated that it was **desirable** or **very desirable** to have a mobile payment system in their business.

Table 48: Mobile Payment Desirability

Response classification	Number of SME respondents
Very desirable	55
Desirable	50
Neutral	43
Undesirable	13
Very undesirable	16
Total	**177**

A better understanding can be gained if the data is viewed from those SME respondents who did not offer a mobile payment solution to their customers. There were 107 SME respondents who did not offer mobile payment solutions as options to their customers and only 51% selected that it was **very desirable** or **desirable** to have a mobile payment solution in their businesses. 22% of the SME respondents selected that it was **undesirable** and **very undesirable** to have mobile payment solutions in their business operations. There still was a significant percentage of respondents who were undecided and hence selected the **neutral** option (26%).

Table 49: Desirability of Mobile Payments

Response classification	Number of SME respondents
Very desirable	32
Desirable	23
Neutral	28
Undesirable	13

Response classification	Number of SME respondents
Very undesirable	11
Total	**107**

Fifty-one percent of the respondents said that it was **very desirable** or **desirable** to have a mobile payment solution in their businesses. When asked, "What are your current frustrations and challenges with your current payment solutions?", some of their responses were as follows:

"Bank charges when cash is deposited into the account".

"Bank to bank transfer can take more than 24 hours".

"Some EFT payments take too long to reflect on the receiver's account".

"It's not safe to carry large sums of money around".

The 22% of SME respondents who selected that it was **undesirable** and **very undesirable** to have mobile payment solutions in their business operations seemed to be motivated by not having issues or frustrations in their current payment offerings. This could explain the lack of a need or desire to have a mobile payment solution in their business. One SME stated: *"My payments happen after service is delivered; therefore, payment is not required immediately and therefore current payment method works."* This was echoed by another SME respondent who shared that they operated in a different business environment in terms of customers and hence this was not an applicable form of payment: *"My business operates in a B2B environment. As such, there is usually an invoicing and payment process that happens monthly."*

Other SMEs shared the following when asked for feedback regarding their frustrations: *"None", "Nothing really", Nothing".* Hence it is not surprising that these SME respondents were not interested in using a mobile payment solution, as they were comfortable with their current payment solutions.

22. How important are the following factors regarding your business when it comes to payment technology and business operations: Cost of fees?

The feedback from the axial and coding analysis in the first part of the data collection indicated that costs are an important factor when it comes to the type of payment method. This is consistent with the findings from previous studies, that showed that costs are a major factor in the decision-making process to adopt mobile payments. Table 50 gives a summative view of the SMEs' responses. There is reasonable quantitative feedback to support this, with 61% of the SME respondents stating that this was an **extremely important** and **very important** factor, and 15% finding it to be **moderately important**. Only about 12% of the SME respondents shared that the cost of fees as a factor was **not at all important** or they were **neutral** in their response. This is supported by Van der Heijden (2002), who notes that costs play a critical role in the adoption of a mobile payment channel. The overall positive view of the importance of the cost of fees as a factor gives credence to the data collected and presented in the framework.

Table 50: Cost of Fees – Importance of Factor

Response classification	Number of SME respondents
Extremely important	56
Very important	53
Moderately important	26
Slightly important	12
Low importance	9
Neutral	19
Not at all important	2
Total	**177**

Table 51 provides a detailed breakdown into the two categories of SME respondents who offer mobile payment options to customers and SME respondents who do not have mobile payments in their business operations. Just over 67% of those who offered mobile payment solutions found the cost-of-fees factor to be **extremely important** or **very important**, compared to 57% of the SME respondents who did not offer mobile payment options to customers. For those who offered mobile payment options to customers, 90% of the SME respondents found the cost of fees to be of some importance, with only 10% being neutral.

For the SME respondents who did not offer mobile payment solutions to customers, 86% found the cost of fees to be of importance, with only 14% selecting either **neutral** or **not at all important**. Based on the responses below, it can be surmised that the cost of fees was of greater importance to those who were offering mobile payments as an option compared to those who were not. It is a marginally small difference.

Table 51: Cost of Fees – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offer MPS	Mobile payment NOT offered	% of respondents who do NOT offer MPS
Extremely important	27	38.6%	29	27.1%
Very important	20	28.5%	33	30.8%
Moderately important	8	11.4%	18	16.8%
Slightly important	4	5.7%	8	7.5%
Low importance	4	5.7%	5	4.8%
Neutral	7	10%	12	11.2%
Not at all important	-		2	1.9%
Total	**70**	**100%**	**107**	**100%**

Table 52 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. SME respondents who used bank-supported mobile payment options were compared with SME respondents who use independent private company-supported mobile payments in their business operations. Just over 72% of the SME respondents who used the latter form of mobile payments found the cost-of-fees factor to be **extremely important** or **very important** compared to 61% of the SME respondents who used bank-supported mobile payment options.

For those SME respondents who used independent private company-supported mobile payments in their business operations, 92.7% found the cost of fees to be of some importance, with only 7.3% selecting neutral. For the SME respondents that who used a bank-supported mobile payment option, 86.4% found the cost of fees to be of importance, with only 13.7% selecting **neutral** as an option. Based on the responses below, it can be surmised that the cost of fees was of slightly greater importance to those who used

independent private company-supported mobile payments in their business operations compared to those SME respondents who used bank-supported mobile payment options.

Table 52: Cost of Fees – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	20	39.2%	19	41.5%
Very important	11	21.7%	13	31.7%
Moderately important	5	9.8%	3	7.3%
Slightly important	3	5.9%	2	4.9%
Low importance	5	9.8%	1	2.4%
Neutral	7	13.7%	3	7.3%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 53 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers – respondents who used QR code + App mobile payment options compared to those who used a mobile device + App mobile payment option in their business operations. Just over 69% of the respondents who used the QR code + App mobile payment option and 67% of the respondents who offered a mobile device + App mobile payment option found the cost-of-fees factor to be **extremely important** or **very important**. Just over 87% of the SME respondents who used the former payment option and 90% of the SME respondents who offered a mobile device + App mobile payment option found the cost of fees to be an **important** factor. There was a marginally small difference in the levels of importance of less than 3% between the two groupings.

What was common across both types of SME respondents was that the cost of fees was agreed to be an important factor, and there were no respondents who selected not at all important as an option. 5 respondents selected the neutral option. The SMEs who selected neutral as an option represented 12.8% and 10.4% of the SME respondents who used the QR code + App mobile payment option and those who offered a mobile device + App mobile payment option respectively.

Table 53: Cost of Fees – Importance of Factor (QR vs Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	17	43.6%	17	35.4%
Very important	10	25.6%	15	31.6%
Moderately important	4	10.3%	5	10.4%
Slightly important	0	0%	4	8.3%
Low importance	3	7.7%	2	4.2%
Neutral	5	12.8%	5	10.4%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100%**

23. How important are the following factors regarding your business when it comes to payment technology and business operations: Ease of use

The feedback from the axial and coding analysis in the first part of data collection indicated that ease of use is an important factor when it comes to the type of payment method and its effect on business operations. The table below gives a summative view of the SMEs' responses. 79% stated that ease of use was **extremely important** or **very important**. Just under 2% of the SME respondents shared that ease of use as a factor was **not all important**. The overall positive view of the importance of ease of use as a factor gives credence to the data collected and presented in the framework.

Table 54: Ease of use – Importance of Factor

Response classification	Number of SME respondents
Extremely important	72
Very important	67
Moderately important	15
Slightly important	3
Low importance	5
Neutral	13

Response classification	Number of SME respondents
Not at all important	2
Total	**177**

Table 55 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers compared to those who did not have mobile payments in their business operations. Just over 86% of those who offered mobile payment solutions found the ease-of-use factor to be **extremely important** or **very important**, compared to 73% of SME respondents that did not offer mobile payment options to customers. This is supported by Van der Heijden (2002), who notes that the ease of use of alternative channels plays a critical role in the adoption of the mobile payment channel. For those who offered mobile payment options to customers, 96% of the respondents found ease of use to be of importance, with only 4% selecting **neutral**. For the SME respondents who did not offer mobile payment solutions to customers, 89% found ease of use to be of important, with only 11% selecting either **neutral** or **not at all important** as an option. Based on the responses below, it can be surmised that ease of use was of greater importance to those who offered mobile payments than those who did not.

Table 55: Ease of use – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	32	46%	40	37%
Very important	28	40%	39	36%
Moderately important	7	10%	8	7%
Slightly important	0	0%	3	3%
Low importance	0	0%	5	5%
Neutral	3	4%	10	9%
Not at all important	0	0%	2	2%
Total	**70**	**100%**	**107**	**100%**

Table 56 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers – those who used bank-supported mobile

payment options and those who used independent private company-supported mobile payments in their business operations. Just over 73% of the SME respondents who used independent private company-supported mobile payments found the ease-of-use factor to be **extremely important** or **very important** compared to 61% of those who used bank-supported mobile payment options.

For those SME respondents who used independent private company-supported mobile payments in their business operations, 92.7% found ease of use to be of some importance, with only 7.3% selecting neutral. For the SME respondents that who used a bank-supported mobile payment option, 86.3% found ease of use to be of importance, with only 13.7% selecting **neutral** as an option. Based on the responses below, it can be surmised that ease of use was of slightly greater importance to those that used independent private company-supported mobile payments compared to those who used bank-supported mobile payment options.

Table 56: Ease of use – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	20	39.2%	19	41.5%
Very important	11	21.7%	13	31.7%
Moderately important	5	9.8%	3	7.3%
Slightly important	3	5.9%	2	4.9%
Low importance	5	9.8%	1	2.4%
Neutral	7	13.7%	3	7.3%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 57 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers – SME respondents who used QR code + App mobile payment options and SME respondents who used a mobile device + App mobile payment option. Just over 87% of the former and 84% of the latter found the ease-of-use factor to be **extremely important** or **very important** respectively, while just over 97% of the former and 96% of the latter found the ease-of-use factor to be **important** respectively. There was a marginally small difference in the levels of importance of less than 3% between the two groupings, but what was agreed was that ease of use was an extremely important factor for those SME respondents already offering mobile payment solutions to customers.

What was common across both types of SME respondents was that, while ease of use was agreed to be an important factor, there were no respondents who selected **not at all important** as an option, and only three selected the neutral option. The SME respondents who selected **neutral** as an option represented 3% and 4% of the SME respondents who used the QR code + App mobile payment option and those who offered a mobile device + App mobile payment option respectively.

Table 57: Ease of Use – Importance of Factor (QR vs. Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	19	49%	22	46%
Very important	15	38%	18	38%
Moderately important	4	10%	6	13%
Slightly important	0	0%	0	0%
Low importance	0	0%	0	0%
Neutral	1	3%	2	4%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100**

24. **How important are the following factors regarding your business when it comes to payment technology and business operations: Risk (cash handling, fraud, theft)**

The feedback from the axial and coding analysis in the first part of this data collection indicated that risk is an important factor when it comes to the type of payment method offered by SMEs. Table 58 below gives a summative view of the SMEs' responses. Just under 50% of the SME respondents selected that risk was an **extremely important** factor, with another 30% stating that it was **very important**. Just under 10% of the SME respondents shared that risk (cash handling, fraud, theft) as a factor was **not at all important** or were **neutral** in their response. This is supported by Van der Heijden (2002), who notes that risk plays a critical role in the adoption of the mobile payment channel. The overall positive view of the importance of risk (cash handling, fraud, theft) as a factor gives credence to the data collected and presented in the framework, as 91% of the SME respondents viewed this factor as important.

Table 58: Risk – Importance of Factor

Response classification	Number of SME respondents
Extremely important	87
Very important	52
Moderately important	14
Slightly important	5
Low importance	2
Neutral	14
Not at all important	3
Total	**177**

Table 59 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and SME respondents who did not have mobile payments in their business operations. Just over 87% of the SME respondents who offered mobile payment solutions found the risk (cash handling, fraud, theft) factor to be **extremely important** or **very important**, compared to the 75% who did not offer mobile payment options to customers. For those SME respondents who offered mobile payment options, 97% found the risk (cash handling, fraud, theft) factor to be of some importance,

with only 3% selecting neutral. For the SME respondents who did not offer mobile payment solutions, 87% found the risk (cash handling, fraud, theft) to be of importance, with only 13% selecting **neutral** as an option. Based on the responses below, it can be surmised that risk (cash handling, fraud, theft) was of greater importance to those SME respondents who were offering mobile payments compared to those who were not.

Table 59: Risk – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	40	57%	12	31%
Very important	21	30%	17	44%
Moderately important	7	10%	3	8%
Slightly important	0	0%	1	3%
Low importance	0	0%	1	3%
Neutral	2	3%	5	13%
Not at all important	0	0%	0	0%
Total	**70**	**100%**	**39**	**100%**

Table 60 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers – SME respondents who used bank-supported mobile payment options compared to SME respondents who used independent private company-supported mobile payments in their business operations. Ninety percent of the SME respondents who used independent private company-supported mobile payments found the risk (cash handling, fraud, theft) factor to be **extremely important** or **very important**, compared to 92% who used bank-supported mobile payment options.

For those SME respondents that used independent private company-supported mobile payments in their business operations, 95% found the risk (cash handling, fraud, theft) factor to be of some importance, with only 5% selecting the **neutral** option to this question. For the SME respondents who used a bank-supported mobile payment option, 100% found the risk (cash handling, fraud, theft) factor to be significant. Based on the responses below, it can be surmised that the risk (cash handling, fraud, theft) factor is of high importance to SMEs

that offer mobile payment solutions in their business operations. This is regardless of the provider of the mobile payment solution.

Table 60: Risk – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	31	61%	26	63%
Very important	16	31%	11	27%
Moderately important	4	8%	2	5%
Slightly important	0	0%	0	0%
Low importance	0	0%	0	0%
Neutral	0	0%	2	5%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 61 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers in terms of the type of solution offered – SME respondents who used QR code + App mobile payment options compared to SME respondents who used a mobile device + App mobile payment option. Just over 85% of the SME respondents who used the QR code + App mobile payment option and 93% of the SME respondents who offered a mobile device + App mobile payment option found the risk (cash handling, fraud, theft) factor to be **extremely important** or **very important**. In terms of importance, just over 97% of the SME respondents who used the former payment option and 98% of those who offered the latter found the risk (cash handling, fraud, theft) factor to be **important**. There was a marginally small difference in the levels of importance, of less than 1%, between the two groupings.

What was common across both types of SME respondents was that risk (cash handling, fraud, theft) was agreed to be an important factor, and there were no respondents who selected **not at all important** as an option and only one selected the neutral option.

Table 61: Risk – Importance of Factor (QR vs. Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	25	64%	28	58%
Very important	8	21%	17	35%
Moderately important	5	13%	2	4%
Slightly important	0	0%	0	0%
Low importance	0	0%	0	0%
Neutral	1	3%	1	2%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100**

25. **How important are the following factors regarding your business when it comes to payment technology and business operations: Device features (e.g. battery life, size of device, screen size)**

The feedback from the axial and coding analysis in the first part of this data collection indicated that device features are a factor to be considered when it comes to the type of payment method. The table below gives a summative view of the SMEs' responses. There was reasonable quantitative feedback to support this, with 27% of the SME respondents stating that this was an **extremely important** factor and 28% who found it to be **very important**. Just under 19% of the SME respondents said that the device features (e.g., battery life, size of device, screen size) was **not at all important** or they were **neutral** in their response. The overall positive view of the importance of device features (e.g., battery life, size of device, screen size) gives credence to the data collected and presented in the framework.

Table 62: Device Features – Importance of Factor

Response classification	Number of SME respondents
Extremely important	48
Very important	50
Moderately important	22
Slightly important	10
Low importance	14
Neutral	27
Not at all important	6
Total	**177**

The table below provides a breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not offer mobile payments in their business operations. 74% of those who offered mobile payment solutions found the device features (e.g., battery life, size of device, screen size) to be **extremely important** or **very important**, compared to 49% of those who did not offer mobile payment options. For those who offered mobile payment options to customers, 88% of the SME respondents found the device features (e.g., battery life, size of device, screen size) to be of some importance, with only 11% selecting **neutral**. For the SME respondents who did not offer mobile payment solutions, only 77% found the device features to be of importance, with 18% selecting **neutral** as an option. Based on the responses below, it can be surmised that device features (e.g., battery life, size of device, screen size) were of greater importance to those who offered mobile payments as an option compared to those who did not. The large number of SME respondents who selected neutral as an option indicates that this factor is not that critical.

Table 63: Device Features – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who do NOT offer MPS
Extremely important	21	30%	27	25%
Very important	24	34%	26	24%
Moderately important	10	14%	12	11%

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who do NOT offer MPS
Slightly important	2	3%	8	7%
Low importance	4	6%	10	9%
Neutral	8	11%	19	18%
Not at all important	1	1%	5	5%
Total	**70**	**100%**	**107**	**100%**

Table 64 provides a breakdown into the two categories of SME respondents who offered mobile payment solutions to customers – those who used bank-supported mobile payment options and those who used independent private company-supported mobile payments. 62% of the SME respondents who used independent private company-supported mobile payments in their business found the device features (e.g., battery life, size of device, screen size) to be **extremely important** or **very important**, and this was the same for the SME respondents who used bank-supported mobile payment options.

