University of Cape Town

Building Trust in Mobile Commerce

A Technical Report presented to the
Department of Information Systems
University of Cape Town

By

Janine Joubert

In partial fulfilment of the requirements for the
Masters in Information Systems
2006

Student number: JBRJAN005
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Abstract

Mobile commerce or m-commerce is seen as the next technological innovation that will transform the marketplace. Despite the hype associated with m-commerce and the massive revenue predictions by research companies, current adoption figures by consumers seem to demonstrate a lack of enthusiasm for more advanced services. A key reason cited in the literature is a lack of trust.

Consumers regard m-commerce as more risky than e-commerce. M-commerce transactions are often characterised by complex technology, anonymous vendors, lack of transparency and convoluted interactions between stakeholders. It is therefore no wonder that consumers are reluctant to adopt new m-commerce services. Trust becomes more important in situations of increased uncertainty, such as m-commerce.

This research is the first South African study to investigate a model that incorporates trust and risk factors to explain adoption and usage of m-commerce. The model is based on the existing trust literature, but complemented with variables that relate to the benefits of mobile technologies, namely Innovation Diffusion characteristics.

Two research approaches were followed. Since m-commerce is relatively new in South Africa, qualitative analysis, by using focus groups, was conducted to explore how and why trust and risk influence m-commerce adoption. This was combined with a more quantitative approach to investigate the relevance and importance of trust and risk issues on a population of potential 'early adopters'.

The study provides several interesting findings. The study determined that personal characteristics significantly influence the perceived trustworthiness of the vendor, technology and the institutional framework. It was further established that these factors significantly influence overall trust perceptions and that trust and risk additionally influence intention to use m-commerce services. However, amongst early adopters, benefits were more important than both trust and perceived risks. This can be attributed to the high-risk tolerance of 'early adopters' and it is possibly not generalisable to later adopters. However, the importance of trust cannot be underestimated, since most of the participants of this study were explicit about limits to their trust e.g. not being prepared to provide credit card details or engage in high-value transactions.

In conclusion, m-commerce appears to have great prospects in South Africa. However, it is important that vendors unleash this potential by designing m-commerce services to reduce risk perceptions and increase trust. To this end, this research also suggests a number of practical vendor interventions.

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Declaration

(1) I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.

(2) I have used the Harvard Convention for citation and referencing. Each contribution to, and quotation in this study from the work(s) of other people has been attributed, and has been cited and referenced.

(3) This study is my own work.

(4) I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

I would also like to extend my appreciation to Dr Jean-Paul Van Belle for his extensive guidance and support.

Signature

Janine Joubert
(JBRJAN005)

Date: 26 May 2006

1 Chapter One: Introduction and Background to Research

1.1 Introduction

While South Africans have embraced mobile voice communications enthusiastically, this is not the case with mobile data communications. Starting from zero eleven years ago, Mobile Network Operators (MNOs) presently claim 21-million subscribers (49% of the population). However, average revenue per subscriber (ARPU) has begun to decline, leading to a search for new revenue streams. One of these revenue opportunities is Mobile Commerce or M-Commerce.

M-commerce is perceived by many as the next technological innovation that will eventually replace Personal Computers (PC) with mobile phones as the preferred tool for conducting business. A lot of hype surrounds m-commerce; partly assisted by research companies that project massive revenue potential for MNOs and providers of these services. Furthermore, advanced mobile technologies and innovative mobile handsets make new types of m-commerce service possible. This is also true in South Africa where subscribers have seen the launch of exciting new services, such as mobile banking, video telephony, television services and location-based services. However, the adoption of these services has however been lethargic.

Distrust in m-commerce has been identified by researchers as one of the main contributing factors for the slow adoption. Trust is important during situations that are perceived to be risky. M-commerce exposes consumers to new vulnerabilities and risks. South African consumers are often not aware who the vendor is that is accountable for delivering the service. A party to trust is therefore absent. Additionally, some of the providers of m-commerce services, Wireless Access Service Providers (WASPs), have been exposed in the media for their unethical conduct. M-commerce technologies introduce additional complexity and expose consumers to Internet-type risks, such as cyber-crime, SPAM, viruses and illegal content. Although South Africa offers consumers legal protection against these risks, confidence in law enforcement remains at a low level.

From this, three broad issues emerge: consumer perceptions about trustworthiness of the vendor, trust in the technology that delivers the m-commerce service and trust in the legislative environment. Given these issues, the question arises of how trust is established and what indicators can be provided to increase trust and reduce perceptions of risk, to stimulate m-commerce adoption?

Studying trust in m-commerce is regarded as an emerging research opportunity by both academics and the providers of m-commerce services who have a vested interest in developing m-commerce. However, at the time of writing this report, no studies on building trust in m-commerce in South Africa had, as yet, been published. Thus this research serves as a 'first step' in developing a model for building trust in m-commerce within South Africa.

In addition, it is of value to investigate trust building within the wider context of adoption and usage. This is necessary to establish the significance of trust and risk within the adoption relationship. This is specifically interesting in the context of South African youths, who are considered to be early adopters, since they are presently already high users of mobile content services. They therefore represent a key segment of the m-services market. The significance of trust, and risk on the willingness of early adopters to use more advanced m-commerce services will be addressed within the course of this study.

The espousal of m-commerce does not occur within a vacuum, but rather takes place within a technological and industrial setting. Trust itself is also regarded as a 'context dependent' construct (Gefen *et al*, 2003). It is therefore necessary to provide an overview of the historical development and the current state of the mobile telecommunication industry in order to clarify the framework for this study.

1.2 History and Background

The commercial history of South African mobile telecommunications is brief, as it goes back a mere eleven years, but has been characterised by rapid development. Currently, Mobile Network Operators - Vodacom, MTN and CellC - boast a subscriber base of 25-million subscribers, compared to the reported 18.2-million estimated in 2004 (Bonorchis, 2004; Gedye, 2005; Senne, 2006). Despite the actual subscriber numbers being disputed, the saturation point for cellphone usage has still not been reached (Mobile Sector Talks Up Numbers, 2004; Grapevine, 2006).

Current Short Message Service (SMS) volumes, as well as the growth in mobile digital content in South Africa, indicate opportunities for the use of more advanced mobile content services (Towergroup, 2002). In 2002, the International Telecommunication Union (ITU) estimated that the average international user sent four SMS per month; compared to the South African average of seventeen. In 2005, this escalated to an average of 36.5 text messages (ITU, 2004; World Wide Worx, 2005). Multimedia Messaging Services (MMS), which enables the transmission of graphics, video and sound files, has moreover expanded into a thriving market, while recently launched cellphone television could make an impact on the already prosperous m-commerce markets relating to ring tones and SMS (Stones, 2006; Senne, 2006; Ntuli, 2006). It is therefore not surprising that the combined estimated worth of the three MNOs was valued at R163 billion in 2005 (Bonorchis, 2004; Gqubulel, 2005). A total of 130 registered content and service providers (Wireless Application Service Provider or WASPs) which offer a variety of services, such as content (ring tones, logos, games) and information services (Lotto, weather) were already in existence in 2005 (October, 2005).

Even if the M-commerce industry is ready and able to endorse m-commerce, challenges still linger. One of these challenges relates to the complex associations identified between the various role players, technologies and m-commerce services. The consumer is a further critical component of the value chain and the question remains whether South African consumers are ready for m-commerce adoption and whether significant stumbling blocks predominate which may slow the rate of m-commerce adoption.

A 'Sicap' m-commerce investigation (2003) surveyed 514 retail professionals in the UK and determined that trust, convenience and usability were found to be the primary determinants of adoption. It was further indicated that, "a significant leap of faith in technology would be needed to get consumers to use their mobile devices for financial transactions," which could also be true for South African consumers. This will form the topic of discussion to be outlined hereafter.

1.3 Research Problem

The Research Problem, which will be evaluated within the subsequent sections, is to develop and assess a new model for building trust in Mobile Commerce.

1.3.1 Problem Statement

Available literature has, thus far, not succeeded in delivering a comprehensive trust model. Trust studies has furthermore been criticised for not focusing on all trust-related concepts, or alternatively, for concentrating on only a limited number of variables. In addition, some of the previous trust studies moreover failed to effectively conceptualise trust. In fact, a uniform definition of trust does not currently exist within the available literature and no South African published studies investigating trust and risk are, at present, available. This thesis is therefore the forerunner in the development of a model to examine the degree to which trust and risk factors influence the adoption and usage of mobile commerce by consumers in South Africa.

The questions posed by the researcher are, firstly: (1) What factors influence the adoption of mobile commerce? (2) Are these factors related to the variables of trust and risk? (3) Do these factors impede mobile commerce growth? The formulation of the research question is consequently based on these three questions.

1.3.2 Research Question

The research question states:

How do trust and risk factors influence the intention to use mobile commerce by consumers in South Africa?

The following definitions serve as an initial qualification of the scope of the research, as shown in Table 1: Definition of Research Question.

Trust	The consumer's confident expectations that mobile commerce can be relied upon in situations entailing risk to the consumer (Delgado-Ballester, 2002).
Risk	Vulnerabilities inherent in mobile commerce that can negatively impact on the consumer (Gefen *et al*, 2003; Cheung *et al*, 2001). Examples of risks include: fraud, privacy, SPAM, etc.
Intention to Use	Willingness of users to accept and use mobile commerce (Rogers, 1995).
Mobile Commerce	The ability to use mobile wireless devices as a secure method of purchasing goods, services or digital content (ACA, 2003b). M-commerce is therefore any entertainment, information, or location-based service provided by a vendor that could be: – A Wireless Applications Service Provider (WASP); – A Mobile Network Operator (e.g. Vodacom, MTN, Vodafone); or – A Service Provider (e.g. Vodacom Service Provider Company, Nashua etc.).
Trust Factors	Indicators that influence the consumer's perception of how trustworthy the vendor, systems and institution-based trust is (Bailey *et al*, 2002). Indicators are grouped into three variables: – Vendor Trust (e.g. privacy policies, refund policies, vendor brand and reputation etc.); – Systems Trust (e.g. performance of the technology, reliability, network coverage etc.); and – Institutional Trust: Indicators in the legislative and dispute resolution environment (e.g. Electronic Communications and Transactions Act and consumer protection organisations like WASPA (Wireless Application Service Provider Association).
Risk Factors	Weaknesses that can be accidentally triggered or intentionally exploited during mobile commerce. Example of a typical scenario includes downloading a game costing R80, but not receiving the content, but still being required to pay for the failed transaction and not knowing who to complain to or who is providing the service.

Table 1: Definition of Research Question

Trust and risks are nonetheless 'intricate, multi-dimensional' phenomena. M-commerce is equally complex and multi-faceted in terms of the role players, services and technology and, as a result, these definitions of trust, risk and mobile commerce will be further expanded upon in the literature survey. The initial research question forms the basis from which an additional set of objectives has been determined.

1.3.3 Objective of Study

The objective of the research is to study trust and risk and how it influences adoption of m-commerce services in South Africa. Based on a survey of the available trust literature, a research model has been constructed, as illustrated in Figure 1: Model of Trust in M-commerce. This study will consequently test the application and relevance of the proposed trust model on potential 'early adopters' of m-commerce services.

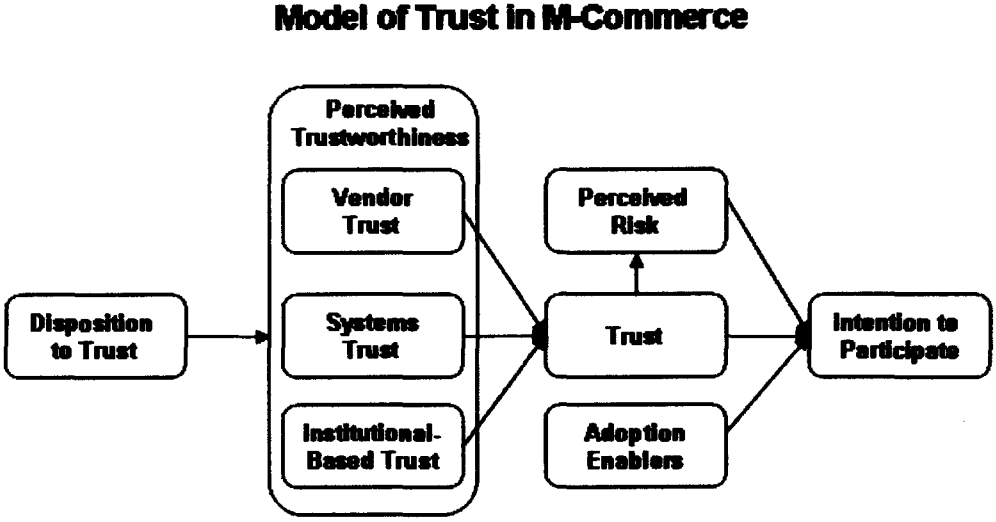


Figure 1: Model of Trust in M-commerce

Both quantitative and qualitative research techniques have been utilised in this study. As m-commerce is relatively new in South Africa, and as trust is such a complex issue to study, focus group sessions were conducted to identify behaviours and attitudes that influence m-commerce adoption. The focus group sessions allowed a wider exploration of the factors that influence the adoption and usage of mobile commerce in South Africa.

The focus group sessions served to explain the 'why' and 'how' of behaviour, whereas the administering of questionnaires was focused on establishing the extent of these behaviours. While the focus group sessions were conducted on a wider audience, the questionnaires concentrated on establishing behaviours relevant to early adopters.

1.3.4 Key Attributes of the Model

The key variables of the model have herewith been explained and categorised, and their relevance to the research moreover explained in Table 2: Definition of Research Components:

Variable	Definition	Controlling party	Questions relevant to the research
Disposition to Trust	Personal characteristics of the consumer that influence his or her general ability to trust (Gurviez *et al*, 2003; Chervany *et al*, 2001a; Granovetter, 1985).	Consumer	Do the personal characteristics of the South African consumer have a significant influence on the decision to use mobile commerce, via their influence on trust in the vendor, institution or systems?
Vendor Trust	Trust factors that demonstrate that the vendor that provides the m-commerce service can be trusted. The vendor can be a WASP, MNO or SP. The vendor has full control over trust factors which demonstrate competence, predictability and goodwill towards the consumer (Ratnasingham *et al*, 2003).	Vendor	Does the perceived trustworthiness of the vendor influence trust and the intention of the South African consumer to participate in m-commerce?
Systems Trust	Amount of trust the user has in the mobile commerce technology and the ability of the technology to deliver appropriately (Davis *et al*, 2000).	Mobile Operator, WASP, Handset Manufacturer	Does the trustworthiness of the mobile technology, such as network coverage, influence trust and the intention to participate in m-commerce?
Institutional - based Trust	Formal mechanisms that increase consumer trust, usually because they increase the cost of opportunistic behaviour (Ho *et al*, 1999; Cheung *et al*, 2001; Zucker, 1986; Chervany *et al*, 2001a).	Government and private bodies such as WASPA	Are South African consumers aware of consumer protection bodies and legislation? Does trust in the environment influence trust and the intention to participate?
Trust in Mobile Commerce	Overall perception of the consumer that he/she can trust the m-commerce service (Grandison *et al*, 2000). Positive expectation which the truster has in m-commerce (Schneiderman, 2000, p58).	WASP, Mobile Operator, Government	Will overall trust, culminating from trust in the vendor, system or institutional environment, influence the intention of consumers to adopt m-commerce?
Perceived Risk	Weaknesses exposed by m-commerce that can leave the consumer vulnerable.	WASP, Mobile Operator, Government, Consumer	Will perceived risks negatively influence adoption of m-commerce, or will high trust in the vendor, technology or system alleviate these concerns?
Intention to Participate	Consequences of the sum of the trust variables that culminate into an intention that demonstrates that the consumer is willing to perform m-commerce transactions (Grandison *et al*, 2000).	Consumer	Do trust and risk factors have a significant influence on the intention to participate?
Innovation Diffusion	Rogers (1995): Theory of Innovation Diffusion (IDT) determined innovation characteristics which influence the adoption of new innovations. Includes characteristics of relative advantage, complexity, compatibility, trialibility, observability, expanded with two additional variables, i.e. cost and image (Gilham, 2005).	Consumer	Do innovation diffusion characteristics have a significant influence on the intentions to participate and are the influences more significant than trust and risk factors?

Table 2: Definition of Research Components

The formulation of hypotheses and propositions will subsequently be discussed as an introduction to the research methodology that will be outlined in Chapter 4.

1.4 Research Propositions and Hypotheses

An explanation relating to the combined use of research propositions and hypotheses will follow. Hypotheses are empirically tested assumptions, while propositions are based on observable phenomena which the researcher utilises to form a decision as to whether the assumptions might be considered true or false (Cooper *et al*, 1998). Research propositions relate to the focus group analysis, while hypotheses relate to the statistical analysis portion of the research. The hypotheses are derived from the literature review and focus group discussions. Seven main hypotheses have been formulated that allow statistical analysis. The variables of the model will be discussed in more detail during the literature survey and research design chapters.

Hypotheses	Description	Research Proposals
H_o1	Perceived trust influences the intention to use mobile commerce services.	RP_o1
H_o2	Disposition to trust influences perceived trustworthiness.	RP_o2
H_o3	Perceived risk negatively influences the intention to participate.	RP_o3
H_o4	Perceived trustworthiness of the vendor influences trust.	RP_o4
H_o5	Perceived trustworthiness of the system influences trust.	RP_o5
H_o6	Perceived trustworthiness of the institution influences trust.	RP_o6
H_o7	Adoption enablers influence the intention to participate.	RP_o7

Table 3: Relationship Between Hypotheses and Research Proposals

In addition to the hypotheses, the research is aimed at addressing the following supplementary issues:

(1) The frequency of usage of types of m-commerce services;
(2) An investigation into the relationship between trust and risk;
(3) The manner in which consumers analyse risk;
(4) The identification of the type of risks and ranking of the most vital risks;
(5) A deduction of the relationships between the different variables of the model;
(6) Resolving the issue of whether trust is still relevant where risks are low;
(7) The identification of the distinction between low-value and high-value transactions in terms of rand value, as well as high-involvement transactions;
(8) An uncovering of the dynamics that exist between risks and high-value transactions to

determine if perceived risk increases when the value of the transaction increases;

(9) Establishing whether m-commerce is regarded as 'safer' than e-commerce.

1.5 Rationale for the Study

The market potential of m-commerce and Internet integration has opened up entirely new worthwhile research and development opportunities (Lehner, 2001). Research Companies, such as Strategy Analytics, estimate the global world market at US$200 billion (Vogel *et al,* 2004), while TowerGroup (Ding *et al,* 2003) approximate the value of micro-payments for mobile digital premium content to be worth US$48.5 billion. Gartner assesses a worldwide growth of 7.4% annually, reaching $676 billion in 2008 (Vechattio, 2005b). Although m-commerce predictions vary, even the more conservative estimates show massive potential. Since international research should closely reflect South African consumer sentiment, significant growth in m-commerce is therefore expected within the near future (Msiza, 2005).

Earlier m-commerce studies reported declines in m-commerce usage of between 20% and 24% (Boston Consulting Group, 2001; Kearney, 2001). An Accenture survey of over 3000 mobile device owners in Europe, Japan and the US, showed that only 15% of this total access the Internet and only 1% shop (O'Cleirigh, 2002). This is therefore interpreted as indicating that the m-commerce hype has not lived up to its expectations.

The potential value of m-commerce indicates that WASPs, Service Providers and Mobile Operators should experience a vested interest in stimulating m-commerce. The study therefore aims to enhance understanding of consumer behaviour regarding m-commerce in general, but also assist by providing interventions that the vendors can use to promote the adoption of m-commerce. MNOs, in particular, should pay attention to the transitive nature of trust (Bensaci *et al,* 2001). The transitive nature of trust implies that the MNO can influence consumer perceptions negatively by allowing unscrupulous WASPs to operate on their networks. This issue has received considerable attention in the media, where a case of misleading advertising by WASPs invoked strong reactions from the MNOs. This situation has reduced consumer loyalty and *trust* and ultimately resulted in limited use of the services (Whitford, 2004).

The dispute resolution environment, such as the Wireless Access Service Provider Association (WASPA), established in 2004, can benefit from the business case provided by the research as WASPA is sponsored by the three MNOs (Clarkson, 2005). This study can therefore assist in further building the business case for WASPA and other dispute resolution organisations. It has however been indicated that South African consumers are unaware of this avenue that is available to them (October, 2005).

Academics should be able to build on this study as trust has generated a great deal of interest in the research community and has been recommended as a worthwhile research opportunity (Varshney *et al,* 2001; Grabner-Kräuter *et al,* 2003c). Lack of trust have furthermore been demonstrated by many trust researchers as a significant factor influencing the uptake of mobile commerce services (De Ruyter *et al,* 2002; Dahlberg *et al,* 2003, Siau *et al,* 2003a; Schmidt-Belz, 2003). Previous trust studies have however been criticised for either failing to effectively conceptualise trust or describing trust in too narrow a scope (Grabner-Kräuter *et al,* 2003a; Ho *et al,* 1999; Chervany *et al,* 2001a; Grandison *et al,* 2000). In contrast to other researchers who have narrowed the scope of their trust research to obtain better findings, this model has been designed to investigate whether trust and risks are important factors in influencing the adoption of m-commerce and whether other significant factors exist.

Although empirical research has been undertaken in m-commerce, several areas remain unexplored. Okazaki (2005) status of m-commerce research is explored in Table 4 and an indication has been provided as to the extent to which the issue will be explored in this study.

Research Agenda (Okazaki, 2005)	Status of M-commerce Research (Okazaki, 2005)	Extent to which this is explored in the study
Mobile Internet Adoption	**Abundant**	**Partly explored during focus group sessions and current usage established by early adopters.**
Push Type Services (SMS-based)	Abundant	Explored as a risk during focus group sessions and on questionnaires.
Mobile Banking/Finance/Payment	Explored	Investigated during focus group sessions and on questionnaires.
Security Issues in M-commerce	Explored	Explored as a risk during focus group sessions and on questionnaires.
Location-based Services	Explored	Partly explored during focus group sessions and current usage established by early adopters.
Cross-cultural Issues in M-commerce	Scarce	Not explored in this study.
Mobile Gaming	Scarce	Partly explored during focus group sessions and current usage established by early adopters.
Electronic Versus Mobile Commerce Comparison	Unexplored	Explored during focus group sessions.
Mobile-based Word-of-mouth	Unexplored	Explored during focus group sessions.
Research Methodology in M-commerce	Unexplored	Building of model and investigation during focus groups and on questionnaires.

Table 4: The Status of M-commerce Research

Although Okazaki's (2005, p162) list is by no means exhaustive, it does indicate that this study provides a useful exploration into m-commerce issues that have been scarcely researched or unexplored by the international research community. Although some studies have been conducted on the general use and adoption of mobile commerce, no South African study has specifically focused on trust and risk. Since this is the first study of this kind conducted in South Africa, this thesis can be seen as the primary step in creating a comprehensive framework for building trust in m-commerce.

1.6 Structure of the Report

Chapter 1 commences by clarifying the focus of the research by introducing the objectives. Based on these research objectives, hypotheses and research propositions are formulated. Within Chapter 2, the concepts relating to m-commerce, trust and risk are brought together within a Literature Survey. This chapter begins with an overview of definitions relevant to m-commerce in an attempt to establish the scope of the research. This is followed by a discussion of the theoretical foundations for the research, highlighting trust and risk variables. The literature survey establishes the foundation of what is to be studied.

Chapter 3 provides an overview of the theory, models and methods on which trust studies, in general, is based. This is followed by an explanation of how the trust model was developed and on what theories it has been based. Chapter 4 translates *'what'* is being studied into explaining *'how'* the research is conducted to test the research propositions and hypotheses as formulated in Chapter 1. Chapter 5 thereafter tests the validity of the theory. The outcome either confirms or rejects the research propositions and hypotheses. This study succeeds, to a large extent, in answering the *'what'*, *'how'* and *'why'* questions, as well as queries relating to *'how much'*. The depth of the research allows valuable insight into m-commerce behaviour in South Africa.

Chapter 5 therefore formulates conclusions based on the research findings in Chapter 4, and the theories of Chapter 2 and 3. Based on these conclusions, some recommendations have been made, which could assist business in designing m-commerce services that will stimulate the adoption and usage of m-commerce in South Africa.

2 Chapter Two: Literature Survey

2.1 M-commerce Definition and Services

The study of trust takes place within the context of m-commerce. M-commerce has many definitions, each of which depend on the scope of what is being research. Not using a uniform definition prevents researchers from comparing and validating findings across studies. To explain the context of this study, definitions from various sources have been compared.

M-commerce is described as, "e-commerce business processes and models carried out on a mobile terminal" (Gordon *et al,* 2001). This view has however been challenged and, as Hyvönen *et al* (2005), explain, m-commerce is a "unique service category and not a stripped down version of the worldwide web on a mobile phone." Focus groups have also revealed that m-commerce cannot be seen as a "natural progression from e-commerce, but should rather be treated as a distinct experience" (Coutts, 2002). When the term m-commerce is used in this study, it refers to transactions conducted using the mobile phone, in contrast to e-commerce, where the access device is the Personal Computer (PC). However, in the case where SMS alerts are generated from websites, such as news alerts or ring tone downloads, the transaction will be deemed m-commerce.

M-commerce can additionally be described as, "any information interaction where a mobile device and networks are used where the transaction leads to the transfer of real or perceived value" (Schwiderski-Groshe *et al,* 2002). Consumers can perceive voice calls as leading to the transfer of value. This is however excluded from the definition of m-commerce. The "transfer of [monetary] value", however, implies that free services are excluded. Both normal SMS between consumers, as well as normal charged SMS to business are excluded. When an SMS is nevertheless charged at Premium Rated Service (PRS) rates, this is regarded as m-commerce (Durlacher Research, 2001).

M-commerce is additionally defined as, "the delivery of trusted transaction services over mobile devices for the exchange of goods and services between consumers, merchants and financial institutions" (Bensaci *et al,* 2001). This definition raises two aspects. One refers to the type of interaction, which, for the purposes of this study, is classified as Business-to-Consumer (B2C) m-commerce. The second relates to the assumption that m-commerce is a trusted service. If this is the case, this would significantly reduce the need for this study. Bensaci *et al* (2001) explain that even though mobile operators and vendors believe that payment using a mobile phone is more secure than traditional credit card payments, the public does not judge this to be true. The idea that trust and security already exist within m-commerce is therefore not assumed by this study.

The Australian Communications Authority (ACA) (2003b) describes m-commerce as, "the ability to

use mobile wireless devices as a secure method to purchase goods, services or digital content." ACA (2003b) also points out that their definition includes the purchasing of pre-paid services. Since 90% of South Africa's mobile subscribers are prepaid (Bonorchis, 2004), it can be assumed that pre-paid services are already widely accepted and trusted in South Africa. Even more importantly, the current brand values of the three mobile operators imply an existing *bond* between the consumer and the brand. Delgado-Ballester (2002) suggests that "the main ingredient of this bond is trust." There is limited value in studying an issue that could, theoretically, already be widely trusted; therefore the purchasing of pre-paid services has been excluded from the scope of this study.

M-commerce additionally relates to "payments originated and completed using a customer's mobile data-enabled phone or other handheld device" (Towergroup, 2002). This study does not subscribe to the completion cycle, since subscription services are generated from websites. Problems with regard to subscription services have been reported in the media, thus it can be presumed that such may not be widely trusted.

The following section deals with further exclusions, as relevant to the various types of m-commerce services, which are to be included in this study:

(1) Digital Premium-rated Content: This refers to payment for delivery of digital content that is downloaded to the mobile. Examples are ring tones, screensavers, audio clips, location information, MP3, gaming, weather forecasts and news. More 'high-involvement' type services are stock-trading and location-based advertising.

(2) Purchases: Relevant here are the purchases of physical products or services, such as books, flowers and location-sensitive purchases such as electronic theatre and airline tickets. Person-to-Person (P2P) payments, or 'cashless exchanges' between individuals, will be included, however, the transfer of airtime between consumers will not.

(3) Mobile Point-of-Sale (POS) Payments: This refers to payments where a wireless device has been used as a retail mobile POS; such as those used by mobile merchants. Examples are parking meter payments, fast food restaurants and vending machines.

(4) Banking: This correlates with the use of the handset to conduct banking transactions, such as transfers, payments and checking of balances. Banking services provided by Financial Service Institutions, like FNB or ABSA, are excluded since banks are well established and regulated, have greater transparency and the possibility of face-to-face interaction exists. In theory, banks could be more trusted than MNOs.

This study also excludes personal life management services, such as e-mail, chatting and mobile office activities, as these are usually provided though a trusted business portal.

M-Commerce refers to the use of a mobile phone to buy goods, services or digital content. The focus of this study is moreover on current m-commerce transactions, for example, content services, as well as future 'your–phone-is-your-wallet' type of m-commerce services which will allow for the payment of bills and the purchase of goods and banking. The provider of these services is called a vendor.

2.2 Mobile Commerce Technology, Services and Role Players

Since trust adoption takes place within the context of m-commerce, it will be relevant to provide an overview of the predominant technology, services and actors; especially considering that competition is expected to increase dramatically within the mobile industry. Vodafone has recently increased its ownership in Vodacom to a total of 50%, while Virgin Mobile is launching a Virgin branded service over the CellC network. These two deals endorse the enormous growth potential seen in the telecommunications sector. This can also be seen as an opportunity for new and innovative services and reduced cost of mobile phone services and handsets; reported to be the drivers of m-commerce.

New mobile technologies increase the prospects for m-commerce, as the upgrade from digital circuit switching technology (GSM) to packet switching technology, called General Packet Radio Service (GPRS), has increased speeds from 9.6 kilobits to 115 kilobits per second. The wider range of bandwidth enabled by GPRS or 2.5G (an intermediate step between second and third generation) has made it feasible to send and receive small bursts of data, enabling web browsing and e-mail applications. Third generation (3G) services, introduced in 2005, have enabled data transfer rates of 1929 kbit/s, of which users see up to 384kbit/s. These transfer rates make it possible to transmit and receive bandwidth intensive content, for example video telephony and television services. What is the next step, one might ask. The subsequent upgrade from 3G could be to Universal Mobile Telecommunications Systems (UMTS) which utilises High Speed Downlink Packet Access (HSDPA) technology, occasionally referred to as 3.5G which will allow for downlink transfer speeds of up to 14.4 Mbits/s. Every new technology roll-out presents the MNO with the challenge of building the network in time to prevent poor coverage, in spite of the usual initial lack of consumer demands for the service. The technology improvements of UMTS and HSDPA are expected to result in mobile devices becoming the major method of Internet access within the near future. A Vodacom Press Release (2006) has indicated that 26,6 thousand 3G Vodafone data-cards were active in December 2005; however, massive market penetration of data services has not yet occurred.

Mobile digital content services can be based on a variety of bearers. Premium Rated Services (PRS) are based on SMS charged at premium rates services (PRS), costing between R1,50 to R80 per download. PRS predominantly utilises the Wireless Application Protocol (WAP). Some WASPs provide location-based services (LBS) that utilise unstructured supplementary services protocol (USSD) codes, such as *#160, that can track individuals within a few metres of a specific location. It is however not only WASPs that provides m-commerce services, but also the MNOs and their Service Providers (SP).

South African MNOs use a 3-tier model where SPs are retailers of telecommunication products and responsible for managing the customer relationship on behalf of a particular MNO or all MNOs. The management of partnerships between mobile operators, WASPs and financial service institutions has therefore been identified as one of the biggest challenges for m-commerce (Brodsky, 2003). Figure

46: Wireless Actors Map, available in Appendix 1, provides an interesting visualisation of the interplay between the main role players in the m-commerce landscape.

The revenue generated by mobile content, estimated at R500 million in 2005, exceeded the 2003 online retail sales figure estimated as R341m by World Wide Worx (Czernowalow, 2005). This is not surprising, since only a few South African consumers have experience of buying over the Internet and only 700 websites offered B2C commerce in 2004 (Mzolo, 2004). South Africa is surprisingly inert in comparison with global statistics for Internet usage, with only 3,5-million Internet users estimated in 2003 (Worthington-Smith, 2000). The slow adoption of the Internet can largely be attributed to South Africa having one fixed line monopoly holder, Telkom, which, many argue, makes Internet access too expensive (Weber, 2004). The situation is improving since South Africans currently have a choice of four broadband service providers - namely MyWireless, iBurst, Vodacom 3G and MTN 3G (Stones, 2005).

Novel technological improvements have introduced new competition for MNOs. Voice Over Internet Protocol (VOIP) was recently legalised by the Telecommunication Act and allows telephone calls over broadband Internet connection, rather than fixed and mobile phone lines (Stones, 2005). Wireless Fidelity, or WiFi, is the term used to describe wireless local area networks (WLAN), known as 'hotspots', often situated at airports and hotels, that allow visitors to log on to the Internet and receive e-mails. Bluetooth is a personal area network (PAN) specification that allows different devices, such as laptops and mobile handsets, to communicate. These technological innovations also serve to drive declining Average Revenue Per Subscriber (ARPU), which increases the attractiveness of m-commerce as an alternative revenue opportunity for MNOs (Sukazi, 2002).

The MNOs are currently actively pursuing m-commerce opportunities. Vodacom, in partnership with Vodafone, has provided m-commerce products and services, via the Vodafone Live Portal, while MTN's information and entertainment portal is known as MTN Loaded (Weideman *et al,* 2004). Both Vodacom and MTN customers equipped with 3G-enabled handsets, are able to make video calls (Carta, 2006). MTN was however the first MNO to launch mobile its banking application: Y'ello Bank. Banking applications are also offered by other South African Financial Service Institutions (FSI), such as FNB and ABSA. Finmark Trust estimated that, out of a potential population for banking services of 28-million, 14-million are unbanked (Crotty, 2005). In contrast to the mobile banking products of the FSIs', MTN Banking and Wizzit offer products that do not require customers to go to the bank to open an account. Wizzit, in particular, targets the 'unbanked' as well as the 'underbanked' where consumers only utilise bank accounts in order to receive salaries (Gunnion, 2005).

2.3 Trust in South Africa

The parties to be trusted in the South African context refer to the providers of the m-commerce services, such as WASPs and mobile operators. Despite consumers feeling 'ripped off' by the high

cost of telecommunication in South Africa (Petit, 2005), the 2004 Business Trust Barometer, a national survey by research company 'Ask Africa', established that South Africans have high trust in MNOs. The high brand value of the MNOs additionally indicates a trusting relationship. The trust building capability of brand is seen as, "the cue for all the past trust generating activity and in the absence of human touch, it can be a symbol of quality and assurance that is capable of building trust" (Urban *et al,* 2002). While the MNO seem to be trusted, this could not necessarily be true of the WASP.

The media plays an important role in raising public awareness of issues relating to trust. Several negative reports about WASPs recently appeared in the media that related incidences of unethical business conduct. Certain WASPs were found guilty of misleading advertising; billing customers for services not received; charging exorbitant rates; double billing and SPAM (October, 2005; Vechattio, 2005; Whitford, 2004). Further indications of unscrupulous behaviour reported cases where the advertised prizes on the competition lines had not been awarded and rumours about selling of private customer details to third parties (Kok, 2005; Stones, 2005). It therefore appears that South African consumers have reason to be wary of certain WASPs.

The lack of transparency and complexity inherent in m-commerce can be advantageous to unethical vendors. M-commerce provides more opportunities to small vendors to 'get rich quick'. This 'ethos', combined with the inability of the criminal justice system to pursue unethical business practices, can lead to an increase in these practices (Camerer, 1996). The stigma attached to unethical behaviour only acts as a deterrent if the law is actively enforced. The inability of the South African Police Force to curb crime has caused South Africa to fall one notch in the World Economic Forum's Annual Global Competitiveness Report (Katzenellenbogen, 2005). Furthermore, Camerer (1996) believes that the 'moral flexibility' of South Africans could justify unethical behaviour as being routine and normal business practice and, therefore, not such a problem.

Trust researchers believe that the legal framework (institutional-based trust) plays a vital role during the trust formation process (Chircu *et al,* 2001; Cheung *et al,* 2001, Ventakesh *et al,* 2000). It provides the assurance that rules and regulations exist and that vendors are required to comply with these. Such a legal framework was introduced in August 2002, namely Act No. 25, 2002: Electronic Communications and Transactions Act (ECT Act). The objective of the Act was to promote trust and confidence in e-commerce by governing the development of safe, secure and effective electronic business environments for consumers. For instance, Chapter 7 of the ECT Act provides the m-commerce consumer with legal protection against SPAM and obligates companies to provide consumers with the opportunity to unsubscribe from the mailing list.

The prosperity of a society is believed to correlate with trust levels, indicating that the more 'economically backward' a society is believed to be, the lower the trust level is likely to be (Gamik, 2004). Pennington (2005) poses the following question: "In the last ten years, have we [South-

Africans] worked on moving from a low-trust community to a high trust community?" This appears to be the case, since the World Economic Forum found that trust in business in South Africa is 48%, exceeding the global trust figure of 42% (Ask Africa, 2004). President Thabo Mbeki states that: "... given our past, we are able to work on building trust at every level in our society, then we will continue to grow our social, political and economic well-being, and increasingly become a beacon of hope in a troubled world" (ANC Today, 2005).

Whilst the preceding sections served to clarify the subject being studied, as well as the mobile entities involved, an important role player in the mobile value chain has not yet been addressed. It will therefore be functional to focus on the consumer within the section to follow.

2.4 Mobile Commerce Consumers

For m-commerce to be successful, it follows that consumers should be willing to adopt m-commerce. Less than eleven years ago, South Africans thought that mobile phones were nothing more than a novelty. Currently, mobile phones have been firmly entrenched in the everyday lives of South Africans. The mobile phone has progressed from a luxury to an essential tool. The issue to be addressed is whether m-commerce services will show the same diffusion trend as mobile voice in South Africa.

2.4.1 Overview of South African Mobile Consumers

There are approximately 25-million people with cellphones in South Africa, as opposed to 3.6-million Internet users (Mochiko, 2005). The combined South African e-commerce and m-commerce penetration rate is still minute when compared with that of Europe. In 2003, it was estimated that 1-billion European mobile users existed, of which 85% were Internet enabled (Timmers, 2000). The relative advantage of obtaining Internet access via the use of cellphones or data-cards will be much higher for South Africans than within countries that have high Internet penetration rates (Fife *et al*, 2004). Key features required for the success of m-commerce are the availability of content and the existence of 3G networks; both of which are available in South Africa (Hague, 2004). An additional factor influencing the adoption of m-commerce is the availability of mobile phones with advanced functionality. Old type GSM-based phones, only capable of handling voice and SMS, are used by the vast majority of the population. Therefore, the availability of m-commerce and the Internet-enabled mobile phones could be a significant inhibitor in South Africa.

Focus group studies found that, "people do have an emotional relationship with their mobile phones in the way that it enables them to stay in touch with those that they are close to" (Vincent *et al*, 2003). This also seems to be true for South African consumers, since, generally, they are very satisfied with the impact that the cellphone has had on their lives. More than 94% of the respondents to World Wide

Worx's Mobility Survey (2005) indicated that they were satisfied with the performance of their cellphones and commented on the impact on their sense of personal and family security. More than 93% were pleased with the service provided by MNOs and with the impact that their phones had had on their lives. Furthermore, the mobility study revealed that 92% felt that the cellphones positively contributed to their working experience; possibly increasing productivity.

2.4.2 Inhibitors and Enablers

M-commerce drivers are similar to e-commerce drivers, which has led many trust researchers to believe that similar trust and risk issues will exist. However, each has its own unique characteristics which should be considered. For instance, the effectiveness of the interface design is one consideration. In a South African study of MBA Students in Kwazulu-Natal, 73% of the student believed the PC-interface to be more effective (Sing, 2003). Interface design should therefore be a more important inhibitor for m-commerce than e-commerce.

The drivers of m-commerce services are widely believed to be: (1) convenience; (2) ease of use; (3) time-savings; and (4) greater availability of information (ACA, 2003a; Hague, 2004; Lee *et al,* 2003). Ease of use relates to 'cash-less impulse buying' and 'queue avoidance'. Both hedonistic (pleasure-seeking) and utilitarian (functional) motivations are important drivers of m-commerce (Lee *et al,* 2003) and the fact that pleasure motivations will overtake privacy and security concerns when the consumer considers partaking in m-commerce should be acknowledged as an importance consideration for this study (Belanger *et al,* 2002).

South Africans consider the following to be inhibitors of m-commerce: (1) cost; (2) lack of business requirement; (3) handset non-compatibility and (4) lack of skills and knowledge (Sing, 2003). International studies refer to: (1) security; (2) poor interface design; (3) lack of skills; and (4) no business requirements (Forrester, 2002).

In contrast, an Australian survey of 3752 mobile commerce and Internet users, revealed a low level of trust in the technology platform, and reported increased security/confidentiality/privacy as the major issue inhibiting future adoption of services (Coutts *et al,* 2003). While security and privacy fears are indicated as a major concern by international customers, the question is whether this is also true of South African consumers. The 2004 MasterCard Survey suggested that South African online retailers could increase their sales by more than R115m if they increased security, as 48% of South Africans feel vulnerable when using credit or debit cards on the Internet (Msiza, 2005). Banking could be considered more risky than normal transactions, and international focus group studies on banking revealed that security and privacy continue to be significant concerns, even though the concerns are based on perceptions rather than fact (Coutts, 2002).

The next question to be raised is, is price a significant factor? In a report published in the Government

Gazette, it was reported that cellphone charges are, in some cases, more than ten times more expensive than that of other comparable European countries (Steenkamp, 2005). Other South African studies reported price as the main inhibitor of further adoption (Von Erkom Schurink *et al,* 2002), or at least one of the factors (Bakker, 2004; Furber, 2004). The issue of price as an inhibitor could possibly relate more to the introduction of risks, as indicated by the remarks of respondents to a study by Gilham (2004): "Some content services are very expensive and there is no opportunity to try them out before purchasing," which denotes uncertainty about what they will be paying for.

2.4.3 Early Adopters

The demographic profile of South African mobile phone users is economically and socially dispersed (Snyman, 2005). The significant predictors of service usage are age, expertise, attitude towards new technology, as well as education and income (Hyvönen *et al,* 2005). There is, nonetheless, one group that is of particular significance for m-commerce adoption; namely 'early adopters'. The term early adopters stems from Rogers Innovation Diffusion Theory (IDT) which will be discussed in more detail in Chapter 4. Early adopters serve as 'opinion leaders' that can persuade others to adopt m-commerce.

Early adopters of m-commerce seem to follow similar patterns to fixed-line Internet users. They are known to be younger, more affluent and better educated than the general population (BCG, 2000). This also appears to be true within the South Africa context. Eleven million, or 39% of South Africa's 43-million population, are between the age of seven and seventeen, compared to the United States, where 50% of the population is over the age of fifty-five (Sampson, 2005). UCT Unilever Institute of Strategic Marketing estimates that the younger generation – those between the ages of seven and seventeen - spend more than 4-billion rand a year on themselves, and their parents an additional 20-billion rand. This makes these youngsters increasingly attractive to MNOs as they are still to break through the 21% penetration barrier in the sixteen to twenty-four market. This should not be too difficult, considering that the Youth Brand Survey named Vodacom and MTN in their list of top South African Companies (Sampson, 2005).

Approximately 4-million South Africans between the age of sixteen and twenty-four live in the middle-to-upper Living Standards Measure (LSM). For the youth market, a cellphone is not only about communication, but relates to self-expression (Taylor, 2004). This is indicated by the popularity of mobile content services. One ring tone can sell over 100,000 copies in a month at between R1, 50 to R10 for a 'truetone', peaking at 800,000 (October, 2005).

The target population for the statistical analysis portion of this study is early adopters. This is acceptable when the adoption of new technologies, such as m-commerce, is tested. The question is whether early adopters are concerned about trust and risk issues. A study by Agarwal *et al* (1998), testing differences between early and late adopters, found that early adopters take more risks. They

exhibit traits showing impulsivity to 'dive in' without considering the risks involved. Late adopters, by comparison, carefully consider the reasons and consequences of adopting m-commerce. This has major implications for the research.

2.4.4 M-commerce Services

What are South African users purchasing? A study by research company World Wide Worx: Mobility 2005, studied the impact of mobile technologies on the South African consumer. The most popular technologies for content services purchases were indicated as SMS/WAP. The study also indicated that the older the customers are, the less likely the tendency to use SMS will be. In addition, the younger the subscribers are, the more likely they are to make purchases. This again indicates that the market for mobile content services is the younger people. The distribution of purchases is indicated in Figure 2.

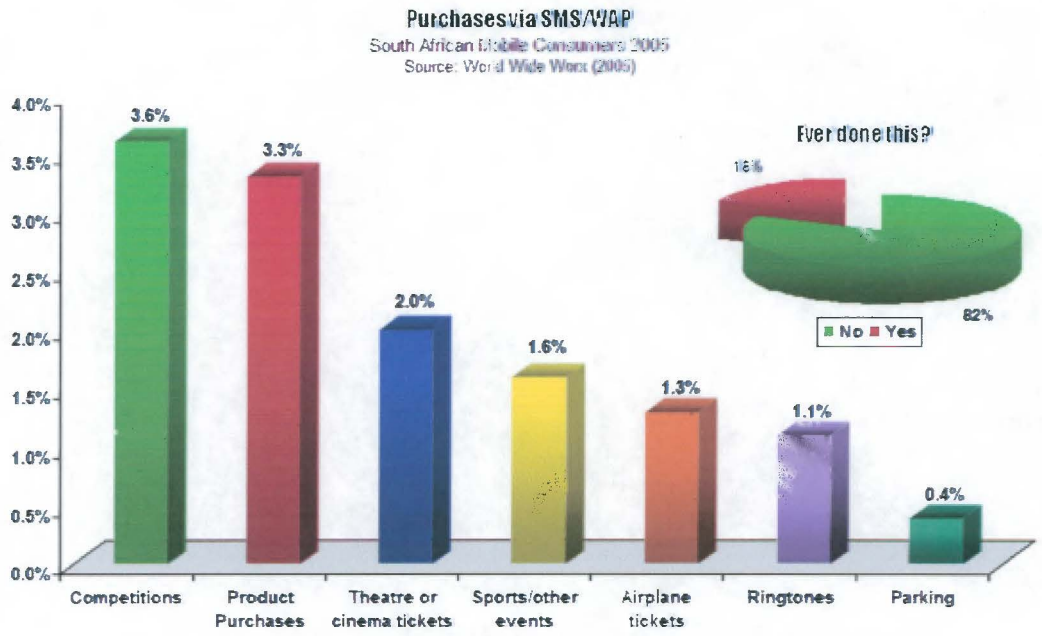


Figure 2: M-commerce Purchases by South African Consumers in 2005

Only 18% of subscribers surveyed perform purchases. The most popular service appears to be competitions (3.6%), followed by product purchases (3.3%), where 4.9% purchase tickets which range from medium-value transactions, like cinema tickets (2%), to high value transactions, such as airplane tickets (1.3%). This could mean that early adopters of these services already have high trust in the services. The type of technologies that they use has been illustrated in Figure 3.

Only 26% of subscribers have mobile phones that are capable of Internet and data access. Current usage patterns of subscribers relate predominantly to leisure activities, such as MMS (53.1%), taking photographs (43.3%) and WAP/WIG (19.4%). The biggest future usage potential for MNOs is

banking, with 32.6% indicating that they would use this service in the future. Usage potential also exists for purchases (24.7%), followed by GPRS (23.6%) and 3G usage (22.9%).

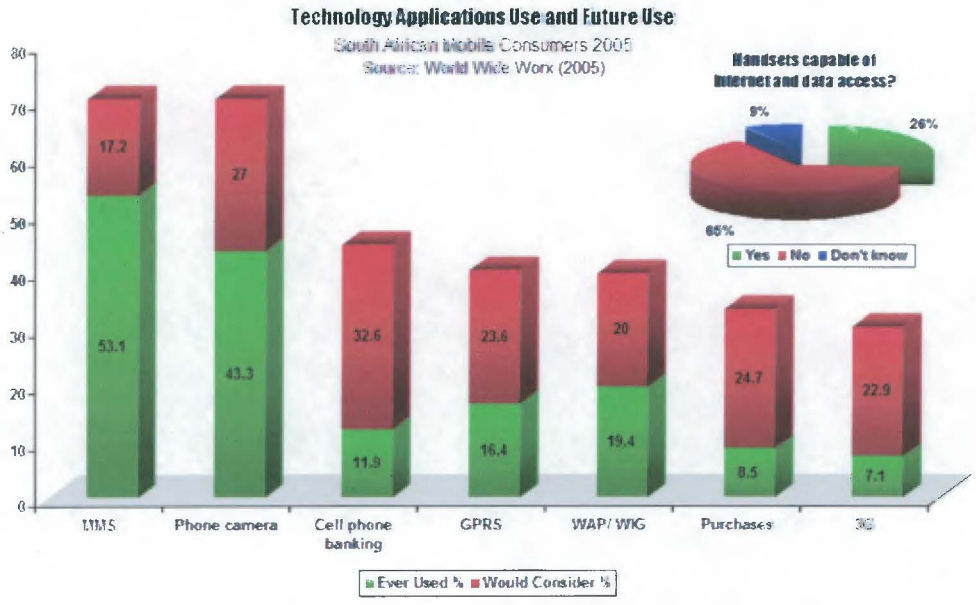


Figure 3: Technology Applications Used by South African Consumers in 2005

The high future potential for banking services warrants further discussion, as, by all indications, it is regarded as a high risk transaction. Forrester indicated that 85% of subscribers do not feel comfortable sending their payment card details over mobile networks. The perception of South African consumers regarding available banking solutions is therefore of big interest for the purposes of this study – as illustrated in Figure 4.

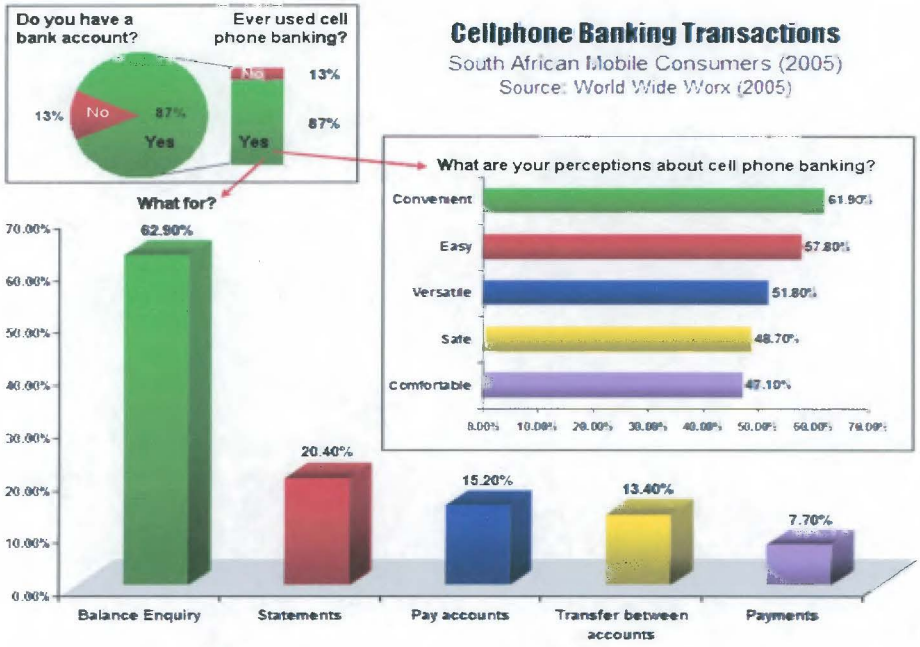


Figure 4: Cellphone Banking Transactions by South African Mobile Consumers in 2005

A total of 87% of the respondents had bank accounts, representing the 14-million 'banked' South Africans (Crotty, 2005). Of those, 87% used some form of cellphone banking, such as perform balance enquiries (62,9%) and review statements (20.4%). Only a small percentage of the subscribers had actually performed financial transactions. Of those that had, these transactions included paying accounts (15.2%), transferring money between accounts (13.4%) and the making of payments (7.7%). The uptake of the more risky type of banking transactions, where money is exchanged and moved, is therefore still below expectation.

The major enablers for cellphone banking were stated as, (1) convenience; (2) ease of use; (3) versatility; (4) safety and (5) comfort. Since this study was conducted early in 2005, MTN banking had not yet been launched. It can therefore be deduced that the above figures relate to banking services provided by FSIs and not MNOs. It could also explain the lack of security concerns noted by the participants of the Mobility Report, since it was previously indicated that MNOs would find it difficult to establish themselves as independent FSIs'. Since this literature survey deals with promoting trust in m-commerce, the next section will clarify what is meant by the term 'trust'.

2.5 Typology of Trust Variables

A basic definition describes trust as, "assured reliance on the character, ability, strength or truth of someone or something" (Merriam-Webster, 2002). A comprehensive trust definition would include several additional concepts. Grandison *et al* (2000) remark that, "there is no consensus in the literature on what trust is and on what constitutes trust management." A definitive definition of trust thus does not exist (Lewis *et al,* 1985; Ho *et al,* 1999). Previous trust studies only supported a limited conceptualisation of trust (Chervany *et al,* 2001a; Grabner-Kräuter, 2002).

Trust is described by Gefen *et al* (2003) as a "complex, multi-dimensional, context-dependent construct". Trust is an inter-disciplinary construct. Tsfati (1999) remarks that, "it would not be an exaggeration to say that trust plays a part in almost every human interaction". Since the exact meaning of trust is not clear, it will therefore be practical to present an overview of the concept.

2.5.1 Trust and Trustworthiness

Trust is a relationship that involves trust and trusting parties (Singh, 2001). The parties are, respectively, the (1) truster and (2) trustee. The truster is the 'subject' that trusts a target entity, while the 'trustee' is the entity that is trusted (Grandison *et al,* 2000). For the purpose of this study, the truster will refer to the m-commerce consumer, while the trustee will refer to the vendor.

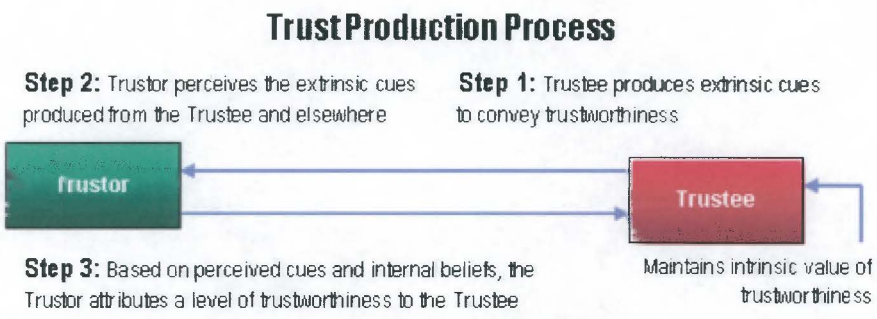
Trustworthiness is seen as the consumer's perception of how trustworthy the vendor is. The two terms are often used interchangeably by trust researchers. The main distinguishing factors is that

trust refers to the consumer's propensity to trust, while trustworthiness implies the ability of the vendor to convey 'signals' that indicate that they can be trusted. Bailey *et al* (2002b) see trust from the consumer's viewpoint as, "the perception of the degree to which an exchange partner will fulfil their transactional obligations in situations characterised by risk or uncertainty." Trustworthiness, from the vendor side, is "an objective quality governing the degree to which transactional obligations will be fulfilled in situations characterised by risk or uncertainty." It is therefore valuable to asses the consumer's perception of trust, since Ho *et al* (1999) did not regard trustworthiness as, "a necessary condition for the development of trusting behaviour." The vendor can therefore be trustworthy, but the consumer could have a different perception. The term trust and trustworthiness will be used interchangeably by this study, since it assumes trust(worthiness) as the consumer's perception of how trustworthy the vendor is.

2.5.2 Trust Production Process

Trust is a 'multilateral relation' that includes technology and partners in a social context (Schmidt-Belz, 2003). Feng, Lazare and Precce (2003) see: "the relationship between online interpersonal trust and people's general trust attitude in their daily life as very complicated." 'Multifaceted intricacies' exist between trust variables. It would therefore be relevant to provide a brief explanation of how trust is produced, referring to Figure 5: Trust Production Process.

Bailey *et al* (2002a) explain the trust production process as starting with the vendor knowing to which degree they their transactional obligations will be fulfilled. As a consequence, the consumer will use 'extrinsic signs' created by the vendor to presume a level of trustworthiness, while the vendor maintains an 'intrinsic value' of trustworthiness. 'Extrinsic signs' of trustworthiness have been researched in many empirical studies as guidelines for vendors to create perceptions that their services can be trusted. This will be discussed in more detail in Section 2.5.6.



Source: Bailey *et al*, (2002a)

Figure 5: Trust Production Process

Widely accepted definitions for each of the trust variables do not exist. Various researchers emphasise different aspects of trust which, ultimately, has lead to inconsistencies between the

various studies. The variables of trust used in the model are: (1) disposition to trust; (2) institution-based trust; (3) systems trust (4); vendor trust and (5) participation in m-commerce.

2.5.3 Disposition to Trust

Disposition to trust is a 'belief' that relates to the 'propensity' of the consumer to depend on the vendor (Gurviez *et al,* 2003). Each consumer, based on their personal characteristics, has a unique willingness to depend on others (Chervany *et al,* 2001a). An individual can be born with this personal characteristic or develop it later in life. 'Disposition to trust' is also described as, "a rational assessment of reliability" (Auroja *et al,* 2002) and a "generalised morality" (Granovetter, 1985). It therefore involves a decision-making process, influenced by 'societal rules and norms'. 'Disposition to trust' is a "generalised tendency across situations" and influences the consumer's perception of all other trust variables (Chervany *et al,* 2001b). This is a significant indicator of overall trust, even when other important determinants of trust are present (Lee *et al,* 2003).

Disposition to trust is also dependent on a specific situation. During unfamiliar situations which involve risks (such as m-commerce), 'dispositional trust' becomes more important (Johnson-George *et al,* 1982). The ways that an individual perceives risk is also influenced by dispositional trust (Dahlberg *et al,* 2003). During trust studies, it is important to isolate 'disposition to trust' from other trust building mechanisms in order to determine its relative influence (Ho *et al,* 1999).

Even though Lewis *et al* (1985) argued that trust could not be reduced to a personal characteristic, various trust researchers have identified indicators of disposition to trust. Urban *et al* (2002) identified four consumer characteristics that promote trust, namely: (1) internet savvy; (2) past behaviour; (3) previous shopping experience and (4) entertainment value. Siau *et al* (2003a) identified, (1) past experiences with product vendor and (2) word-of-mouth referral as consumer characteristics that could influence trust building in m-commerce. De Ruyter *et al* (2002) furthermore identified personal characteristics that influence m-commerce adoption. These are: (1) innovativeness; (2) opinion leadership and (3) previous usage. Siau *et al* (2003a) identified (1) past experiences and (2) word-of-mouth referrals, whereas, Hu, Lin and Zhang (2002) did not find previous experience to be significant. Most of these characteristics are indicative of 'early adopter' characteristics. For the purposes of this study, 'disposition to trust' refers to the personal characteristics of a consumer which, in general terms, indicate a tendency to trust others. The term 'disposition to trust' and personal characteristics will be used interchangeably.

2.5.4 Institution-Based Trust

Institution-based trust is the belief of the truster in the security of a specific situation, due to the fact that certain performance structures are in place. Many researchers feel that trust will not develop

without "institutional infrastructures that establish and enforce rules and regulations" (Chircu *et al,* 2000; Cheung *et al,* 2001). The power of institution-based trust is best explained by Mahadevan and Ventakesh (2000) stating that when vendors "do not support fair information practices and enforcement mechanisms when addressing user's privacy and other concerns, the legal framework could play a vital role in regulating the industry and restoring confidence in the minds of customers." Chervany *et al* (2001), citing Rotter *et al* (1971), argue that disposition to trust is a "generalised reaction to life's experiences with other people", therefore partly based on personal characteristics. Other trust researchers, such as Zucker (1986), argue that the formation of institution-based trust is not reliant on personal characteristics, but based on formal mechanisms which provide assurances that conditions are in place to ensure that the transaction will be successfully completed.

Institutional-based trust relates to laws, regulations and institutions. In South Africa, the Independent Communications Authority of South Africa (ICASA) is the primary regulator for the telecommunication industry. iCASA additionally fulfils the role of monitoring and dealing with customer complaints that were unsatisfactory resolved by MNOs. Other avenues of recourse available to consumers are the Wireless Applications Service Provider Association (WASPA), established in 2004 (Weideman, 2004). Unhappy subscribers are also increasingly setting up their own consumer groups, such as the recently established forum www.celhell.co.za (Marud, 2006). The Electronic Communications and Transactions Act is one of the most important customer protecting provisions. Despite South Africa having some of the most advanced electronic commerce regulations, a study by Van der Merwe (2004) indicated that none of the South African websites complied with the regulations of the ECT Act. The question is therefore how effective these regulations are in protecting consumers.

Some researchers identify 'third party certification' as an antecedent of institutional-based trust because this assists consumers to trust due to the increased cost of opportunistic behaviour (Ho *et al,* 1999; Siau *et al,* 2003a). However, for the purposes of this study, third party certification is seen as part of vendor trust; since the vendor can use third party certifications, if the need arises, in contrast to institutional trust, where the vendor has limited influence over laws and regulations.

2.5.5 Systems Trust

Research has shown that consumers can develop trust in technology (Nas *et al,* 1995; Waern *et al,* 1996). The process for producing trust is similar due to the fact that the interaction takes place in a 'social manner' (Sproull *et al,* 1986). Trust in technology is often referred to by trust researchers as 'systems trust', which is based on assumptions that "systems are operating in a predictable way" (Grabner-Kräuter *et al,* 2003a; Lee *et al,* 2003; Kim *et al,* 2002). Schmidt-Belz (2003) asserts that the assessment of trustworthiness of a system requires "special and profound expertise," which means that the 'expert's' assessment of trustworthiness of a system might differ from that of an 'ordinary' consumer. A case in point is that mobile operators believe that mobile phones offer more secure payments than traditional credit card payments (Danesi *et al,* 2001). Consumers, however, do not

share this view and regard security as one of their primary concerns (Methlie and Petersen, 2000; Hague, 2004). This study is therefore concerned with the customer viewpoint of systems trust.

Urban *et al* (2002) reiterate that, "in the early stages, online trust might have more to do with the performance of the technology." Since m-commerce technology is relatively immature when compared with the Internet, technical competence or 'technology credibility' is indicated by sufficient bandwidth, network coverage, speed and Quality of Service (QoS); perceptions which will contribute to the building of trust (Siau *et al*, 2003b; Carlsson *et al*, 2001; Purdue, 2001; Capra, 2003 and Chircu *et al*, 2000).

According to Varshney *et al* (2002), trust in m-commerce is likely to grow with increased "network reliability, redundancy, improved security and the support of atomic transactions (transactions with no steps)." The latter is important in the case of a disconnection during the transaction. The technology platform should also address trust issues relating to security, performance, scalability, compatibility, reliability and authentication (Auroja *et al*, 2000). Ehrlich (1999) affirms that "state-of-the-art technology connotes professionalism, even if it's hard to use," which, in turn, indicates that the use of 'leading-edge' technology, such as 3G, could build trust.

Improved security is another trust-building mechanism, which includes "encryption, digital certificates and private and public keys among the measures that will help meet future security requirements in the mobile environment" (Siau *et al*, 2003b). Security is seen as a technology issue, while privacy is seen as a business process (Van der Merwe, 2001, p49). Security relating to technology will therefore conceptually form part of systems trust, while privacy will form part of trust in the vendor.

2.5.6 Vendor Trust

M-commerce studies have presented evidence that consumers are concerned about the vendors that deliver the service (Schmidt-Belz, 2003). Trust in a mobile vendor is dependent on the consumer's perception of the skills, expertise and operational abilities (competence trust) of the vendor, in addition to demonstrations of consistent behaviour (predictability trust) and honesty (goodwill) (Siau *et al*, 2003a).