For those SME respondents who used independent private company-supported mobile payments in their business operations, 86% found the device features (e.g., battery life, size of device, screen size) to be of some importance, with only 2% selecting **neutral**. For the SME respondents who used bank-supported mobile payment options, only 78% found the device features (e.g., battery life, size of device, screen size) to be of importance, with 20% selecting **neutral** as an option. Based on the responses below, it can be surmised that device features were of greater importance to those who used independent private company-supported mobile payments than those who used bank-supported mobile payment options

Table 64: Device Features – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	19	37%	12	29%
Very important	13	25%	13	32%
Moderately important	5	10%	6	15%
Slightly important	1	2%	1	2%
Low importance	2	4%	3	7%
Neutral	10	20%	5	12%
Not at all important	1	2%	1	2%
Total	**51**	**100%**	**41**	**100**

Table 65 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers – those who used QR code + App mobile payment options and those who used a mobile device + App mobile payment option. 59% of the former and 56% of the latter found the device features (e.g. battery life, size of device, screen size) to be **extremely important** or **very important**. In terms of importance, only 79% of the SME respondents who used the QR code + App mobile payment option and 90% of those who offered a mobile device + App mobile payment option found the device features to be an **important** factor. There was a statistical difference in the levels of importance of 11% between the two groupings. This can be explained by the fact that 18% of the SME respondents who selected the neutral option were among the respondents who offered QR + App mobile payment options.

Table 65: Device Features – Importance of Factor (QR vs. Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	13	33%	15	31%
Very important	10	26%	17	35%
Moderately important	5	13%	6	13%
Slightly important	1	3	2	4%
Low importance	2	5%	3	6%
Neutral	7	18%	4	8%
Not at all important	1	3%	1	2%
Total	**39**	**100%**	**48**	**100**

26. How important are the following factors regarding your business when it comes to payment technology and business operations: System features (e.g. reporting functions? blue-tooth connectivity)

The feedback from the axial and coding analysis in the first part of this data collection showed that costs are an important factor when it comes to the type of payment method. The table below gives a summative view of the SMEs' responses. 30 of the respondents, comprising 17% of the responses, selected neutral. The responses were varied in terms of feedback, with 38 respondents stating that this factor was **extremely important**, a similar number to those who stated that the factor was moderately important (34). 50 respondents found the factor to be **very important**. Compared to other factors, system features were not very important as a factor.

Table 66: System Features – Importance of Factor

Response classification	Number of SME respondents
Extremely important	38
Very important	50
Moderately important	34
Slightly important	11
Low importance	8
Neutral	30
Not at all important	6
Total	**177**

Table 67 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not. 66% of those who offered mobile payment solutions found the system features (e.g. reporting functions, blue-tooth connectivity) to be **extremely important** or **very important**, compared to 39% of those who did not offer mobile payment options to their customers. For those who offered mobile payment options, 84% of the respondents found the system features to be of some importance, with only 10% selecting **neutral**. For the SME respondents who did not offer mobile payment solutions, 76% found the system features to be of importance, with 24% selecting either **neutral** or **not at all important**. Based on the responses below, it can be surmised that system features (e.g., reporting functions, blue-tooth connectivity) were of greater importance to those who offered mobile payments as an option compared to those who did not. However, what was common between the two groupings was that there was a near identical percentage of respondents who selected the neutral option (16% and 18% respectively).

Table 67: System Features – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	18	26%	20	19%
Very important	29	41%	21	20%
Moderately important	11	16%	23	21%
Slightly important	1	1%	10	9%
Low importance	0	0%	8	7%
Neutral	11	16%	19	18%
Not at all important	0	0%	6	6%
Total	**70**	**100%**	**107**	**100%**

Table 68 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. 78% of the SME respondents who used independent private company-supported mobile payments in their business found the system features to be **extremely important** or **very important** compared to just 55% of those who used bank-supported mobile payment options.

For those SME respondents who used independent private company-supported mobile payments in their business operations, 90% found the system features to be of some importance, with 10% who were neutral. For those who used a bank-supported mobile payment option, only 73% found the system features to be of importance, with a sizeable 27% selecting **neutral** as an option. Based on the responses below, it can be surmised that system features were of significantly greater importance to those who used independent private company-supported mobile payments in their business operations compared to those who used bank-supported mobile payment options.

Table 68: System Features – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	18	35%	9	22%
Very important	10	20%	23	56%
Moderately important	8	16%	4	10%
Slightly important	1	2%	1	2%
Low importance	0	0%	0	0%
Neutral	14	27%	4	10%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 69 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Only 64% of the SME respondents who used the QR code + App mobile payment option and 73% of those who offered a mobile device + App mobile payment option found the system features (e.g., reporting functions, blue-tooth connectivity) to be **extremely important** or **very important**. In terms of importance, 79% of the SME respondents who used the former payment option and 97% of those who used the latter found the system features to be an **important** factor. The main difference between the groupings was driven by the 21% of respondents who selected the **neutral** option amongst the those who had QR + App mobile payment solutions on offer.

Table 69: System Features – Importance of Factor (QR vs. Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	13	33%	12	25%
Very important	12	31%	23	48%
Moderately important	6	15%	6	13%
Slightly important	0	0%	1	2%
Low importance	0	0%	0	0%
Neutral	8	21%	6	3%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100**

27. **How important are the following factors regarding your business when it comes to payment technology and business operations: Impact on business image?**

There was a generally positive view, with 131 of the respondents agreeing that the factor is extremely important, moderately important or very important. The feedback from the axial and coding analysis in the first part of this data collection indicated that impact on business image is a factor to consider in the context of selection of payment method. The table below gives a summative view of the SMEs' responses. There is reasonable quantitative feedback to support this, with 29% of the SME respondents stating that this was an **extremely important** factor, and 19% who found it to be **moderately important**. Just over 15% of the SME respondents said that impact on business image as a factor was **neutral**, while only 2% stated that this factor was **not at all important**.

Table 70: Impact on Business Image – Importance of Factor

Response classification	Number of SME respondents
Extremely important	51
Very important	47
Moderately important	33
Slightly important	4
Low importance	11
Neutral	27
Not at all important	4
Total	**177**

Table 71 below provides a detailed breakdown into the two categories of SME respondents – those who offered mobile payment options to customers and those who did not. Just over 63% of those who offered mobile payment solutions found the impact on business image factor to be **extremely important** or **very important**, compared to 50% of those who did not offer mobile payment options. Of those who offered mobile payment options to customers, 90% found the impact on business image to be of some importance, with only 10% selecting neutral. For the SME respondents who did not offer mobile payment solutions, 77% found the impact on business image to be of importance, with only 19% selecting **neutral** and 4% stating that this factor was **not at all important**. Based on the responses below, it can be surmised that impact on business image was of greater importance to those that offered mobile payments as an option than those who did not.

Table 71: Impact on Business Image – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	25	36%	26	24%
Very important	19	27%	28	26%
Moderately important	17	24%	16	15%
Slightly important	1	1%	3	3%
Low importance	1	1%	10	9%
Neutral	7	10%	20	19%
Not at all important	0	0%	4	4%
Total	**70**	**100%**	**107**	**100%**

Table 72 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions – those who used bank-supported mobile payment options and those who used independent private company-supported mobile payments in their business operations. Only 63% of the latter respondents supported mobile found the impact on business image factor to be **extremely important** or **very important**, compared to 56% of those who used bank-supported mobile payment options.

Of those respondents who used independent private company-supported mobile payments in their business operations, 93% found the impact on the business image to be of some importance, with only 7% selecting the neutral option. For the SME respondents who used bank-supported mobile payment options, 90% found the impact on business image to be of importance, with only 10% selecting **neutral** as an option. Based on the responses below, it can be surmised that impact on business image was of equal importance to the two groupings.

Table 72: Impact on Business Image – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	16	31%	14	34%
Very important	13	25%	12	29%
Moderately important	14	27%	12	29%
Slightly important	2	4%	0	0%
Low importance	1	2%	0	0%
Neutral	5	10%	3	7%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 73 provides a detailed breakdown of the two categories of SME respondents who offered mobile payment solutions to customers. Only 59% of the respondents who used the QR code + App mobile payment option and 66% of the SME respondents who offered a mobile device + App mobile payment option found the factor of impact on business image factor to be **extremely important** or **very important**. In terms of importance, just over 87% of the former respondents and 94% of the latter found the impact on business image to be an **important** factor.

What was common across both types of SME respondents was that the impact on business image was agreed to be an important factor, and there were no respondents who selected **not at all important** as an option. The SMEs that selected neutral as an option represented 13% and 6% of the respondents who the used QR code + App mobile payment option and mobile device + App mobile payment option respectively.

Table 73: Impact on business image – Importance of Factor (QR vs Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	14	36%	17	35%
Very important	9	23%	15	31%
Moderately important	9	23%	13	27%
Slightly important	1	3%	0	0%
Low importance	1	3%	0	0%
Neutral	5	13%	3	6%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100**

28. **How important are the following factors regarding your business when it comes to payment technology and business operations: Convenience (for you and the customer)?**

This factor had the largest number of positive responses, with 147 SME respondents stating that the convenience factor (for both the customer and the merchant) was extremely important, very important or moderately important. This represented 83% of the respondents' views. Only eight respondents had a neutral view on this, with one individual stating that convenience was not important at all. The feedback from the axial and coding analysis in the first part of this data collection indicated that costs are an important factor when it comes to the type of payment method. In his discussion of the value of payments, Allums (2014) states that convenience is one of the three key pillars on which any payment method should be based. The table below gives a summative view of the SMEs' responses. The overall positive view of the importance of convenience as a factor gives credence to the data collected and presented in the framework.

Table 74: Convenience – Importance of Factor

Response classification	Number of SME respondents
Extremely important	84
Very important	58
Moderately important	15
Slightly important	3
Low importance	3
Neutral	8
Not at all important	6
Total	**177**

Table 75 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not. Just over 82% of those who offered mobile payment solutions found the convenience factor to be **extremely important** or **very important**, compared to a slightly lower 78% of the respondents who did not offer mobile payment options. For those who offered mobile payment options, 99% of the respondents found the convenience factor to be of high importance, with only 1% selecting neutral. Of the respondents who did not offer mobile payment solutions to customers, 92% found convenience to be of importance, with only 8% selecting either **neutral** or **not at all important** as an option.

Table 75: Convenience – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	41	59%	48	45%
Very important	23	33%	35	33%
Moderately important	5	7%	10	9%
Slightly important	0	0%	3	3%
Low importance	0	0%	3	3%
Neutral	1	1%	7	7%
Not at all important	0	0%	1	1%

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Total	**70**	**100%**	**107**	**100%**

Table 76 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions. Of the SME respondents who used independent private company-supported mobile payments in their business, 92% found the convenience factor to be **extremely important** or **very important** –the same as the 92% of respondents who used bank-supported mobile payment options.

Of those respondents who used independent private company-supported mobile payments in their business operations, 98% found the convenience factor to be of high importance, with only 2% selecting **neutral**. All the respondents who used a bank-supported mobile payment option found the convenience factor to be of high importance. It therefore can be surmised that convenience is a critical factor in the selection of payment method.

Table 76: Convenience – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	31	61%	26	63%
Very important	16	31%	12	29%
Moderately important	4	8%	2	5%
Slightly important	0	0%	0	0%
Low importance	0	0%	0	0%
Neutral	0	0%	1	2%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 77 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Just over 90% of the SME respondents who used the QR code + App mobile payment option and a similarly high number of 95% of the SME respondents who offered a mobile device + App mobile payment option found the convenience factor to be **extremely important** or **very important**. In terms of importance, 100% of the SME respondents who used the QR code + App mobile payment option and 98% of those who offered a mobile device + App mobile payment option found the convenience factor to be **important**. There was a marginally small difference in the levels of importance of less than 2% between the two groupings. What was common across both types of SME respondents was that convenience was agreed to be an important factor, as there were no respondents who selected **not at all important**, **slightly important** or **low importance** an option.

Table 77: Convenience – Importance of Factor (QR vs. Device)

Response classification		QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important		24	62%	29	60%
Very important		11	28%	17	35%
Moderately important		4	10%	1	2%
Slightly important		0	0%	0	0%
Low importance		0	0%	0	0%
Neutral		0	0%	1	2%
Not at all important		0	0%	0	0%
Total		**39**	**100%**	**48**	**100**

29. **How important are the following factors regarding your business when it comes to payment technology and business operations: Integration of the system with existing systems?**

Numerically, this factor had one of the large responses of **neutral** (33), which represents nearly 19% of the responses. Ten percent of the respondents stated that integration was of **low importance** or **not at all important**. Only 51% stated that integration was **extremely important** or **very important**. The feedback from the axial and coding analysis in the first part of this data collection indicated that integration of the system with existing systems plays a role when it comes to the type of payment method. Table 78 gives a summative view of the SMEs' responses.

Table 78: Integration of the System with Existing Systems – Importance of Factor

Response classification	Number of SME respondents
Extremely important	42
Very important	49
Moderately important	26
Slightly important	9
Low importance	12
Neutral	33
Not at all important	6
Total	**177**

Table 79 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers compared SME and those who did not offer mobile payments. Only 57% of those who offered mobile payment solutions found the integration of the system with existing systems factor to be **extremely important** or **very important**, compared to 47% of the SME respondents who did not offer mobile payment options. Of those who offered mobile payment options to customers, 81% of the SME respondents found the integration of the system with existing systems to be of some importance, with only 19% selecting **neutral**. Of the SME respondents who did not offer mobile payment solutions to customers, 75% found the integration of the system with existing systems to be of importance, with 25% selecting either **neutral** or **not at all**

important as an option. Based on the responses below, it can be surmised that integration of the system with existing systems is not as critical a factor compared to the other factors in this study, given the lower importance as per the data.

Table 79: Integration of the system with existing systems – Importance of Factor

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	16	23%	26	24%
Very important	24	34%	25	23%
Moderately important	9	13%	17	16%
Slightly important	6	9%	3	3%
Low importance	2	3%	10	9%
Neutral	13	19%	20	19%
Not at all important	0	0%	6	6%
Total	**70**	**100%**	**107**	**100%**

Table 80 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Only 54% of the SME respondents who used independent private company-supported mobile payments found the integration of the system with existing systems to be **extremely important** or **very important**, similar to the 54% for the SME respondents who used bank-supported mobile payment options.

For those SME respondents who used independent private company-supported mobile payments in their business operations, only 76% found the integration of the system with existing systems to be of some importance, with a sizeable 24% selecting neutral. For the respondents who a used bank-supported mobile payment option, 84% found the integration of the system with existing systems to be of importance, with only 14% selecting **neutral** as an option. This factor was not as strong as the others in terms of obtaining positive responses.

Table 80: Integration of the System with Existing Systems – Importance of Factor

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	13	25%	9	22%
Very important	15	29%	13	32%
Moderately important	10	20%	4	10%
Slightly important	3	6%	5	12%
Low importance	2	4%	0	0%
Neutral	8	16%	10	24%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 81 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Only 57% of the SME respondents who used the QR code + App mobile payment option and 62% of the SME respondents who offered a mobile device + App mobile payment option found the integration of the system with existing systems to be **extremely important** or **very important**. In terms of importance, only 77% of the former respondents and 85% of the latter found the integration of the system with existing systems to be an **important** factor.

What was common across both types of SME respondents was that the integration of the system with existing systems was that no respondents selected not at all important as an option. The SMEs that selected neutral as an option represented 23% and 15% of the QR code + App mobile payment option and the mobile device + App mobile payment option respectively.

Table 81: Integration of the System with Existing Systems – Importance of Factor

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	10	26%	13	27%
Very important	12	31%	17	35%
Moderately important	5	13%	6	13%
Slightly important	2	5%	4	8%
Low importance	1	3%	1	2%
Neutral	9	23%	7	15%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100**

30. **How important are the following factors regarding your business when it comes to payment technology and business operations: Impact of payment system on business operations?**

The factor, **impact of payment systems on business operations**, received mixed responses, even though it was generally deemed important. As per the literature review, compatibility was a major barrier to merchant adoption of mobile payments in most environments. However, the results of this study show that 7% of the respondents felt that it was **not at all important** or of **low importance**. Nearly 11% of the respondents were **neutral** in this regard, while 30% of the respondents felt that it was **extremely important** when considering a mobile payment solution. This number increased to 65% when including those who felt that it was **very important**, as shown in Figure 34 below.

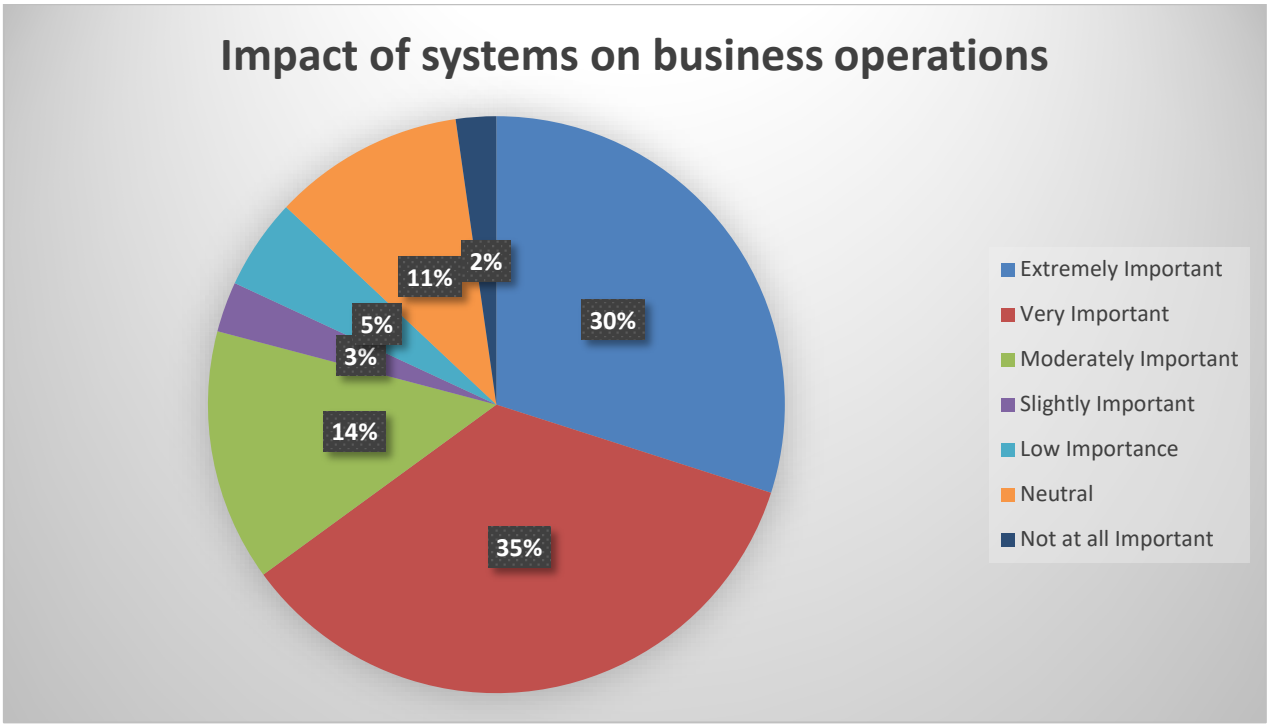


Figure 34: Impact of systems on business operations – Importance of factor

Table 82 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not. Just over 72% of those who offered mobile payment solutions found the impact of the payment system on business operations to be **extremely important** or **very important**, compared to 61% of the SME respondents who did not offer mobile payment options to customers. Of those who offered mobile payment options, 90% found the impact of the payment system factor on business operations to be of some importance, with only 10% selecting neutral. Of the SME respondents who did not offer mobile payment solutions, 85% found the impact of the payment system on business operations to be of importance, with only 15 % selecting either **neutral** or **not at all important**. Based on the responses below, it can be surmised that the impact of the payment system on business operations was of greater importance to those who offered mobile payments compared to those who did not.

Table 82: Impact of Payment System on Business Operations – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	23	33%	30	28%
Very important	27	39%	35	33%
Moderately important	10	14%	15	14%
Slightly important	1	1%	4	4%
Low importance	2	3%	7	7%
Neutral	7	10%	12	11%
Not at all important	0	0%	4	4%
Total	**70**	**100%**	**107**	**100%**

Table 83 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Just over 72% of the SME respondents who used independent private company-supported mobile payments in their business found the impact of payment system on business operations to be **extremely important** or **very important**, compared to 70% of the respondents who used bank-supported mobile payment options.

Of those respondents who used independent private company-supported mobile payments in their business operations, 90% found the **impact of payment system on business operations** to be of some importance, with only 10% selecting neutral. Of the respondents who used a bank-supported mobile payment option, 90% found the impact of payment system on business operations to be of importance, with only 10% selecting **neutral**. This factor was of equal importance to those respondents who offered mobile payment solutions.

Table 83: Impact of Payment System on Business Operations – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	18	35%	13	32%
Very important	18	35%	16	39%
Moderately important	9	18%	6	15%
Slightly important	1	2%	0	0%
Low importance	0	0%	2	5%
Neutral	5	10%	4	10%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 84 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. 67% of the SME who used a QR code + App mobile payment option and 79% of the respondents who offered a mobile device + App mobile payment option found the impact of payment system on business operations to be **extremely important** or **very important**. In terms of importance, 90% of the respondents who used the former option and 90% of those who offered the latter payment option found the impact of payment system on business operations to be an **important** factor.

What was common across both types of SME respondents was that they agreed that the **impact of payment system on business operations** was an important factor, and no respondents selected not at all important as an option. The SMEs that selected neutral as an option represented 10% of each of the groups of respondents, respectively.

Table 84: Impact of Payment System on Business Operations – Importance of Factor (QR vs. Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	12	31%	20	42%
Very important	14	36%	17	35%
Moderately important	7	18%	5	10%
Slightly important	1	3%	0	0%
Low importance	1	3%	1	2%
Neutral	4	10%	5	10%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100**

31. **How important are the following factors regarding your business when it comes to payment technology and business operations: Customer service (impact of the system on customer service)?**

Customer service had a large positive response, with 46% of the respondents deeming this factor to be **extremely important** in the selection of mobile payments. This number rises to 81% when including those who deemed this factor **very important**. Only one respondent deemed this factor to be **not at all important**. and only 10 were **neutral** in their responses. Nearly 93% of the respondents deemed customer service to have a high level of importance when selecting mobile payments. The feedback from the axial and coding analysis in the first part of this data collection indicated that customer service is a factor to consider when it comes to the type of payment method. The overall positive view of the importance of customer service (impact of the system on customer service) gives credence to the data collected and presented in the conceptual framework and detailed in the table below.

Table 85: Customer Service – Importance of Factor

Response classification	Mobile payment offered
Extremely important	76
Very important	68
Moderately important	16
Slightly important	3
Low importance	3
Neutral	10
Not at all important	1
Total	**177**

Table 86 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers compared to the respondents who did not. A total of 89% of those who offered mobile payment solutions found customer service (impact of the system on customer service) to be **extremely important** or **very important**, compared to 76% of the SME respondents who did not offer mobile payment options. Of those who offered mobile payment options, 100% of the respondents found customer service to be of importance. Of the SME respondents who did not offer mobile payment solutions to customers, 90% found customer service to be of importance, with only 10% selecting either **neutral** or **not at all important** as an option. Based on the responses below, it can be surmised that customer service was of great importance to both groupings of SME respondents.

Table 86: Customer Service – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	37	53%	39	36%
Very important	25	36%	43	40%
Moderately important	7	10%	9	8%
Slightly important	0	0%	3	3%
Low importance	1	1%	2	2%
Neutral	0	0%	10	9%
Not at all important	0	0%	1	1%
Total	**70**	**100%**	**107**	**100%**

Table 87 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Just over 83% of the respondents who used independent private company-supported mobile payments in their business found the **customer service** (impact of the system on customer service) factor to be **extremely important** or **very important**, compared to 98% of the respondents who used bank-supported mobile payment options.

100% of both groups of found customer service to be of importance. Based on the responses below, it can be surmised that customer service (impact of the system on customer service) was of significant importance to both SME groupings.

Table 87: Customer Service – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	31	61%	23	56%
Very important	19	37%	11	27%
Moderately important	1	2%	6	15%
Slightly important	0	0%	1	2%
Low importance	0	0%	0	0%
Neutral	0	0%	0	0%
Not at all important	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

Table 88 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. A total of 87% of the SME respondents who used the QR code + App mobile payment option and 91% of the SME respondents who offered a mobile device + App mobile payment option found customer service (impact of the system on customer service) to be **extremely important** or **very important**, with all respondents finding this factor to **important**. No respondents selected not at all important as an option or the neutral option.

Table 88: Customer Service – Importance of Factor (QR vs Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	21	54%	29	60%
Very important	13	33%	15	31%
Moderately important	4	10%	4	8%
Slightly important	0	0%	0	0%
Low importance	1	3%	0	0%
Neutral	0	0%	0	0%
Not at all important	0	0%	0	0%
Total	**39**	**100%**	**48**	**100**

32. How important are the following factors regarding your business when it comes to payment technology and business operations: Alignment with business strategy (does the use of mobile payments align with your business strategy?)

30% of the respondents indicated that the factor, alignment with business strategy, was **very important** when it comes to the selection of a mobile payment system. This percentage rises to 53% when including those who stated that it was **extremely important**. 34 of the respondents were neutral regarding this option, and 9% felt it was either of **low importance** or **not at all important**. Nearly 78% of the respondents felt that the factor was of some level of importance, ranging from low importance to extremely important. Figure 35 below gives a summative view of the SMEs' responses.

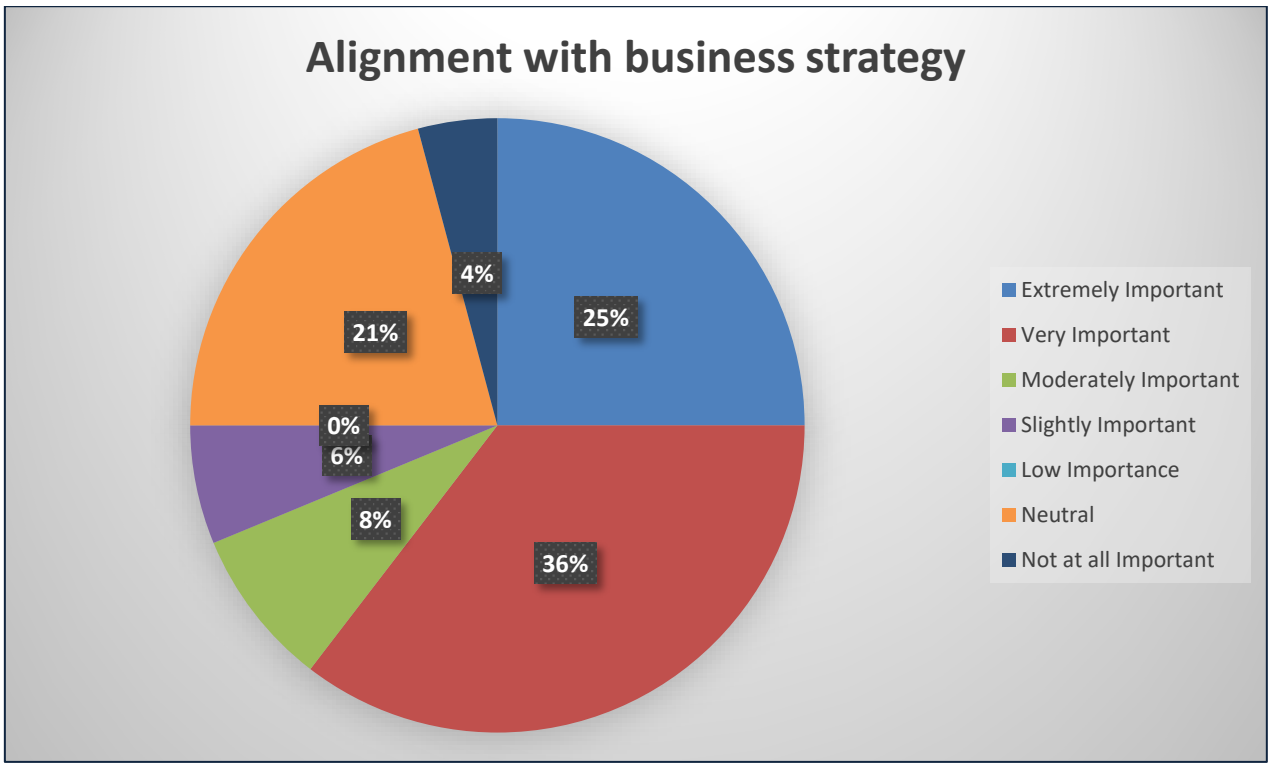


Figure 35: Alignment with Business Strategy – Importance of Factor

Table 89 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not. Only 54% of those who offered mobile payment solutions said alignment with business strategy was **extremely important** or **very important**. compared to 52% of the respondents who did not offer mobile payment options to customers. Of those who offered mobile payment options, only 73% of the respondents found alignment with business strategy to be of some importance, with a sizeable 23% selecting **neutral**. Of the SME respondents who did not offer mobile payment solutions, 80% found the alignment with business strategy to be of importance, with 20% selecting either **neutral** or **not at all important** as an option. Based on the responses below, it can be surmised that alignment with business strategy was not a very significant factor.

Table 89: Alignment with Business Strategy – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	19	27%	20	19%
Very important	19	27%	35	33%
Moderately important	8	11%	14	13%
Slightly important	4	6%	7	7%
Low importance	1	1%	10	9%
Neutral	16	23%	18	17%
Not at all important	3	4%	3	3%
Total	**70**	**100%**	**107**	**100%**

Table 90 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Only 58% of the SME respondents who used independent private company-supported mobile payments in their business found the alignment with business strategy factor to be **extremely important** or **very important**, compared to 50% of the respondents who used bank-supported mobile payment options.

Only 78% of the SME respondents who used independent private company-supported mobile payments in their business operations found the alignment with business strategy to be of some importance, with 17% selecting **neutral**. Of the SME respondents who used bank-supported mobile payment options, 71% found the alignment with business strategy factor to be of importance, with 27% who selected **neutral**. Based on the responses below, it can be surmised that alignment with business strategy was not as significant a factor in the selection of payment method.

Table 90: Alignment with Business Strategy – Importance of Factor (Bank vs. Private)

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Extremely important	13	25%	12	29%
Very important	13	25%	12	29%
Moderately important	5	10%	4	10%
Slightly important	4	8%	4	10%
Low importance	1	2%	0	0%
Neutral	14	27%	7	17%
Not at all important	1	2%	2	5%
Total	**51**	**100%**	**41**	**100**

Table 91 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Only 54% of the SME respondents who used the QR code + App mobile payment option and 60% of the SME respondents who offered a mobile device + App mobile payment option regarded alignment with business strategy as **extremely important** or **very important**. In terms of importance, only 74% of the former respondents found alignment with business strategy to be an **important** factor. What was common across both types of SME respondents was the high percentage of respondents who selected neutral and were undecided.

Table 91: Alignment with Business Strategy – Importance of Factor (QR vs. Device)

Response classification	QR + App mobile payment offered	% of respondents who offered MPS	Device + App mobile payment offered	% of total respondents
Extremely important	13	33%	12	25%
Very important	8	21%	17	35%
Moderately important	5	13%	4	8%
Slightly important	2	5%	3	6%
Low importance	1	3%	0	0%
Neutral	9	23%	10	21%
Not at all important	1	3%	2	4%
Total	**39**	**100%**	**48**	**100**

33. How important are the following factors regarding your business when it comes to payment technology and business operations: Trust?

A total of 36% of the respondents indicated that trust was **very important** when it comes to the selection of mobile payments. This percentage increases to 77% when including those who stated that it was **extremely important**. Only 10 of the respondents were neutral regarding this option, and there was 6.7% who either felt it was of **low importance** or **not at all important**. Nearly 93% of the respondents felt that trust regarding the use of mobile payment technology was of some level of importance, ranging from low importance to extremely important. Figure 36 gives a summative view of the SMEs' responses.