Vendor trust is the degree to which the consumer perceives that the vendor will fulfil the transactional obligations in risky or uncertain situations (Bailey *et al*, 2002b). Vendors can use 'interventions' to influence consumers to show trusting behaviours. Timmers (2000) identifies vendor interventions as the use of "self-regulation to bridge the trust gap." Vendor interventions are the operationalisation of trust theory into 'utility maximisation mechanisms' (practical applications) that the vendor can use to provide assurances to consumers (Ho *et al*, 1999). The more embedded or fixed into the environment these mechanisms are, the more likely it is that trust will increase (Lee *et al*, 2003). Example of an intervention embedded in the environment is third party certification or 'trust promoting seals', such as

TRUSTe and VeriSign. Hu *et al* (2002) established that consumers who are more familiar with a particular seal will be more willing to buy from an unknown vendor who bears this trust seal.

Since the vendor decides what type of technology to use, trust researchers, such as Chervany *et al* (2003), include 'systems trust' as part of vendor trust. Although vendor interventions increase trust, this trust is not automatically extended to the underlying computer technology. Camp *et al* (2000) explain that, "as computer systems become more integral to individual action, social interaction, and commerce, the study of trust must extend to understand how individuals extend trust to computers and computer systems". If the vendor is a WASP, they will have limited control over some technological aspects, such as the reliability of the handset and the mobile network. The battery of the handset could discharge, or the network connection fail, which could cause distrust. Vendor trust, for the purpose of this study, therefore specifically deals with trust factors that relate to the vendor and over which the vendor has full control.

It is also important to clearly distinguish between institution-based trust and vendor trust. The primary difference is how the variable fits within the overall m-commerce environment. Institution-based trust relates to the overall m-commerce environment, while vendor interventions provide consumers with the assurance that a particular m-commerce service is safe in spite of the overall m-commerce environment (Chervany *et al,* 2001a). If vendor interventions become standard practices, the overall m-commerce environment might, over time, be perceived to be safe and secure. Standardisation of m-commerce interventions, such as proposed by WASPA, could eventually lead to an increase in institution-based trust.

It is necessary to be guarded against the idea that vendor interventions will automatically create trust. Lundblad (2001) cautions "that trust is not an artefact that can be created or implemented. This is not a self-evident truth. It might very well be argued that trust is an emergent quality that is not reducible to a set of quick fixes." Vendor trust has a number of sub-variables which will be discussed next.

2.5.7 Vendor Trust Sub-variables

A key issue of this research is how the vendor can promote trust in m-commerce. To answer this question, it is necessary to discuss the sub-variables of vendor trust. Some trust researchers agree on three sub-variables, while others view it as one main variable. These sub-variables refer to the critical high-level attributes that the trustee must show to enable trust. This has been illustrated in Table 5: The Sub-variables of Vendor Trust.

Researcher	Number	Variables
Mayer *et al* (1995).	3 sub-variables	Ability, integrity and benevolence.
Bhattercherjee (2002)	3 sub-	Competence, integrity and benevolence.

Researcher	Number variables	Variables
Doney *et al* (1997)	1 variable	Combine integrity, ability and benevolence as one variable.
Kumar *et al* (1995) cited by Gefen *et al* (2003)	1 variable	Combine honestly and benevolence as one variable.

Table 5: The Sub-variables of Vendor Trust

Not only is there a lack of agreement with regards to the number of sub-variables, but Gefen *et al* (2003) argue that the three sub-variables relate to trustworthiness rather than trust. To guide the discussion, the vendor trust characteristics, proposed by Bhattercherjee *et al* (2002), have been adopted - namely competence, integrity and benevolence. The interventions can overlap and can, in some instances, indicate both competence and integrity. Researchers additionally disagree about the exact fit of the interventions within the different variables.

2.5.7.1 Competence

Competence refers to the belief of the truster that the trustee has the power to fulfil transactional obligations. Urban *et al* (2002) describe competence (credibility) as, "the belief in the sellers (trustee) expertise to do the job effectively." It is necessary that the vendor displays these characteristics of competence, but mere display on its own is insufficient to generate trust (Siau *et al,* 2003b, p106). Well-designed, but insecure, websites could therefore not necessarily succeed into "lulling users into potential inappropriate high trust behaviour" (Camp *et al,* 2003). The reliability and quality of the network indicate competence of the MNO (Bouch *et al,* 2001).

Interventions that the vendor can use to create the impression of competence include disclosure of reliable financial reporting, since this is seen as an attempt at greater transparency (Shneiderman, 2000). The mobile operator brand value and the brand of the WASP, independent of the operator brand, are important (Delgado-Ballester, 2002). The quality of information content (IC) has a direct influence on the consumer's perception of a vendor (Egger *et al,* 2002; Siau *et al,* 2003b). Egger (2000a) states that, "if interface properties (IP) are not properly addressed, they can be very damaging to any level of trust that has already been built up." Broken links, typographical and grammatical errors, may affect the credibility of the service as well as lack of "quantity (either too much or too little content), quality and timeliness of information" (Auroja *et al,* 2000; Urban *et al* 2002). Vendors can make information easier to locate by using navigation strategies, such as consistent placement and help facilities to assist and inform the user (Ehrlich, 1999). Given the limited text-supporting capabilities of mobile devices, interface design and ease of use are even more important in m-commerce than e-commerce (Gefen *et al,* 2003).

A further indicator of competence is the provision of 'reputation services'. An example is E-Bay's reputation service which allows the parties in the transaction to comment on "how they felt the other

party handled the deal" (Lundblad, 2001). Other examples of 'reputation services' include return and refund policies, warranties and references from past and current users. Additional 'reputation mechanisms' are identified as customer testimonials; awards that the company has received; links to other associations and ranking or comparing the companies or the products and services (Auroja *et al,* 2000). Linking to other web-pages may, as Singh (2002) has pointed out, "indicate some sorts of an endorsement relationship." If a reference is therefore provided to a disreputable vendor, it could lower trust in the vendor who provided the link.

Trusted third parties (such as Mweb Safeshop) are called 'reputation services'. In the case where the m-commerce service is provided by a WASP, the MNO can be seen as a trusted third party (Josan and Sanderud (2002). Urban *et al* (2002) define third party trust as a "transitive trust to rely on an exchange partner in whom one has confidence." The role of the trusted third party is to lower the need for user expertise. Chircu *et al* (2000) feel that expertise is not simply translated into 'ease of use', but is rather a "much deeper, domain-specific knowledge". It is therefore important for vendors to consider that their partners or references in the m-commerce value-chain are reputable (Wetzels *et al,* 2001; Gefen, 2000).

2.5.7.2 Integrity

Integrity is the belief of the truster that the trustee makes good faith agreements and fulfils promises (Chervany *et al,* 2001a). The vendor can disclose information about the company itself, such as physical location, ownership and contact information (Shneiderman, 2000). This type of information is mandatory for South-Africa e-commerce sites according to the ECTA. However, Koufaris *et al* (2002b) found that providing information about the company to new customers will not significantly increase trust, which could show that new customers distrust information provided by the vendor itself.

The provision of information that indicates the company reputation and size was identified as a trust builder. The company reputation was however considered to be more important than company size (Jarvepaa *et al,* 2000) and, furthermore, the company size was not as significant a factor in trust-building (Koufaris *et al,* 2002), which is not surprising since, as stated by Zhu *et al* (2004), company size is negatively related to value since 'structural inertia' associated with large vendors tends to retard value. However, Jarvenpaa *et al* (2000) suggested that vendors include the number of staff and physical outlets in order that consumers might determine the company size.

The provision of a clear and comprehensive privacy and security policy will increase trust, as the truster will be able to make informed decisions about the risks involved in a transaction (Bailey *et al,* 2002b). Kiryanova (2003) described privacy as the trustee's "abstinence from unauthorized tracking" and "willingness to refrain from unauthorized and potential injurious dissemination" of the truster's "personal and financial information". To promote trust in m-commerce, PriceWaterhouseCoopers

(2001) advised the mobile commerce industry, "to handle tracking capabilities responsibly and to develop strict standards for the use and disclosure of such technology." For first time users of a service, privacy is furthermore the most important determinant of trust (Koufaris *et al,* 2002a).

2.5.7.3 Benevolence

Benevolence refers to the expectations of the truster, i.e., the assumption that the trustee will consistently 'act fairly', care for the truster, act in his/her best interest and not take advantage of the truster, even if the opportunity arises (Lee *et al,* 2000; Chervany *et al,* 2001a; Urban *et al,* 2002).

Two benevolence factors are of interest, namely 'guarantees' and 'personalisation'. Guarantees include up front disclosure of dispute resolution policies and procedures. It is probably for this reason that Gefen *et al* (2003a) referred to benevolence as a higher level of trust in comparison with the other remaining two sub-variables. Cooperative behaviour is not based on ability, but rather on goodwill. Moreover, the influence of benevolence on trust will increase throughout the course of the customer relationship. Guaranteed policies also play a role in lowering risk perceptions, as they reduce the potential impact of negative events (De Ruyter *et al,* 2001).

'User-driven personalisation' enhances trust due to the fact that it allows users to "set the pace of personalisation and contact from marketers" (Urban *et al,* 2002). Personalised content demonstrates 'care and goodwill' towards the customer and better satisfies the needs of the customer (Auroja *et al,* 2002). If personalisation does not have the desired influence, 'virtual re-embedding' can also be considered. Duda *et al* (2002) additionally explain that 'virtual re-embedding' refers to the inclusion of photographs which create a "social presence and bringing the impersonal process of commerce closer to the familiar situation of a face-to-face sales conversation."

2.5.8 Trust and Trust-related Behaviours

Trust in m-commerce is the sum total of the influences of all the previous trust variables; ultimately culminating in the 'positive expectation' that the truster has in m-commerce (Scheiderman, 2000. p58). 'Trusting beliefs' are dependent on the situation, thus a trust relationship cannot be regarded as stable, as the "truster trusts a trustee with respect to its ability to perform a specific action within a context" (Grandison *et al,* 2000).

Trust-related behaviour is viewed by Grandison *et al* (2000) as the "outcome of a trust decision based on many things such as the truster's propensity to trust and the beliefs and past experience relating to the trustee." Chervany *et al* (2001a) see trust-related behaviours as the consequence of the sum of trust variables inevitably resulting in behaviours of the truster that demonstrate willingness to do business; to cooperate and to share information with the vendor.

It is also imperative to consider that additional factors which are not related to trust might be the primary determinants of future m-commerce intentions. Convenience, it is asserted, was found to be a far more important indicator of future m- commerce intentions than vendor trust (Barr *et al,* 2002).

During the previous discussion of trust, various researchers, including contributions by Chervany (2001a), indicated that risk plays an important role due to the fact that trust-building often occurs in situations where negative consequences may be or even are possible. It is therefore necessary to discuss risk as a relevant aspect to be considered within this study.

2.6 Risk

To trust is a risky decision. Xu *et al* (2003) reasoned that trust "is always combined with risk, since to trust essentially means to take risks and leave oneself vulnerable to the actions of trusted others." As trust, in its own right, is predisposed to be complex in nature, it is perhaps understandable, but certainly not excusable, that the majority of researchers inappropriately ignored the role of risk (Gefen *et al,* 2003).

E-commerce trust researchers show that increased trust reduces the trustee's perception of risk and influences their attitudes towards the trustee, which, in turn, influences the willingness to purchase (Jarvenpaa *et al,* 2000). The risk management discipline views risk as related to the cost of outcomes, where trust and risk are 'mirror images' with an "approximate inverse relationship" (Grandison *et al,* 2000; Johnson *et al,* 2002).

In view of this standpoint, the question of whether the study of trust is relevant in instances where risk is perceived to be low is highlighted. Some trust researchers feel that, without risk, there is neither need nor opportunity to trust (Johnson *et al,* 2003). This is disputed by Magura (2003) who through coining the term 'low-involvement transactions', distinguished between low risk items (such as ring tone downloads) and 'high-involvement transactions' (such as mobile banking). Magura's (2003) study established trust as the primary determinant of both 'high-and–low involvement' transactions. Significantly, trust becomes even more important during high-involvement transactions. This can perhaps be explained by Ho *et al* (1999) who state that, as the value of the transaction increases, "the probability of untrustworthiness increases: because the rewards for the fraudster are bigger."

Gefen *et al* (2003) emphasise that, within the context of low risk items such as ring tone downloads, it is trust, and not perceived risk, that influence the decision to take part in m-commerce. However, within the context of 'high-involvement' transactions, risk becomes more important and trust assumes a secondary role of reducing risk instead of directly influencing the purchasing decision. During new types of services perceived risk will be the dominant factor whereas in long-term relationships characterised by multiple interactions between the truster and trustee, vendor trust will prove to be the

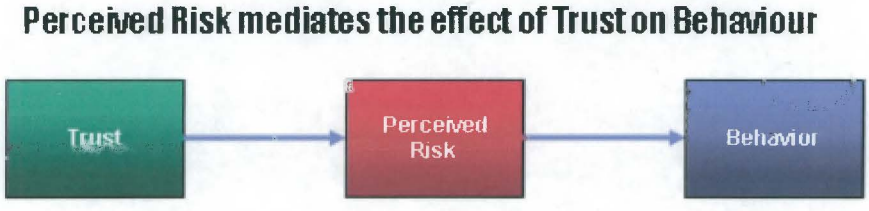
dominant factor.

2.6.1 Relationship Between Trust and Risk

No scholarly consensus has been reached on how to depict the relationship between trust and risk in models (Johnson *et al*, 2002). Three types of risk and trust models have however been identified, and will hereafter be discussed.

2.6.1.1 Mediating Influence of Risk

In the mediating relationship (as illustrated in Figure 6: The Mediating Influence of Risk, trust is shown to influence perceived risk that, in turn, influences behaviour. If trust exists, the perception of risk is reduced, which, in turn, increases the willingness to take part in m-commerce. For example, if the consumer has high trust in a specific MNO who is in the process of launching a mobile banking service, the high vendor trust would probably negate the perceived risk and increase the probability that the consumer will participate in mobile banking. As previously indicated, mobile banking is used for the remainder of the discussion about risks as an example of a high-risk m-commerce transaction (refer to Section 2.2.4).



Source: Gefen *et al*, (2002)

Figure 6: The Mediating Influence of Risk

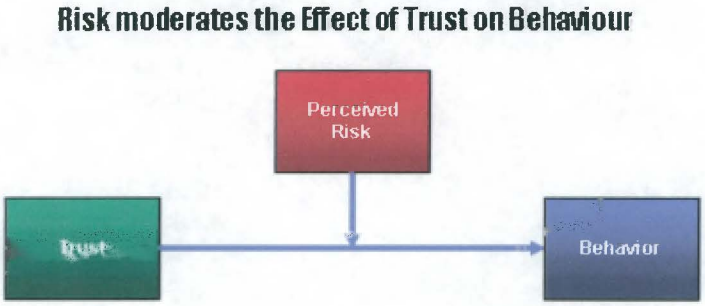
The perceived risk of mobile banking is a negative precursor to taking part. Trust in the MNO is an indirect positive predecessor, acting through the variable of risk to lower the perceived risk and indirectly influence the decision to participate in mobile banking. The mediating relationship therefore implies an 'explicit causal relationship' between trust and risk which Pavlou and Tan (2002) depict as trust having a "negative effect on perceived risk". Similarly, Ajzen's (1999) deems consumers to be more willing to transact if their risk perceptions are low.

Olson *et al* (2000), cited by Gefen *et al* (2002), view trust as the consequence of risk, implying that trust mediates the relationship between risk and behaviour. Olson and Olson (2000, p43) state that "we trust more when the stakes are relatively low... or when the potential loss is miniscule". Trust is therefore seen as a positive influence on the decision to take part in a relatively low risk m-commerce activity, an example of which is downloading ring tones.

2.6.1.2 Other Trust and Risk Models

Two other trust and risks models exist; namely the moderating relationship and the threshold model. In the moderating relationship, the influence of trust on behaviour is seen as varying depending on whether it is a low risk or a high risk condition, as demonstrated in Figure 7: The Moderating Influence of Risk.

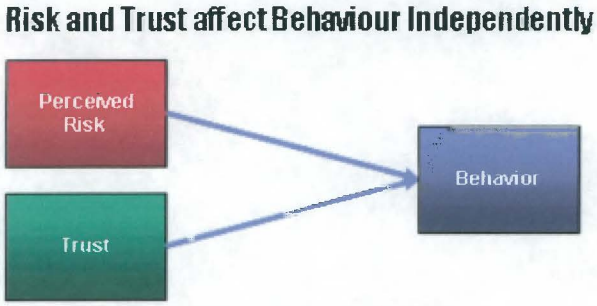
When trust is high, risk will have less of an impact on the formation of attitudes (Mayer *et al* 1995). In cases where high-risk conditions exist, for example mobile banking, trust between the truster and trustee will be higher than low-risk conditions. This is true for the downloading of ring tones. The hypothesis of the moderating relationship was however disproved by Grazioli *et al* (2001) and will therefore not be used in the model.



Source: Gefen *et al*, (2002)

Figure 7: The Moderating Influence of Risk

The threshold model views trust and risk as two independent perceptions. If the perception of risk is higher than the trust relationship, the truster will not engage in m-commerce. The threshold model (Figure 8: Risk and Trust Influence Behaviour Independently) assumes that no relationship exists between trust and risk and that the consumer evaluates the relationship independently (Kim and Prabhakar, 2000).



Source: Gefen *et al*, (2002)

Figure 8: Risk and Trust Influence Behaviour Independently

This model assumes a decision-making process whereby the truster will evaluate each situation and compare the levels of trust versus the levels of risk. If trust is higher, the consumer will engage in m-commerce. The model thus assumes that all consumers are rational. This theory was however disproved by the Prospect Theory which states that humans are not always rational decision-makers (Kahneman *et al*, 1984, cited by Berstein, 1998). 'Irrational' behaviour is attributed to two human traits, namely: emotion that influences self-control and cognitive difficulties in fully understanding what is being dealt with. M-commerce is complex and mobile phones are responsible for evoking strong personal emotions (Barr, 2003), but, nevertheless, where the perceived benefit is greater than the perceived risk, consumers will choose the benefit (Barr, 2003).

This study will use the mediating model as this is the model to which that the majority of e-commerce researchers subscribe (Cheung *et al*, 2001; Lee *et al*, 2003; Jarvenpaa *et al*, 1999 and 2000; Yousafzai, 2005).

2.6.2 Measurement of Risk

Four ways in which risk can be measured were discussed by Gefen *et al* (2003), and will be discussed during this section of the study. The potential risk of a subscriber's handset being infected by a virus is used as an example to guide the discussion.

(1) Measure the probability or likelihood of a negative outcome of the event: The objective is to derive an overall likelihood rating that indicates the probability that a particular vulnerability might be exercised. Since Gartner dismissed the threat of viruses as nothing but a 'niche nuisance' and reiterated that only 6% of users of 'smart phones' (handsets with advanced functionality) are vulnerable (Stones, 2005), the overall probability of being infected by a virus is potentially, even probably, low, although most people download Bluetooth content without first and foremost checking the source. The likelihood level remains the same for both high- and low-value transactions.

(2) Measure the magnitude of the negative outcome: The objective is to determine the adverse impact that

could result from the threat source successfully exploiting the vulnerability. The most adverse impact probably could result from a criminal gaining access to the consumer's bank account which might have major negative consequences. The most negative events reported by the media were the Bootton.E Trojan horse, which was found to corrupt the mobile device to the extent that it was rendered unusable (Gohring, 2006).

It is clear that the magnitude of the outcome for high- and low-value events could differ significantly. Therefore, if consumers are reluctant to perform high-value transactions, for example purchasing plane tickets, this might therefore be attributed to fear of the magnitude of the outcome rather than the likelihood of it occurring (Gefen *et al,* 2003).

(3) Separate the positive and negative outcomes of the event and then calculate the difference between them: The positive event is that handset manufacturers have begun to integrate antivirus software on the handsets and most MNOs are offering free virus downloads available from their websites. The negative aspect is that the consumer may be infected by a virus. A value is calculated for each and the difference between the two in equal to the net calculation. Gefen *et al* (2003) however state that it is not clear how this net calculation is effected.

(4) Perform an overall weighting on a positive-negative continuum: The consumer may be requested to rate how strongly they agree or disagree according to a Likert type scale, with the statement: "I feel exposed to the risk of viruses". Gefen *et al* (2003) believe that the latter process is more advantageous and more prudent, as the measuring of the risk is left to the consumer rather than the researcher. This is therefore the approach that will be followed by this study.

2.6.3 Operationalisation of Risks

Featherman *et al* (2003) identified four categories or types of risk. These are: (1) performance risk; (2) financial risk; (3) psychological risk and (4) time risk. Performance risk relates to the vendor or the technology not performing as expected, whereas financial risk involves financial losses. Psychological risk refers to negative emotions, such as regrets as a result of the loss of privacy due to the consumer's use of a m-commerce service and/or receiving SPAM. Time risk is when the passing time reduces the ability of the service to satisfy the need. An example of this category of risk is where a customer uses a location-based service to find the nearest hospital in an emergency situation and only receive the SMS six hours later.

It is further necessary to distinguish between vendor and systems (technology) risk. Technology risks have a greater influence on behaviour than vendor-related risks (Gefen *et al,* 2003). The argument is moreover that technology introduces extraneous elements, such as hackers, which increase the probability of unexpected losses.

It is improbable to assume that consumers will consult academic literature to establish what risks exist and therefore non-academic resources, called 'practitioner sources', are more likely to govern their perceptions. It is therefore relevant to incorporate these practitioner sources into a discussion of risk (Johnston *et al*, 2003). The risks are summarised in the following - Table 6: Identification of Potential Risks in M-commerce.

Threat Source	Explanation	Consumer Risk Type
	Systems / Technology Related Risks	
Viruses	Three most recent viruses detected are: (1) The Bootton.E Trojan horse which restarts the mobile devices it infects but releases corrupted components that cause the reboot to fail, leaving devices unusable; (2) The Pbstealer.D Trojan which uses Bluetooth to send an infected consumer's contact list, notepad and calendar to-do-list to other nearby users; (3) The Trojan, Sendtool.A, sends malicious programmes, such as the Pbstealer Trojan, to other devices via Bluetooth (Gohring, 2006). The Cabir mobile virus that used the Symbian operating system and Bluetooth to spread at the Athletics World Championship in Helsinki, draining the power of handsets (Stones, 2005b). DoCoMo network was overloaded from infected phones dialling emergency call centres.	Performance
Blue-snarfing	Contact details, picture and diary details stolen by using Bluetooth. (Spies Can Hack Into Top Cellphones, 2004). Hackers stole celebrity phone numbers from Paris Hilton's phone and posted them on website (Stones, 2005).	Psychological
Systems Errors	Incorrect transactions and errors, such as records lost, modified, duplicated, or incorrectly processed (Auroja *et al*, 2000; Chircu *et al*, 2000).	Performance, Financial
Security	Even though mobile phones are more secure in contrast to credit card payments (Danesi *et al*, 2001), security has been regarded as a primary concern of m-commerce consumers (Methlie and Petersen, 2000; Hague, 2004). IDC believes that security will be the number one inhibitor of m-commerce over the next five years (ACA, 2003a).	Financial and Psychological
Fraud	Fraud can relate to the identification of theft, stolen handsets and the use of the phone for stolen purchases (ACA, 2003b; Dalhberg *et al*, 2003). If a handset stores personal banking details and a PIN number, as in the case of mobile banking or mobile payments, the scope for fraud is dramatically increased (Stones, 2005b). All MNO banking products are reliant on PIN numbers and therefore vulnerable to exposure (Snyman, 2005).	Financial
Health	There are some consumers who believe that using a mobile phone could increase the risk of developing illnesses. The Institute of Cancer could find no relation between the risk of acoustic neuroma and mobile phone usage, however doctors are not able to dispute that longer-term usage could increase risks (Fildes, 2005).	Psychological
Handset	Handset-related risks include concerns that the phone battery could discharge while the consumer is transferring money and that valuable information could be lost whilst the phone is being repaired.	Performance, Financial
Network Errors	Risks include losing the network signal during the transaction. Slow service response times could result in the failure of the transaction.	Performance, Financial
	Vendor Related Risks	
Privacy	**52% of m-commerce consumers are apprehensive about privacy** (Magura, 2003; Dahlberg *et al*, 2003). Reuters (2006) recently reported **that** US federal agencies were investigating whether telecoms companies have provide sufficient measures in order to protect consumers' record amid concerns that Internet sites had been selling cellphone call information.	Psychological

Threat Source	Explanation	Consumer Risk Type
Bill shock	Many parents have found themselves on the verge of bankruptcy due to excessive expenditure by their teenagers on mobile content (October, 2005).	Financial
Payment Escalation	WASPs reported as billing consumers for services not received, charging exorbitant rates and double-billing (Whitford, 2004; October, 2005).	Financial
SPAM	Placing of misleading advertising and sending SPAM (Vechattio, 2005; Coetzer, 2005).	Psychological
Harmful Content	The world market for adult content has been valued at $1-billion. In South Africa, young children have accessed hard-core pornography via cellphones to such an extend that Child line has proposed emergency steps to protect children from accessing inappropriate material (Hollands, 2005). Similarly, according to Jupiter research, the global market for mobile gambling services will generate $19-billion by 2009. It is therefore a cause for concern that children could have access to these facilities (Czernowalow, 2005).	Psychological, Financial
Consumer Errors	Entering the wrong amount, or paying the incorrect party. Entering the wrong code may cause an unwanted but expensive game to be downloaded. Not knowing how to correct the error could relate to both the vendor and the institution (ACA, 2003a).	Financial, Performance
Institutional-based Risks		
Lack of Trans-parency	Due to the involvement of multiple stakeholders in m-commerce, subscribers do not know who to contact in the instance that a complaint may arise (ACA, 2003b).	Performance and Psychological
Consumer Rights	Lack of knowledge about consumer rights. The legislative framework is too complex for ordinary consumers to grasp. Customer protection organisations, like WASPA and ICASA, furthermore, show little transparency (Senne, 2005). It is mostly the educated and affluent who are likely to use these services.	Performance and Psychological
RICA	The Regulation of Interception of Communications and Provision of Communication-related Information Act obligates MNOs to intercept voice recordings of suspected criminals (De Bruyn, 2005). This might lead to privacy concerns. Although privacy relates to the vendor, the vendor is expected to comply with legal regulations; therefore, this concern is seen as an institutional-based risk.	Psychological

Table 6: Identification of Potential Risks in M-commerce

The philosopher Lawrence Becker argued that "far more relevant to our readiness to trust are the motives and intentions we perceive other to have than actions and outcomes. So, for example, if we believe that things have gone wrong as a result of incompetence, our trust will be far less affected than if we believe ill-will to be behind it" (Camp *et al*, 2000).

3 Chapter Three: Theoretical Framework

This section provides an overview of the theory, models and methods on which trust studies and the model have been based. A number of theoretical frameworks which study Information Systems' adoption have furthermore been acknowledged. These frameworks have, in many cases, been expanded to include the new variables of trust. Due to the Internet being a new and innovative technology, the majority of studies have been conducted on e-commerce, yet some researchers feel that these same issues will also be relevant to m-commerce (Siau *et al*, 2003a). This has however been disproved by other studies (Coutts, 2002). As the theoretical models for studying trust evolved from e-commerce, it would be pertinent to offer an overview of the major contending theories, as well as research conducted.

3.1 Electronic Commerce Studies

This section provides an overview of the major contending theories, using one, or a combination of, the following approaches as illustrated in Table 7: Summary of Electronic Commerce Trust Studies.

Framework	Description	Originator	Trust researcher	Methodology	Sample
Theory of Reasoned Action (TRA)	One of the most influential theories of human behaviour.	Ajzen and Fishbein (1975)	Jarvenpaa *et al* (1999)	Survey, Prototyping	Students and panel
			Gefen and Straub (2000)	Survey, Prototyping	Students
			Pavlou *et al* (2002)	Survey, Prototyping	Students and Internet users
Theory of Planned Behaviour (TPB)	An extension of TRA by adding an additional variable intended to predict deliberate behaviour.	Ajzen (1991)	Jarvenpaa *et al* (1999)	Survey, Prototyping	Students and panel
			Koufaris and Hampton-Sosa (2002a)	Survey, Prototyping	Students
			Pavlou (2002)	Survey, Prototyping	Students and Internet users
Technology Acceptance Model (TAM)	A model using two perceptions of perceived usefulness (PU) and perceived ease of use (PEOU) to describe information technology acceptance and usage.	Davis (1989)	Gefen and Straub (2000)	Survey, Prototyping	Students
			Yousafzai (2005)	Survey	Internet banking users
			Koufaris and Hampton-Sosa (2002a)	Survey, Prototyping	Students
			Pavlou (2002)	Survey, Prototyping	Students and Internet users
			Gefen, Karahanna and Straub (2003)	Survey, Prototyping	Students
Innovation Diffusion Theory (IDT)	Technology adoption is influenced by individual characteristics and	Rogers (1995)	Chircu *et al* (2000)	Survey, Prototyping	Students and Internet users

Framework	Description	Originator	Trust researcher	Methodology	Sample
	external influences which make them adopt technologies at different rates.				
Exchange Theory and Social Network Theory	Describes the process whereby individuals exchange value for something that is of a higher value and how people exchange value in social relationships.	Bagozzi (1975)	Jarvenpaa *et al* (1999)	Survey, Prototyping	Students and panel
			Kim and Prabhakar (2002)	Survey	Internet users and on-line banking users
No specific framework was used to base the following studies upon.			Gefen (2000)	Survey, Prototyping	Students
			Lee and Turban (2001)	Survey	Students
			Pavlou and Chelappa (2001)	Survey, Prototyping	Students
			Bhattacherjee (2002)	Survey, Prototyping	Students and on-line banking users

Adapted from Grabner-Kräuter et al (2003a)

Table 7: Summary of Electronic Commerce Trust Studies

The fundamental assumption of the models is that vendor interventions can promote trust-building. The major criticism against these studies is that they focus on a limited number of variables and do not include all the trust-related concepts. Convenience samples (students) have been used to test the theory, but, although surveys introduce both testability and context into the research, the study of trust involves many uncontrolled and unidentified variables which are difficult to reduce into testable variables. A level of simplification is necessary to obtain results which can be generalised. As Duchon and Kaplan (1998, p574) explain, "the stripping of context buys 'objectivity' and testability at the cost of a deeper understanding of what actually is occurring."

3.2 Mobile Commerce Studies

M-commerce studies that included trust as variable in their models have been recorded in the Table 8: Summary of Mobile Commerce Trust Studies. It should be noted that this list is by no means exhaustive.

Framework	Description	Trust researcher	Major conclusions
Innovation Diffusion Theory (IDT)	Contexts specific variables were added which influence m- commerce consumer adoption.	*De Ruyter *et al* (2002)	De Ruyter *et al* (2002) studied consumer adoption of mobile gaming services and not specifically trust in m-commerce. The results confirmed that trust influences the adoption of m-commerce. Risk was identified as the most important factor, followed by ease-of-use and perceived usefulness as defined by Davis (1989).
	IDT expanded by introducing image and cost as further	*Gilham (2004)	South African studies investigating usage and adoption of mobile content services. The study

Framework	Description	Trust researcher	Major conclusions
	variables. Image introduced by Moore and Bensebat (1991); whereas Tornatzky and Klein (1982) introduced cost.		identified gender as a key differentiator in usage and sought further investigation into IDT characteristics that could have a direct impact on the adoption of mobile content services.
Technology Acceptance Model (TAM) Davis (1989)	TAM was expanded to include trust and is called the Trust Enhanced Technology Acceptance Model (TOMI).	*Dahlberg *et al* (2003)	An exploratory study using focus group interviews which identified types of security risks for mobile consumers. It was concluded that the TAM model provides a good basis for exploring trust in mobile payment solutions. The disposition to trust and perceived trust were added to the model to better describe consumer acceptance.
Theory of Reasoned Action Ajzen and Fishbein (1975)	A model for consumer acceptance of mobile marketing was developed and includes perceptions of risks.	Bauer *et al* (2005)	Social norms have a slight direct influence on behavioural intention, but are strong indirect determinant via personal attitude. Empirical evidence however could not be produced with regard to consumer-based determinants. Evidence of a positive relationship between 'innovativeness' and 'knowledge about mobile communications' was provided.
Observation	Observing mobile users using location-based technology.	*Schmidt-Belz (2003)	The study did not specifically investigate trust, but did manage to present evidence of distrust when users were observed using mobile services. The study essentially confirms that location-based services are regarded as risky by consumers.
Value-focused Thinking Approach (VFT) (Keeney, 1992)	The values that comprise trust were identified and converted into two objectives according to the outcome that consumers value and the methods used to achieve the result.	Siau *et al* (2003a)	Explored building consumer trust in m-commerce and proposed a framework to build sustainable trust relationships.
		Siau *et al* (2003b)	This framework was expanded upon or based on the Value-focused Thinking (VFT) approach advocated by Keeny (1992).
Both IDT and TAM	The model was based on both TAM and Innovations Diffusion and was augmented with specific features of mobile services adoption.	Mallet *et al* (2006)	The study investigated the impact and use of situation and mobility on the acceptance of mobile ticketing services. The study introduced two new variables, mobility and use in a situation. These items suggest that the benefits of mobile ticketing are dependent on the situation in which they are used.
Developed Own Model		Lee (2005)	Consumer behaviour was studied and a model based on literature was developed for both interactivity and the nature of the m-commerce environment.
The Decomposed Theory of Planned Behaviour	Expands TAM by including additional variables, such as: attitude towards use, subjective norm and behavioural control.	*Van Wyk (2004)	A South African study of mobile gaming compared to a similar Norwegian study. The study indicated 'subjective norm' to be a more important determinant of behavioural control in South Africa than the Norwegian study. The study also referred to the importance of the political environment.