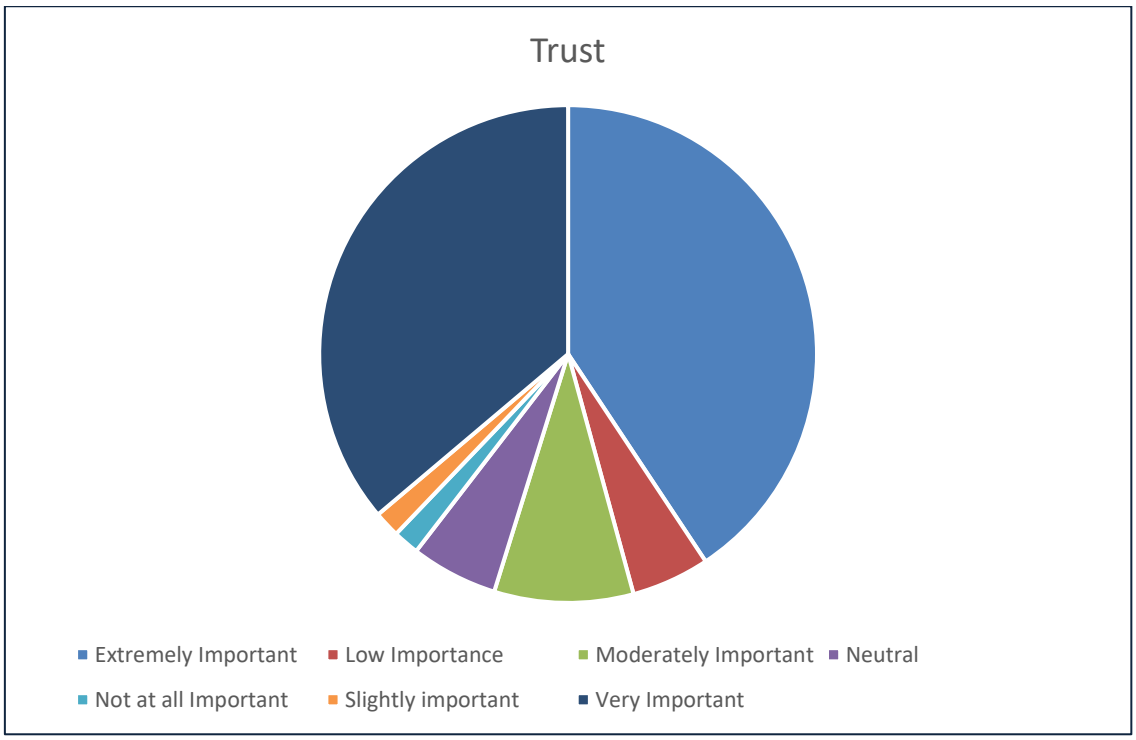


Figure 36: Trust – Importance of Factor

Table 92 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not use mobile payments in their business operations. Of those who offered mobile payment solutions, 78% said that trust factor was **extremely important** or **very important**. compared to 45% of the SME respondents who did not offer mobile payment options to customers. Of those who offered mobile payment options, 97% found the trust factor to be of some importance, with only 3% selecting **neutral**. Of the SME respondents who did not offer mobile payment solutions to customers, only 61% found the trust factor to be of importance, with 39% selecting either **neutral** or **not at all important** as an option. Based on the responses below, it can be surmised that trust was a significant factor for those who were already using mobile payments in their business.

Table 92: Trust – Importance of Factor (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Extremely important	29	41%	43	40%
Very important	26	37%	5	5%
Moderately important	9	13%	7	7%
Slightly important	0	0%	8	6%
Low importance	4	6%	3	3%
Neutral	2	3%	3	3%
Not at all important	0	0%	38	36%
Total	**70**	**100%**	**107**	**100%**

34. **System reliability: I can count on the system to be 'up' and available when I need it**

The figure below details views of system reliability. A total of 32% of the respondents stated that they **always** count on the system to be up and available, while 42% of the responses indicated that they can count on the system to be 'up' and available **often**. The 2% and 3% who indicated that they **Never** and **Rarely** counted on the system also indicated that they regularly experienced power outages (64%).

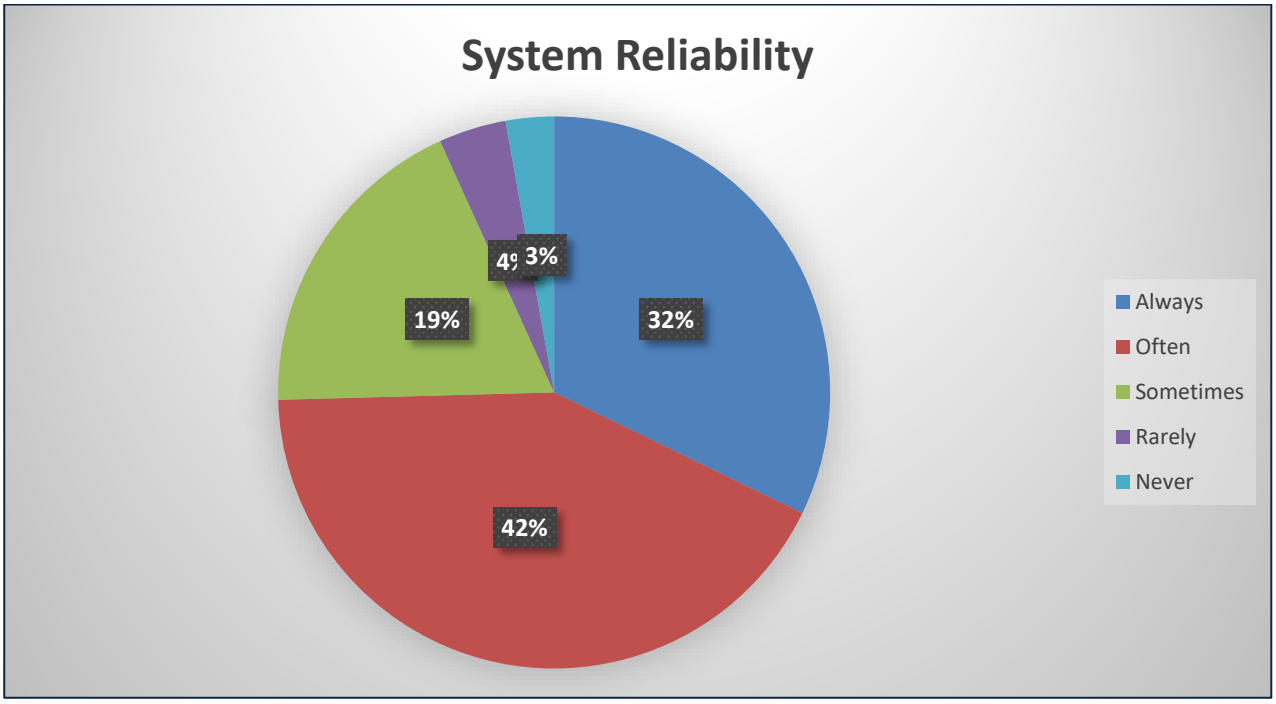


Figure 37: System Reliability

Table 93 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and SME respondents who did not offer mobile payments in their business operations. Of those who offered mobile payment solutions, 84% found the system to be reliable **always** or **often**, compared to 68% of those who did not offer mobile payment options to customers. Of those who offered mobile payment options, 99% of the respondents found the system not to be an issue, with only one SME respondent selecting rarely as an option. For the SME respondents who did not offer mobile payment solutions, 89% found the system not to be an issue in terms of reliability, with 11% of the SME respondents selecting that the system was rarely or never reliable as options.

Table 93: System Reliability – MPS vs. No MPS Offered

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Always	24	34%	33	31%
Often	35	50%	40	37%
Sometimes	10	14%	23	21%
Rarely	1	1%	6	6%
Never	0	0%	5	5%
Total	**70**	**100%**	**107**	**100%**

Table 94 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment solutions to customers. Of the SME respondents who used independent private company-supported mobile payments in their business, 88% found the systems to be **always** or **often** reliable. This is in comparison to 84% of the respondents who used bank-supported mobile payment options. Across both groupings, 99% responded that the systems in use were always, often or sometimes reliable, with only one respondent stating that the system was rarely reliable.

Table 94: System Reliability – Bank vs. Private

Response classification	Bank-supported mobile payment offered	% of respondents who offered MPS	Private independent mobile payment offered	% of total respondents
Always	14	27%	18	44%
Often	29	57%	18	44%
Sometimes	8	16%	4	10%
Rarely	0	0%	1	2%
Never	0	0%	0	0%
Total	**51**	**100%**	**41**	**100**

35. **System reliability: The payment systems that I use are subject to unexpected or inconvenient downtimes, which make it harder to work.**

The findings as per the table below indicate that systems are reliable, with more than 59% of the respondents stating that this was the case, and that there was little to no downtime impact on their businesses. Table 95 provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not offer mobile payments. No SME respondents who offered mobile payments options to customers said that they always had unexpected or inconvenient downtimes in their systems. This was in contrast with the SME respondents who did not offer mobile payments, where 5% stated that they always had unexpected or inconvenient downtimes in their systems. Of the respondents who offered mobile payments, 85% believed they experienced unscheduled downtimes most of the time, with only 15% stating that they **never** experienced downtime. Among the SMEs that did not offer mobile payments to their customers, 75% were of the opinion that they experienced unscheduled downtimes most of the time, with only 20% stating that they **never** experience downtime.

Table 95: System Reliability – Impact of Downtime (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Always	0	0%	5	5%
Often	12	17%	12	11%
Sometimes	26	37%	28	26%
Rarely	22	31%	41	38%
Never	10	15%	21	20%
Total	**70**	**100%**	**107**	**100%**

36. Ease of use: The payment system I use is convenient and easy to use.

38% of the SME respondents **strongly agreed** that their systems were convenient and easy to use and 52% of the respondents **agreed** with this statement as shown in the figure below.

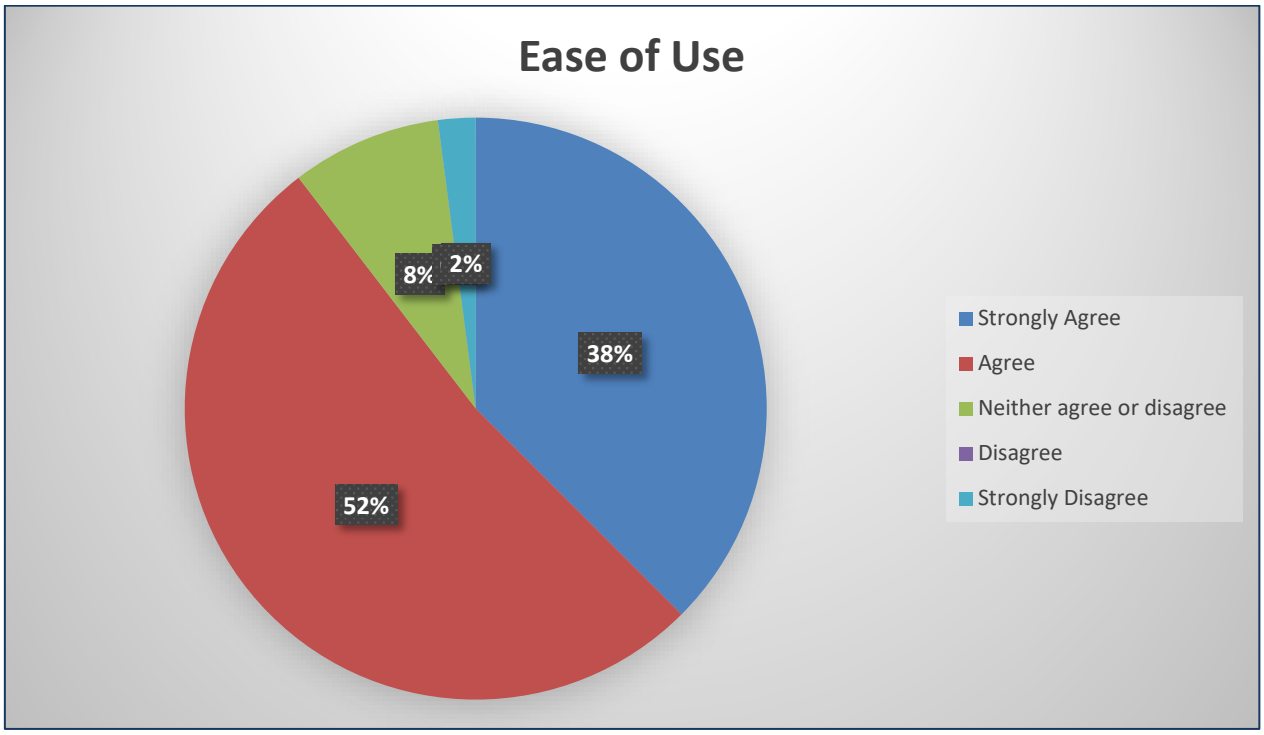


Figure 38: Ease of use – Convenience

Table 96 below provides a detailed breakdown into the two categories of SME respondents who offered mobile payment options to customers and those who did not. Only 1% of the SME respondents who offered mobile payments to customers stated that they strongly disagreed that their systems were convenient and easy to use. This was in contrast with the 90% of respondents who agreed and strongly agreed that their mobile payment options were convenient and easy to us. This data was complemented by the SME respondents who did not offer mobile payment option, with 87% of them agreeing and strongly agreeing that their mobile payment options were convenient and easy to use. This was in contrast with the 3% of respondents who disagreed or strongly disagreed with the notion that their mobile payment solutions were convenient and easy to use.

Table 96: Ease of Use – Convenience (MPS vs. No MPS Offered)

Response classification	Mobile payment offered	% of respondents who offered MPS	Mobile payment NOT offered	% of respondents who did NOT offer MPS
Strongly agree	27	39%	26	24%
Agree	36	51%	67	63%
Neither agree nor disagree	6	9%	11	10%
Disagree	0	0%	2	2%
Strongly disagree	1	1%	1	1%
Total	**70**	**100%**	**107**	**100%**

37. I would use IT for my business if?

The objective of this question was to understand the primary driver of the use of information technology by small businesses. The SME respondents were able to select multiple options in the responses to this question. The table below shows the reasons that were selected. The ability to sell to more people and the ability to ensure that payment turnaround was quicker were the options selected the most. The least-selected reason was the ability to be mobile. This is not surprising, as the top reasons selected as per the data has shown that the payment process is a crucial aspect of the business. Ability to sell to more people inherently would lead to more sales, hence more revenue, and hence it is no surprise that this was a key reason for the use of technology. This speaks to offering customers convenience, which has been highlighted as a key factor in the selection of payment methods in this study.

Table 97: I Would Use IT for my Business if …

Response classification	No. of responses
It was mobile	68
I could sell to more people	85
It ensured that my payment turnaround was quicker	83
I could sell in more than one location	75

Table 98 below provides a breakdown of the responses focusing on SME respondents who only selected one option. Thirty-four SME respondents selected **It ensured that my payment turnaround was quicker**, while the option that had the fewest responses was **It was mobile**, with 21 responses. A diverse set of responses and multiple reasons were selected by the SME respondents. **I could sell in more than one location** received 15% of the responses. As part of the multiplicity of options, nearly 42% of the respondents stated that **I could sell in more than one location** as a reason for using IT in their business.

Surprisingly, only 12% of the respondents selected **It was mobile** as a singular reason, while 38% of the respondents included this as a reason when considering multiple selections. **It ensured that my payment turnaround was quicker** was selected by nearly 20% as a singular option. This was the largest singular reason for using IT for business. As part of the multiple selection, this option was selected by 47% of the respondents.

Table 98: I Would Use IT for my Business if … – Single Responses.

Response classification	No. of responses
It was mobile	21
I could sell to more people	27
It ensured that my payment turnaround was quicker	34
I could sell in more than one location	27

5.3 CONCLUSION

The objective of the second cycle of the DSR process was to test the constructs in the framework from cycle 1. Table 99 shows the constructs tested in cycle 2 of the DSR process using a survey among SMEs across South Africa. This is then used to update the framework with the refined constructs. This chapter has detailed the responses to each question, showing various linkages between questions as well as detailed views from SMEs with MPS and SMEs with no MPS.

When considering the classification of **extremely important** and **very important** as a benchmark, the **convenience** factor has the highest ranking, with 92% of SME respondents finding this factor crucial in the selection of mobile payment options. It is the only factor from both datasets on which the SME respondents who offered MPS and those who did not offer MPS had more than 90% agreement.

This was followed by **customer service** (89%) as a crucial factor. Among the SMEs that did not offer MPS options to customers, there was no factor that had more than 80% agreement by the respondents. When considering the classification of **extremely important**, **very important**, **moderately** and **slightly important** as benchmarks, the **convenience** factor had the highest ranking, with 99% of SME respondents who offered mobile payment options finding this factor crucial in their selection of mobile payment option. This is tied to the **customer service** factor, with 99% of respondents who offered mobile payments finding this a crucial factor. They are followed by **risk** and **ease of use** with 97% and 96% respectively. Looking at Table 99, the SME respondents who did not offer mobile payment options did not have a single factor with more than 90% importance. **Convenience** was the highest ranked factor, with 89%, followed by customer service. The top factors among the respondents who did not offer mobile payments mirrored those of the respondents who offered mobile payments, with **risk** and **ease of use** being third and fourth, respectively.

Table 99: Summary of Cycle 2 Results

Response classification	Offers MPS	Does not offer MPS	Offers MPS	Does not offer MPS	Order
	Extremely important + Very important	Extremely important + Very important	Extremely important to Slightly important	Extremely important to Slightly important	
Cost of fees	67%	57.9%	84%	82%	5
Ease of use	86%	73%	96%	84%	4
Risk (cash handling, fraud, etc.)	87%	75%	97%	84%	3
Device features (e.g., battery life)	64%	49%	82%	68%	9
System features (e.g., reports)	67%	39%	84%	69%	8
Impact on business image	63%	50%	89%	68%	7
Convenience	92%	78%	99%	89%	1
Integration of the system	57%	47%	78%	66%	10
Impact of payment system on internal systems	72%	61%	87%	79%	6
Customer service	89%	76%	99%	88%	2
Alignment with business strategy	54%	52%	72%	71%	11
Trust	78%	45%	91%	58%	

Figure 39 below is an updated MMPCF after the second cycle, indicating the factors that resonated the most from the findings of Cycle 2. The updated MMPCF undergoes another cycle, as discussed in the next chapter.