*Identification of trust researchers that did not specifically study trust in mobile commerce, but introduced concepts relevant to trust and risk.

Table 8: Summary of Mobile Commerce Trust Studies

Only a few studies have specifically focused on identifying trust variables in m-commerce. Siau *et al*'s (2003a) study is noteworthy, as it has explored trust-building in m-commerce and has used the Value

Focused Thinking (VFT) approach by Keeny (1992) to develop a trust model. The VFT approach is explained with the assistance of Figure 9: Value-focused Thinking Approach.

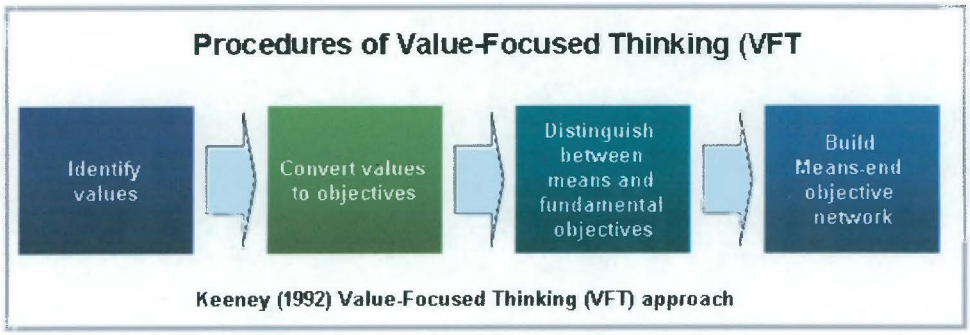


Figure 9: Value-focused Thinking Approach

Participants of the study were interviewed to identify the values that make up trust. These were subsequently converted into objectives. These objectives were characterised as either 'fundamental' or 'means'. 'Fundamental' objectives are the 'outcomes' that consumers value (in a specific context), whereas 'means' objectives are the 'methods' that are used to achieve the result. The 'means' objectives were organised into a 'means-end objective' framework. This relates to the methods that can be used to achieve the 'fundamental objectives'; essentially, in order to maximise trust in m-commerce. The results of the study are presented in a framework which has been reproduced in Figure 48: Means End Objective Network available in Appendix one, Section 9.3. The variables identified by the study were labelled by the researcher to demonstrate how they relate to the variables of the study and, furthermore, many of the concepts identified by the study were also included in the questionnaire and focus group sessions.

3.3 Contending Theories

The study of adoption of new technologies has gained new interest since the 1980s due to increased diffusion of new technologies. An example of such a novel technology is the Internet (Eid *et al,* 2002). The most popular theory used for studying technology adoption is Technology Acceptance Model (TAM) (Davis, 1989), closely followed by the theory of Planned Behaviour (TPB) (Ajzen and Fishbein, 1975). These models offer different, but, in some cases, overlapping perspectives. A brief overview of each of the theories will hereafter be provided.

3.3.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) was developed by Ajzen and Fishbein (1975) to predict behaviour and the actual results of the behaviour in diverse settings or circumstances. The basic premise of the model is that consumers use rational criteria to base their decisions upon, obviously depending on the information that is available to them. This specific model is illustrated in Figure 10:

Theory of Reasoned Action (TRA).

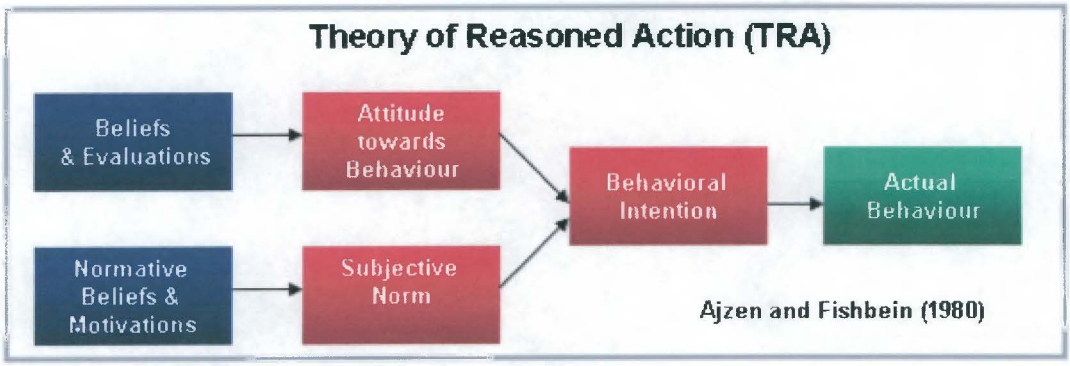


Figure 10: Theory of Reasoned Action (TRA)

Behaviour is predicted by 'attitude' and 'subjective norm'. 'Attitude' represents the positive or negative feeling about using m-commerce, while 'subjective norm' refer to the societal influences that have an impact upon the use of m-commerce by the consumer. TAM does not include 'subjective norm', more than likely due to the fact that it is "one of the least understood aspects of TRA," according to Ajzen and Fishbein (1975, p304).

There are some similarities between 'subjective norm' and the trust variable of 'disposition to trust' as both are related to psychological constructs that influence behaviour. Chervany *et al* (2003) describes 'disposition to trust' as consisting of two sub-variables, namely 'faith in humanity' and 'trusting stance'. While 'faith in humanity' relates to a general psychological propensity to trust, 'trusting stance' is similar to the Ajzen *et al* (1975) premise that behaviour follows a rational decision-making process. In the case of 'dispositional trust', the individual will therefore decide to trust until circumstances prove him/her wrong. The relevance to this study is that even though an individual might exhibit a low trusting stance, it does not automatically extend to mistrust. It would therefore be relevant to distinguish between the trust levels of consumers experiencing a negative encounter, compared to those that do not.

3.3.2 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) is an established social psychology theory that outines that certain significant beliefs influence behaviour intentions (Ajzen, 1991). The TPB is an extension by Ajzen of the Theory of Reasoned Action (TRA), rendering the theory more suitable to situations where the individual does not have full control over the situation (for example, m-commerce). The TRA has however criticised as it does not describe conduct of individuals who had little power or control over their behaviour. A third variable, namely perceived behavioural control, has therefore been added to the TRA model - Figure 11: Theory of Planned Behaviour (TPB).

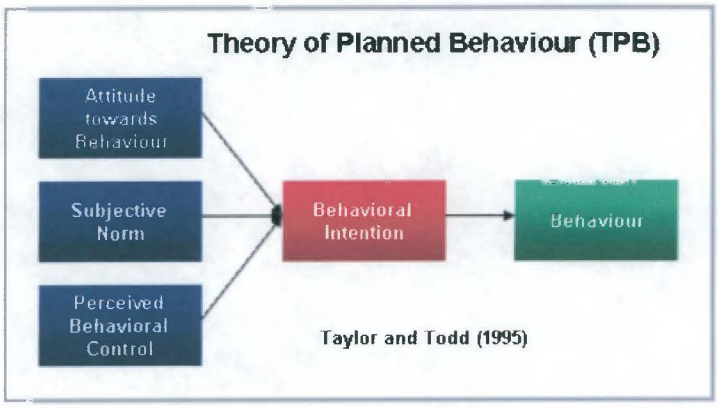


Figure 11: Theory of Planned Behaviour (TPB)

The major variables of TPB are 'attitude', 'subjective norm' and 'perceived behavioural control (PBC)'. These three variables can be used to determine what drives adoption of m- commerce. The influence on behaviour, as determined by PBC, takes place via the user's perceptions of internal and external constraints. PBC is furthermore influenced by 'facilitating conditions' and 'self-efficacy'. Behaviour is, after all, a function of 'behavioural intention' and 'perceived behavioural control' and, moreover, behavioural intention is influenced by the concepts previously explained, namely 'attitude' and 'subjective norm' (Leong, 2003).

The implications for the study of trust are that trust development takes placed within a certain m-commerce context and is influenced by both internal and external factors. It would therefore be necessary to accurately describe the m-commerce context of the research in order to obtain an accurate measure of trust. The complexity of trust and m-commerce may potentially require the researcher to reduce the scope, in order to obtain a more accurate assessment of trust development.

3.3.3 Theory of Technology Acceptance (TAM)

The Technology Acceptance Model (TAM) was developed by Davis *et al* (1989), based on Ajzens' TRA model. TAM substitutes some of the TRA's attitude measures with two technology acceptance measures, namely 'ease of use' and 'usefulness'. The model is portrayed in Figure 12: Technology Acceptance Model (TAM).

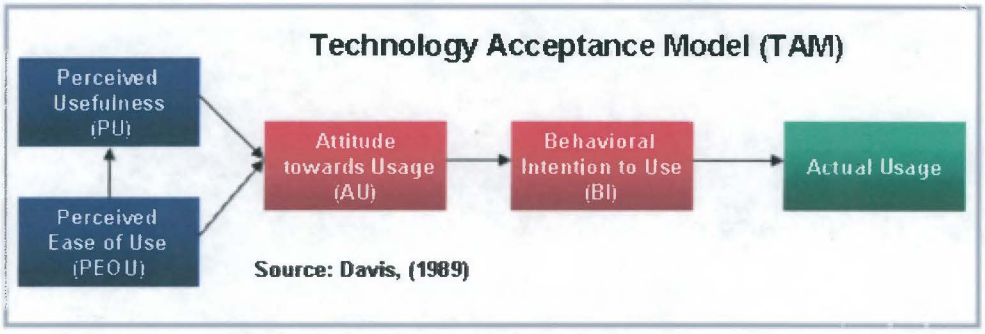


Figure 12: Technology Acceptance Model (TAM)

'Perceived usefulness' (PU) and 'perceived ease of use (PEOU)' are independent variables, mediated by 'attitude' and 'behavioural intention' with the objective of measuring 'usage intent'. PU is the degree to which a person believes that using a system would enhance his job performance whereas PEOU refers to the degree to which a person believes that a system would be easy to use. PU mediates the effect of PEU on usage, meaning that if an individual believes that m-commerce will increase his/her performance, even if it is initially seen as difficult to use, the individual is more likely to adopt the technology (Eid *et al*, 2002).

Chircu, Davis and Kauffman (2000) used TAM in order to investigate trust and established that both trust and expertise requirements have a significant direct and indirect influence on adoption decisions. They further indicated that other studies of technology adoption should consider the role of complexity in their models, as this might explain the "variance in the predictive power of TAM" (Davis, 1989). Since m-commerce is complex, the use of TAM could cause the focus of the study to shift to technology, negating the other important aspects of the study. Eid *et al* (2002) forewarned that, "despite the wide acceptance of TAM, it still needs to be utilised and interpreted with caution."

3.3.4 Innovation Diffusion Theory (IDT)

The Innovation Diffusion Theory (IDT) was developed by Rogers (1995) to research the dissemination of innovations. An innovation is a new idea or concept (such as m-commerce) which is spread throughout society by a process which is called 'diffusion'. The 'diffusion' of new technologies takes place within a five stage process, as shown in Figure 13: Innovation Diffusion Process (IDT).

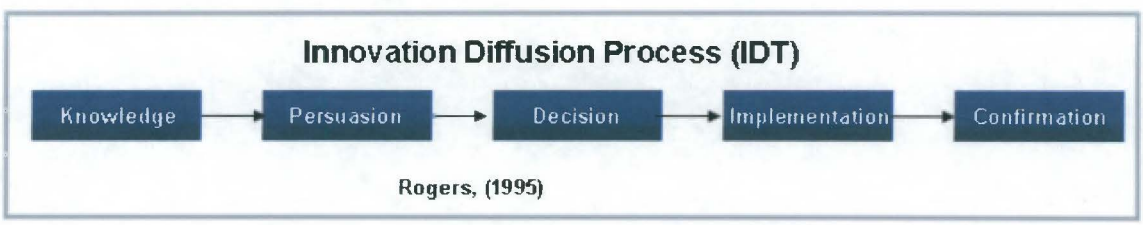


Figure 13: Innovation Diffusion Process (IDT)

During the 'knowledge' stage, 'early adopters' or pioneers start using the innovation as awareness of the technology develops. The 'early adopters' use 'persuasion' or 'peer influence' to establish a growing community of adopters that flow through the various stages of 'decision', 'implementation' and 'confirmation', until the population of adopters becomes exhausted, leading to the well-known 'S-shaped' adoption curve (Eid, 2002).

It is important to note that some potential adopters (called early innovators or adopters) are more prone to innovation than others. This is based on personal characteristics, for example education and age. These differences between adopters and non-adopters make them espouse technology at

diverse rates (Chircu, Davis and Kauffman 2000). This study will test the trust model on a population of potential early adopters. This aspect is relevant for the purposes of the research, as the process of diffusion is often also accelerated by 'opinion leaders' (frequently 'early adopters') (Argawal *et al,* 1998).

Several attributes are acknowledged for their influence on the diffusion process. These are:

(1) Relative advantage – The degree to which an innovation (e.g. m-commerce) is seen to be better than the previous innovation (e.g. e-commerce);
(2) Compatibility: The degree to which the user sees the innovation (e.g. m-commerce) as being compatible with his/her existing lifestyle (e.g.: values, needs and past experiences);
(3) Complexity: The degree to which m-commerce will be seen a difficult to use, understand and learn;
(4) Observability: The degree to which the results of m-commerce are visible to others. For instance, the degree to which a user can learn about m-commerce from others; and
(5) Trialibility: The degree to which an innovation will be experimented with before adoption (Fife *et al,* 2004).

The PU and PEOU variables from TAM closely relate to two attributes of IDT. Perceived usefulness (PU) correlates with relative advantage, while perceived ease of use (PEOU) is associated with complexity.

Based on Gilham's (2004) study, two additional variables have been included, namely 'cost' and 'image'. 'Image' and 'voluntariness' were introduced by Moore and Benbasat (1991) as an expansion of IDT. Image is considered important for the study of m-commerce adoption since the consumer might view the possession of the most recent model cellphone as a status symbol.

Following on Gilham's study, 'voluntariness' has been excluded and 'cost' included. 'Voluntariness' has been excluded due to the fact that m-commerce participation has not been forced on the population of early adopters used in this research. 'Cost' was likewise introduced as an additional variable by Tornatzky and Klein (1982), as cited by Gilham (2004), but, earlier studies indicated that cost could have an influence on adoption. This has been discussed in Section 2.2.2, and has been included within the model. The extended model has been reproduced in Figure 14: Extended Model of Innovation Diffusion (IDT).

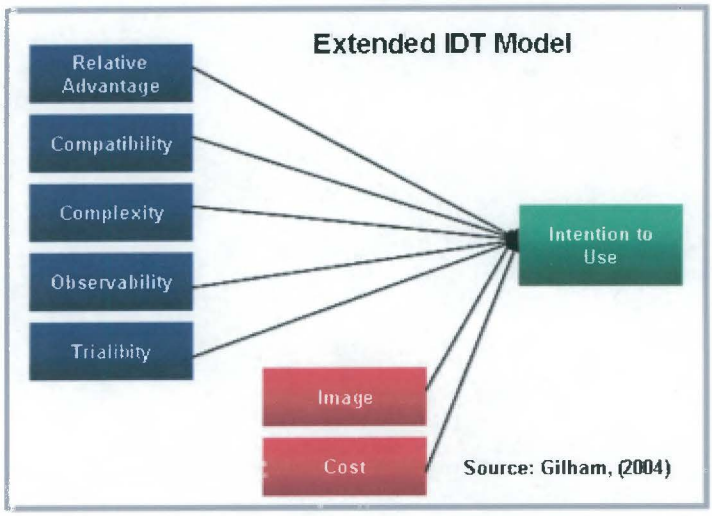
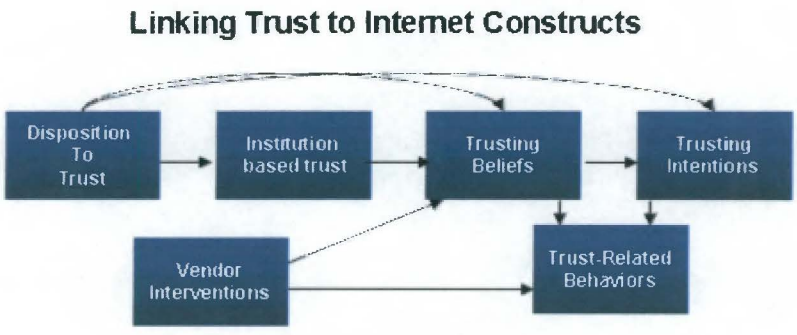


Figure 14: Extended Model of Innovation Diffusion (IDT)

TAM and IDT have been criticised due to their inability to examine features specific to mobile technologies and services (Mallet *et al,* 2006). The model of trust used for the purposes of this study has been expanded to include an additional variable; namely 'adoption enablers', which include the aforementioned IDT characteristics. The objective is to determine the relative influence of these adopters in combination with the influence of trust and risks.

3.3.5 The Theory of Trust

Chervany *et al* (2001a) can be considered a major influence for this study due to their development of one of the first trust models, shown in Figure 15: The Variables of Trust.



Source:* Chervany *and McKnight (2001)

Figure 15: The Variables of Trust

The main differences between Chervany's model, the models used by the various relevant trust researchers and the model used for the purposes of this study is that systems trust is shown as a separate variable. This idea has furthermore been propagated by the leading trust researchers (Lee *et al,* 2003; Kim *et al*, 2002; Altschuller *et al*, 2003; Grabner-Kräuter *et al,* 2003b). Disposition to trust has however been excluded by some trust researchers, but included

as a trust variable in this study as it is seen as a significant predictor of trust in general (Lee and Turban, 2003). Chervany did not include risk in his model, although he referred to the possibility of 'negative consequences'. Risk is therefore included as a separate variable. 'Trusting belief' is referred to as trust in this study, and 'trusting intention' relates to the same concept as 'intention to participate'.

3.3.6 The Trust Model

Chervany *et al* (2003a) highlighted the efficacy which a typology should encompass. Firstly, the model should allow a clear distinction between concepts that appear alike and, secondly, the model should illustrate the relationship between disparate variables. The following section outlines the various variables within the model. The model is expanded to show the relationships between the variables as demonstrated in Figure 16.

Expanded Model of Trust in M-Commerce

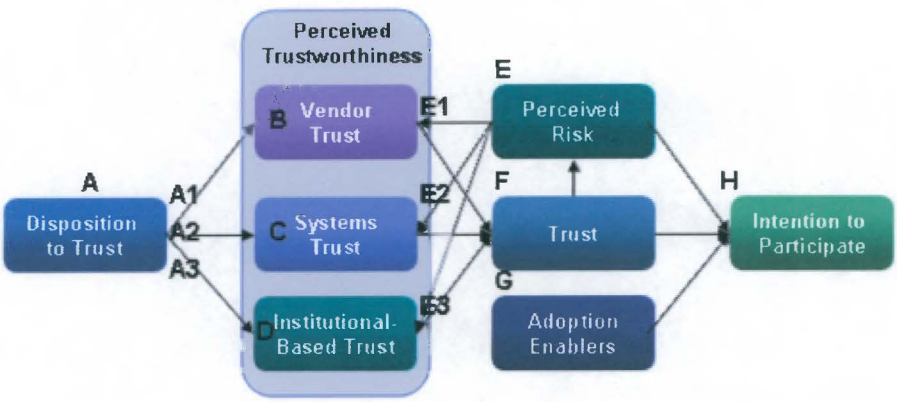


Figure 16: Expanded Model of Trust in M-commerce

Table 9: Definition of Sub-variables and Evaluation Indicators serves as a summary of the preceding literature survey which has culminated in the trust model.

Variables	Definition	Definition of Scope	Description of Relationship
(A) Disposition to Trust	Personality traits of the consumer that influence his/her general ability to trust.	This study will not distinguish between Chervany's sub-variables of 'humanity' and 'trusting stance', but refers to the generalised tendency to trust as generally being trusting of people.	*The disposition to trust directly influences vendor trust (A1), systems trust (A2) and institutional trust (A3). It also indirectly influences all other variables, including intention to participate.
(B) Vendor Trust	The belief of the consumer that the vendor will fulfil the mobile commerce transactions effectively and competently (Urban *et al*, 2002; Davis *et al*, 2000).	Overall trustworthiness of the vendor will be examined and not each of the following sub-variables individually, i.e., benevolence, integrity and competence. The distinction between the sub-variables is not clear and one term	*Vendor trust is influenced by disposition to trust (A1). Vendor trust influences trust (F) directly, and indirectly intention to participate (H). Vendor trust can also be influenced by risk perceptions that relate to the vendor (E1).

Variables	Definition	Definition of Scope	Description of Relationship
		is often understood as a synonym for the other.	
(C) Systems Trust	The expectation that the service and underlying technology is working as expected.	The overall trustworthiness of the mobile commerce technology and smooth functioning of m-commerce systems will be investigated.	*Systems trust directly influences trust (F) and indirectly intention to participate (H). System trust is also influenced by personal characteristics (A2) and risk perceptions relating to the technology (E2).
(D) Institutional Based Trust	Formal institutional mechanisms that increase consumer trust.	Examine the consumer overall perception of trustworthiness of the institutional framework.	*Institutional-based trust directly influences trust (F) and indirectly intention to participate (H). It is also influenced by personal characteristics (A3) and risks perceptions relating to the technology (E3).
(F) Trust in Mobile Commerce	Overall belief of the consumer that the mobile commerce service can be trusted.	A general indication or perception of overall trustworthiness of m-commerce is provided.	*Trust directly influences intention to participate (H) and is influenced by all other variables, except adoption enablers (G).
(E) Perceived Risks	Potential weaknesses exposed by mobile commerce that can expose the consumer to financial losses, fraud and inconvenience. Risk assessment also relates to the consumer's previous mobile commerce knowledge and experience. A low risk situation is one that is predictable (Bouch *et al*, 2004).	This study uses two approaches: (1) Categorise risks according to their relationship with the vendor, the systems and institutional based risks. (2) Examines the risk inherent in m-commerce in SA, by categorising the perceived risk in terms of risks relating to privacy, security, lack of transparency and external risks. It should be noted that the second approach will only be used to establish the extent to which the risks exist, while the first option will determine statistical significance.	*Perceived risk mediates between trust (F) and intention (H). Perceived risk therefore negatively influences intention to use m-commerce. Perceived risk relates to the vendor (E1), institution (E3) and systems (E2) which influence trust (f) and intention to use (H).
(G) Adoption Enablers	IDT characteristics that influence adoption.	The relative influence of each of the characteristics will be examined.	Adoption enablers influence the intention to participate (H).
Participation in Mobile Commerce	Degree to which the consumer intends to take part in mobile commerce.	Overall indication of future intent to use the services. .	Participation will be influenced by all other variables, including adoption enablers (G).

*Not all the relationships or the type of relationships will be statistically validated in this study, due to time and resource constraints.

Table 9: Definition of Sub-variables and Evaluation Indicators

The previous subdivision was committed to addressing 'what' has been studied, while the section to follow will address the issues relating to the 'how' of the study.

4 Chapter 4: Research Design and Methodology

4.1 Research Philosophy

The fact that trust is multifaceted and that m-commerce adoption does not occur within a vacuum assumes that the social construct is more likely to be dynamic and the technological environment intricate. The research philosophy adopted by the researcher is initially qualitative in order to ensure that both the adoption and usage of m-commerce in South Africa are thoroughly explored, but, thereafter, a quantitative approach allow for the collection of quantifiable data from a wider population. Using both approaches will ensure that not only will in-depth understanding be established; the introduction of the testability of such research will additionally be focused upon.

Most information system research is characterised as quantitative studies. The relatively recent introduction of m-commerce in South Africa, combined with the limited number of trust studies conducted thus far worldwide, could emphasise a need for more interpretive studies. As Marcus and Robey (1998) state, qualitative methods, "can yield data from which process theories and richer explanations of how and why processes and outcomes occur can be developed."

4.2 Research Approach

The research model is not based on a particular model available in the literature, but rather upon a consolidation of many trust research approaches. This study uses a combined approach of research propositions and research hypotheses (as previously explained in Section 1.4, page 18). Research propositions are tested during the focus group analysis while hypotheses are assumptions which are tested in order to validate the variables of the model; the outcome of which may lead to a modification of the model and theory. The researcher is primarily interested in understanding how trust and risk influence the adoption of m-commerce rather than merely describing trust and risk factors.

4.3 Research Time Frame

The research time frame is cross-sectional. The focus group sessions were conducted in September 2005, while the questionnaire data, which only presents a snapshot view during this particular period, was collected from December 2005 until early January 2006. Due to time constraints, the cross-sectional time horizon has been chosen. The researcher however does acknowledge that trust is relevant during the entire customer life cycle, as well as experience over time (Ehrlich, 1999; Delgado-Ballester, 2002). A longitudinal perspective would therefore, be most appropriate to

investigate the importance of trust for first-time buyers and within other stages of the customer relationship life cycle.

4.4 Research Strategy and Approach

The research approach uses a combination of qualitative and quantitative approaches as it is assumed that such a stance will increase the validity of the data and findings and allows a more complete understanding of the phenomena studied (Kreamer and Pinsonneault, 1993). The objective of the qualitative approach is described by Robson (2002) as, "what is happening; to seek new insights; to ask questions and to assess phenomena in a new light." The research model conceptualises relationships between variables which will be tested. This therefore, implies a quantitative approach.

4.5 Research Instruments

The research is conducted in four stages, using three categories of methodology. Each phase provides input into the subsequent phase to increase understanding of m-commerce and trust. Although each new phase is a further development on the previous phase, some overlapping will however occur. The research instruments are demonstrated in Figure 17.

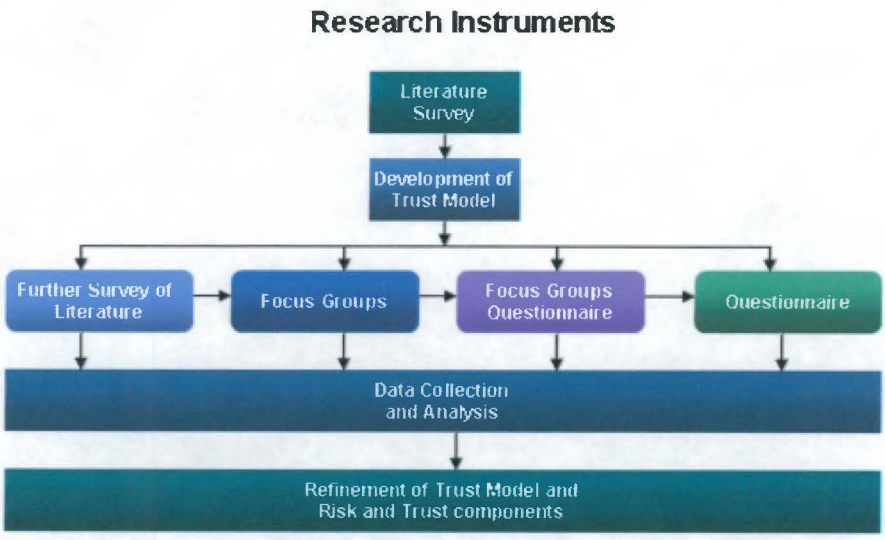


Figure 17: Research Instruments

The phases referred to are:

(1) **Phase 1:** The literature survey was undertaken which describes trust and risk variables as they apply to m-commerce, from which the trust model has been developed.

(2) **Phase 2**: Focus group sessions were conducted according to the Focus Group Interview Guide, as provided in Appendix 2, Section 10.1, page 135.

(3) Phase 3: After each focus group session, the participants were requested to complete a questionnaire as provided in Appendix 2, Section 10.2.

(4) Phase 4: A questionnaire was administered to 'early adopters' who theoretically should not lack any of the consumer characteristics that promote trust.

(5) Phase 5: The focus group sessions, focus group questionnaires and 'early adopter' questionnaire were analysed and interpreted.

(6) Phase 6: The trust model was refined and findings consolidated into recommendations to be included in this study.

4.6 Research Methods

The research methods relating to focus groups (qualitative research) and survey (quantitative research) will subsequently be explained.

4.6.1 Focus Groups

Disparities exist between the quantitative research approaches and the actual usage and experiences of users (Grandison and Sloman, 2000). McDonagh-Philp *et al* (2003) consider focus groups to be suitable for topics that are poorly understood since they, "combine both context and depth, encourage investigation and comparison of differences between preferences at a detailed level. At the same time, they provide reasons for individual opinions and experiences." This allows richer insight into the use, experiences and opinions of prospective and existing consumers; more so than mere quantitative research. It will allow the researcher to make better recommendations which should be of greater value to m-commerce stakeholders.

4.6.1.1 Research Population

In total, four focus group sessions were conducted. The participants were heterogeneous, but a degree of commonality did exist in that they shared one common characteristic. This relates to the fact that they were all cellphone users and had previously used mobile services. The participants were all essentially from the same social background. The groups were mixed in terms of age groups, gender, language, education levels and MNO affiliation. One group comprised 'low users' as a control group and the other three groups included 'high users' of current m-commerce services. To protect confidentiality, the MNOs will subsequently be referred to as MNO 1 and MNO 2 respectively. At the end of each focus group discussion, the participants were each requested to complete a questionnaire.

The number of participants was kept to a minimum, as Saunders *et al* (2003) suggest that exploring a topic relating to a more emotional construct, such as trust, should be undertaken in smaller groups than when merely obtaining views about a specific product. A private research company was responsible for recruiting the participants and the following criteria were used to screen the participants of the focus groups:

#	Criteria	Reason	Qualifying answer
1	Do you live in Cape Town?	Focus group sessions were conducted in Cape Town.	Yes
2	Do you use (or have you used) the MNO 1 or 2 package called MNO package 1 or MNO package 2?	Familiarity with services is established. If the participants have not used the portals, they could still obtain m-commerce services from other vendors.	Yes or No
3	Do you use your cellular phone to do any of the following: - Send premium rated SMS's; download content (e.g. sports, ring tones); play games; browse Internet (e.g. 3G data cards); access e-mail (e.g. Blackberry); send MMS; use video telephony?	Categorisation of participants according to usage and the disqualification of respondents who do not use these services.	Yes. If the answer to all the previous questions is no, the respondents do not qualify.
4	Do you use the services on a daily, weekly, monthly or less-than-monthly basis?	Categorisation of respondents into 'non-user', 'low user' and 'high user'.	Yes, daily or weekly - means that the respondent has qualified as a 'high user'. Yes, monthly or less - means that the respondent has qualified as a low user.

Table 10: Screening Questions for Focus Group Participants

An experienced moderator was sourced in order to facilitate the focus group sessions which were held in an office building with focus group facilities. Name tags were supplied and snacks and refreshments were served. The focus group sessions were recorded on tape and observed from behind a one-way reflected window.

4.6.1.2 Preparation of Data

The sources of information consist of the moderator and the researcher's notes and the audio tape-recordings of the session. The full session was transcribed from the audio-tape recording and recorded in Microsoft Word. The researcher used three diverse contexts to aid the qualitative analysis as prescribed by Ritchie *et al* (2004, p201). These refer to: (1) condensing the discussion to understand what participants mean and understand; (2) applying common sense understanding by using general knowledge applicable to m-commerce services and stakeholders; and (3) theoretical understanding of how the statement fits within the broader literature perspective.

The data analysis comprised nine steps. Steps one to eight have been explained with the assistance of Figure 18.

Step 1: Labelling

Each paragraph and/or sentence of the detail focus group data was assigned a label to allow the researcher, during subsequent steps, to revisit the original data. Labelling was applied to the focus group transcriptions (as recorded in MS Word format), by numbering each sentence or paragraph with a numeric number starting from 1. These numbers (labels) were added to each further level of analysis to allow the researcher to revert back to the specific context of the discussion.

Step 2: Categorisation

The voluminous amounts of data were categorised according to broad categories. This allowed the researcher to organise the data according to key themes influenced by the literature. The index is available in Appendix 3, Table 26: Index for Study Trust, page 150. The categorisation also followed the structure of the moderator guide, available in Appendix 2, Section 10.1 page 135. Information containing corresponding categories provided common perspectives.

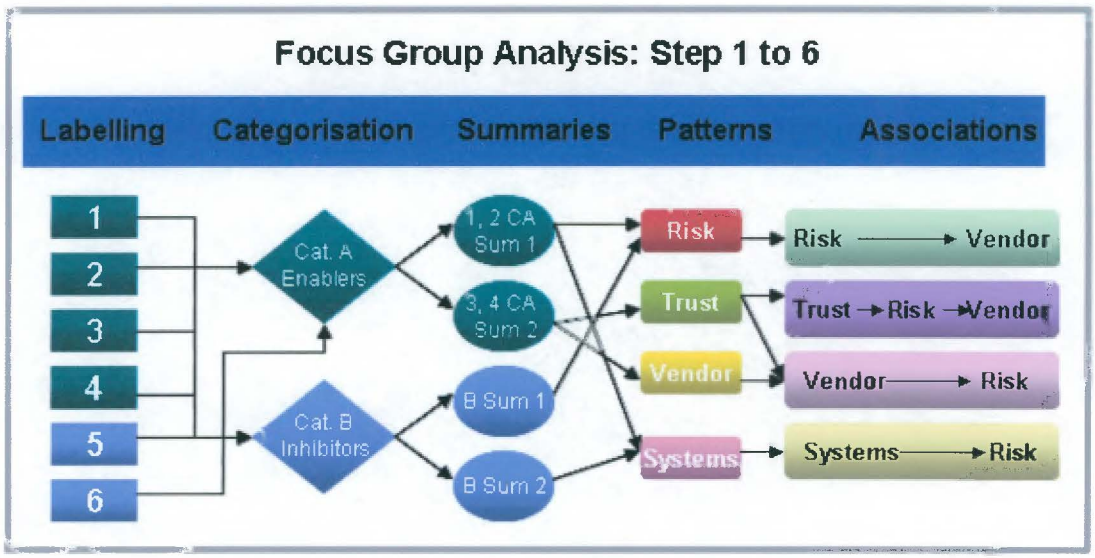


Figure 18: Focus Group Analysis

Step 3: Summarisation

The data belonging to the key categories was summarised into statements by the researcher. This increased theoretical understanding and reduced the volumes of data to manageable size summations.

Step 4: Patterns

The preceding data was further related to the main and sub-variables of the model. If the summary stated that 'banks provide insurance that minimise risks', this was seen to relates to Index 4.2 - i.e. 'risk', but moreover this relates to the variable of 'participation' which is indicated as P = Positive (and

N = Negative).

Step 5: Associations

The data was further analysed to determine relationships. Using the preceding example (banks relate to the variables of 'Vendor' and 'Trust'), the vendor (bank) provides risk-reducing interventions, such as 'insurance', which, in the wider context of the discussion, increase trust.

Step 6: Relationships:

The supplementary summation of the associations was undertaken by noting the relationships. Using the preceding example, the relationship would be: Vendor → Reduce Risk → Increase Trust → Promote Participation. A reduced version of the relationship spreadsheet is available in Appendix 3, Section 11.3, page 150 of which an extract is provided in Table 11.

		Trust Variables						Risk			Innovation Diffusion Characteristics					
Relation-ship	Context	Interpersonal	Vendor Trust	Systems	Institution	Trust	Participation	Vendor	Systems	Institution	Relative Adv	Compatibility	Complexity	Trialibility	Observability	Image	Cost
RS - TV	Cost transparency						N	x	X				x				x
C - RS	Cost of handset			x			N										x
C - RS	Transaction errors						N		X								x
RV - RA	Prov. of incorrect info						N	x			x						
TV - RA	HM most user friendly		x				P				x						
TV - CP	Teach yourself						N	x					x				
RS	Damaged handset						N		X								
RS- RA	Software versions						N		X	x							
RS - RA	Battery flat: no service						N		X		x						
RV - RA	Game score late						N	x			x						

Table 11: Example of Summary of Relationships Between Trust Variables as Indicated by Focus Groups

Step 7: Modelling

A graphic presentation of the relationships between the variables has been provided. Using the preceding example, the vendor can reduce the risks (that additionally relate to security risks) in order to increase trust as indicated in Figure 19.

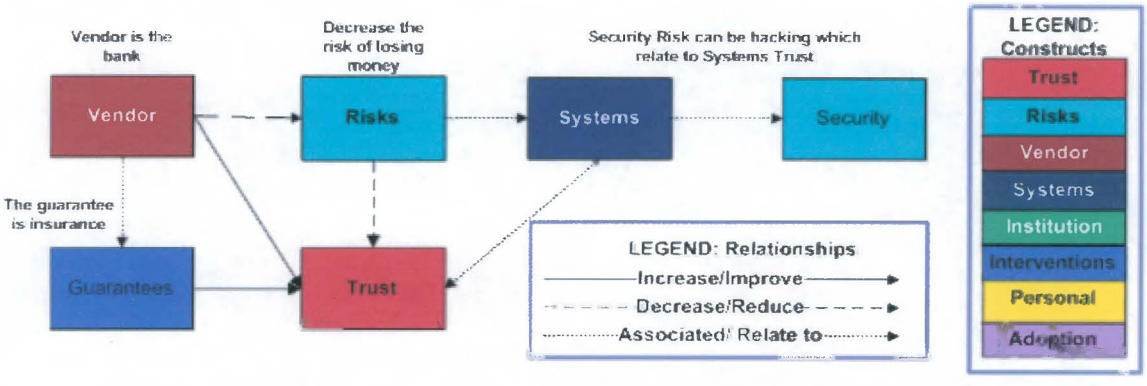


Figure 19: Example of Model Illustrating the Relationships Between Variables as Shown by Focus Groups

Step 8: Explanatory Accounts

The results were described in terms of the associations between the data and the explanations which were provided. The key themes were summarised according to their relation to the hypotheses and research propositions. The implications will be presented as recommendations in Chapter 5 and selected quotations from the participants will be used to clarify various relevant concepts.

Step 9: Research Proposition

The totality of preceding data was analysed to determine whether it supported or disproved the research proposition. Results are not numerically analysed, but rather described according to the patterns and broad themes.

4.6.1.3 Limitations and Key Assumptions

The moderator managed the focus groups according to the interview guide. To ensure that the objectives of the focus group session were achieved, numerous pre-interviews were held with the moderator and a detailed interview guide was provided.

The experienced moderator ensured participation of all contributors by avoiding domination by certain individuals. A limitation of the focus groups was the use of heterogeneous participants, since it could be viewed that this may inhibit discussions. The groups were specifically designed to test for differences between age groups and affiliation with regards to the mobile network operator. One cohesive commonality was however reflected in terms of the fact that all participants were cellphone users and utilised of m-commerce services. The use of heterogeneous participants benefited the study, as it allowed more in-depth exploration of the pertinent issues. The participants were also called on to speak freely, as the likelihood of these individuals interacting socially with one another in the near future was improbable.

Focus groups have been criticised because social norms prevent people from expressing divergent views (Ritchie *et al*, 2003). The moderator therefore adopted the following approaches to challenge apparent consensus, by: (1) encouraging that divergence is acceptable; (2) drawing out individual respondents; (3) establishing reasons; and (4) challenging conformity by presenting alternative viewpoints.

The risks mainly related to the qualitative approach which might result in the introduction of observer bias. The focus group participants were therefore also called upon to complete a questionnaire, which eliminated observer bias by using absolute and discrete evaluation criteria. The researcher did not actively participate in the focus group sessions.

The small sample cannot be deemed representative of the South African population; however, due to

the random approach adopted in the selection of the participants, the group could be somewhat typical. All coding and classification of the focus group data was performed by the researcher. Bailey *et al* (2002a) express the opinion that one person should perform the classification to maintain consistency and reliability as the coding process is subjective and not singly an application of hard and fast rules.

An overall risk to the research relates to the researcher adopting the role of practitioner-researcher; meaning that research is being conducting within the researcher's own organisation. The advantage of this is that access to the research population is not a major obstacle. The time required to 'learn the context' is probably also diminished (Saunders *et al,* 2003). The major disadvantage is that the researcher could have certain preconceptions that could prevent sufficient exploration of issues that would enrich the research. The researcher should be aware and guard against subjective interpretations.

4.6.1.4 Ethics

At the commencement of each session, the moderator requested permission from the participants to record the meetings, and notification was provided that the focus group would be observed by the researcher. The reason for using the tape recorder was explained and consensus obtained. The interviewer and moderator assured confidentiality and anonymity by withholding names and by not publishing individual details in this technical report.

4.6.2 Questionnaire

The results ensuing from the exploratory methods enabled the researcher to better understand how trust and risk influence the adoption of m-commerce. The focus group questionnaires provided limited answers with regard to 'how many' and 'how much'. The survey approach however provided a response or solution to the strength of the relationships and the relevance of the model.

4.6.2.1 Research Population

'Early adopters' are the target population for the statistical analysis potion of the study as previously stated in section 2.4.3. Early adopters are generally considered to be younger than later adopters. The population profile for this research therefore targets younger individuals. The 2001 Census indicated that there were 2,113,774 individuals between the age of 0 and 25 living in the Western Cape during the time of the census (www.statssa.gov.za). The population are however too large to apply a random sampling technique.

In addition to age (youth), the research targets individuals that have characteristics of 'early adopters'

such as being already high users of m-commerce, showing signs of innovativeness, being more affluent and better educated than the general population (refer to section 2.4.3). These characteristics are displayed by call centre agents. The call centre of a telecommunications company was accessible to the researcher. Due to financial and time constraints a convenience sampling approach was adopted. Call centre agents were therefore identified as the target population and a convenience sample was taken at the call centres of a telecommunications company.

The two call centres used are based in Cape Town with the size of the sampling frame being approximately 500 call centre agents. The agents are representative of South Africa in terms of race, language and gender. The average qualification is university exemption and the average age of the call centre agents is 22. A previous study by Gilham (2004) compared a mobile communications industry call centre with a retail industry call centre, as depicted in Figure 20.

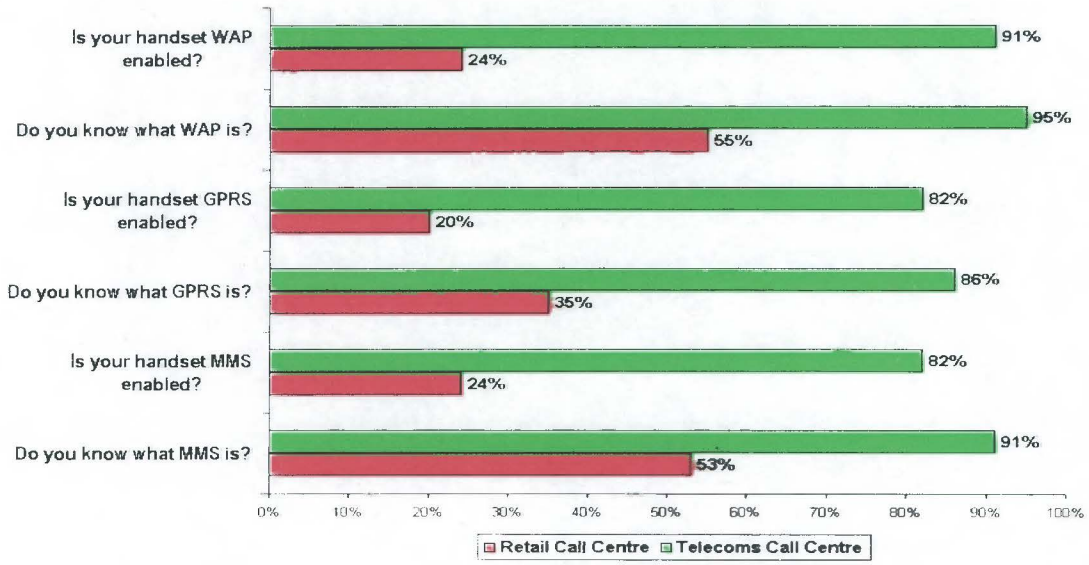


Figure 20: Indication of User Knowledge and Handset Technology Amongst Call Centre Groups
(Adapted from Gilham, 2004)

Figure 20 illustrates that the mobile communication industry call centre agents are more knowledgeable with regard to mobile technology. The factors that make the telecommunications call centre a target group for the population have been summarised in Table 12.

Attributes	Researcher	Implications for Study
High users of content services.	Gilham (2004)	Already early adopters.
Youth market key segment for m-commerce.	Consumer Direct (2001)	Youth markets are early adopters, and will quickly learn how to navigate and use services.
M-commerce savvy: Continuously trained on new technology and services to assist the customers of the mobile network.	Urban *et al* (2002)	Consumer characteristics that promote trust.
Previous experience with services and vendors.	Gilham (2004); Urban *et al* (2002)	
Word-of-mouth referral.	Siau *et al* (2003a)	
Innovativeness.	De Ruyter *et al* (2002)	

Attributes	Researcher	Implications for Study
Contract and cellphone allowance with high average expenditure.	Gilham (2004)	Cost will theoretically not be a major inhibitor of adoption.
Continuously upgrade to newest cellphones with the most recent features.	Gilham (2004)	Lack of handset features will not be a major inhibitor.

Table 12: Attributes of Mobile Telecoms Call Centre and Implications for Study

The research will not be biased towards a specific network operator, as WASPs provide services across all mobile networks to all consumers of all networks. In addition, WASPs often use short codes, like '34040', which eliminate association with a specific network.

4.6.2.2 Design of the Questionnaire

The research question states: 'To what extent do trust and risk factors influence the adoption and usage of mobile commerce by early-adopters in South Africa?' To test the theory and the qualitative research conducted, the hypotheses and research proposition, as stated in Section 1.4, page 18, have been investigated.

The questions posed were based on previous trust studies conducted in both electronic and mobile commerce. 'Intention to use' was tested by using Moore *et al*'s (1991) probes, an example of which is the following statement: "I would be willing to link my cellphone number to my bank account to do banking." Trust in the vendor and 'disposition to trust' was based on the variables as developed by Jarvenpaa *et al* (2000) and Koufaris *et al* (2002). The following declaration: "This company wants to be known as one who keeps promises and commitments," was transcribed into, "I would be able to trust vendors to provide the services effectively and competently." Trust propensity was transformed from, "it is easy for me to trust a person/thing," into, "I am confident that other people can be trusted." The Innovation characteristic questions have been adapted from Moore and Benbasat's (1991) model, to test for m-commerce services, as it was suggested by Gilham (2004) that the standard questions might not be best suited for the m-commerce environment.

It should be noted that a number of questions relating to risk have been included in the study. The reason is two-fold. Firstly, trust researchers, such as Yousafzai (2005), remark that, "the examination of more detailed facets of risk would be a promising area for future research." Secondly, no South African study has been conducted to asses the risk perception of South African consumers in terms of m-commerce. Risk perceptions raised in the popular literature are however seldom included in trust studies and only limited examples could be found in research such as Bauer *et al* (2005): "There is a risk of receiving unwanted SMS-messages when using mobile marketing services." Since many of these questions were developed by the researcher, this has implications for the validity of the model. For this reason, a number of extra questions have been incorporated. This factor in tum, has significantly increased the length of the questionnaire. Risk questions have moreover been used to provide descriptive statistics relating to the extent to which early adopters feel exposed to certain risks.

No socio-demographic attributes were however collected. The number and usage of m-commerce transactions was gathered, due to the fact that prior usage, foreknowledge and expectations with regard to a specific company reputation have been indicated as important factors in trust (Egger, 2000). Furthermore, this section of the study focuses specifically on early-adopters and it is therefore expected that these individuals would already be high users of existing m-commerce services.

The survey instrument has been developed to test the research proposals. The main variables of the conceptual model for producing trust in mobile commerce have been investigated and the types of questions, and how they relate to the variables and sub-variables, summarised in Table 13.

H0	Variable	Sub-variables	Question Numbers	Typical Question Wording	Coding
	Activity/Usage	Mobile Commerce	B: 65 – 73	How often do you use your mobile phone to browse the Internet?	AU1 - 9
H_02	Personal Characteristics	None	A3, A16, A31, A46	I am confident that other people can be trusted.	TPc
H_04	Vendor Trust	None	A1; A13; A18; A33; A49	I would be able to trust vendors to provide the services effectively and competently.	TV
H_05	Systems	None	A21, A34, A35, A50, A52	I trust the technology (e.g. WAP, USSD, 3G) to deliver the transaction successfully.	TS
H_06	Institutional-based Trust	None	A8; A23: A38; A55; A64	I am confident that my rights as a m-commerce consumer are protected by law.	TI
H_03	Perceived Risk	Risk Vendor	A7; A9; A12; A36; A39; A41; A56	I feel exposed to receiving unwelcome SMS's (SPAM) from vendors.	RV
		Risk Systems	A2; A6; A14; A17; A19; A24; A27; A29; A32; A44; A47; A59; A61	I feel exposed to the risks of viruses.	RS
		Risk Institution	A8; A23; A38; A55; A64	I am confident that my rights as a m-commerce consumer are protected by law.	RI
	In some cases a question is repeated to test risk variables. This is also used to establish the extent to which these risk categories and factors exist amongst early adopters.	Risk Transparency	A22; A53; A64	I take the risk of not knowing exactly how much I am paying for the transaction.	RVT
		Risk Privacy	A9; A39; A56; A24	I am afraid that my personal information is vulnerable to abuse.	RVP

H0	Variable	Sub-variables	Question Numbers	Typical Question Wording	Coding
		Risk Security	A2; A19; A27	I am concerned about lack of security when using m-commerce services.	RSS
		Risk Network	A6; A17; A32; A47	I feel that the transaction speed is too slow.	RSN
		Risk Handset External	A14; A29; A44; A61	I am concerned that my phone could be used for purchases if stolen.	RSH
$H_0$1	Trust	None	A11; A40; A26; A58	In general, I believe that m-commerce services can be trusted.	TT
	Participation	None	A43; A60; A63	I intend to use m-commerce services quite frequently.	TP
$H_0$7	Innovation Diffusion	Relative Advantage	A10; A45	Using m-commerce services will improve my quality of life.	IdRA
		Compatibility	A5; A42	Using m-commerce services will be compatible with my lifestyle.	IdCT
		Complexity	A15; A48	I believe that m-commerce transactions will be easy to use.	IdCP
		Trialibility	A20, A28; A51	I need the opportunity to play around and figure the services out.	IdT
		Observability	A37; A62	I will only use m-commerce services if many other people are using them.	IdO
		Image	A25; A54	Using m-commerce will improve my image amongst friends.	IdI
		Cost	A30; A57	I expect that m-commerce services will, in general, be affordable.	IdC
	Reverse Coded Questions		A15; A16; A26; A30; A32; A49; A50; A54	I expect that m-commerce will be difficult to use.	

Table 13: Design of Test for Variables

The full questionnaire and cover letter is available in Appendix 4, section 12.1 and 12.2 page 168. All the measures were assessed using a 7-point Likert Scale and, where appropriate, the questions were reverse-coded. Questions were randomly posed in order to encourage honest responses.

4.6.2.3 Data Collection and Preparation

The Executive Director of the Call Centre was first approached for permission to conduct the study. Thereafter, the senior manager and team leaders at each call centre were approached to encourage

participation as no incentives were offered or provided. Responses were coded into MS Excel; completeness was verified and negatively-phrased questions were reversed. Descriptive statistics was performed in Excel and an analysis of the responses to each item was coded and categorised. Cronbach's Alpha was used to test consistency by calculating the expected internal relation of variables. Statistica was used for correlation, regression and factor analysis.

A pilot was conducted at the IT Call Centre of the Telecommunications Company to determine whether the questionnaire was, in fact, measuring what it was intended to measure and in order to assess whether it was understandable. Only two questions were re-phrased.

4.6.2.4 Limitations and Key Assumptions

The questionnaire was designed to investigate trust and risk barriers to potential m-commerce adoption. The quantitative research only focuses on power users, or 'early adopters', who are not typical of the broader m-commerce market in South Africa. Although sufficient data will exist to enable quantitative conclusions, the results will not be representative of the total market. The results could, however, assist future researchers with additional reference points for reviewing trust and risk in m-commerce.

5 Chapter 5: Data Analysis and Findings

This study examines the trust and risk factors that influence the adoption and usage of m-commerce. This chapter presents the data analysis and findings for the focus groups (qualitative analysis) as well as the early adopters (quantitative analysis).

5.1 Structure of Data Analysis

Because of the relatively large number of hypotheses and the decision to use a combination of qualitative and quantitative analysis, the structure of this chapter needs to be explained (refer to Figure 21).

Section 5.2 is concerned with a high-level analysis of both the focus groups and 'early adopter' sample. It commences by looking at the demographic data collected from the focus group participants (5.2.1). On the other hand, no demographic data could be collected from early adopters who completed the survey questionnaire, since (contrary to the opinion of the author and supervisor) the University of Cape Town Ethics committee deemed the demographic profile questions to be irrelevant to the research objective. The descriptive statistics in Section 5.2 emphasise the target population for m-commerce and validates the population used for the quantitative analysis. Thereafter, the focus briefly changes from the qualitative research to the quantitative analysis of the 'early adopter' survey (5.2.2). The frequency of use of current m-commerce services by 'early adopters' is described to support the notion that they have previous experience with m-commerce. The section concludes with a high-level analysis of the focus group sessions by highlighting important distinguishing features between e- and m-commerce as observed from the focus group discussions (5.2.3). Section 5.3 focus on quantitative analysis by investigating the construct validity and reliability of the 'early adopter' survey.

Section 5.4 to 5.10 brings together both quantitative and qualitative analysis by testing the hypotheses and research propositions. Each sub-section from section 5.4 to 5.10 starts with the quantitative analysis followed by an analysis of the data provided from the qualitative research. The quantitative analysis describes to what extent relationships exist between the variables of the trust model. The qualitative analysis provides 'how' and 'why' answers to questions previously raised in the research. In some sections, the observations of the focus group participants are supplemented with descriptive statistics from the quantitative analysis. An example is Section 5.6.2.4 where the risks mentioned by the focus group participants are compared with the frequency of occurrence by early adopters. This allows a better indication of the extent to which these perceptions of risks exist in a wider audience, more specifically by 'early adopters'. In some cases the focus group analysis is enriched with additional information from the questionnaire completed by the focus group participants.

This enables a clearer indication of the relative importance of certain factors since they are ranked by the focus group participants. The combination of the quantitative and qualitative analysis thus serves to provide two perspectives on the same hypotheses. It is believed that this "triangulation" and complementary analysis not only enriches the analysis but it also enhances the validity of the findings.

Structure of Chapter 5: Data Analysis and Findings

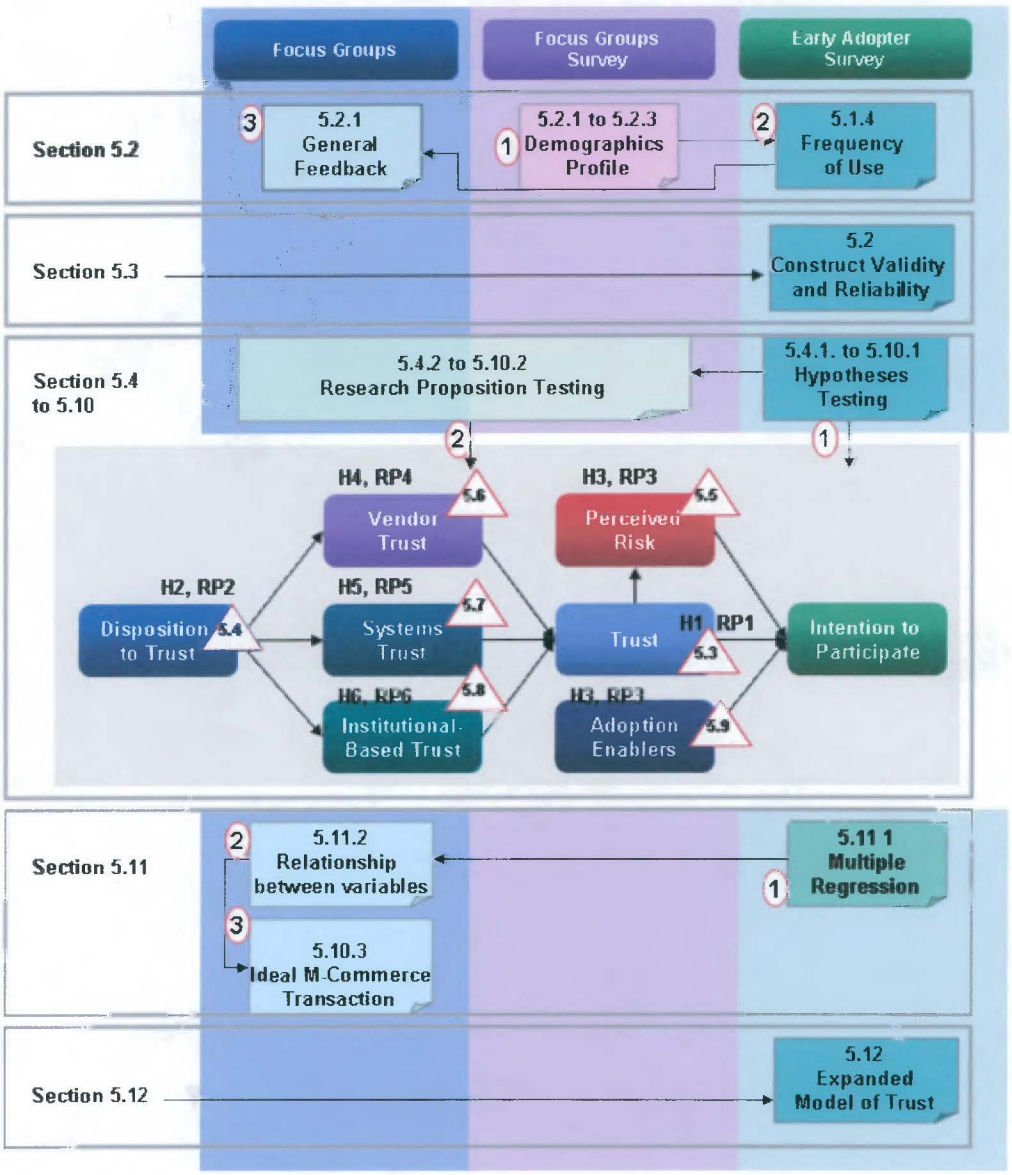


Figure 21: Structure of Chapter 5

Hypotheses testing in section 5.4 to 5.10 are conducted by means of simple regression testing when only two variables are compared, while multiple regression is use in the case where more than two variables are under consideration. Section 5.11 introduces additional analysis into the research, firstly from the (5.11.1) quantitative analysis by conducting multiple regression, followed by qualitative models (5.11.2/3) based on the focus group discussions. This analysis is included since it provides richer explanations of the relationships between variables. Section 5.12 concludes the data analysis

by presenting the results of the quantitative analysis in a model of trust, showing all the significant relationships.

5.2 Demographics and Usage Profile

No demographic data could be collected for the 'early adopter' survey. However, the Executive Director responsible for the relevant call centres confirmed that the profile was representative of the average population of South-Africa. The demographic and usage profile of the focus group participants was obtained through the self-completion questionnaire and has been reviewed. It should be fairly representative of m-commerce users due to the random nature of the recruitment. The focus groups comprised a total of twenty-seven (27) participants and each group consisted of between six (6) to nine (9) members.

5.2.1 Demographic Profile

Figure 22 illustrates the demographics of the focus group contributors, who were predominantly male, English speaking, young and with a tertiary education. Thirteen (13) participants were between the age of twenty-one (21) and twenty-five (25). This confirms that the target population for m-commerce is young, early adopters and validates the population used for the questionnaires.

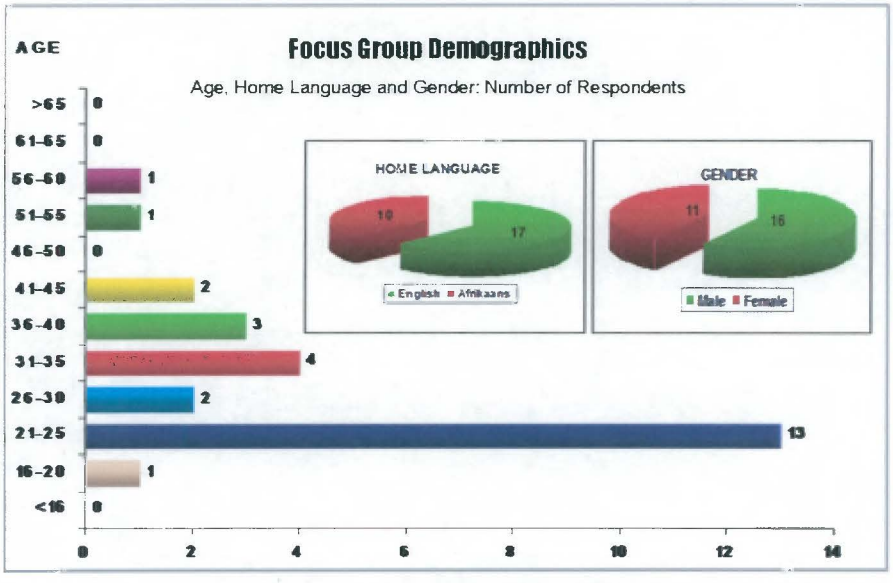


Figure 22: Demographics of Focus Group Participants

5.2.2 Education and Average Spend

The education and average spend by focus group contributors corresponds with the 'early adopter'

profile in terms of age, affluence and education (refer to Section 2.4.3). The education level and average spend, as demonstrated in Figure 23, indicates that the majority of participants have post-matric qualifications and spend between R101 and R500 per month on cellular bills.

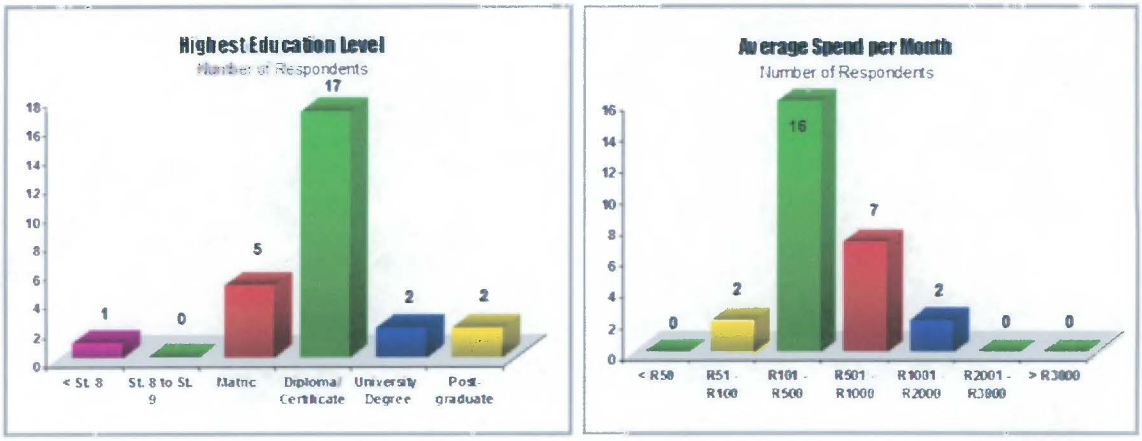


Figure 23: Education Level and Average Spend by Focus Group Participants

5.2.3 Affiliation with the Mobile Network Operator

Figure 24 demonstrates the lengthy association (three or more years) that sixteen (16) focus group contributors have had with their MNO. This could indicate loyalty to the MNO, or, alternatively, be due to the fact that mobile number portability (MNP) is not yet available in South Africa. Furthermore, there was an almost even representation of the two MNOs in the focus group discussions.