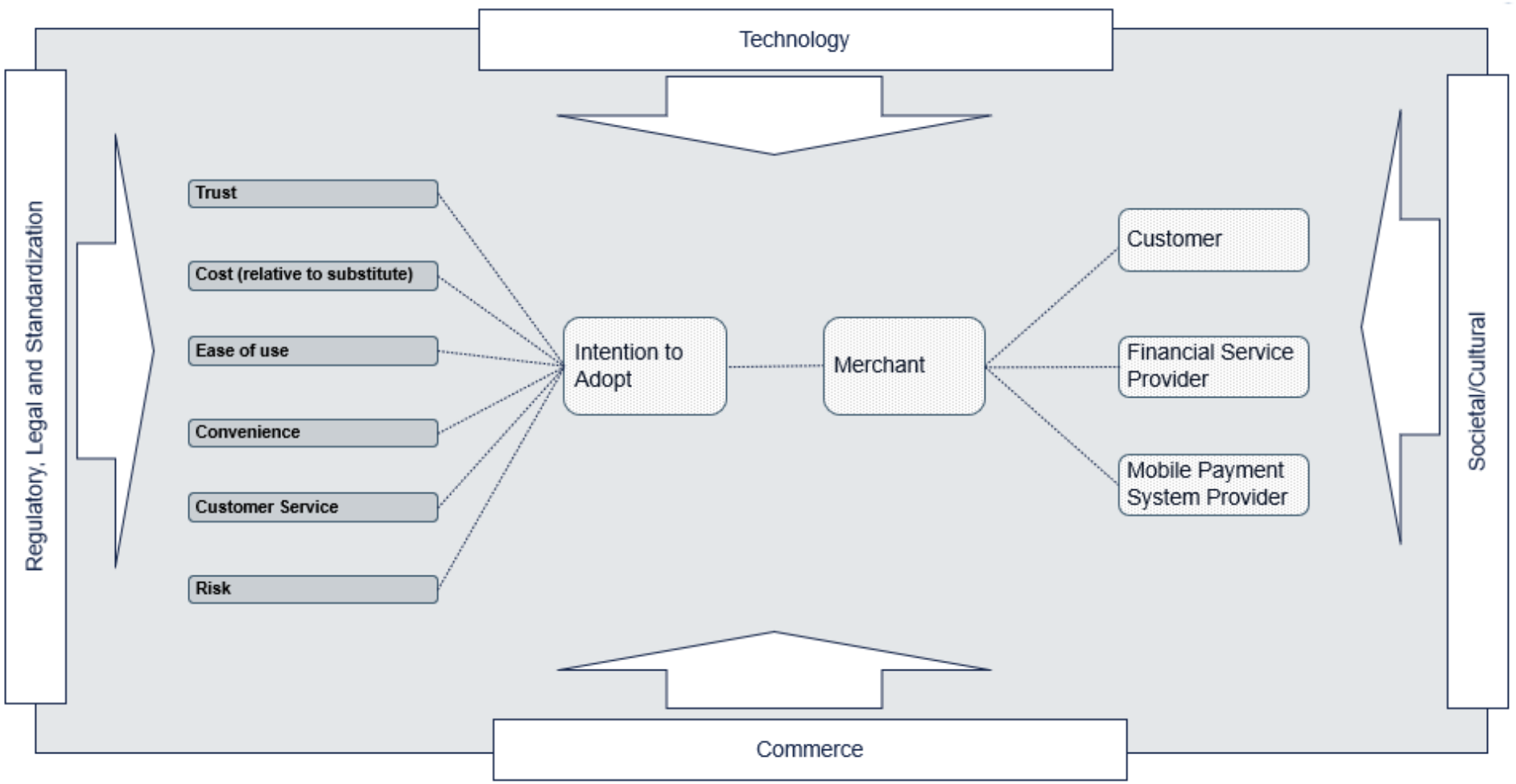


Figure 39: Merchant Mobile Payment Conceptual Framework (MMPCF) - Cycle 2

6 CHAPTER 6: CYCLE 3: FOCUS GROUPS

The aim of this chapter is to verify and validate the outcomes of the previous chapter's updates to the framework. This chapter is a culmination of the previous cycles, which were detailed in Chapter 4 and Chapter 5. This chapter starts out by detailing the outcomes of the 3rd cycle that was carried out. The 3rd cycle involved testing out the updated framework through a focus group of SME owners. All the SMEs that participated in the focus groups had already taken part in one or both of the previous cycles. Unfortunately, due to Covid-19, the lockdown and some SMEs going out of business, the researcher could not involve all participants who had participated in the interviews in Cycle 1. The chapter starts by discussing the participants and their backgrounds, after which the results of the focus groups are discussed in detail. All findings are related to the literature and previous results obtained in the earlier cycles (1 and 2).

This chapter addressees some of the research questions set out at the beginning of Chapter 1, the main question being:

1. What would the constructs of a framework for mobile payment adoption by SMEs in South Africa be?

The following sub-questions were posed to give further value to the framework. These will help answer the questions raised as further future research questions by Dahlberg et al. (2007, 2015) on mobile payments in South Africa.

2. What is the current ICT profile of the merchant? The typical characteristics of the adoption merchant? (This looked at the merchant, their setup, their environment)
3. Why do merchants adopt mobile payments?

6.1 FOCUS GROUPS

6.1.1 Participants

Participants were invited to attend focus group discussions as a follow-up to the interviews and survey questions asked earlier in the research process. Two focus groups were eventually conducted, with the first focus group having six participants and the second one having three participants. Despite this, the data from the two focus groups was sufficient to proceed. The participants who attended provided rich data, which is discussed below. The participants comprised of people who had mobile payment systems in their business, those

who did not and those who were considering. This enabled a diverse set of opinions and views in the focus group. Both workshops were conducted at the end of the day on Fridays via Zoom calls. Due to lockdown and Covid-19 in South Africa, it was not possible to arrange face-to-face or in-group sessions.

Nyumba et al. (2018) note that, in terms of duration, it is recommended that focus groups are no longer than one to two hours, depending on the size of the group, due to fatigue setting in. The focus groups in this research lasted no longer than 90 minutes, with the first one lasting just over 70 minutes and the second one 45 minutes. The questions for the focus groups were based on the constructs of the second cycle. However, the initial questions asked to set the mood and environment were exploratory questions about the participants, what they did and how they found the role of operating a business.

6.1.2 Participant Overview

Each participant was given an alphabetical reference to represent them, and the researcher referred to them by their letters instead of their names to ensure anonymity. These participants were not the same as the initial participants in Cycle 1.

The table below gives an overview of the participants who took part in the focus groups.

Table 100: Focus Group Participants

Participant	Description
B	Founder and creator of a comic book brand
D	Employee at a small designer store
F	Buys and sells expensive apparel
K	Baker
L	Owner of a small financial services business
N	Owner of a small pharmaceutical business
S	Owner of a corporate wellness and health business
T	Nail beautician

Participant	Description
W	Food establishment and restaurant owner

Once all participants had joined the Zoom call, the researcher welcomed them and explained how the proceedings would work. Participation in the focus group was voluntary, and the participants gave their consent to participate as well as to have the conversations recorded for the purposes of transcription. It was explained to the participants that the researcher would refer to them using their assigned letters and that it would be in the best interest of all in the focus group to take part and try to participate and enjoy the experience.

6.2 FOCUS GROUP ANALYSIS

The following sections detail the questions asked in the focus groups. The focus group was conducted in a semi-structured manner to allow the exploration of ideas and to give the participants a voice. The aim of the groups was to verify and validate the framework. The semi-structured questions asked in the groups were used to explore the final constructs in the framework, while allowing for more insights into the final framework.

What do you currently use or offer people to use to make payments in your business? And how often do people use this?

The above question was asked after the participants had introduced each other. The objective was to get the participants to reflect on their business operations and the type of payment processes they used in their businesses. The payment options provided by the participants in their businesses varied from mobile payments to cash and EFT.

According to participant B (2019), *"I use Yoco for point of sale. How often I use it? Every time I am down in South Africa for conventions, so that's maybe twice a year for two big events."* Participant B also mentioned that they complement the use of Yoco with PayPal for their online store, as it allows them to accept payments from anywhere in the world. Participant N (2019) used a mobile payment device in their business, specifically Zapper. Participant D (2019) also used a mobile payment device, Yoco, but this was specifically for events, *"As well as Yoco for events where we have to display designer clothes in various*

places, that is the one that we use." Participant D (2019) added that they accepted EFT and used a bank-provided swiping machine for in-store purchases.

There were a number of participants who accepted cash, primarily T, K and F. Participant T (2019) stated that *"I'm mostly focused on cash on delivery because I don't buy my products beforehand"*. This was similar to feedback from participants T and K (2019). Participant K(2019), however, stated that *"a lot of people do tend to use … Cash send from … like e-wallet or like Standard Bank cash send".* Participant K (2019) also mentioned that they are in the process of obtaining a swiping machine from a bank or Yoco so that they can reduce the use of cash.

Participants L and S (2019) operated businesses with different models, with Participant S sharing that *"we only operate via purchase orders and so … it is only EFTs and internet banking that we use".* This was on the premise that participant S (2019) operated a business-to-business operation offering services to government, and hence they did not see the need to have devices or offer payment services on their premises.

Theme: In the analysis of the transcriptions, the categories that were consistent in the feedback were **payment options** and **business processes**. The main theme derived from the axial coding process for this question was in line with **Operating a business and its processes**, as well as **the impact of payment systems and payment process on the business**. These themes were derived from the first cycle of the design science research process and as shown, consistently came through in the feedback from the focus group participants, and thus confirmed the constructs and elements of the framework.

So if we can dig down into the payment options you are using. What positive experiences have you had, so for example, compliments from customers or quick turnaround in time, in terms of the payments appearing in your accounts?

The above question was asked after the participants had shared the type of businesses they operated, as well as introduced themselves. The objective was to get the participants to reflect on their business operations and what experiences had been learnt using their current payment methods. This would enable a discussion of payments and begin to add contextual feedback to the MMPCF, given the number of constructs that were up for discussion.

There was varied feedback from the participants; however, what came through strongly was a sense of safety and security or concerns regarding aspects from both customers and the participants as owners of the business operations. *"I'll go, so for now, I think for us it is more about safety cause our sales process is quite long"* (Participant S, 2019). Such feedback that speaks to the security aspects of payments was a consistent theme in the discussions, with Participant S (2019) stating further that *"we feel it is a safer option to do the EFT or the internet banking obviously for the mere fact …. that it is more secure for the type of business that we are in".* This was further supported by feedback from participant D (2019), who shared the same sentiment and experiences. *"I think with us, the Yoco especially, when people come in. It's a small machine and it's not something that is widely used. First thing that people ask is safety, "Is it safe?" "Are you going to take more money then or are they constantly going to be taking more money?*" In the case of participant L (2019), their experiences from a safety perspective were that the mechanism they used reduced the number of customers who would dispute that they had authorised the payment. Participant L (2019) felt that their payment method protected both them and the customer. Participant N (2019) shared similar sentiments, namely that *"people are reluctant to carry around cash with them."*

Codes and categories such as convenience came through in the feedback from the participants and were shared in commentary such as *"So it is very convenient to carry around in terms, for us, when you have to display at different places"* (Participant D, 2019). Participant W (2019) shared the convenience of their payment mechanism, namely Yoco, as it initially allowed them to receive their funds from revenues during the day, within 24 hours, "*when they started their disbursements of funds, if any sale goes before 7 pm you*

would get your money the following day." The feedback was not a surprise, given that we were discussing mobile payments.

Theme: In the analysis of the transcriptions, the categories that were consistent in the feedback were **safety and security**, as well as **Simple to use (ease of use)**. The main theme that was derived from the axial coding process for this question was in line with **Operating a business and its processes**, as well as **Customer access and marketability**, which was quite common when the categories were grouped together. The codes were mapped to these themes, as they fit into an already existing set of themes derived from the study. Smaller categories, such as convenience, customer service, cashflow, and ubiquitous mobile were distilled from the feedback shared by the participants.

What was the main influence or major feature that made you choose the option that you have? Be it Yoco, be it Zapper. If we can have discussion around these points? Let us start with D.

The above question was asked to engage in debate and understand the driving reasons or factors that propelled the participants to select the current payment methods that they were using in their business operation. This is the crux of the reasons that have a major impact on business processes, customer service and company image.

On reflection, participant D (2019) shared that convenience was a major factor in the choice of using Yoco as a payment device for their business*: "I think one of the main things that made the change take place was definitely the convenience."* The participant further elaborated on how the use of Yoco had affected their business processes and improved productivity, especially when they were hosting events*. "So, the convenience, you are just tapping the client's card and the next thing is just them putting in the PIN and their leaving."* Teece (2007) discusses seizing capabilities by capturing and maximising technological opportunities, which participant D carried out and which affected their checkout process as well customer experience. This experience contrasted with that of Participant W (2019), who initially used a mobile payment device, the Absa Pebble. This gave rise to many challenges, specifically device features that were meant to be security features but ended up hindering the sales process. Participant W (2019) elaborated on that example, *"Unfortunately, with the Absa pebble, people were struggling with the … because it scrambles the pin pad every*

time so if you type in a digit then the numbers change because maybe I think they were doing it for security purposes but from a user perspective it was quite horrible." This resulted in Participant W having to help customers capture their PIN numbers, which was a challenge and quite uncomfortable. The above experiences speak to convenience, security and customer service as categories that key in the process of mobile payment selection.

Participant N (2019) stated that they had observed a difference in shopping between young people and old people, and hence had felt that Zapper was a mobile payment option they could use. *"I feel like for us, we wanted to try a new thing that people would be opening up to. We saw that in our previous experiences, that the reluctance to walk around with cash and the mere fact that everyone wherever they go they carry phones with them and 80% of the time is that phone is a smart phone."* Participant N (2019) shared that they were aiming for customer service in bring in new technologies to cater for customers who always had smartphones everywhere they went.

Participant B (2019) shared different thoughts in that they were interested in brand identity: *"The reason why I chose Yoco over something else was really the brand identity and the news surrounding Yoco."* This is quite different from the other responses, which were driven by business processes, customer service, and convenience.

Participant S (2019)'s options for a payment method were limited to the business models that they were operating: *"That is the only way the payment, obviously we can't do Yoco or swiping payments between five and six figures is just, doesn't make sense, you know what I mean. So that is the kind of thing we go for. We only do EFT and Internet banking."* This is specific to their business and hence the reason for using the selected payment methods. Their choice of payment methods was dictated by business processes and the industry in which they are. This is in line with participant L (2019), who emphasised that *"the reason why we went for the Debi-check pebbles was that they were convenient and easy to carry. Where the reps whether they are in the field they are able to conduct a sale and conclude a sale".*

Participant T (2019) was an outlier and one of the only participants who preferred cash. This may be attributed to her line of business and the stage of growth of the business, as the participant had recently started the business. This was also noted in that the participant

shared that their clients were not familiar with this technology and hence preferred to use cash as payment immediately after the service had been rendered: *"For me, personally it is much easier especially with cash."*

Theme: Categories ranging from device features, convenience, brand identity and customer service were consistent in the feedback shared by the participants. The major theme that came through from the participants' views was of **the impact of payment systems and payment processes on the business operations** and, to certain extent, what the researcher classified as **customer access and marketability**, thus confirming the constructs of the framework.

How much of an influence is price or was price when you were looking at what payment options to enable? I know, for example S, you mentioned you are in B2B and how important is price in your line of business?

The basis of asking this question was that price and cost of fees featured as strong factors in the previous research cycles. The objective was to ascertain and confirm the importance of this factor and the why.

Participant S (2019), who operates a business to business (B2B) operation, shared that the costs were not a major concern in the beginning, as the focus was on getting the business up and running. *"We started getting corporate work and … price wasn't an issue. Then we started getting … detailed on the numbers every time we had to send to the accountants to get our … annuals, then we noticed that the bank charges were a little bit steep at a percentage."* It is noted that participant S (2019) consistently shared how security was as big a concern for them as price eventually was. Trust and security were mentioned strongly over price, even though this was later negotiated. There was a strong sense of valuing the process of money transfer due to the nature of the business and the vast sums of money involved in their business operations. An example of this is in their feedback: *"You know something goes wrong with … other types of devices, so we used the most trusted device and tried to negotiate payments with the banks with regards to debits and credits and so forth."* This is in line with the literature, with Mallat and Dahlberg (2005), Mallat and Tuunainen (2005), Pousttchi (2004) and Pidugu (2015) stating the importance of trust in service providers in the decision-making process.