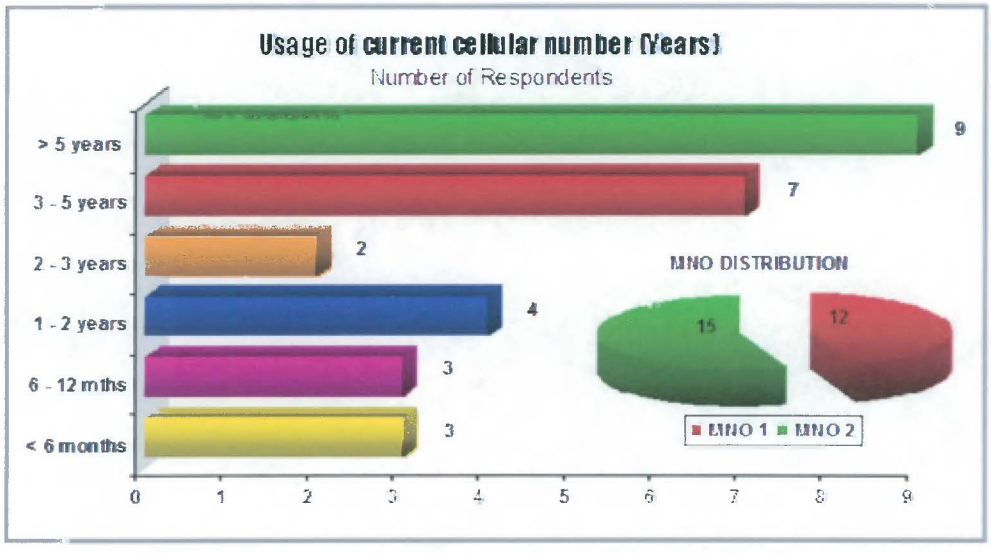


Figure 24: Affiliation with Mobile Network Operator by Focus Group Participants

It should be noted that no important differences could be ascertained between the focus group participants, in terms of their affiliation with their MNO, education, current usage or spend. The only significant difference was found to be 'age'.

5.2.4 Frequency of Use by 'Early Adopters'

This section focuses on quantitative analysis. Figure 25 showed that the 'early adopters' were infrequent users of mobile content services. They were also high users of more advanced m-commerce services, such as accessing the Internet via their mobile phones, and frequently used portals like Vodafone Live and MTN Loaded.

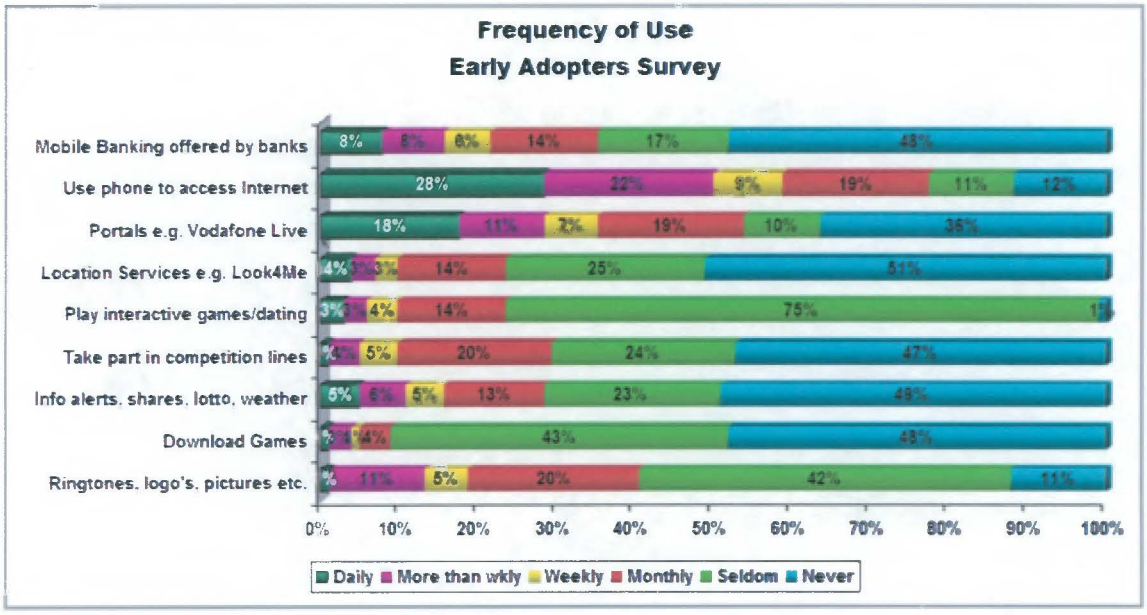


Figure 25: Frequency of Use – Early Adopter Survey

5.2.5 General Feedback from Focus Groups

The facilitator appealed to the participants to provide their own definition of e-commerce and m-commerce. The actual definitions, as documented by the contributors, are available in Appendix 3, Section 11.4, page 158. A large percentage could not mention any m-commerce service used, which demonstrated that they were not aware that some of the services which they utilised were classified as m-commerce services. A brief overview of the factors influencing adoption of e-commerce and m-commerce, as well as the services used is available in Appendix 3 (Section 11.6, starting at page 160). The next section seeks to clarify important points raised during the literature survey.

5.2.5.1 Cost of M-commerce Transactions

Table 14 summarises the distinction between high and low-value transactions, as put forward by the focus group participants.

Category	Amount	Comments
Low-value transaction	Between R3 and R10 (for ring tones) and up to R15 (for true tones).	A price of R50 for wallpaper is considered to be too high. Higher than R15 for a ring tone is perceived to be too expensive as it. *"is cheaper to download via the Internet."*
Medium-value transaction	Between R15 and R50	Losing R100 is, *"not that big of an issue."* as opposed to one younger participant commented that he would, *"throw his toys"* if a R50 transaction failed.
High-value transaction	Anything higher than R50, such as buying movie tickets.	A participant said: *"I don't think anybody in their right mind would buy something for more than R150 [using their cellphone]."*

Table 14: Distinction Between High- and Low-value Transactions by Focus Group Participants

In sharp contrast to e-commerce, the focus group members had no clear understanding of how much they were paying per mobile transaction, or how the technology functions. Several participants were under the impression that they were paying for the duration of the GPRS connection, instead of only forfeiting for downloads. Importantly, the participants remarked that it was not the cost of the transaction that was the issue, but rather the value to the customer and the level of convenience. Other participants remarked that trust in the transaction was a driver to use high cost transactions.

5.2.5.2 Key Differences Between E- and M-commerce

The focus group contributors did not view m-commerce as a natural extension of e-commerce. Participants displayed a clear preference for their PC, citing that it was "easier to browse." They furthermore expressed complaints relating to the small screen size of the mobile phone and the, "speeds that you download on the cell phones [which] are way slower than your normal Internet." In addition, it was reiterated that new services, like 3G, make "your cellphone go flat if you want to use the services." It therefore became apparent that m-commerce would more than likely be migrating from mobile telephony rather than from e-commerce (as stated in Section 2.4.2).

Another important difference was the perception that e-commerce is less risky than m-commerce. The technology feels more secure, as indicators or signals are available (e.g. the SSL lock) that suggest: "This site is very, very secure." A lack of control was pointed out due to the fact that no virus control exists on the mobile phones, while, "on a computer pretty much every time you turn on your computer it scans for a virus." The banks also provide assurances, using the example of, "the guy that hacked in – the bank stood good for it and refunded everybody." Furthermore, greater transparency exists. If a problem is experienced with the bank, "I will walk in today and demand to see the bank manager and deal with him face to face."

In contrast to the Internet experience, every group related a few negative m-commerce experiences. They criticised unsuccessful content downloads, which, "take so long. When it does come out it will give you half the picture." Almost every m-commerce service type that was mentioned during the focus group discussion was disparaged for being complex and suffering from technology-related problems. This is in sharp contrast to the e-commerce discussion.

5.3 Construct Validity and Reliability

Section 5.3 concentrates on the quantitative analysis of the research. There were 110 responses to the 'early adopter survey', of which eight (8) cases were rejected due to incomplete information. However, three influential outliers were identified and removed. It appeared as if these 3 questionnaires were completed mindlessly by the respondents by mechanically choosing all the extreme response options (i.e. all 1s or 7s).

5.3.1 Reliability

Item reliability was evaluated using the Cronbach alpha scores. The results can be found in Table 15. The IDT characteristics could not be evaluated for internal validity due to the fact that only two questions per IDT variable were asked, and at least three (3) were required. However, the IDT test items were taken from existing instruments that have been validated extensively in previous research.

Variable	# of items	Reliability
Disposition to Trust	4	0.790562
Vendor Trust	5	0.772977
Systems Trust	5	0.939170
Institutional Trust	5	0.887567
Perceived Risk: Vendor	7	0.868767
Perceived Risk: Systems	13	0.935339
Perceived Risk: Institution	3	0.853945
Trust	4	0.867562
Intention to Participate	3	0.962804

Table 15: Reliability Analysis

Since the items for all variables showed Cronbach alpha scores exceeding 0.77, the internal reliability can be regarded as acceptable.

5.3.2 Construct Validity

Exploratory factor analysis (EFA) was conducted to explore the relationship between the variables. The results of the exploratory analysis have been introduced in Appendix 5: Statistical Analysis, page 173. The sixty-four (64) variables loaded onto fifteen (15) factors. Factor one (1) and factor two (2) account for a significant percentage of the variance in the data and revealed a commonality between IDT characteristics and trust in the system and vendor.

Principle Components Analysis (PCA) was subsequently conducted to reduce the variables into a set of eight (8) weighted combinations. The rotation method used was Varimax with Kaiser Normalisation. A summary of the results (Table 32), illustrating only those items with a significant

loading of more than 0.3, is available in Appendix 5, section 13.2.1. The complete set of results is available in Table 33: Factor Analysis, page 178. Overall trust and participation in m-commerce load together, which indicates a strong causal link between the two. Respondents were unlikely to trust m-commerce, yet not participate in it, and vice versa. Personal characteristics; trust in the system and vendor trust loaded together. Detailed examination of the questions revealed that the respondents could not potentially view these as identical, and that it was not exclusively trust researchers who would be able to conceptually distinguish between the variables. The IDT questions, which had all been adapted from previous research, also tended to load together. Moore and Bensabat (1991) found that relative advantage and compatibility are predisposed to load together, which could mean that these two are viewed as being similar.

Although the loading of different variables onto the same factor initially appeared to raise an issue, it must be remembered that factor analysis will only produce meaningful results if the data is, "truly continuous and multivariate normal," and, furthermore, "item-level data in psychological research (e.g. disposition to trust) almost never meets these requirements." (O'Connor, 2005). Bernstein *et al* (1988, p398) cited by O'Connor (2005) states that, "the correlation between any two items is affected by both their substantive (content-based) similarity and by the similarities of their statistical distribution." This therefore implies that items that show similar distribution may be loaded into similar factors. This was investigated by examining the means and standard deviation of the items on each factor (results available in Appendix 5, Section 13.3.1, page 178). Factor three (3) demonstrates items with high response rates of a 5.26 average, while factor one (1) displays an intermediate response rate of 4.48. Factors four (4) and two (2) confirm low response rates of 3.8 and 3.5 respectively. Berstein *et al* (1989) suggested that, if this is the case, "there are strong reasons to attribute the factors to statistical rather than to substantive bases".

A correlation matrix was produced to test the relation between the various question groups (refer to Appendix 5: Section 13.5.1 for results). Questions belonging to the same variable could be associated with a correlation coefficient greater than 0.5, but, in some instances, a relationship with other questions belonging to various other question groups might exist. Another correlation matrix was produced that demonstrated correlation between the variables of the model (refer to Appendix 5, Section 13.5.2.). The correlations between the trust variables and their predictor variables were predominantly high and significant (up to 0.79). Since the construct reliability was high, and the concerns about construct validity could be explained, it was decided to proceed with the testing of the hypotheses.

5.4 Overall Trust

Previous research suggested that trust influences participation in m-commerce. The next section considers both qualitative and quantitative analysis in order to establish if this is also the case for South African consumers.

5.4.1 Quantitative Analysis

Hypothesis 1 investigated whether overall trust influences intention of 'early adopters' to participate in m-commerce services as illustrated in Figure 26.

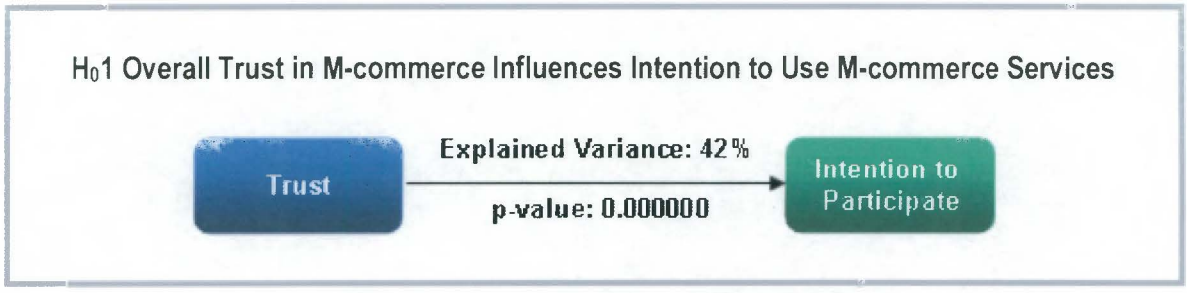


Figure 26: Trust influence Intention to Participate

Figure 26 demonstrates a highly significant association demonstrated by the low p-value between the two variables, which, in turn, accounts for 42 percent of the variance in the model. Table 16 presents the results of the hypothesis test by using simple regression testing:

Test	Results	Explanation	Supported
Variable	**Trust**	**Independent variable perceived trust influences intention to participate**	**YES**
T-value	8.595723	Statistical significance > 2	YES
P-value	0.000000	Significant relationship $p < 0.05$	YES
Adjusted R^2	0.426520	42% of the model is explained by a combination of these two variables	YES
Beta	0.657550	Importance of variable	YES

Table 16: Trust Influences Intention to Use M-commerce services

The outcome is that trust has a significant influence on the intention to participate in m-commerce by 'early adopters'. Hypothesis 1 is therefore regarded as strongly supported.

5.4.2 Qualitative Analysis

Qualitative (focus group) analysis explores the awareness of the main theme of trust. This is followed by an investigation of the sub-themes. Sub-themes relate to the relationship between trust and other variables.

5.4.2.1 The Importance of Trust

Participants were not able to verbalise the concept of trust very well. They described trust in the following manner: "it is the big unknown," and, "a pretty faceless situation that you are dealing with."

Although the word trust is infrequently used, the points raised by the participants relate to trust issues. An indicator of lack of trust is the frequent observations by contributors relating to the absence of face-to-face interaction and the lack of conscious awareness with regards to channels available in the instance that 'something goes wrong'. The participants described themselves as having a cautious approach to m-commerce, rendering them vulnerable and reluctant to use certain services. Some current high users of content services are very adamant that they would never use credit cards, or buy high-value services, using their mobile handsets. Lack of trust is also demonstrated by some participants' insistence that the m-commerce services would firstly need to be tested by many other potential users before they would be willing to try it.

Participants indicated concerns with regard to "all these transactions in the air," indicating that the technology itself introduced uncertainty and complexity. They also expressed anxiety with regard to vendors, stating that "the more they explain the benefits the more scared I am getting," thereby demonstrating a lack of trust. Participants also indicated that vendors often downplayed risks, in that, "they are not mentioning any possibility of fraud. They should mention it." Most of the complaints about services or vendors related to issues of trust and risks.

Contrary to the 'early adopter' survey results, (especially) the (younger) focus group participants did not seem to regard trust as a major issue. They explained that, "they have nothing really but your cellphone number. That can be changed... when it gets to the point where they find out a bit more details, like who actually owns the cellphone ... then my trust will be broken completely."

The influence of trust on intention to participant is reflected in this hesitation: "I won't do it again... The R10 is not a big deal, but the principle of the matter." In the instance that their trust has been broken, participants explain that, "if you don't give the goods – rip me off or whatever – I will try and retrieve what I have lost from you, but I am just going to go somewhere else." When the question was asked whether trust is relevant in the case of a low risk purchase, the answer was: "It is still relevant. It is like you send for a ring tone or something – you get hot pages back. It is a breach of trust."

5.4.2.2 Relationship Between Trust and other Variables

Participants described the relationship between trust and risk as, "the lack of trust can be as a result of increased risk." It appears as though the focus group members see trust as mediating the relationship between risk and behaviour. This contrast to the perception of the majority of trust researchers who identify risk as the mediating influence. The participants highlighted a strong correlation between trust and risk, in that the higher the value of the transaction, the higher they regarded the risks. This is expressed as participants being willing to use their mobile phones to buy a coke but not buy plane tickets. They described high value transactions as being, "a different story all together - that I wouldn't trust."

The relationship between trust and the other variables is illustrated in Figure 27. It is important to consider that, even though trust has been indicated as the mediator between behaviour and risk, the researcher does not suggest that conclusive evidence was presented during the focus group sessions to support this notion. It is however indicated as a promising area for future trust research.

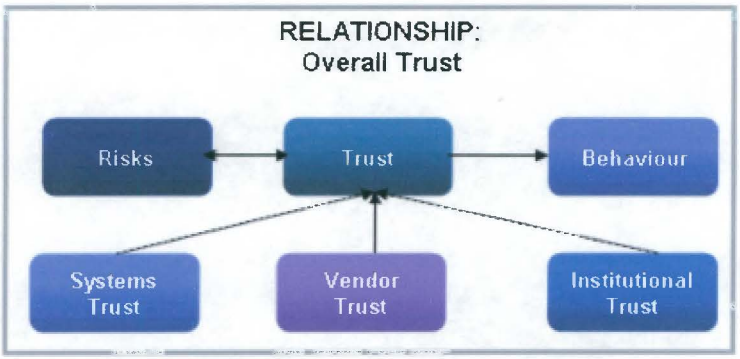


Figure 27: Relationship Between Trust and Other Variables

Trust relates mainly to three areas: (1) risks, as, "if you start using credit card details over the cellphones... trust is a big thing;" (2) trust in the vendor, none of which (with the exception of banks) the participants seem to regard as particularly trustworthy; and (3) trust in the technology. This concept has been described as an assurance that, "everything is going to work technologically and nothing is going to cut out," and, furthermore, relating to a sense of, "trust [that] the transaction will go through."

The focus group participants succeeded in validating the model, with the exception of institutional-based trust (reviewed as part of hypothesis 6). None of the participants demonstrated any awareness of institutional structures or regulations that could protect their interest, therefore the question of whether it can be viewed as a trust-building measure remains. Once the participants were however made aware of current consumer protection mechanisms, they acknowledged the importance of institutional trust by stating that, "if you know more specifically how legislation protects you... I think that will give, in general, a lot more confidence in using it."

5.5 Disposition to Trust

Previous research indicated that a consumer's personal characteristics influence his or her perception about the trustworthiness of the vendor, institution and systems. This section focuses on establishing whether this is also relevant for South African consumers.

5.5.1 Quantitative Analysis

Hypothesis 2 is investigates whether disposition to trust influences 'early adopters' perceived trustworthiness of the Vendor, Systems and the Institution as illustrated in Figure 28.

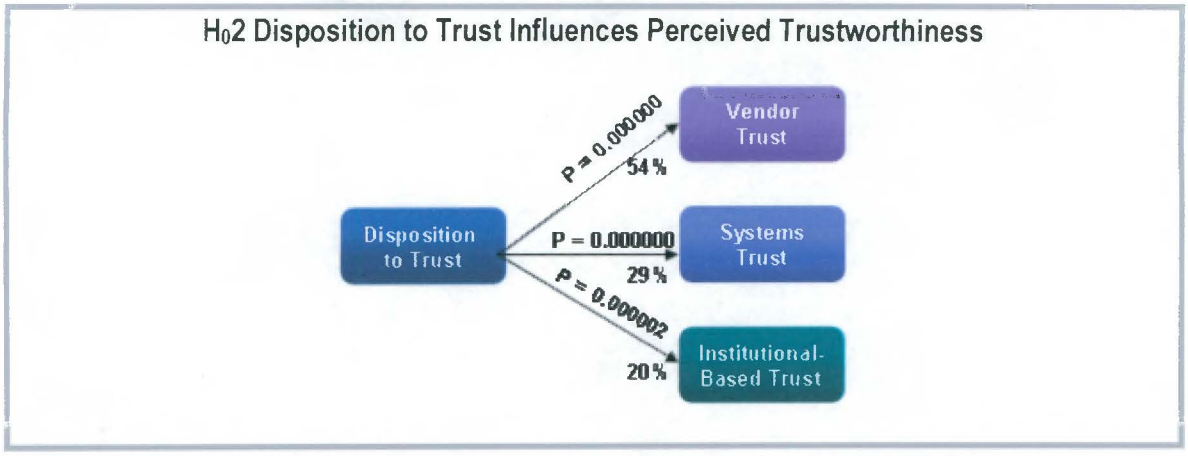


Figure 28: Disposition to Trust Influences Perceived Trustworthiness of Vendor, Systems and Institution

Figure 28 presents a high association between disposition to trust and all three dependent variables. Disposition to trust has the strongest influence on vendor trust, which accounts for 54 percent of the variance in the model; followed by systems trust and thereafter institutional trust. Table 17 exhibits the results of the hypothesis by using simple regression testing:

Relationship	T-value	P-value	Adjusted R^2	Beta	Supported
Disposition to trust influence Vendor Trust	10.98112	0.000000	0.549601	0.744444	YES
Disposition to trust influence Systems Trust	6.42410	0.000000	0.291237	0.546324	YES
Disposition to trust influence Institutional Trust	5.066712	0.000002	0.201119	0.457461	YES

Table 17: Relationship between Disposition to Trust and Vendor, Systems and Institutional Trust

Based on these findings, hypothesis 2 finds very strong statistical support.

5.5.2 Qualitative Analysis

This section provides further support to the conclusion above by focusing on the results of the qualitative analysis, i.e. determining whether focus group discussions implied that personal characteristics influence trust building.

The inclusion of 'disposition to trust' as a variable in the trust model was validated further by the focus group participants. The reason why some people use m-commerce and others not was ascribed to

the individual; it was described as, "a personality thing". Some participants described themselves as not being innovative or "electronically minded" and "ignorant". Participants thought that the younger generation were more likely to use m-commerce, since, "older people can't do that. The people who know how to work that are my daughter and son – that age." They described the youth as possessing m-commerce savvy: "Kids will instinctively start fiddling and finding a way around. Take a bunch of 60-year olds and they won't touch the thing." This demonstrates that the youth market quickly learns how to navigate and use services. The younger participants displayed characteristics of innovativeness, stating that, "if you don't have anything to do – the first thing you do is to take your cellphone and play around."

Personality characteristics for young adopters (shown in Figure 30) related mainly to the IDT variables of 'trialibity' and 'compatibility'. Older participants were associated more with 'relative advantage' and were more likely to experience m-commerce services as being complex and, thus, it was not likely that they would be inclined to experiment. It was also clear that disposition to trust relates closely to IDT characteristics. These observations are summarised in Figure 29. However, they could not be tested in this study and are included here as an interesting conjecture that can be explored in future research.

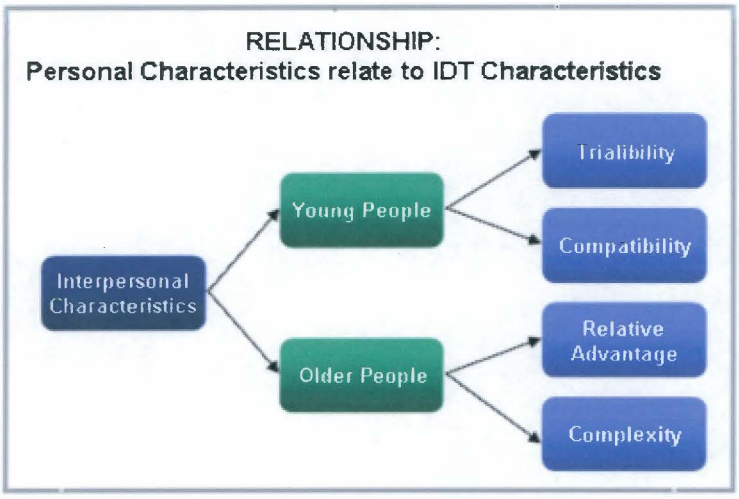


Figure 29: Personal Characteristics Relate to IDT

The need for self-expression or individualism was identified as a significant characteristic of young participants which is seen to influence participation. This has been expressed by personalisation of their handset and communications, such as regularly updating their personal ring tone and using MMS as, "you can go wild with it... you can add a sound clip or whatever." The existence of services is usually communicated via word-of-mouth from "your mates" and family and the services are usually prevalent in the media - such as TV advertisements, magazines, newspapers and radio - as expressed in the statement: "you can't miss it." This confirms indicators of dispositional trust, for example self-expression (refer to Section 2.4.3); word-of-mouth referrals and innovativeness (refer to Section 2.5.3).

Interestingly, the majority of focus group participants described themselves as being risk averse. They described their overall risk profile as "low risk" and reiterated the following about themselves: "I would definitely not take a risk." Some participants explained their risk profile in the following light: "I will never give out my personal details," indicating privacy concerns. The older participants were even more hesitant with regard to risk than the younger participants; a phenomenon which can be ascribed to the younger members being risk seekers. This risk seeking subgroup made statements such as: "I like taking risks," and, "I will go onto a new site and explore what is going on there." The motivation for taking risks was seen as the potential for gain: "maybe I can get a free ring tone (or game)." This correlates with the findings of Argawal *et al* (1998), who state that 'early adopters' do not consider risks (refer to Section 2.4.3). When the moderator asked, "what makes you try something?" the participants agreed that the primary indicator was "needs-driven".

Also of interest, and perhaps somewhat surprising, 'early adopters' can be described as predominantly leaning towards the 'low trust orientation' rather than a 'high trust orientation'. Compared to the trust levels (in business) of 48.1%, as reported by the Ask Africa survey, the trust levels of early adopters appear to be lower (also refer to section 2.3). A graphical presentation of the trust orientation has been provided in Figure 30.

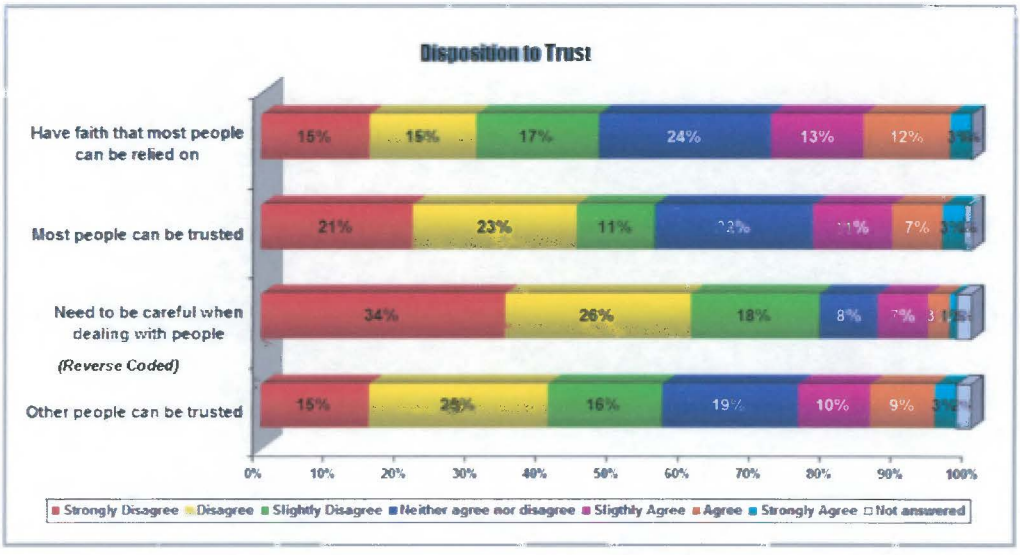


Figure 30: Disposition to Trust – Early Adopter Survey Results

5.6 Perceived Risks

Risks are prevalent in m-commerce, while trust has been demonstrated as one of the variables that compensates for risks. This section examines if risks influences South African consumers intention to use m-commerce services.

5.6.1 Quantitative Analysis

Hypothesis 3 is examined to determine if perceived risk has a negative influence intention to participate in m-commerce (Figure 31). The researcher did not use the composite risk variable to illustrate the relationship, but instead elected to choose the three sub-variables (refer to section 3.3.6 and 4.6.2.2). The three sub-variables categorise risks according to their relationship with the vendor, the systems and institutional based risk. Using the sub-variables allowed a more in-depth exploration and understanding of relationships between variables (refer also to further analysis conducted in section 5.11).

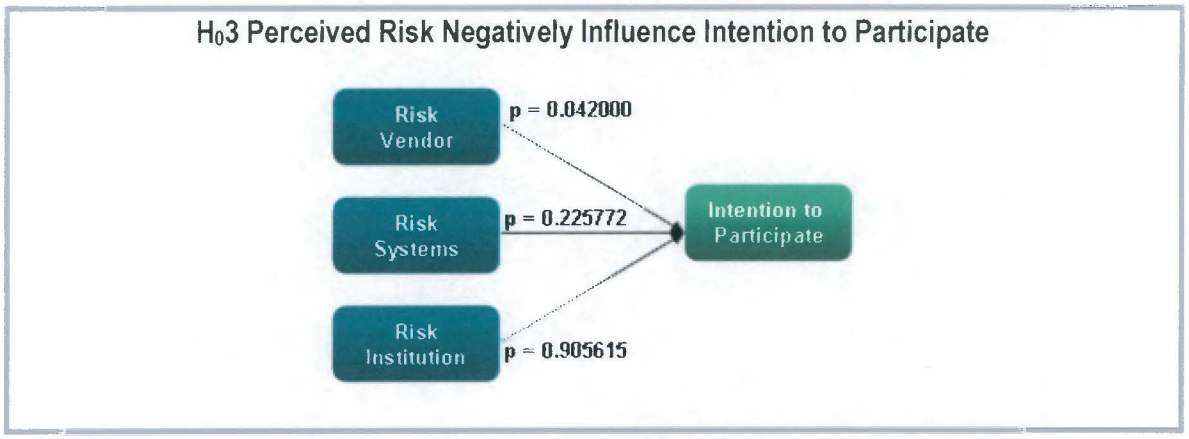


Figure 31: Perceived Risk Negatively Influence Intention to Participate

A *negative* association exist between overall risk and intention to participate which accounts for 9% of the variance in the model. Table 18 presents the multiple regression testing results:

Relationship	T-value	P-value	Beta	Supported
Risk Systems influence Intention to Participate	-1.21924	0.225772	-0.148464	NO
Risk Vendor influence Intention to Participate	-2.06137	0.042000	-0.247007	YES
Risk Institution influence Intention to Participate	0.11889	0.905615	0.012537	NO

Table 18: The Influence of Perceived Risks relating to the Systems, Vendor and Institution on Intention to Participate

Institution-related risk appears to have little direct association with the intention to participate (its beta ≈ 0). On the other hand, both systems and vendor risk show a fairly strong negative association. The negative sign of the correlation is fully consistent with the model. However, only the risks relating to the vendor showed a statistically significant relationship to 'intention to participate'. Hypothesis 3 can therefore only be accepted for risks relating to the vendor.

5.6.2 Additional Analysis

Risk is a perception, not an objective quality. To obtain a better grasp of the concept of risk, the focus group discussions are explored in this section to describe opinions about the importance of risk, the decision-making process involving risks and type of risks. However to obtain a more quantitative measurements of the extent of risks in South Africa, the risk perceptions of 'early adopters' are also included in this section. The section concludes with a brief overview of banking, perceived to be a high risk transaction by both the qualitative and quantitative analysis.

5.6.2.1 The Importance of Risk

Like with the concept of trust, Focus Group participants were also not able to effectively verbalise risk. The focus group participants remarked the following: "I am not sceptical, but I think safety is always an issue. Convenience tends to override it." The fact that convenience overrides any perceived risk relates to the results of hypothesis 7, and previous research, that found convenience to be a more important indicator of m-commerce intentions (refer to Section 2.5.9).