There was a strong sense of the effect of costs or pricing on the business, regardless of the business operations, with participant N (2019) stating that*, "Well, for me, it was a case of like … we wanted something that we wouldn't experience much costs on operating it."* Participant N's reasons for considering a mobile payment device were based on costs being cheaper than those of a traditional swiping device: *"The cost is not as much as having your point-of-sale thing where you have to produce a card and it's something that is cost effective and is efficient and that is why we had to go that route."* Participant L (2019) shared the same sentiment regarding costs*: "It's costs, you can't run away from the bank. … you can't run away bank charges."* Participant L (2019) and participant S (2019) relied strongly on their banks to negotiate and manage the costs of the devices they were using. The participants were resigned to the fact that their costs would always be tied to what the bank said, as noted in comments such as *"we use their facilities very often and we rely very heavily on their support"* (Participant L; 2020)

Participant W (2019) shared strong sentiments based on their experiences of costs and pricing: *"Okay so as alluded to earlier by the other participants, I think cost was a major factor in our choice to go with Yoco and … I think for the time that we had friends in the restaurant business and they were paying a minimum of 2.3K per month for their FNB, for a bank item."* The aspect of cost per usage seemed to appeal strongly to both participant W and participant D (2019), *"At least with Yoco and stuff, you know they were taking as per the sales that was coming in so that was a big determination."* This view was shared by participant D (2019), *"So the first thing that was really attractive was that they based the costs on sales that we make rather than having a fixed monthly charge, so that allows especially smaller businesses to grow in terms of having a flexible payment."*

Despite most participants sharing strong views on the impact of costs and pricing, participant B (2019) had a different view, selecting convenience as the primary reason over costs and pricing*, "At the time that I got Yoco, it was more about convenience and not costs. Costs was secondary as Yoco was something I needed."* This was because a payment method was a necessity, given they had experienced loss of sales due to a lack of a payment devices at conventions they had attended.

Pricing and cost of fees drew a large debate and many responses, with the participants referring to each other's examples or continuing the train of thought that previous participants mentioned. Participant F (2019) shared how, in the beginning of their business, costs were a major factor*: "Okay when I started off, I didn't have any cash you know, so it was quite a big deal. If I had to lose any then I would have paid, to pay in."* For the sole entrepreneur like F, there was a significant thought process that went into their pricing and the cost of payment methods due to associated costs. Participant F (2019) shared that,

> *"Yah, it was a big issue when I started, I had to think wisely on how I am going to do it. So I had to think about payment mechanisms. I could not, I can go pick up the cash, that's petrol, you know, you have to think of the money that you give up in driving to the bank. I am living nowhere close to a bank, so price was an issue in the beginning."*

This is supported by another sole entrepreneur, participant T (2019), who also used their own funds to start the business: *"For me it was also a big issue because I also started this business from scratch. Like out of my own pocket."*

Thinking about your history and your business, what are some of the challenges you have faced?

SMEs face many challenges in the process of operating and surviving as a business. Participant W (2019) pointed to a critical challenge that faces all businesses when they are starting out, namely funding. Participant D (2019) shared that "*The first challenge was accessibility to funding, that was a big one. When we started, we needed a bit of additional funds, what we worked on was our own savings."* Participant D (2019), further elaborated in their own experiences in how capital for small business is difficult to obtain, especially when the business owner does not have a track record to support that they can pay the money back.

> *"I think capital in general for smaller businesses, especially if you do not have, you know, the data to back it up that you are able to maintain the income that is coming in over a period of time, cause you starting and you getting people to warm up to the idea of your product that you are offering and your service."*

The challenges that most of the participants faced related to funding, except for participant B, whose challenges were related to their industry. As a comic book writer, their challenges were based around finding suppliers for the materials and getting fair pricing for printing their

comic books. “Let’s make a comic book price, let’s setup what, you know this means going forward, so it’s a lot of navigating in the dark and that in general is the biggest hurdle.”

Participant L (2019) continued on the same theme of funding challenges for small business*: “As a small business, it’s really hard to get funding from these professional institutions. So, it gets to a point where I had to get personal loans in my personal capacity for me to be able to fund the company.”* This was supported by participant N (2019), who echoed the same sentiments: *“Just to mention my side, capital … mostly capital is a problem cause now, when ... I remember … going to the financial institutions as like, they want to compare you to like especially to the currently majoring pharmaceuticals that are there”*. The feedback shared indicated the frustrations that the SMEs endure as they sought funding to start or expand their business offerings. As per participant N (2019), SMEs seem to feel that they are assessed through the same lenses as large companies that are well established when it comes to seeking financial aid for their businesses.

The lack of funds hinders the growth and, in some respects, slows down the potential of SMEs to start their operations. This feedback shared by the participants speaks to the underlying theme of operating a business and its processes and how complicated this can be. The slow growth can be exemplified by participant S (2019), who stated: *“For the first four years no money so … we couldn’t get any capital, no credit as well. In my fourth or third year as I said, I moved from the corporate world and that is when I gained an investor.”* As discussed in the literature, finances were identified as one of the top reasons why SMEs do not invest in ICT. A literature review of African SMES reveals a consistent picture of the importance of finance and credit to the success of SMEs and how credit constrains SME growth (see Hansen, Kimeria, Ndirangu, Shry and Wendle (2012) for Ghana, Kenya, South Africa and Tanzania; and Kuntchev, Ramalho, Rodriguez-Meza and Yang (2013) for SMEs across Africa and other continents).

Despite the challenges of funds to the growth of SMEs, this is not the only challenge they face. There are the psychological aspects to consider, such as quitting permanent employment to pursue the entrepreneurship role fulltime, such as faced by participant K (2019) and participant F (2019), who had the following to say respectively: *“Biggest challenge was … was quitting my day job to do … baking full time”* and *“Uhm but yah, I think that was the biggest challenge to take the leap of becoming your own boss.”*

Coupled with the challenge of starting a business regarding obtaining funds, participant T (2019) stressed that even getting clients is a big challenge. *"My biggest challenge was clientele obviously because I was newly started this business and everyone in my area was actually busy setting up nail salons or starting to do nails."* Participant F (2019) referred to the aspect of trust from customer in her products, i.e., getting customers to trust that her products and services are worth buying. *"My biggest challenge is also getting the clients to trust that my product does work, convincing them to invest in this product, it is quite expensive."*

The main theme that came across in the conversations among the participants was of **struggle** and the process of attempting to move from employment to running one's own business. Lack of funding is a well-known issue regarding SME growth and survival, and this was shared, for example participant S (2019), who struggled for four years before eventually finding an investor. This participant's story is the exception and not the norm of what was shared in the session. The theme of **owning a business and the challenge of this process** is quite strong in the feedback.

Please rank the six items in order of importance for you when it comes to mobile payments in your business.

Given the six constructs that constituted the MMP Conceptual Framework after the second cycle, the objective of this question was to give the participants an opportunity to share direct feedback on which factors are important. The participants were asked to rank the factors, and some of the participants proceeded to give their view of why they had ranked the factors in that order. The participants were presented with the list of factors and given a few minutes to think about which factors were most important to them in the process of getting a payment device/option. The participants then played back the list to the focus group. This also served as a form of validation of the constructs of the MMP Conceptual Framework. The factors given to the participants are:

1. Customer service
2. Risk
3. Ease of use
4. Cost of fees
5. Trust

6. Convenience

Participant W (2019) shared that *"Ease of use, customer service and convenience, they seem to be almost relatable".* This view feedback shared by participant D (2019), who nodded their head vigorously in agreement. Participant L (2019) went on to state that *"I was agreeing with that as I was ranking them, I could place ease of use and convenience in the same category for me because it's more like the same thing."* Participant S (2019) also supported the ordering and thought process of participant W (2019) regarding the grouping of ease of use, customer service and convenience together. Given the impact on customers, this participant also noted that the ordering was also dependant on the individual and their preference for their business. Given participant S's business-to-business operations, they were comfortable with their ordering, given the setup of their business*: "For me I wanted to bring costs last and bring value first and that is why I did them in that order."* Participant S (2019) said this was due to how they would like their customers to perceive them and their business. Participant S noted that based on different businesses and different individuals, the importance of factors would be different: *"It goes to show that we all have preferences, we all have what we deem to be important and what we deem to think we can or cannot do without. So that for me was really interesting to see."*

Participant W (2019) further expanded on their thought process and why the three factors were intertwined, using the scenarios that they had experienced using a mobile payment device. Participant W reasoned as follows: *"Okay, so for me if I was to put them in a relationship, I think ease of use becomes the basis of where convenience and customer service would come through, like I will use the example that I said of the Absa payment pebble. Its ease of use was so poor, so it meant there was poor customer service and then it became not very convenient to use."* Even though participant S (2019) shared the same view, participant B (2019) viewed the process in a different light, explaining that they had viewed the factors from an internal to the business and external to the business perspective, and hence had different views regarding the factors. Participant W's feedback resonates with Mallat and Tuunainen (2005) and Teo et al. (2005), who found that complexity can be a hindrance to merchant adoption. The system and process must be easy to use and follow so that there is no friction and merchants and consumers do not get frustrated with the process. In the above example of the mobile payments' solution that Participant W (2019) used, it caused frustration to both the merchant and the customer.

The factor, **customer service**, was identified as being the top factor to consider in the purchase of a mobile payment device, with four of the participants selecting as number 1 in their list. More customers can be serviced if there are multiple channels to ensure payment. Mallat and Tuunainen (2005) state that enhanced customer service could drive an increase in merchant adoption of mobile services.

Interestingly, four of the participants ranked customer service as last or number 5 in their list. This indicated that there were contrasting views on what is deemed important among the different participants. Participant K (2019) shared that, "*Okay firstly yah for me it's definitely customer service. Yah, I think that is self-explanatory yah".* Participant K (2019) went on to share that, *"secondly, the risk is definitely much higher receiving cash, and you are not always sure whether you will get your money when they collect the cake. I'm not there most of the time during the day when people collect so I need to also know that the money has been paid."* Participant T (2019) shared that **risk** would be important for her, as *"I don't know these people personally, I don't know if they are going to pay me"*, and hence the use of a payment device would be ideal for her. Participant F shared that all factors were important or very important, but in relation the matter of risk, *"then it is risk because I don't want anyone to lose money".* This mirrored the feedback shared in earlier discussions by Participant S regarding the risk of losing a customer's money.

The use of a mobile payment device would negate the **inconvenience** of having to withdraw cash and to drive around with it, as these were noted as risks and inconveniences by Participant K (2019), "*Then it's the convenience of not having to ride around and dropping off money and to receive a cake."* The importance of convenience was also shared by participant F (2019), who said that "it needs to be convenient for my customer not to lose any time or money". Participant D (2019) shared how they viewed convenience, noting that there is convenience from a customer perspective as well as from the business owner's perspective in terms of the process that one must undertake to make a payment. Participant D (2019) went on to state: *"I was looking at it from … is it convenient for me to carry out this payment method as well as the customer. It could work for me but does it necessarily work for the customer as well."* This was interesting, as it meant that Participant D (2019) was placing their customer at the centre of their choices and hence processes.

Table 101 shows a summary of the participants' responses.

Table 101: Factor Rating

Constructs: Cycle 3	Participant B	Participant D	Participant F	Participant K	Participant L	Participant N	Participant S	Participant T	Participant W
Convenience	2	1	3	3	2	4	4	6	6
Customer service	1	5	1	1	5	6	2	1	5
Risk	3	4	2	2	3	5	5	2	4
Ease of use	4	3	4	4	4	1	3	4	3
Cost of fees	5	6	6	5	6	3	6	5	1
Trust	6	2	5	6	1	2	1	3	2

Table 101 provides a view of the participants' responses to being asked to rank the factors of adoption in order of importance to each participant. As discussed above and below, the responses are varied but with some commonalities, as noted with customer service ranking highly and cost of fees not as highly.

The **trust** factor was discussed and five of the participants ranked it either as the top or second most important factor, as noted in the table above. Participant D (2019) posed the following question in her bid to understand her choice*: "Do I trust this payment method? To carry out these sales or transactions that I am performing without putting the customer at risk and my own business."* Participant N's views were the same, considering the customer's view as well as their own view in the decision-making process regarding trust as a factor, stating that*: "I need to trust the payment method and the patient, the customer needs to trust it."* Participant W (2019) was quite passionate about the trust factor and deemed it to be critical in the decision-making process.

Participant W (2019) noted that, in their instance, their landlord introduced them to the tenants in the business park and hence, when they used the Yoco device, which was new to them, there was a trust element based on the goodwill of being introduced by the landlord. Participant W (2019) said*: "As time went on, it seems that people were more trusting without asking questions. I don't know if its repeated use or anything, I am not sure that was but definitely questions were asked to say 'We have never seen this device that you are utilising'."* This was indicative of an increase in trust in the device between them and the customers.

6.3 CONCLUSION

The issue of the reliability of qualitative data can be addressed by explaining how the research addressed the following questions raised by Breen (2006), who notes:

- Did you have an independent researcher to cross-check your codes? **Yes**
- Did you look at the level of agreement or disagreement between participants? **Yes**
- Did you assess the frequency of opinion change among respondents? **Yes**

The above questions were posed at the end of Cycle 1 and Cycle 3, where interviews and the focus group had been interpreted and analysed and provided a view of the level of reliability of the data.

The objective of the final cycle of the DSR process was to finalise and confirm the constructs in the framework from Cycle 1 and Cycle 2. This section focused on finalising the results of the multiple cycles of data collection with SME participants in this study. Throughout the focus groups and analysis, the specific constructs and validity of each construct for mobile payment adoption were considered. This was used to update and display the final framework, as in Figure 40. The next chapter summarises the output of this research in terms of answering the research questions set out at the beginning of the research in Chapter 1.

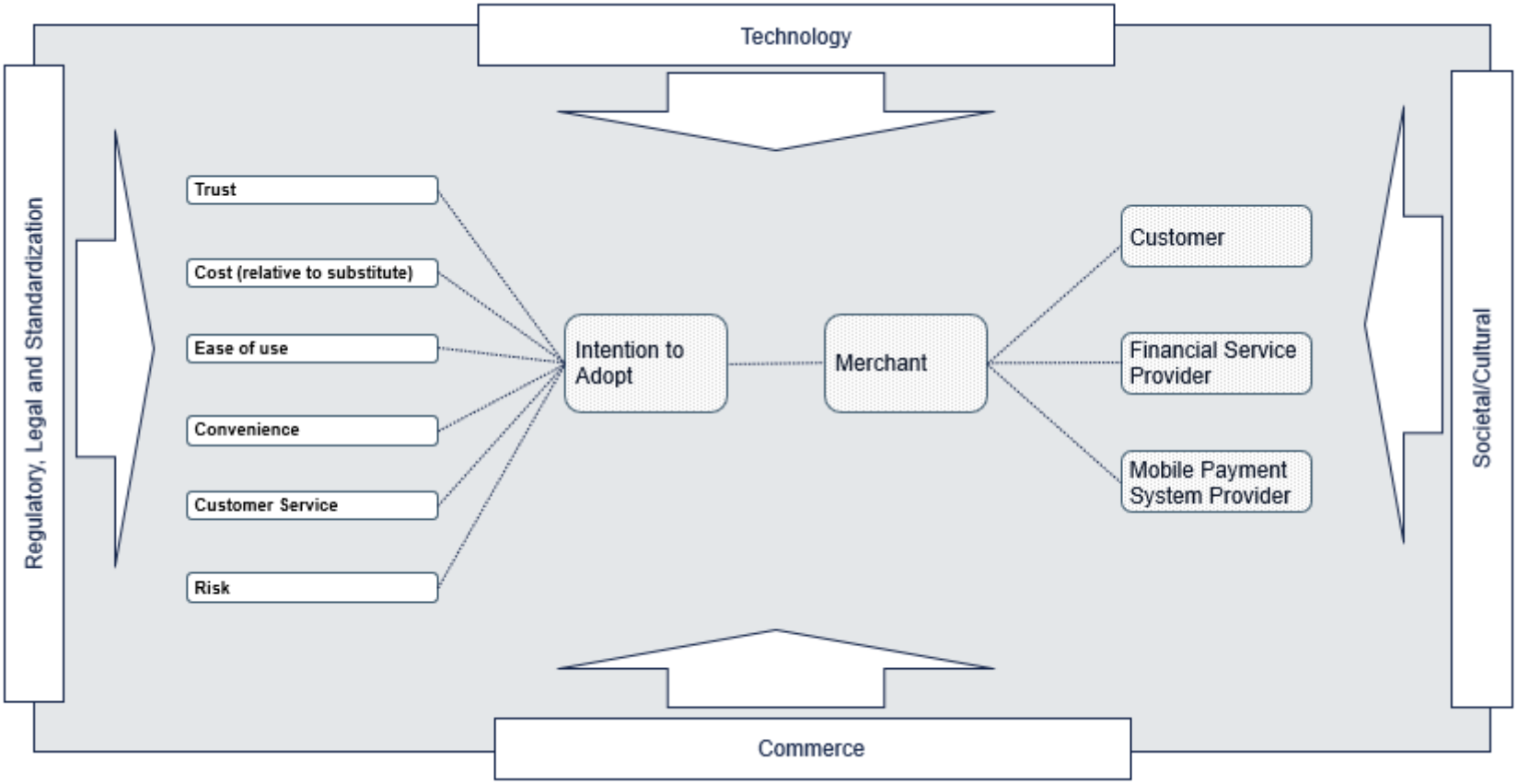


Figure 40: Final Merchant Mobile Payments Conceptual Framework

7 CHAPTER 7: RESEARCH SUMMARY AND CONCLUSION

7.1 INTRODUCTION

This thesis has explored various aspects of mobile payments, focusing specifically on the framework for adoption, and the role of the merchant in this business model. Focus was placed specifically on SMEs. This should assist SMEs in considerations of payment options and factors to consider in the decision-making process in order to improve aspects such as the challenges faced in operating a business. This chapter summarises the findings to answer the research questions asked and emphasises the contributions of the thesis. The chapter looks at the contributions made by this research, as well as applicability of the study through TOE theory as well as the DSR approach. The reliability and validity of the research process are discussed in this chapter, and future research and the study's limitations are identified and discussed as well.