Respondents described risks in a financial context as "losing money". Others described risk as, "whatever you expect to happen didn't happen. Money should have gone from me to her and it didn't get there." This conceptualises risk as unexpected occurrences which cannot be managed. Others have described risk as a conscious decision-making process that starts, "as soon as you begin on these transactions... You are saying okay I am allowing myself to be vulnerable and that is the risk." Risk is therefore also seen as an intrinsic part of a rational decision-making process whereby, "you just got to work out the relative risk." This corresponds with Gefen *et al* (2002) and Ajzen and Fishbein's (1975) TRA theory that postulated that consumers use rational criteria to make decisions (refer to Section 2.6 and 3.3.1).

5.6.2.2 The Decision-making Process Involving Risk

The decision-making process is described in the following manner: "You weight it up with what you actually want to do, like with anything in life... [considering aspects such as] is it more convenient for you... is it going to save you time and money for that kind of risk." The risk is thereafter assigned a monetary value that respondents feel uncomfortable losing. When this monetary risk level is reached, they demonstrate behaviour which will minimise risk. This has been described as the point where, "you would rather say hold on, I will go into the bank and do everything in a secure environment."

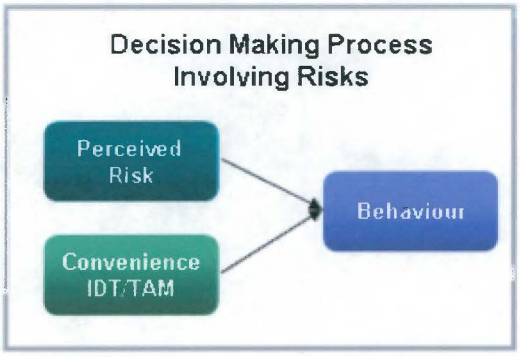


Figure 32: Decision-making Process involving Risk – Focus Groups

This decision-making behaviour described by the focus group participants resembles the threshold model (as shown in Figure 32), where the trustor will evaluate each situation and compare the levels of trust versus the levels of risk. The difference is that focus group participants view the two primary variables involved in the decision-making process as convenience and risk, rather than risk and trust. It is also important to consider that each decision takes place within a certain context described by focus group as, "certain aspects attached to certain things." Depending on the situation, the contributor will evaluate the positives, which can relate to any one, or a combination of, the innovation diffusion and trust variables, against the risk factors. It however appears as if the primary evaluation takes place between risks and IDT factors rather than trust factors.

The decision-making process suggests that focus group participants measure risk in terms of the magnitude (rand value of potential loss). A small number of focus group members did however measure risk in terms of the likelihood of a negative outcome, quantified by one person as a "2% chance." The reason why perceived risk was not regarded as such a big influence on participation by the quantitative 'early adopters' analysis could potentially relate to the perceived 'chance' that a risk might occur being regarded as insignificant. This would also indicate 'high-trust' in the technology, which will be investigated as hypothesis 5.

For the focus group participants, it would appear that 'magnitude' is a stronger indicator than likelihood. This correlates with Gefen *et al*'s (2003) findings that the reluctance of consumers to perform high-value transactions relate to the fear of the enormity, instead of the probability, of the outcome (refer to Section 2.6.2, page 44). Banking has generally been regarded as more risky, even where mobile banking has been provided by the FSI and was described as, "letting too many areas open that people can find out things".

5.6.2.3 Types of Risks Identified by Focus Group Participants

The focus group participants were all generally aware of security risks. Moreover all of the risks explained in Section 2.6.3 (with the exclusion of RICA) were discussed during the course of the focus group sessions.

Respondents categorised risk into two groups: (1) Accidental risks, such as: "I might press the wrong button and the money goes somewhere else," and (2) risks related to "corruption and fraud". The categorisation of risks which evaluates the premise that if risk has been exercised due to incompetence rather than ill-will, trust will be far less affected is relevant (refer to Section 2.6.2.). It is also significant that respondents used harsher words to describe their feelings when presented with scenarios involving deliberately unscrupulous behaviour by WASPs. In general, contributors described their feelings related to negative m-commerce experiences as ranging from being, "annoyed, feeling stupid, not happy, tremendously vulnerable, frustrated ... [to] disliking it intensely [and being] peeved off."

A list of possible m-commerce inhibitors was provided and the focus group participants had to rate those in terms of their importance as shown in the following Figure 33. Most of the focus group participants felt that nothing would prevent them from using m-commerce. SPAM was regarded as the biggest inhibitor, in addition to having no need for the service, and thereafter vendor reputation. The fact that nothing would prevent them from using m-commerce served to validate the 'early adopter' survey responses and explained why risks do not have such a significant impact on intention to participate.

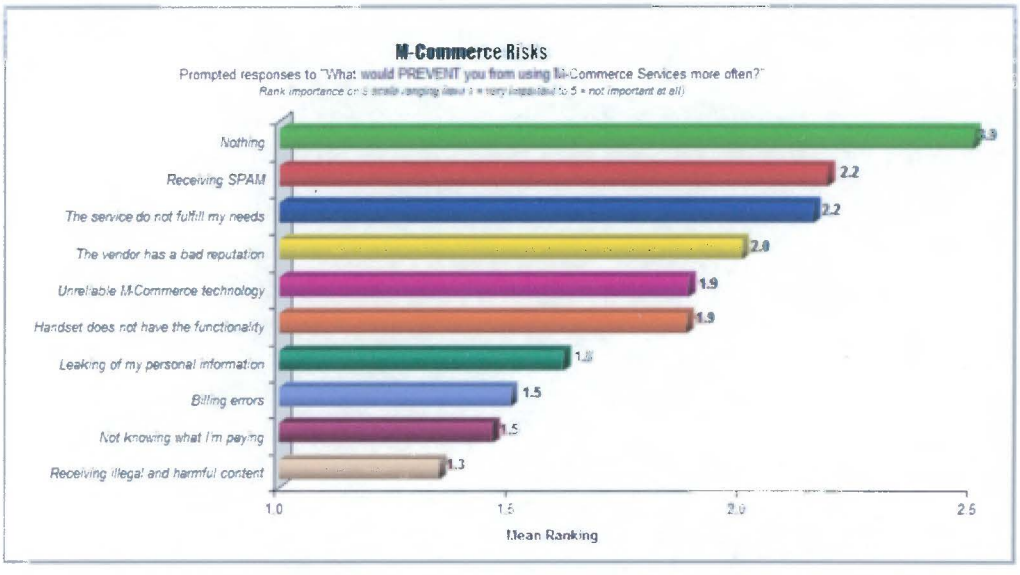


Figure 33: M-Commerce Risks Focus Group Survey

Privacy was not found to be a major concern for focus group participants. Even though they described their cellphone as, "the doorway to everything else in your life," they stated that they, "don't worry too much," about privacy. The fact that privacy is currently not perceived as an immense concern could relate to the assumption that most m-commerce services currently do not require personal and financial information from participants. The participants however did indicate that, as soon as more information is required (such as credit card details), or, "as soon as someone starts messing with my money," they would become concerned about privacy.

The focus group contributors identified security risks as being: hackers, stalkers, viruses and stolen handset. Stolen hands*et* *al*so related to cost, since respondents mentioned that they would additionally lose the content (personalised games and ring tones) on their phones which equates to a larger financial loss than the mere loss of the value of the handset. SPAM was regarded as the most considerable risk by focus group members (refer Figure 32) and a high risk (74%) by the early adopters (Figure 33). In contrast to SPAM, however, focus group participants thought that occasional marketing information was, "sometimes ... actually nice," indicating that, if useful and personalised information was provided, it would not be regarded as so intrusive. This validates trust researchers inclusion of 'user-driven personalisation' as a variable of 'benevolence' (refer to Section 2.5.7.3).

The focus group contributors' second most important security concern was found to be viruses. The fear of viruses related to the sensation of being vulnerable or unprotected, and was described in the following manner: "I don't have any control over it." This is versus the PC, where virus protection programmes can be updated (refer to Section 5.2.2). It was therefore felt that the MNO should be responsible for providing protection against viruses because the individual, "does not know and does not have control over it."

Participants furthermore expressed concern with regard to the size of the screen of the handset, indicating that they preferred the "bigger screen" of the PC. The early adopters (following section 5.5.2.4), in contrast, did not regard this as a high concern. Video-conferencing (3G), Bluetooth and Vodafone Live were identified as 'fancy extras that use batteries" and make "your cellphone go flat." Participants indicated that newer handset makes and models tended to suffer more from software problems than older models, stating that the, "more expensive [the] phone you buy; the more updates you need." Damage and stolen handset were identified as additional external risks.

5.6.2.4 Types of Risks Identified by Early Adopters

This section shifts the focus to qualitative analysis of the risks identified by 'early adopters'. As mentioned (refer Section 3.3.6 and 4.6.2.2), this study will use two categories for analysing risks. The first approach categorises risks according to their relationship with the vendor, the systems and institution. The second approach examines the risk inherent in m-commerce in South Africa, by categorising the perceived risk in terms of risks relating to privacy, security, lack of transparency and external risks. The second approach is only used to establish the extent to which the risks exist, while the first option is used to determine statistical significance (refer section 5.1.1).

Strangely enough, this lack of concern for privacy issues was not supported by the results of the quantitative analysis (refer to Figure 34). Early adopters seemed to be predominantly concerned about paying for unsuccessful downloads (80%), followed by loss of confidentiality (76%) and concerns about security (75%) and personal information being vulnerable to abuse (75%). Risks

relating to the network (systems risks) were not regarded as such a great problem by 'early adopters'; again indicating high trust in the technology.

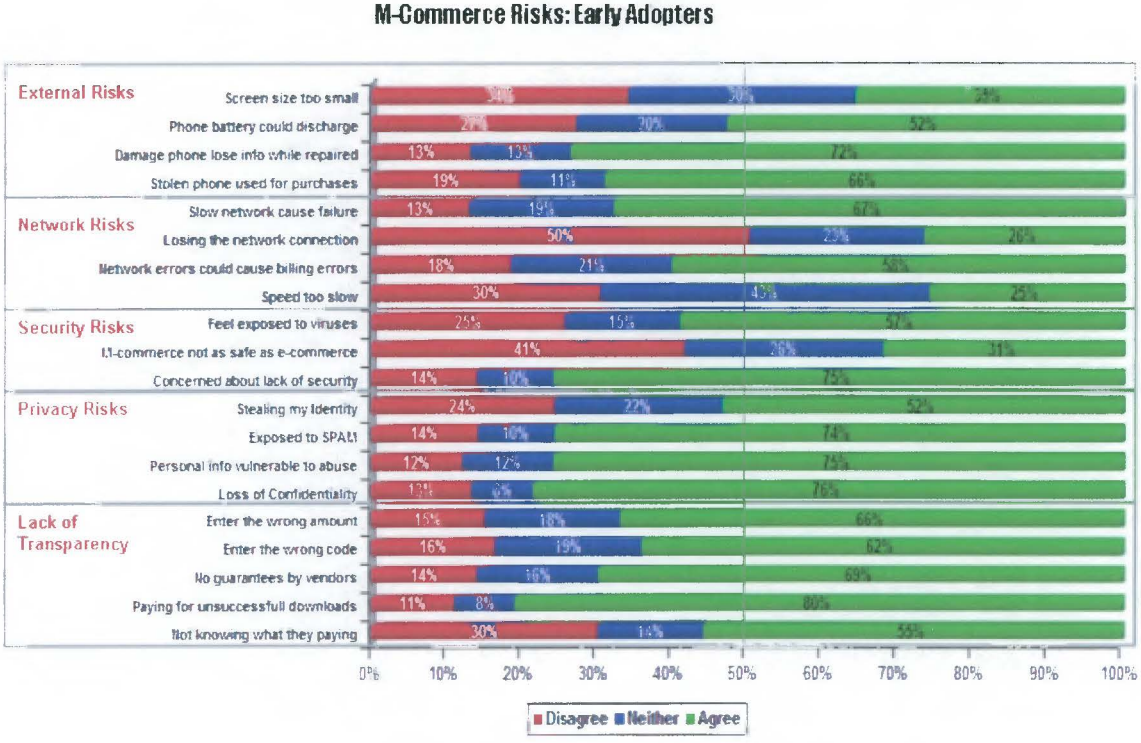


Figure 34: M-commerce Risks: Early Adopters

5.6.2.5 Banking Regarded as a High Risk M-Commerce Transaction

When questioned about future usage of banking, the focus group participants were adamant that they will never provide their credit card details to perform banking transactions with the MNO. This was confirmed by the early adopters. Referring to Figure 35, where the responses to whether 'early adopters' "would be willing to supply their credit card details to the vendor" is analysed. The predominant number of early adopters (67%) indicated that they are unwilling.

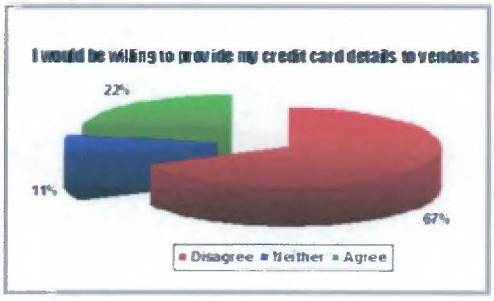


Figure 35: Willingness of Early Adopters to provide Credit Card Details to Vendors

Returning to the focus group analysis, the participants described themselves as "hesitant" and expressed concerns with regards to, "all these transactions in the air. Frequencies. Someone is going to hack in somewhere." Participants expressed the opinion that banking, "just doesn't feel complete to me. There is no conclusion to it... what proof do I have that it has been done?" Respondents often referred to Internet banking, where, "you can go back and see you have done a transaction successfully." It was felt that mobile banking had, "no defined parameters. You don't know what has happened. You are not even sure [whether] you [have] made a mistake or [whether you] haven't."

The participants portrayed themselves as, "a little bit wary of it, not being proven wrong yet. I think with something new, you want to see it proven first from a safety point of view".

5.7 Vendor Trust

Trust and confidence in the vendor is likely to drive the use of m-commerce services. This section verifies if this observation is also true in the South African context.

5.7.1 Quantitative Analysis

Hypothesis 4 states that the perceived trustworthiness of the vendor influences overall trust for 'early adopters' (Figure 36).

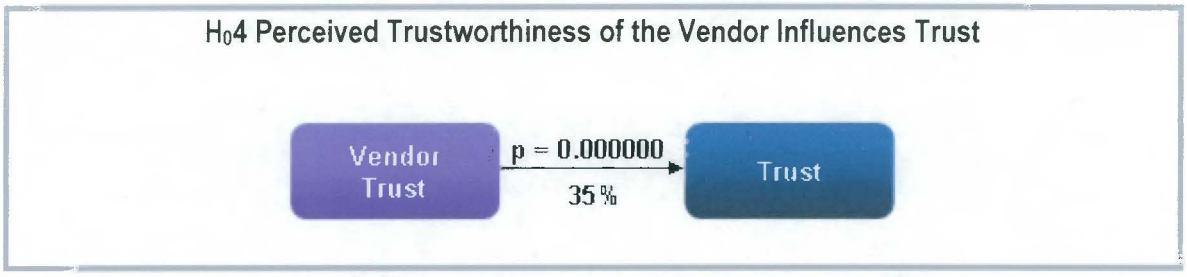


Figure 36: Trustworthiness of the Vendor Influences Overall Trust

The data shows a high association between perceived trustworthiness of the vendor and overall perceived trust that accounts for 35 percent of the variance in the model. Table 19 presents the regression testing results.

Variable	T-value	P-value	Adjusted R^2	Beta	Supported
Vendor Trust	7.349353	0.000000	0.351049	0.598056	**Yes**

Table 19: Perceived Trustworthiness of the Vendor Influences Trust

The low P-value indicates that a highly significant relationship exists between trust in the vendor and overall trust in m-commerce. Hypothesis 4 is therefore strongly supported.

5.7.2 Qualitative Analysis

The perceptions of focus group participants about the importance of vendor trust, trust in specific vendors and what they consider to be indicators that convey perceptions of trustworthiness are discussed in the following section.

5.7.2.1 The Importance of Trust in the Vendor

The moderator posed the question as to whether the WASP or the vendor could be relied upon to act fairly and fulfil promises. The following respondent summarised the overall sentiment by stating: "I don't know. When you go to a shop, you see the people you are buying from. You see the people that go in there. I don't know who else is going onto that site and getting that ring tone. I don't know who I am dealing with. It is a person sitting there who is getting the money while we idiots are sitting here." The concerns refer to lack of transparency and extraneous risk introduced by third parties. It is for this reason that Gefen *et al* (2003a) believe that technology risks present a bigger risk than vendor-type risks (refer to Section 2.6.4). However, this assumption was not supported by results of the quantitative analysis.

The participants frequently complained about the lack of face-to-face interactions. MNOs are, for example, described as a, "massive, nameless, faceless" entity. They also mention that they, "wouldn't have a clue where to go to [in order to] complain about something," and would like to speak to, "someone that took your money." MNOs and Service Providers use call centres as customer-facing mechanisms, which, significantly, were not regarded as trust-building mechanisms.

5.7.2.2 Trust in Specific Vendors

Focus group members identified four (4) role players relating to trust, namely: the MNOs, WASPs, Service Providers and handset manufacturers. Trust in each of the four entities will hereafter be briefly discussed.

Mobile Network Operator:

Participants described trust in the MNO as, "a black hole. It takes more and more of your money." The MNOs were depicted as the most important party in the value chain. On the one hand, the MNOs were not to be trusted, especially not to perform banking transactions, while other participants displayed signs of high trust by stating that: "I only trust one. I don't go to any other sites." The banks, on several instances, were mentioned as a trustworthy party and participants stated that, if the MNO could, "give you this kind of undertaking at least – then you can put a bit of trust in them. If they say things like use it at your own risk, then you must be wary." Some participants accused MNOs of untrustworthy behaviour, such as price collusion; selling confidential customer data and having a monopoly on occasions where the MNOs, "agreed not to set a price below a certain point."

Issues raised that influence trust in the MNO related to network reliability, cost and complexity. Many incidences related by participants, where they described, "losing the connection and paid R22, but did not get the download." Complaints were also received about, "downloads taking long," and then, "only half the picture arrives," or cases where something urgently needed to be done and they received the

"busy network signal," or, "no signal," A case where a participant was ready to adopt video telephony, but failed to do so was described in the following terms: "I would love to do it. I specifically asked for a phone with that capability, because I know [video-telephony] is technology. They don't tell me in order to use it...[the MNO] network is not set up." It therefore confirms network quality issues as a means to an end in achieving the objective of maximising trust in m-commerce. It also indicated how closely vendor trust and systems trust are related; since the interventions that increase trust also extend to technology issues.

Wireless Access Service Providers:

WASPs were regarded as the most untrustworthy party. Participants attributed the motivation for WASPs to behave unethically as: "It is small enough not to really bother an individual, but they do it to 100 000 people," indicating that small amounts could grow into large financial income for the WASPs. Respondents recounted that they, "have heard of people that have had bad experiences with them," showing that word-of-mouth is an important indicator of trustworthiness. Criticism against specific WASPs was raised with regard to SPAM and misleading subscription-type services. In the case of a complaint, it is unclear to participants where the responsibility between the MNO and the WASP lies. Participants expressed the opinion that the MNO should police the WASPs and that disciplinary steps should be taken against them. This correlates with trust research where the MNOs, by allowing WASPs to operate on the network, were seen to imply a sort of 'transitive' trust (refer to Section 2.5.7.1).

Handset Manufacturers and Service Providers:

Handset manufacturers were also surprisingly accused of being undependable and untrustworthy. One respondent conferred that a well-known handset manufacturer offered free games on their website. In spite of the brand name, the game was not guaranteed, leading the respondent to pronounce, "a free game and no trust. I am not going to take the chance to get it." The role that handset manufacturers play in increasing trust is demonstrated in Appendix 3, Section 11.7, page 163.

The few mentions of Service Providers made by participants presupposed that SPs are not regarded as playing an important role in m-commerce. When discussed, participants indicated loyalty expressing that, "well they are my service provider so I will stick with them." Some participants also saw the SP as the last recourse: "In case of problems, if all else fails, I go to the SP." Participants indicated that it was the responsibility of their SP to inform them about customer protection regulations and posed the following question: "Why haven't our SPs told us?" This could illustrate that participants associate benevolence factors more with SPs than the MNOs, as the SPs have direct customer contact and are responsible for relationship building. Problems in the value-chain between the MNO, the SP and the dealers were furthermore highlighted.

5.7.2.3 Indicators of Trustworthiness of Vendors

The participants validated most of the trust-building interventions described by trust researchers in Section 2.5.6. Participant explained that they would, "rather go and do a transaction through your phone to [large retailer] than to somebody on the street." They expressed trust for, "well-known, large organisations," and, "brand name." The participants viewed 'well-known' and 'large' as being the same thing. Trust researchers did not find 'size' to be a significant indicator, while company reputation was indicated as relevant (also refer to Section 2.5.7.2).

'Reputation mechanisms' were highlighted several times as a trust-building measure. E-Bay's reputation services were used as an example of how they would like the reputation service to work. Participants seemed to trust the opinions of their peers more than those of the vendor. They also regarded 'opt-in' services, where you click on "do you accept", as very important. There was however some disagreement on this point, as other contributors felt that terms and conditions look after the vendor's interest, and not those of the person buying; stated as: "I don't want that. It protects the vendor not you."

The phrase 'subject to terms and conditions' often heard in advertisements by MNOs was not viewed as a benevolence factor, as it failed to demonstrate that the vendor expressed any concern for the welfare of the customer, but was rather acting in the best interest of the vendor. If the opt-in however demonstrated care and goodwill towards the subscriber; it might be seen as a trust-building mechanism. An example of where the opt-in could effectively be used is to allow the subscriber to choose whether they would like to receive additional information about the company. As indicated in Section 2.5.6, it could be seen as a type of a 'user-driven personalisation' where the user sets the pace of contact, which indicates that the company will not take unfair advantage if the opportunity arises.

Endorsement of vendors or WASPs by the MNO was identified as another important trust builder. It was described as, "when you want to use the site, or there are a number of sites that are already pre-approved by [MNOs]...all the checks and balances have been done and you can use them." Trust researchers consider that the role of the trusted third party - the MNO in this case - is to lower the need for user expertise (refer to Section 2.5.7.1). The action of endorsing vendors serves then to reduce the necessity for consumers to use their limited resources to establish the reliability of vendors.

Interestingly enough, privacy and security policies were not indicated as trust-building mechanisms; again contrary to what the remaining trust researchers believe (refer to Section 2.5.7.2). Poor interface design was however identified as an inhibitor and some participants who used subscription services, like weather and sport updates, complained about the quality of the information, indicating that there are either too many SMSs received or too little information in the content of the SMS.

Lack of transparency was time and again mentioned as an issue. If vendors could succeed in providing greater transparency, it would facilitate the trust-building process tremendously.

5.8 Systems Trust

Confidence in the technologies that support m-commerce was indicated as a factor that influences trust. This section investigates whether this is also true for South African consumers.

5.8.1 Quantitative Analysis

Hypothesis 5 is researched to determine if 'early adopters' perception about the perceived trustworthiness of the system influences trust (Figure 37).

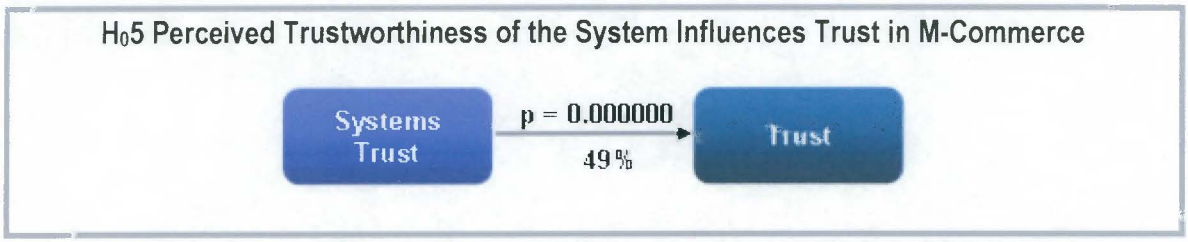


Figure 37: Perceived Trustworthiness of the System Influences Trust in M-Commerce

Figure 37 illustrates a highly significant relationship between perceived trustworthiness of the vendor and overall perceived trust that accounts for 49 percent of the variance in the model. Table 20 presents the simple regression testing results:

Relationship	T-value	P-value	Adjusted R^2	Beta	Supported
System Trust influences Overall Trust	9.849824	0.000000	0.494895	0.707141	YES

Table 20: Perceived Trustworthiness of the System Influences Trust in M-Commerce

Systems trust is therefore also a significant indicator of overall trust and, therefore, hypothesis 5 can be regarded as accurate.

5.8.2 Qualitative Analysis

The focus group participants' perception about trust in the technology and services is discussed below.

5.8.2.1 Trust in the Technology

Information from the focus group self-completion questionnaire was used to guide this discussion. A list of bearer services was supplied and the participants had to rate those in terms of reliability. The results are shown in Figure 38.

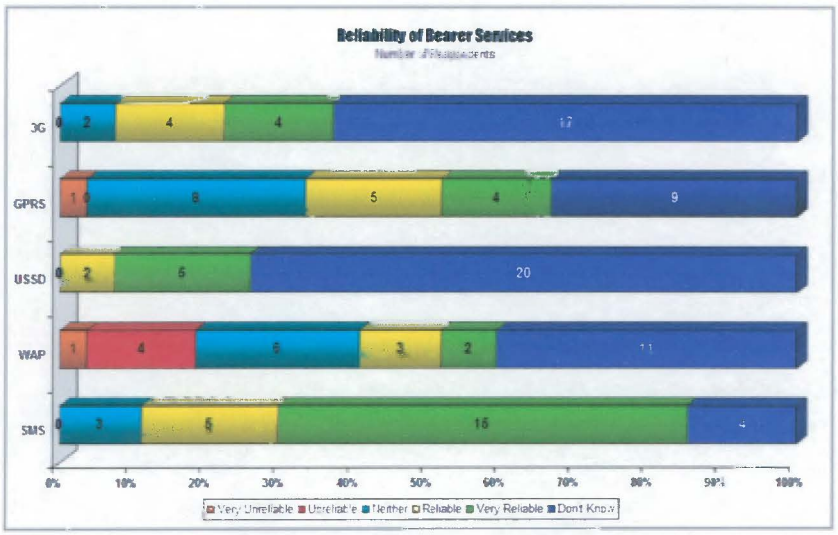


Figure 38: Trust In Bearer Services Focus Groups

The results acknowledged high trust in all of the underlying technologies, except WAP. SMS was regarded as the most reliable bearer service by the majority of respondents, followed by USSD, GPRS and 3G. WAP was rated as unreliable or very unreliable by five (5) respondents. Most dissatisfaction with WAP was associated with games not being downloaded successfully. Technologies that the respondents indicated that they were least familiar with are USSD (twenty [20] participants), followed by 3G (seventeen [17] participants). The inability of the respondents to rate the reliability of bearer services could relate to a lack of knowledge about the technology that supports m-commerce services.

5.8.2.2 Trust in the Services

M-commerce services were regarded as less trusted than the supporting technologies. Reliability of the m-commerce services might relate to trust placed in vendors and the absence of cost transparency and limited recourse in the instance that a problem might arise.

The focus group participants ranked the reliability of the various types of m-commerce services as indicated in Figure 39.

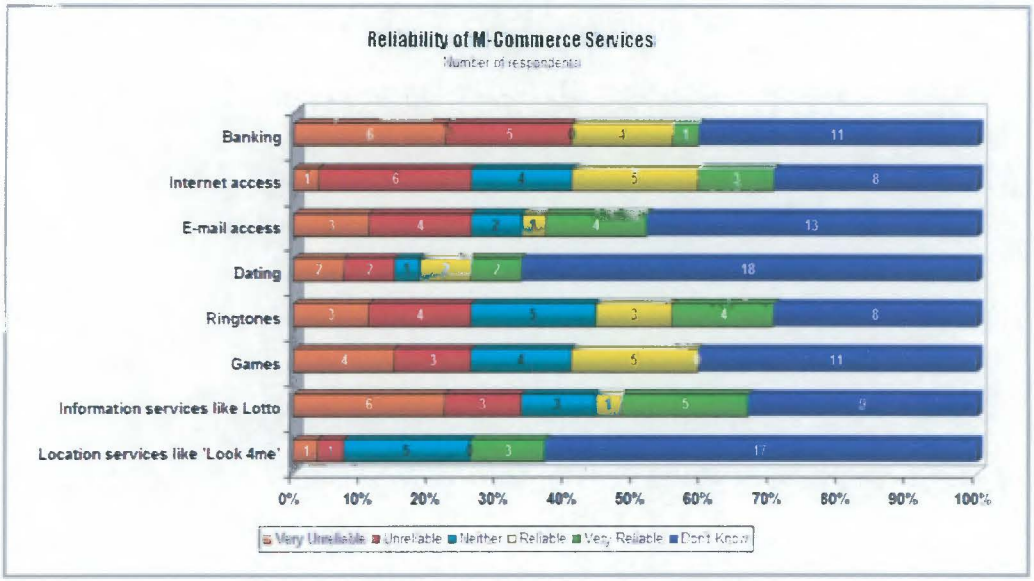


Figure 39: Reliability of M-commerce Services

Participants were least familiar with, or preferred to express no opinion about dating and location-based services. Eighteen respondents deemed banking services to be the most unreliable, which might be indicative that the MNO is not trusted to provide banking services. Dissatisfaction related predominately to subscription services (9 respondents), followed by games, e-mail and Internet access (seven respondents each).

5.9 Institutional-based Trust

Trust in the Institution was identified as a major influence of the overall perceived trustworthiness of m-commerce. The influence of Institutional-based trust will be explored in more detail in this section.

5.9.1 Quantitative Analysis

Hypothesis 6 states that the perceived trustworthiness of the institution influences the perception of trust by 'early adopters' (Figure 40).

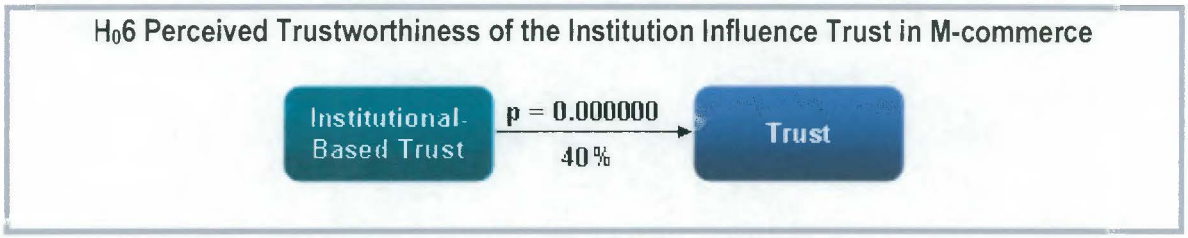


Figure 40: Perceived Trustworthiness of the Institution Influence Trust in M-commerce

The data suggests a strong relationship between perceived trustworthiness of the institution and trust,

which accounts for 40 percent of the variance in the model (Figure 40). Table 21 presents the regression testing results:

Relationship	T-value	P-value	Adjusted R^2	Beta	Supported
Institutional–based Trust influence Overall Trust	8.275375	0.000000	0.407790	0.643298	Yes

Table 21: Perceived Trustworthiness of the Institution Influence Trust in M-commerce

Institutional trust is also a strong indicator of overall trust and, therefore, hypothesis 5 is strongly supported.

5.9.2 Qualitative Analysis

This section explores the focus group participants' perceptions about Institutional-based Trust. Focus group participants were not aware of any laws or parties that protect their consumer rights. When the moderator asked what they currently do when they experience a problem, they suggested that, "you can go to the ombudsman, but that is like a long way round." In the case of a fault occurring while downloading, the following was stated: "e-mail the website and no one has an obligation to answer." The contributors also complained about the difficulty of resolving problems: "If you don't understand something, or something doesn't work – it is not a simple process in correcting it. You have to really jump to find the right way around it."

Once the moderator had however explained the ECT Act and WASPA, the participants were mostly positive, stating that, "to know what your rights are. It would be brilliant, because I don't know if it is just my bad luck that the connection went bad or [whether] there is actually a con going on." A desire to facilitate the process by having one place where they, "could go ... and maybe get that money back ...." was furthermore emphasised. The respondents also felt that these types of organisations should be advertised in the newspapers and on the MNO websites, and reiterated that the news would spread rapidly via word-of-mouth, stating that, "if people hear how effective it is, other people will be doing it." They moreover suggested that the terminology should be, "simple so that people know – layman's terms." Communication campaigns are an important trust intervention that can be utilised by vendors to increase trust. Some participants however thought that the ECT Act was not applicable to cellphones.