7.2 RESEARCH OVERVIEW

7.2.1 Research questions and answers

The following sections details the research questions stated earlier, as well as the answers to these specific questions. The research contributions are then detailed. The following sub-question was posed to contextualise SMEs and their environments, while ensuring a further understanding of SMEs in South Africa and the current challenges faced. This gives further value to the framework and aids in the understanding of the main research question.

1. **What is the current ICT profile of the merchant (SME)? The typical characteristics of adoption merchant. (This will look at the merchant, their setup, their environment)**

Chapter 5 outlines the ICT profile of SMEs in South Africa based on the findings from the questionnaire that was answered by the SMEs who responded to the call for input. The profile that is generated is based on the SMEs that took part in the research study, the findings, as well as the findings from the literature from Chapter 2, which highlighted the state of entrepreneurship in South Africa.

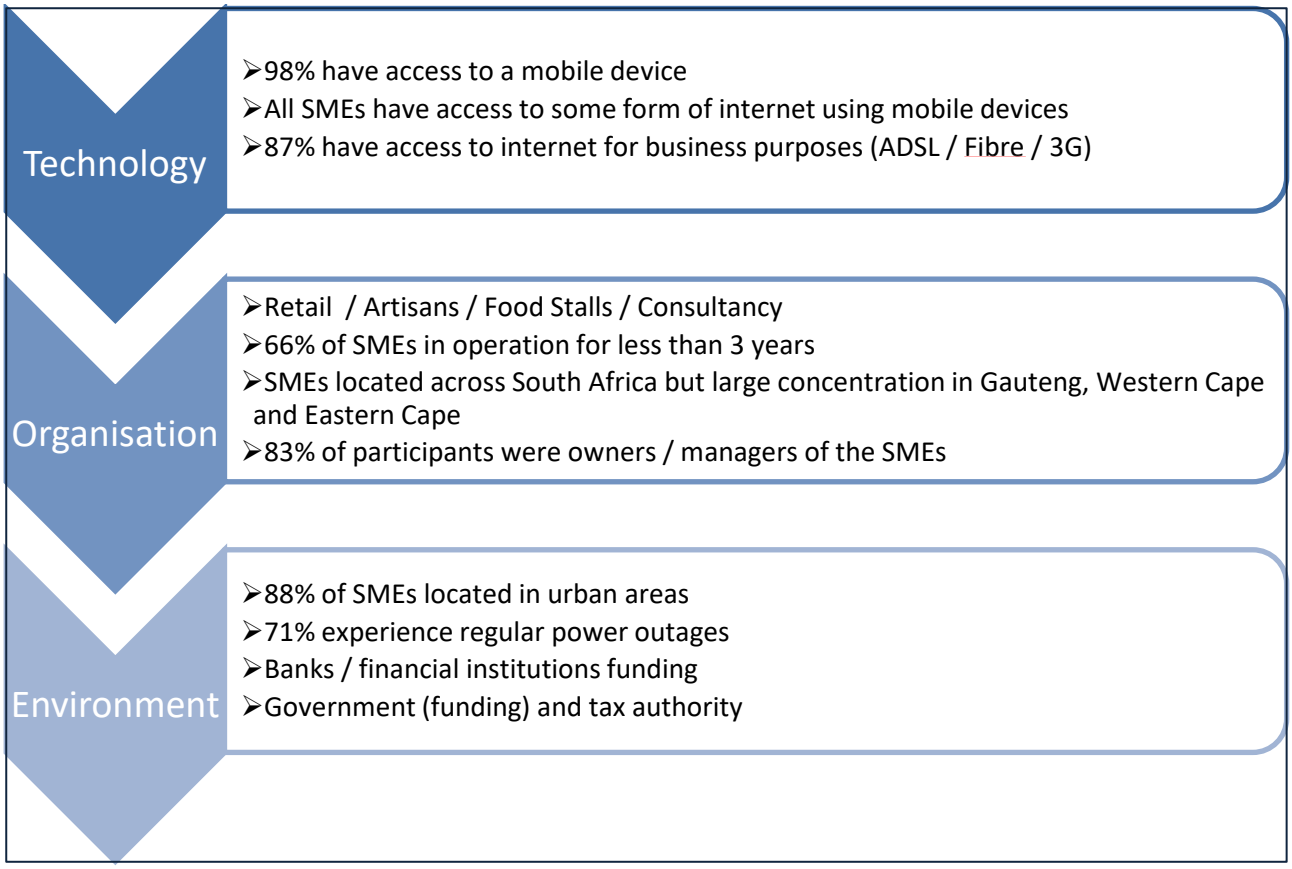


Figure 41: Merchant (SME) Overview

It must be noted that this view is based on the SMEs that took part in this research process across the multiple data-collection cycles. This should provide mobile payment providers with an increased understanding of design, social, economic and process considerations for further development of their products. This should also help SEDA and other government-backed entrepreneurship-focused agencies with a better understanding of the challenges that SMEs face in their business processes. The following sub-question was posed to give further value to the framework. This will help to answer the questions raised as further future research questions by Dahlberg et al. (2007, 2015) on mobile payments in South Africa.

2. Why do merchants adopt mobile payments?

Throughout the multiple cycles of data collection, what was clear was the merchants (SMEs) face many challenges in getting their businesses to move beyond surviving and to thrive. Some of the challenges are financial and regulatory barriers, convenience; risk-related behaviours; payment infrastructure to enable the businesses to receive payments and hence the use of mobile payments by some merchants. As noted in Chapter 4 in relation to the

data findings, there was an expanded number of constructs identified as affecting adoption. When a wider population sample was surveyed, the number of reasons varied, and this is displayed in the list below. These reasons are consistent with the literature reviews, even though the context is different.

- Business processes
- Company image
- Convenience
- Cost of fees
- Customer service
- Device issues
- Payment options
- Risk
- Ease of use
- System features
- System integration
- Trust in service provider

The list above shows the top factors that merchants (SMEs) considered in the process of selecting a mobile payment option for their businesses, as per the data findings from the survey. This list is consistent with the findings of the DSR process from cycle one in Chapter 4 and cycle three in Chapter 6. More reasons were stated, and these were explored in Chapter 4. The reasons depicted could be classified into thematic areas at an organisational level and these are discussed below.

At a thematic level, the following were consistently present in the cycles of data collection and analysis:

- Business decision-making and impacts
- Customer access and marketability
- The impact of payment systems and payment process on the business
- Infrastructure setup, support and connectivity
- Operating a business and its processes

The naming of the themes was based on the overarching factor that came through the categories that were grouped together (see Figure 42).

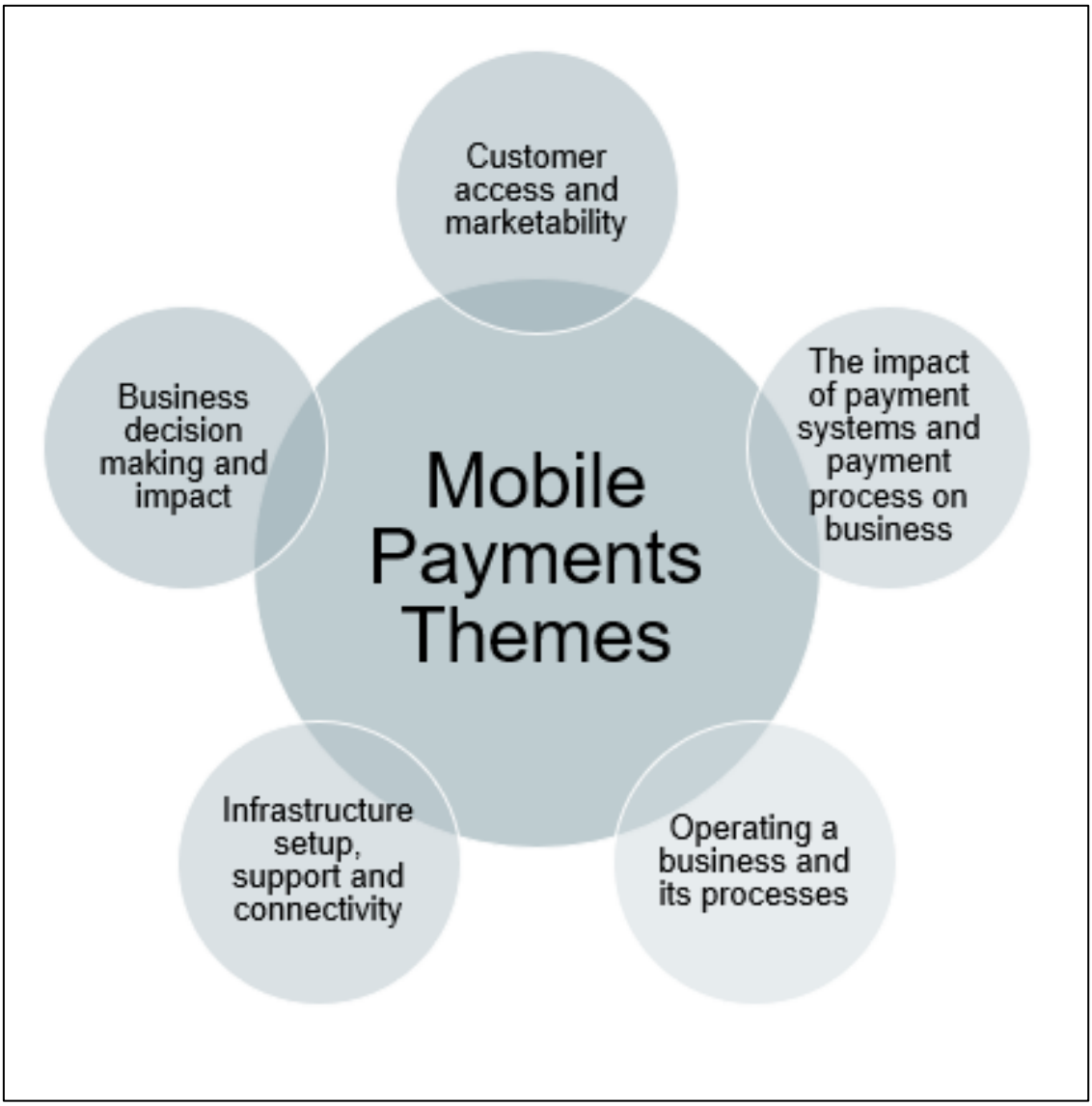


Figure 42: Thematic Findings

Infrastructure setup, support and connectivity are linked to the impact of payment systems and payment processes on the business. This is so because the payment systems depend on infrastructure of some sot (Wi-Fi, broadband) and connectivity to start and complete the payment process. Operating a business and its processes have a certain amount of impact on customer access and marketability. Customer access and marketability was an underlying theme, as there were instances where the merchant mentioned that the lack of customer awareness of payment providers such as Zapper hindered the payment process.

Infrastructure, setup, support and connectivity are critical for the success of enabling mobile payments. This is because mobile payments rely largely on some form of infrastructure and internet connectivity. Support is a crucial element, as it enables entrepreneurs to focus on the core aspects of the business instead of spending time dealing with technical issues.

7.2.2 Addressing the main research question

What would the constructs of a framework for mobile payment adoption by SMEs in South Africa be?

As noted in the previous chapters, the use of a payment channel that suits SME merchants is still a challenge to SME owners. Increased costs due to the use of traditional bank-swiping machines, loss of sales due to a lack of devices, and inherent risks associated with holding cash are some of the issues that SME merchants face in their business operations. What emerged from the research is that the following factors detailed in Figure 43 below are critical in ensuring the adoption of mobile payment channels by SME merchants:

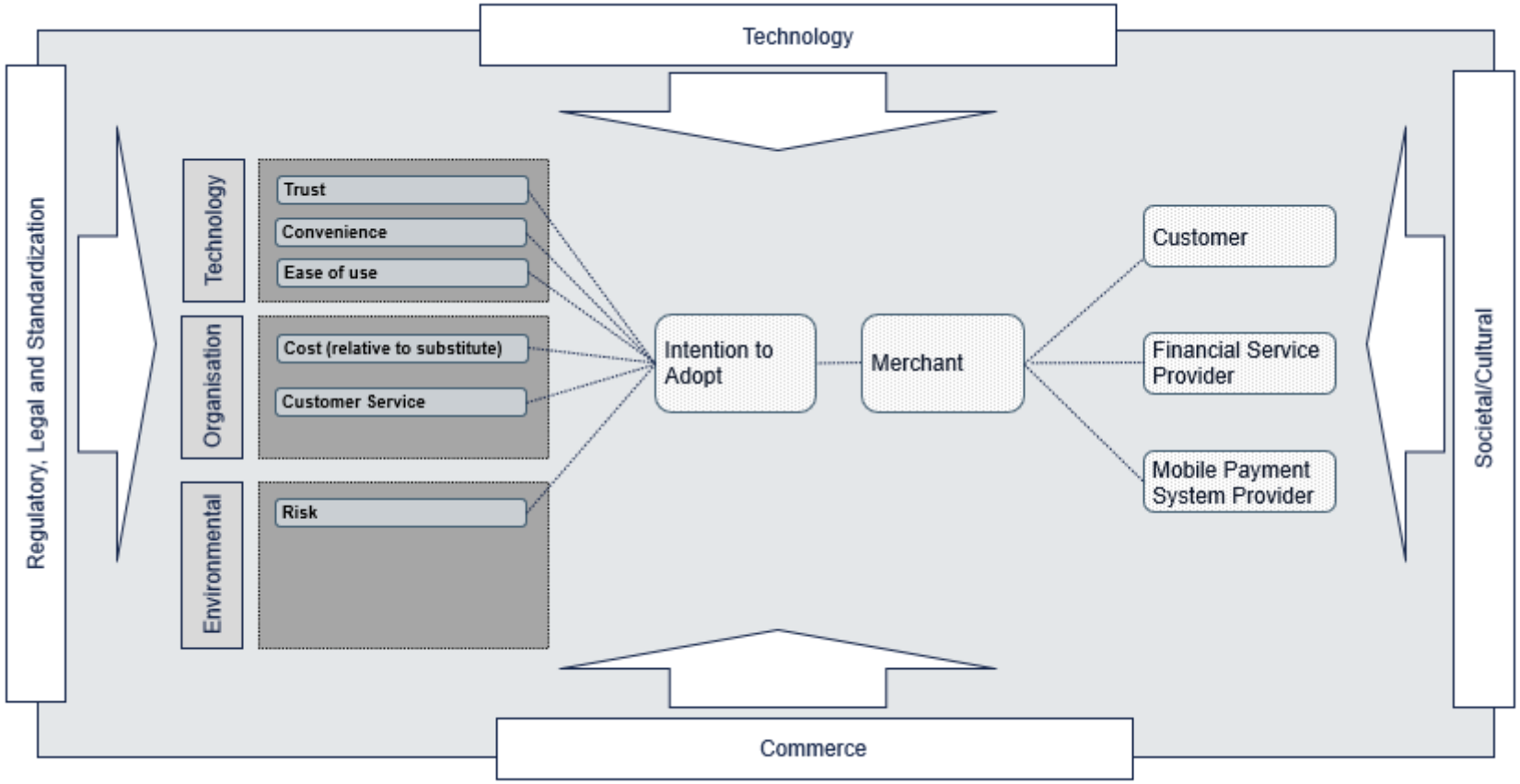


Figure 43. Final Merchant Mobile Payment Conceptual Framework

These factors were mentioned and discussed consistently in the different data collection cycles regarding business operations within the SME context. Factors such as customer service, convenience and ease of use are intrinsically linked, as per the feedback from the focus groups, with the SME owners noting how these factors are important and cannot be viewed in isolation. Looking at these factors within the context of the T-O-E lens, it can be summarised that trust is an organisational and environmental factor given that it relates to trust of the SME merchant in the technology provided, as well as trust by the customer that the payment mechanism will not result in financial harm to them.

What came to the surface was how some SMEs are aware, but others are not aware of the options they have available to them in terms of payment channels, specifically from a mobile payment perspective. This can be attributed to the lack of marketing and exposure by the mobile payment providers. Another noted reason is that the default mechanism is to get such products from banking institutions as a first option.

7.2.3 Reliability and validity

Reliability and validity were discussed in Chapter 3 in the context of this research from an interpretivist perspective. As stated in Chapter 3, dependability is the equivalent of reliability in positivist quantitative studies and is a measure of how the research can be replicated by another researcher to reach the same conclusions (Bhattacherjee, 2012). Bhattacherjee (2012) details how researchers should ensure that they provide enough context of the social setting and the phenomena of interest in such a way that these independently allow the researcher to come to an interpretive conclusion of their own. This will be detailed below to complement the questions asked by Saunders et al. (2003), who state the following:

- Will the measures yield the same results on other occasions?
- Will similar observations be reached by other observers?
- Is there transparency in how sense was made from the raw data?

The researcher is confident that the same results can be obtained on other occasions if a similar research approach is followed under the same conditions. Given that the context is the study of the South Africa SME merchant, which is a specific subset of the merchant community as well as a subset of those who operate businesses, the researcher is confident

that the same observations can be obtained by other observers. A detailed step-by-step process on how the data was analysed and how the researcher came to update the framework through the various data analysis stages in the research is provided. The process was structured and the questions that were asked of the participants have been shared as part of this research to enable transparency.

At a research approach level, the following guidelines were discussed in Chapter 3 and have been updated to reflect the results of the study as part of the evaluation to the reliability and validity of the process. The guidelines set out by Hevner et al. (2004) are summarised in the table below and allowed the researcher to use this as a base for the DSR process.

Table 102: Design Science Research Guidelines (Hevner et al., 2004)

Process	Description	Applications in this research
Design as an artefact	An output in the form of an artefact must be produced. This can be a construct, a model, a method or an instantiation (Hevner et al., 2004).	A conceptual framework was created and taken through the DSR process.
Problem relevance	The problem identified must be relevant and, when solved, must have a real-world impact. Kuechler and Vaishnavi (2008) state that the artefact must be relevant to the problem under investigation. Hevner et al. (2004) state that a technology-oriented solution must be the outcome of the DSR process to solve the identified problem.	The researcher was aiming to answer the following problem statement: What would the constructs of a framework for mobile payment adoption by SMEs in South Africa be? The relevance of the problem was explored in Chapters 1 and 2.
Design evaluation	Hevner et al. (2004) discuss the efficacy of the proposed solution, the quality, completeness, accuracy and if the solution adheres to certain standards that are applicable to artefacts of its nature. Kuechler and Vaishnavi (2008) are in agreement on this point, stating that an evaluation process of the artefact should be formal.	The artefact is complete after having gone through three design cycles. In terms of completeness and evaluation, the framework has been evaluated by two independent researchers for completeness and quality.

Research contributions	Novelty is a requirement for the artefact as this is a distinguishing factor between DSR and design practice (Kuechler & Vaishnavi, 2008). The contribution of the artefact must be clear and undisputed, and the artefact is the medium for this (Hevner et al., 2004).	The contribution of the framework is clear, as it is the first of its kind in the South African context. The framework extends the knowledge of merchant adoption of mobile payments while adding new findings to the development country context, proving the applicability of the DSR process to mobile payment research.
Research rigour	A due and diligent research process must be carried out to achieve the state of the artefact (Hevner et al., 2004). Hevner et al. (2004) state that rigor is exemplified through the effective use of the knowledge base.	The framework is based on an extensive literature review that was used as a base for this research. This is thoroughly detailed in Chapters 2 and 3, both from a mobile payments' perspective and a research methodology perspective.
Design as a search process	Design science is an iterative process whose objective is to identify a worthy solution through a search process (Hevner et al., 2004). Kuechler and Vaishnavi (2008) state that the functionality of the artefact is of more importance than the theoretical development.	A design science research process was followed in this research and a usable artefact was created (framework).

Communication of the research	When communicating the results to both professional and academic audiences, the rigour and relevance requirements of both industries need to be demonstrated (Kuechler & Vaishnavi, 2008; Hevner et al., 2004).	The outputs of the research are communicated through the publishing of the thesis as well as through journal article publications.

The researcher used the principles of interpretive field research that were proposed by Klein and Myers (1999). Even though the research conducted did not involve field research, the principles proposed by Klein and Myers (1999) provide a sound platform from which to carry out an evaluation of the research approach and this is discussed in the table below:

Table 103: Principles for Interpretive Field Research (Klein & Myers, 1999)

Principle	Application of principle in research
The fundamental principle of the hermeneutic circle: *This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles* (Klein & Myers, 1999).	The hermeneutic circle speaks to the understanding and how this is gained through understanding the text, in part to achieve an understanding of the whole. Data from the interviews in Chapter 4, the survey data from Chapter 5 and the focus group data in Chapter 6 were al transcribed by the researcher. This process (which involved listening to the recordings multiple times) ensured that the researcher developed an appreciation of the individual aspects of the SMEs. This was then complemented by reading and understanding the whole set of data in the process of obtaining a deeper understanding that led to the analysis and outcomes, such as the categories and themes. Regarding the literature, the thesis explores the South African environment, delving into SMEs and mobile payments from a specific perspective, thus ensuring the circle is complete. The researcher is confident that this principle was applied in the context of this research.
The principle of contextualisation: *Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged* (Klein & Myers, 1999).	The basis of the thesis was the identified lack of knowledge on the role of the merchant in the mobile payment ecosystem, specifically the factors to take into account when implementing mobile payments. A gap has been identified for future research by multiple authors, such as Ondrus and Guo (2015), who noted the lack of research on merchants. The context of this research was introduced in Chapter 1 and Chapter 2, therefore ensuring that the reader of this thesis understands its context and setting.

Principle	Application of principle in research
The principle of Interaction between the researcher and the subjects: *Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and participants* (Klein & Myers, 1999).	The researcher conducted the interviews, surveys and focus groups and ensured that that, in each, the researcher was clearly introduced to the research participants, including his background and the goals of the research. The focus groups were semi-structured/open, and this resulted in the participants being able to speak their minds freely on their thoughts, observations and experiences in their business operations. The researcher was acutely aware of the influence that a researcher has on a setting such as a focus group, and hence tried not to influence the participants in any direction, except within the context of the research.
The principle of abstraction and generalisation: *Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action* (Klein & Myers, 1999).	T-O-E theory was used to understand the setting of merchants within the mobile payment ecosystem. T-O-E served as a theoretical lens to understand the SME merchants' reasoning on mobile payment choices for their business operations. The results of the research were within the context of the technology, organisation and environment, and this completed the hermeneutic circle.
The principle of dialogical reasoning: *Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision* (Klein & Myers, 1999).	The research was carried out using a design science approach. The initial constructs identified from the literature in Chapter 2 were used as the basis for the initial framework that was taken through multiple cycles and refined as part of the DSR process. During the multiple cycles, it emerged that not all constructs were relevant to the same degree, and hence the framework evolved on the basis of the findings. For example, network effects had been identified as a major construct for the adoption of mobile payments, whereas the findings proved that these are not as relevant as other factors identified.

Principle	Application of principle in research
The principle of multiple interpretations: *Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it* (Klein & Myers, 1999).	This thesis followed the DSR approach and, in it, used a mixed-methods approach. This ensured that there were multiple viewpoints, especially in the focus groups. The focus group had some SMEs with shared backgrounds and hence environments, thus allowing for the same feedback but from different viewpoints.
The principle of suspicion: *Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants* (Klein & Myers, 1999).	It is noted that there is no 'expert' opinion in the research findings, but rather the opinions of the SME merchants as they interpreted their contexts and environments and hence answered the questions presented. The researcher was aware of his own understanding in interacting and hence tried to remain objective throughout the process and let the analysis produce the facts based on the data and not on a pre-set understanding.

7.3 RESEARCH CONTRIBUTION

The research contributions are discussed below.

1. The research was carried out through the theoretical lens of the T-O-E framework as the underlying theoretical foundation. The Merchant Mobile Payments Conceptual Framework (MMPCF) introduced in Chapter 3 was modified with each iterative design cycle based on the DSR process. This thesis contributes to the body of knowledge on the mobile payment ecosystem, as per the call by Ondrus and Guo (2015) that more research was need that investigates merchants, as well as more research that is based on theory and does not focus on students as research participants.
2. The practical contribution of this thesis is that provides evidence that allows industry leaders, mobile payment solution providers, financial institutions to look at the constructs in the MMPCF and begin to design solutions that suit merchants needs.
3. This conceptual framework contributes to the body of knowledge in that it has identified key factors to be focused on or designed around for mobile payment systems in respect of the merchant in the ecosystem. This is a theoretical and practical contribution, as the framework is created and tested in a South African environment, i.e., that of a developing country, and this included the validation of the factors that made up the framework.
4. This thesis has expanded the mobile payment literature by introducing a theoretically based study on the factors affecting merchant adoption in the South African context.
5. This research followed a DSR approach which was a methodological contribution. The DSR was carried out through continual refinement and testing of the constructs of the conceptual framework in each data collection cycle. The DSR approach allowed a discernible, structured path to be followed throughout the research process. The use of the DSR enabled the research outcomes to be added to the body of knowledge, as this was a research limitation of previous research on mobile payments.
6. This research has shown how the DSR can be used in doctoral studies in combination with TOE theory and the steps that can be taken. This can assist other researchers to understand how this approach can be used in other contexts and applied as a way to conduct research.

7. This thesis used a mixed-methods approach in the data collection process by using interviews, surveys and focus groups, which consisted of both quantitative and qualitative methods. This was a methodological contribution and the data was analysed in Chapter 4, 5 and 6 respectively. The process that the researcher followed adds to the body of knowledge by showing the process a researcher can follow when carrying out a mixed-methods approach in a single study. The main advantage of using multiple data collection methods is that it also ensures some form of validity regarding the data, which is examined from different lenses. This enabled the researcher to gain a deeper understanding of the SME merchants, their business process, context and the impact of mobile payments.

7.4 RESEARCH LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Interesting findings emerged from the research process from this thesis, but in the process there also were limitations, which the researcher highlights below. These will be discussed along with possible areas of future research to add to the body of knowledge.

1. The impact of Covid-19 and the subsequent lockdowns that were implemented across South Africa resulted in limited focus groups from the original set of participants who were interviewed. Some of the interview participants were no longer in business and hence were not interested in taking part in the focus groups.
2. Digital transformation is accelerating the use of mobile technologies, and hence a future area of research would be to carry out a longitudinal study to examine merchant attitudes to the changing payment options available to them. This can be incorporated into the framework.
3. The conceptual framework could be used in similar studies to ascertain feasibility from a contextual perspective in different countries.
4. A limitation of this study is that only the TOE theoretical lens was used; future studies could look to use different theoretical lenses, such as a business model approach, to further understand merchant adoption of mobile payment systems.
5. One of the limitations of this study is that, due to time constraints, fewer than 200 responses were received from the survey for data collection. It is recommended that a survey approach be used for a longer period, as there are more than 250 000 registered SMEs in South Africa, and hence a large sample would be required.

6. Future research could focus the scope of the participants to a specific industry, e.g., restaurants/food stalls or farmers' markets. Focused research and outcomes would yield greater insights into that industry.
7. Future research could also look at specific aspects, such as organisation and environmental factors and how this influences the adoption of mobile payments.

7.5 RESEARCH CONCLUSION

This thesis set out to add to the body of knowledge of the mobile payment ecosystem with a specific focus on merchants. Given the critical importance of SMEs to economies, especially in the South African context, one of the objectives was to understand how mobile payments can alleviate some of the challenges that SMEs face in their business processes and operations. I hope that this thesis has highlighted the challenges that SMEs in South Africa face and the role mobile payments can play in reducing some of these challenges.

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9 APPENDIX A – INTERVIEW QUESTIONS

Interviewee:

Employer Attributes

Do you own a mobile phone or tablet?	
Do you own a smartphone?	
How old are you?	
What is the highest educational qualification that you have?	
What type of business are you?	
Sole Owner| Partnership|	
Number of Employees in your business	
Number of years in operation	
Area of location of Business (Rural vs Urban)	
Industry type	

Organisation Attributes

1. How do you access your business bank accounts (balances)?
2. How do you perform transactions for your business bank accounts?
3. How do you access and perform transactions for your personal accounts?

Technology

1. What would you require to feel secure about using mobile payments? (Linck, et al., 2006)
2. What do you do to stay on top of the ever-changing IT environment?
3. Which systems do you currently have implemented in your business?
4. How many employees work with ICT?
5. Does your company have an IT department?
6. How has ICT adoption affected your operational costs?

7. Are the owners directly and constantly involved in managing ICT aspects of the business?
8. What do you think are the factors limiting ICT adoption and effective usage for your company?
9. From your point of view, what factors contribute to the success of adopting the current mobile payment solution that you are using?

Mobile Payments Usage	How many customers use mobile payments per day? a. Between 0 and 5 b. Between 5 and 10 c. More than 10
Seizing Opportunity	We have prevented threats using mobile payment technology
Sensing Opportunity	We have foreseen opportunities. We create opportunities by using mobile payments. We discovered hidden opportunities when using mobile payments
Absorptive Capability	Mobile payments help us to meet customer expectations faster Information has become clearer since we began using MP MP helps us to work better with each other
Adaptive capability	MP helps us identify problems and needs We get feedback through the use of MP Elaborate on the types of routine activities that you carry out to make your firm adapt to the environment when there are changes (Zhou, et al., 2018)

(Ondrus & Pigneur, 2006) Adapted for merchants.

What is the cost of switching (Financial, physical, cultural and physiological)?

Is there a simple procedure (describe) to register for the service?

Do you trust the newcomers and intermediaries for mobile payments?

10 APPENDIX B – SURVEY

Table 104: Survey Instrument Details

Questions	
Do you consent for this information to be used for this study only?	
What type of business are you operating?	
If you option is not available above, please type what type of business you are operating?	
How many years has the business been in operation?	
Which area is your business located and operating in?	
Where is your business situated?	
Do you regularly experience power outages at your business premise (electricity cuts)?	
Do you have access to a mobile phone or tablet (smartphone or basic feature phone)?	
How many employees (full time and part time) does your business employ?	
What is your position in the business?	
Can you access the internet using your mobile phone?	
Do you have access to the internet (Wi-Fi / Fibre / ADSL / 3G) for your business use?	
Have you heard, seen or interacted with any of following? If yes, select the ones that you are aware of?	
Please select which payment options that you are using for your business. (If you are not using any form of mobile payments, please select submit form to end the survey)	
Why did you choose the forms of payment you offer at your business? (You can select multiple reasons from the list below)	
What frustrates or concerns you about the current payment methods on offer in your business?	
If you use technology for business, who helps or supports you?	
How do you communicate with your employees?	
Does the use of swiping machine in your business, make your business seem more legitimate (as compared to just accepting cash)?	

Does the use of mobile payments, acceptance of cards improve or affect your company image?	
What is the estimated frequency of use of the mobile payment device in your business on a weekly basis?	
What is the level of desirability to have a mobile payment system in your business?	
How important is the following factors regarding your business when it comes to payments technology and business operations: Cost of Fees	
How important is the following factors regarding your business when it comes to payments technology and business operations: Ease of Use	
How important is the following factors regarding your business when it comes to payments technology and business operations: Risk (cash handling, fraud, theft)	
How important is the following factors regarding your business when it comes to payments technology and business operations: Device features (e.g., battery life, size of device, screen size)	
How important is the following factors regarding your business when it comes to payments technology and business operations: System features (e.g., reporting functions? blue-tooth connectivity)	
How important is the following factors regarding your business when it comes to payments technology and business operations: Impact on business image	
How important is the following factors regarding your business when it comes to payments technology and business operations: Convenience (convenience for you and the customer)	
How important is the following factors regarding your business when it comes to payments technology and business operations: Integration of the system with existing systems	
How important is the following factors regarding your business when it comes to payments technology and business operations: Impact of payment system on business operations	

How important is the following factors regarding your business when it comes to payments technology and business operations: Customer service (impact of the system on customer service)	
How important is the following factors regarding your business when it comes to payments technology and business operations: Alignment to business strategy (does the use of mobile payment align to your business strategy?)	
How important is the following factors regarding your business when it comes to payments technology and business operations: Trust	
System reliability: I can count on the system to be 'up' and available when I need it	
System reliability: The payment systems that I use are subject to unexpected or inconvenient down times which makes it harder to work	
Ease of use: The payment systems I use, ae convenient and easy to use?	
I would use IT for my business if?	
Total	