For institutional trust to be successful, the rules must be enforced (refer to Section 2.5.4). When the moderator asked if the participants perceived that South Africa had the ability to protect the user, the responses were mixed. Some felt that, "we do...with the fact that everybody – just about everybody in this room had a problem with their cellphone, you would be able to actually get things sorted out." Others asked, "who is policing it? One thing having the law – it is another thing implementing it." Also refer to Section 2.3.

5.10 Innovation Diffusion

In this section the influence of IDT characteristics on the intention to participate in m-commerce is examined. However, since the main objective of the research is to investigate trust building in m-commerce and IDT factors have been examined by numerous other studies, the results will not be discussed in as much detail in this research.

5.10.1 Quantitative Analysis

Hypothesis 7 states that adoption enablers (as indicated by the Innovation Diffusion characteristics) influences 'early adopters' intention to participate in m-commerce as illustrated in Figure 41.

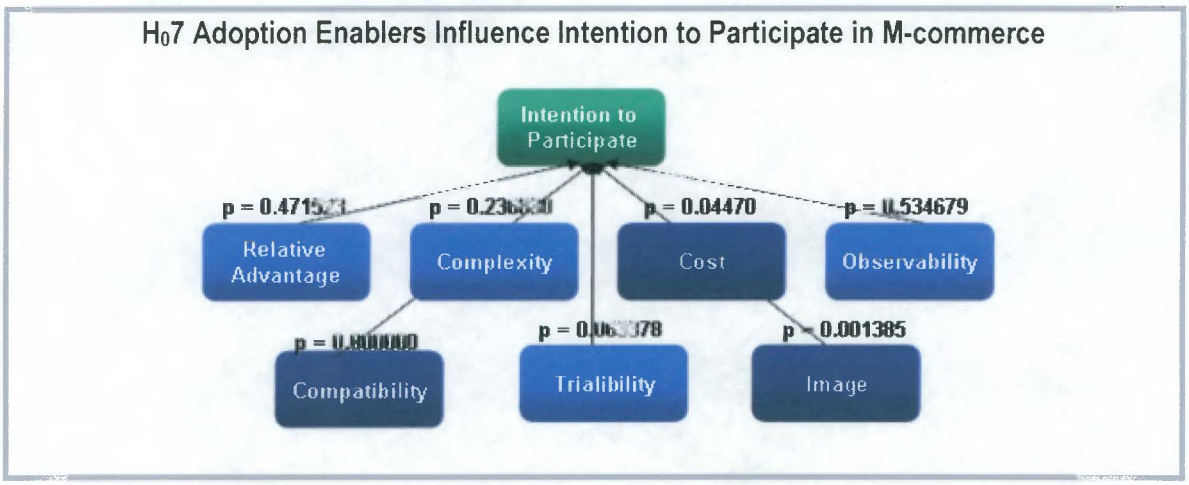


Figure 41: Adoption Enablers Influence Intention to Participate in M-commerce

Figure 41 puts forward a positive association between IDT characteristics and intention to participate. Together they account for 57% of the variance in the model. Table 22 presents the multiple regression testing results:

Relationship	T-value	P-value	Beta	Supported
Compatibility influence on Intention to Participate	5.54067	0.000000	0.592942	YES
Relative Advantage influence on Intention to Participate	-0.72302	0.471523	-0.080552	NO
Trialibility influence on Intention to Participate	1.87949	0.063378	0.148539	NO
Cost influence on Intention to Participate	2.91557	0.004470	0.247285	YES
Image influence on Intention to Participate	3.29923	0.001385	0.231491	YES
Complexity influence on Intention to Participate	-1.19080	0.236830	-0.095649	NO
Observability influence on Intention to Participate	-0.62325	0.534679	-0.044455	NO

Table 22: Adoption Enablers Influence Intention to Participate in M-Commerce

Only compatibility, cost and image demonstrated statistically significant relationships with intention to participate. Note that only two questions per IDT variable was asked, since IDT characteristics are not

the main objective of the study. This could have reduced the validity of the observations. The potential exist that questions can be misunderstood, resulting in the two questions yielding dissimilar results.

As an example the response to 'observability' could perhaps be explained by the phrasing of the questions. Question 1 asked participants if they would like to see how other people use m-commerce services; while question 2 posed the question whether it would prevent them from using m-commerce if they did not first grasp how others used m-commerce. From the descriptive statistics, it appears as though there was agreement with regard to the first point, but not so the second; meaning that 'observability' is a nice-to-have, but not a necessity, for early adopters. The anomaly in 'complexity' could possibly be attributed to the use of a reverse-coded question. Relative advantage' can possibly reveal that early adopters felt that m-commerce would not improve their productivity or quality of life.

5.10.2 Qualitative Analysis

This section commences with discussing the focus group participants perceptions of IDT factors as enablers of m-commerce followed by their view of the challenges presented for m-commerce by the IDT factors.

5.10.2.1 IDT as Enablers of M-commerce

The focus group respondents related the enablers of m-commerce primarily to IDT characteristics and not to any trust and risk variables. Participants frequently complained about complexity and that the services should be easier to use, since, the, "more user-friendly a service becomes, the more people use it." Trialibility was explained, as, "at the moment I am just playing with it – to figure it out. To understand and to learn about it, but, I mean, there is no practical benefit to me at this stage."

It was predominantly the older participants that viewed 'observability' as important and who described it in the following manner: "There are millions of people around me who are using it and they are happy with it. Sure I will buy in." The requirement that m-commerce should fit into their lifestyle was expressed by participants as, "I would imagine that if you have the need for it and you can utilise it, it must be convenient." This statement also indicated how closely 'compatibility' and 'relative advantage' are related. The contributors did view m-commerce as a symbol of prestige due to it being indicative of professionalism and efficiency. Interestingly, although the use of M-commerce services was seen as an image builder, no participant suggested that their cellphone model could be seen as a prestige symbol.

M-commerce was described as increasing their efficiency by showing professionalism and saving time; thus referring to the IDT characteristics of relative advantage. Respondents described it as, "prestigious and cool to do things easier and more conveniently," indicating that prestige was more

about the benefits than image. Participants also described their handset as, "... a tool, the tool that does the job the best is the kind of what you want."

Cost was also identified as an enabler, by lowering the cost of m-commerce services by introducing cheaper handsets and services. It was furthermore suggested that the MNOs should introduce 'call-more' packages (as currently available for voice) and incentives to use m-commerce services by offering discounts on products purchased.

The focus group participants ranked the inhibitors of m-commerce as displayed in Appendix 2, Section 9.2, page 133. Surprisingly, 'being trendy' was not considered as important during the spontaneous discussion, but emerged here in the top spot. This made sense when participants described their perception of trendy as professionalism and increased productivity; concepts which relate more to the IDT characteristics of 'relative advantage' than image. The second and third top enablers of 'nothing' and 'wider range of services' could relate to the absence of a need for m-commerce services.

5.10.2.2 IDT as Inhibitors of M-commerce

In addition to IDT characteristics, reasons for not using m-commerce related to trust and risk factors. A graphical representation of the inhibitors and their relationship with the trust variables can be viewed in Appendix 3, Section 11.7, Figure 51, page 165.

Examples where IDT characteristics were seen as inhibitors related to when participants stated that they had no need for m-commerce services. Their current actions, or 'ways of doing things' (like using the PC), were considered more convenient. Participants also displayed a resistance to novelty or change, indicating that the effectiveness of new services should be proven first before used.

They complained about services, and, in some instances even the handsets which were found to be involved and complicated. One participant even mentioned that, "[He] spent probably 2 to 3 weeks just sitting and trying to understand it [the handset] ... so you basically try and teach yourself." The contributors also complained about limited viewing of the product before they were entitled to purchase them, for example listening to a ring tone before purchasing.

Cost was identified as another important inhibitor. Cost does not only relate to the pure innovation construct of cost, but has many additional facets within the complex m-commerce environment especially within the context of trust and risk factors. The explanation is included in the Appendix (Section 11.7.4, page 165) as a potential area for future research.

It was interesting to note that trust and risk variables were not considered enablers but, rather, the prevalence of mentioning these variables only increased during assessment of inhibitors. It could very

well be that trust and risks are moderating influences for some of the innovation characteristics. This will however not be explored in this study and is indicated as another potential area for future research.

5.11 Additional Analysis

Additional analysis beyond that previously contemplated is necessary to establish the relative influence of the variables, using multiple regression. This study is further expanded by including models from the qualitative analysis, offering support for the understanding of the complexity of trust and risk issues within m-commerce. This section concludes with the design of the ideal m-commerce transaction by focus group participants.

5.11.1 Multiple Regression Analysis

During the preceding section, simple regression analysis was used to investigate relationships between two variables, and multiple regression was used in the instance where more than one independent variable was under investigation. The relative influence of the combination of all the variables together has subsequently been investigated by using multiple regression.

The regression summary for the dependent variable, 'participation in m-commerce', produced the following result: *An adjusted R^2= .68639052 F(15,83)=15.299 p<.00000 Std.Error of estimate: .78665.* The entire model displayed features that are desirable in a regression model, with a high R^2 and a high and significant F above 4. Only the significant variables have been portrayed in Table 23 (refer to Appendix 5: page 180, Section 13.4. for full results).

	Beta	Std Err. of Beta	B	Std Err. of B	t(83)	p-level
Trust Vendor	0.250523	0.100108	0.311027	0.124285	2.50253	**0.014293**
Risk Institution	-0.155830	0.068887	-0.161609	0.071442	-2.26211	**0.026304**
Image	0.159839	0.066660	0.176540	0.073625	2.39783	**0.018736**
Compatibility	0.472226	0.096653	0.456415	0.093417	4.88577	**0.000005**
Cost	0.240472	0.095013	0.258837	0.102269	2.53093	**0.013263**

Table 23: Multiple Regression - Significant Variables

Only vendor trust and institutional risk were identified as significant, in addition to the IDT characteristics of image, compatibility and cost. Although institutional risk was not found to be significant when the relationship between risks and participation was examined, its overall influence in the model was significant. This correlates with the focus group discussions, where 'lack of transparency' was noted as one of the most prevalent concerns. It will therefore be appropriate for future trust researchers to focus on issues that are applicable to reducing transparency.

It was also not surprising that compatibility with their lifestyle was found to be significant, as this

indicates that a need exists for using m-commerce services. The importance of image in the model was also not entirely unexpected. Focus group participants regarded, 'trendy and improving image,' as the most important enabler of m-commerce (refer to Figure 47) due to the fact that they viewed 'being trendy' to denote professionalism and increased productivity (refer to Section 5.10.1).

5.11.2 Association Between Variables

The high association between the variables of the trust model has been demonstrated by Figure 42. The model has been designed in order to improve the researchers understanding of the risks that relate to vendor (as mentioned by the focus group participants).

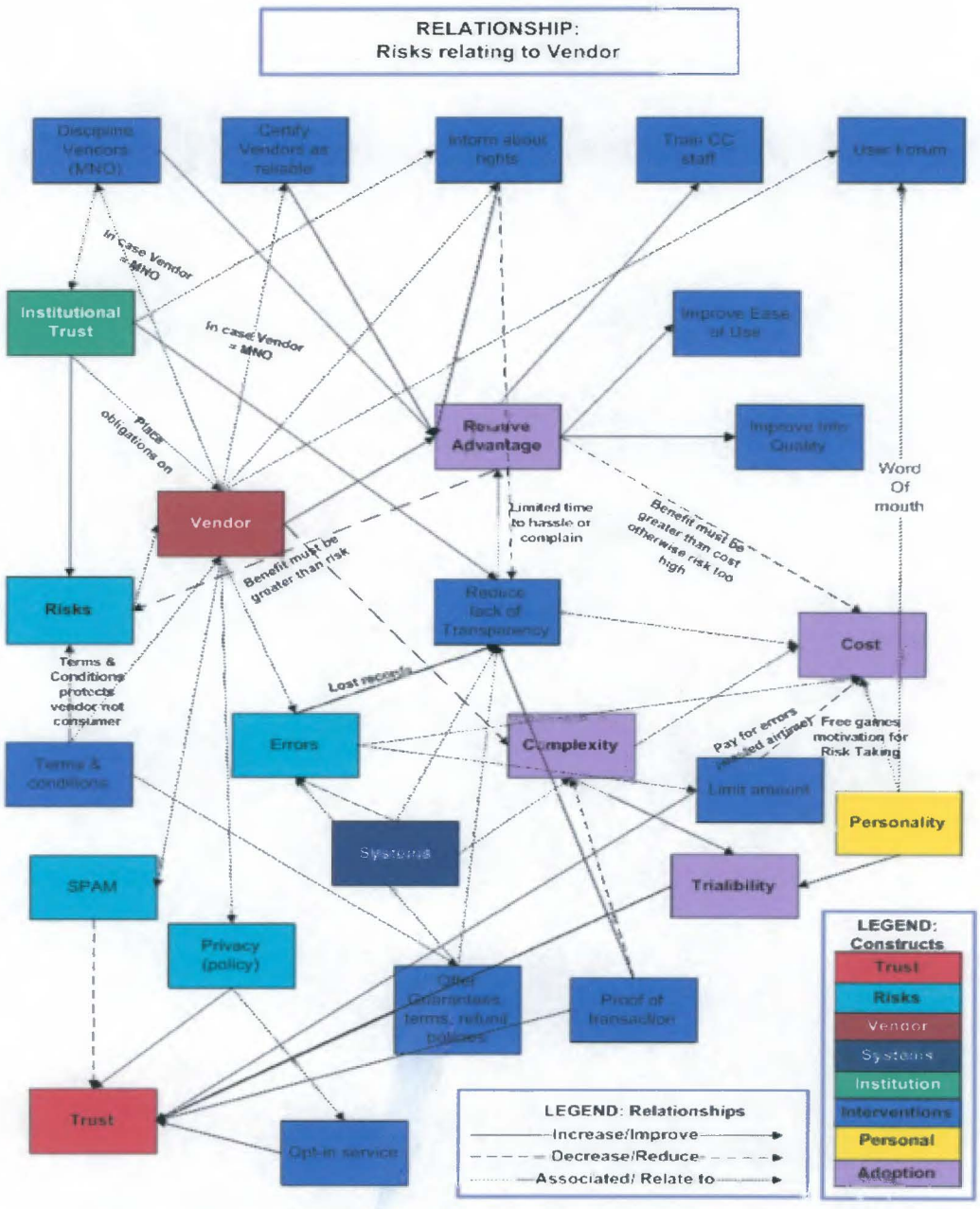


Figure 42: Relationship Between Risk Relating to the Vendor and Other Variables

Vendor risks relate to IDT characteristics, as well as trust, institutional trust and interventions which could increase trust. The difficulty faced by trust researchers is determining how interventions that relate to trust, risk and IDT variables can be distinguished.

5.11.3 Ideal M-commerce Transaction

The ideal m-commerce transaction experience designed by the focus group participants are shown in Figure 43.

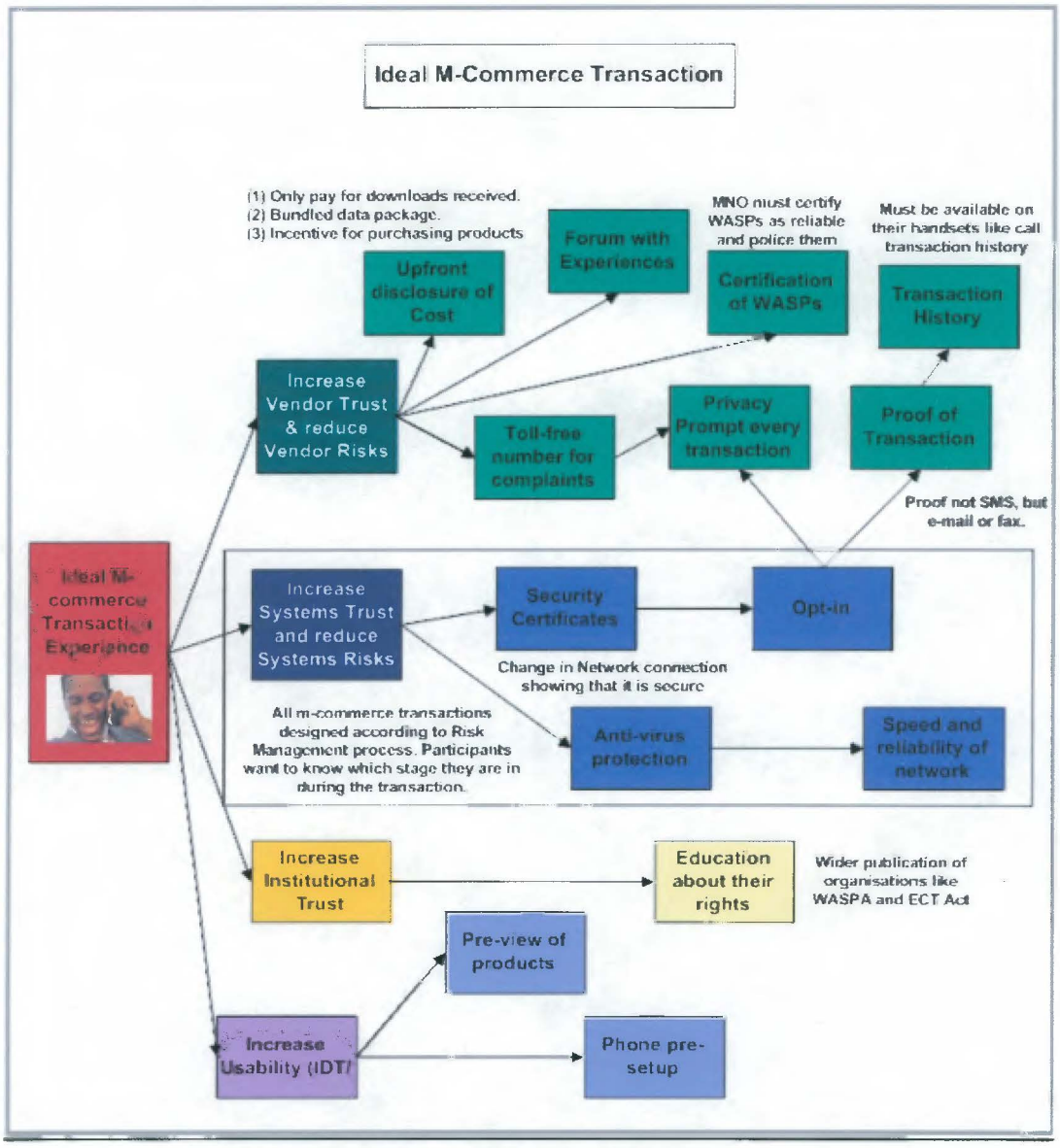


Figure 43: Ideal M-Commerce Experience

The detail explanation is provided in Appendix 4, Section 11.7.5, page 166. Similarities exist between Figure 42 and 43, which demonstrates that the participants clearly described a service to reduce risk and provide recourse and protection mechanisms in the instance that problems arise from the

transaction. The design of the transaction furthermore sums up issues highlighted in this study. Consumers must fully trust the entire m-commerce process from the technology to the different vendors that deliver the service. For future use of more advanced m-commerce services, trust will become a major issue. The qualitative analysis confirmed the Sicap m-commerce survey (2003) results that illustrated that more risky transactions, like banking, will "requires a significant leap of faith."

5.12 Expanded Model of Trust in M-commerce

This chapter is concluded by examining the all the statistically significant relationships between variables as indicated in Figure 44.

Firstly four additional significant relationships were discovered:
(1) Perceived vendor risks negatively influence vendor trust;
(2) Perceived vendor risks negatively influence institutional trust;
(3) Trust reduces (negatively influences) perceived vendor risks;
(4) Trust reduces (negatively influences) perceived systems risks;
The statistical results for the above four additional relationships are available in Appendix 5, Section 13.4.2.

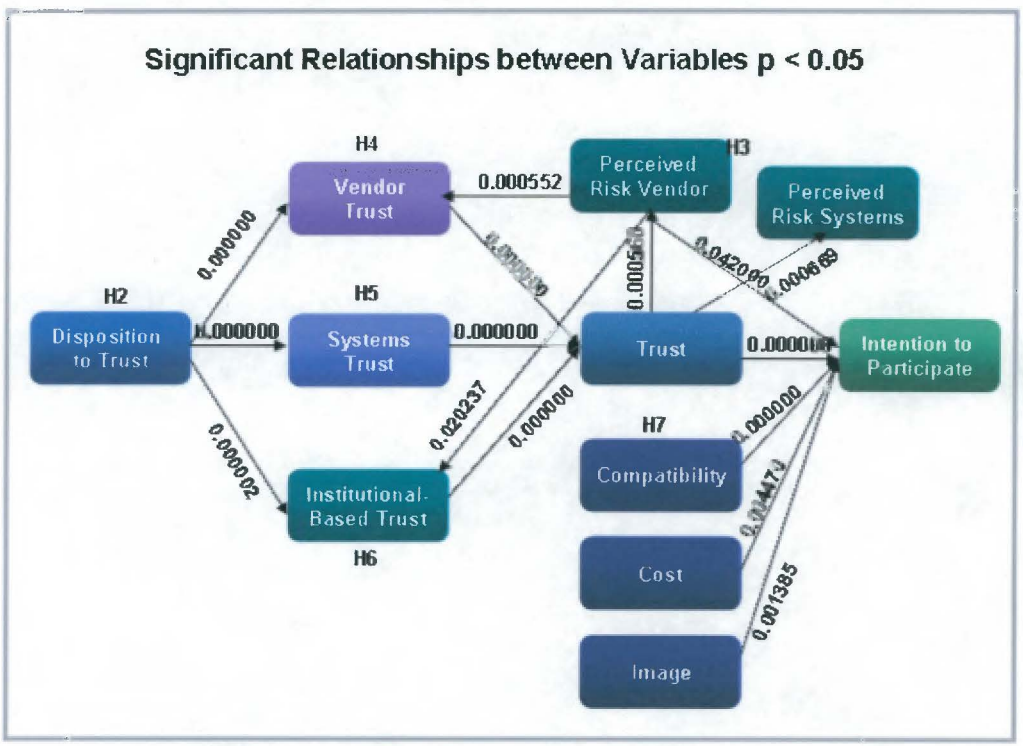


Figure 44: Significant Relationships in Trust Model

The model was developed to examine a comprehensive set of variables that influence intention to

participate in m-commerce. While the model did not include all of the determinants influencing intention to participate in m-commerce, it did account for a large percentage of the variance (69%), which indicates that it did capture the majority of the important determinants. The model also allowed researchers to understand the relative importance of the variables that influence trust.

Disposition to trust acted as a strong influence on vendor, systems and institutional trust, which validates previous research (refer to Section 2.5.3). Disposition to trust, however, had the most significant influence on vendor trust (54%). It also correlated with the notion that the influence of disposition to trust increased in situations of greater risks. The most significant risk identified by this study was moreover vendor risks.

Vendor risks were also the only perceived risk that exhibited a significant negative influence on intention to participate. In addition, it was the only significant risk variable that negatively influenced vendor and institutional trust. The relationship between participation and systems trust was negative, but not significant. This does not correlate with Gefen *et al* 's (2003) finding that technology risks have a greater influence on behaviour than vendor-related risks. However, this can simply be attributed to the fact that early adopters do not regard risks relating to the technology as a significant issue. This study (both qualitative and quantitative) showed that the underlying technology is trusted.

The model furthermore succeeds in establishing that overall trust in m-commerce reduced vendor and systems concerns; but not institutional-related concerns. Systems and institutional trust (both 49%) was more influential than vendor trust (35%) in determining overall trust. However perceived competence and reliability of the vendor plays a significant role since vendors (in particular WASPs) were regarded as the least trustworthy party in the model.

Of all the variables tested, the IDT factor of compatibility emerged as the most significant variable in the overall model that influences intention to participate. This was validated by the focus group participants who indicated that convenience would override any trust and risks issues. Importantly, this study also indicated that IDT characteristics account for 57% of the intention to participate in m-commerce, as demonstrated in Figure 45. The combined risk and trust factors account for a 42% variance. The relative influence of risks is small at 9%. However, by combining IDT factors as enablers and increasing trust and minimising risks, the *marginal* influence of the risk and trust factors is only a relatively small 7% for early adopters.

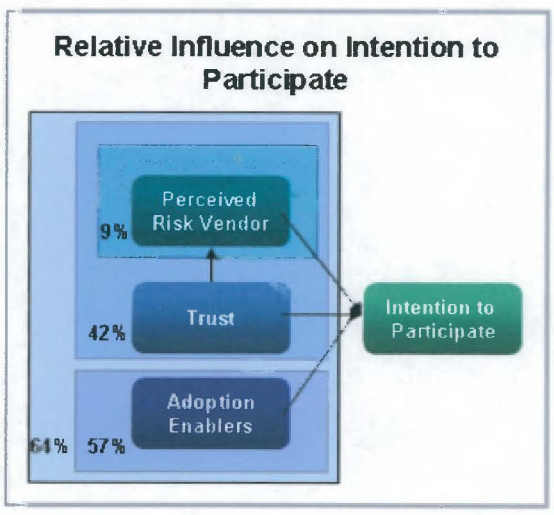


Figure 45: Relative Influence on Intention to Participate

'Early adopters' are already high users of advanced m-commerce services. It could therefore be that they do not regard trust and risk as significant factors when determining whether to use m-commerce. This could be attributed to the high-risk profile of early adopters and might not be the case for late adopters.

The fact that compatibility, cost and image were significant predictors of intention to use for early adopters makes intuitive sense. The benefit of a service is more important than the risk and cost associated with the service. Since IDT factors interact with trust and risk factors (as shown in Figure 42), it would be difficult to judge what specific interventions would have the greatest influence on future m-commerce adoption. The model did however succeed in showing a clear relationship between trust and intention to participate in m-commerce.

Table 24 provides a summary of the findings of the research:

Hypotheses	Results	Outcome	Research Proposals
$H_0$1	Trust positively influences intention to use m-commerce services.	True	$RP_0$1
$H_0$2	Disposition to trust influences perceived trustworthiness of the vendor, system and institutional trust	True	$RP_0$2
$H_0$3	Perceived vendor risks negatively influences intention to participate but not risk systems or risk institution.	True but only vendor	$RP_0$3
$H_0$4	Perceived trustworthiness of the vendor influences trust in m-commerce.	True	$RP_0$4
$H_0$5	Perceived trustworthiness of the system influences trust in m-commerce.	True	$RP_0$5
$H_0$6	Perceived trustworthiness of the institution influences trust in m-commerce.	True	$RP_0$6
$H_0$7	IDT characteristics of cost, compatibility and image positively influence intention to participate.	True but only for 3 factors	$RP_0$7

Table 24: Relationship Between Hypotheses and Research Proposals

6 Conclusion

6.1 Review of Theory

The interest in m-commerce by the providers of the services is motivated by the expected revenue predictions. The indicators are that m-commerce can succeed in South Africa. South Africans in general have a positive attitude to mobile devices and services with the popularity of SMS and mobile content pointing to a greater future demand for m-commerce services. Additionally, the institutional framework and consumer protection authorities are in place to encourage future adoption of m-commerce and, in addition, South Africa has low fixed-line Internet penetration rates, which further encourage the acceptance of mobile Internet.

While future adoption of m-commerce is advantageous to vendors, many multifaceted barriers to adoption exist. One of these barriers is believed to be a lack of trust. Only a few studies thus far have focused on building trust in m-commerce. Trust studies have also been criticised for limited conceptualisation of trust; but it should be emphasised that studying trust is not easy, as trust involves many uncontrollable and unidentified variables. Studying trust in m-commerce is made even more challenging due to the fact that m-commerce is delivered by numerous stakeholders using complex technology with convoluted interactions.

To date, no South African published studies could be found that investigated trust and risk issues in e- or m-commerce. This research is therefore the first South African study to develop a model and investigate whether trust and risk factors are important factors that will influence the adoption of m-commerce. The research explored the relative importance of trust and risk factors for the South African consumer and whether other significant enablers exist that are considered more important indicators of future m-commerce adoption.

6.2 Implications

The development of the trust model was based on previous trust research, but included additional variables that relate to the benefits of mobile technologies; namely the Innovation Diffusion Characteristics. This study therefore provides a useful exploration of m-commerce issues, broadening the scope to include factors besides trust and risk issues. An important contribution of the research is that it accounted for a large percentage of all factors that influence m-commerce adoption. Qualitative analysis, through the use of focus groups, assisted in highlighting m-commerce issues which are relevant between age groups. Younger consumers, or 'early adopters', expressed a greater willingness to experiment with new technologies than the older participants. Furthermore, it was found

that older respondents were more risk averse than younger participants.

Quantitative analysis explored the relative importance of the various barriers for early adopters and the role that they play in inhibiting m-commerce. The study confirmed that consumer perceptions about trust and risk influenced the adoption of m-commerce. An important finding of this study is that 'early adopters' found convenience to be a more important indicator of intentions to adopt m-commerce than trust.

Personal characteristics influence the development of trust, and the early adopters demonstrated signs of being more geared toward a low trusting orientation. Despite this low trusting stance, early adopters have proven to be risk takers. Although they are aware of security and privacy issues, they do not consider trust and risk to be significant issues that influence their uptake of m-commerce services. As early adopters already had multiple m-commerce interactions, it was not particularly surprising that convenience were found to be more dominant than trust and risk in determining intention to use m-commerce. This might, however, not be the case for new users of m-commerce services.

When deciding to take part in m-commerce, South African consumers evaluate levels of risk versus the advantages provided by the service. Risks are measured in terms of both the probability that the risk might occur and the impact (or magnitude) of the result if it occurs. But in case of high-value transactions (which were determined as more than R50), the predominant influence is fear of the amount of damage that can be caused by the outcome. When a decision is made to partake in a risky transaction, trust appears to play a secondary role to both risk and the perceived benefits of mobile technologies.

The study confirmed that focus group participants did not grasp the technology that underlies the m-commerce services. Despite this lack of knowledge, they showed signs of high trust in the technology. The main cause of concern for prospective m-commerce consumers are the vendors, in particular WASPs. They frequently complain about lack of transparency and face-to-face interaction. In contrast to international studies which identified privacy as a major m-commerce inhibitor, the focus group participants were surprisingly more concerned about security risks such as SPAM and viruses. However, by comparison the early adopters expressed high concerns about privacy and the possible loss of confidentiality. The major concern related to paying for unsuccessful downloads.

It was established that trust in the Mobile Network Operators could be negatively influenced by the actions of unscrupulous WASPs. Furthermore, South African consumers appeared to be unaware of the dispute resolution environment and recourses available to them, but felt that greater awareness of recourse procedures would contribute to trust building. The focus group contributors designed an ideal m-commerce experience detailing interventions which could reduce risks and improve trust.

6.3 Recommendations

Apart from the academic contribution of this research, a number of practical recommendations to the industry stakeholders also emerge from the analysis. South African vendors should concentrate on using interventions that demonstrate benevolence and that they are acting in the best interest of the consumer. This includes the offering of guarantees to lower risk perceptions and the use of personalisation techniques which allow the consumer to be in control of when, where and what communications they would like to receive. The vendors should increase transparency by clearly specifying who is accountable for the service and what the recourse procedure is if the transaction is unsuccessful. They may further assist consumers in making informed decisions by allowing them to preview content and by clearly stating the cost and procedures of the transaction upfront.

Despite the illegality of SPAM in South Africa (according to the ECT Act), it was identified as one of the top m-commerce inhibitors. It therefore appears as though the industry requires increased monitoring. The stakeholder most suited for this regulation would be the Mobile Network Operators who should be able to certify WASPs as being trustworthy. Information campaigns could and should communicate the existence of watchdog and consumer protection organisations, such as WASPA, to the general public. More and better consumer education is required relating to the benefits of m-commerce and how it could complement the lifestyles of the participants. A further suggestion is that m-commerce services should not be based on existing Internet models, but should rather be geared towards offering unique value propositions catering for the needs of the mobile consumer.

The vendors that design m-commerce services should ensure that it is secure and robust. Technology should be used to convey the trustworthiness of the medium to the consumer. More overall control should be exercised during the development of m-commerce services to increase usability and minimise risk, especially where high-value transactions are involved. The vendors who design their current mobile services to reduce risks for consumers should ensure that they are strategically positioned to benefit from the future demand for more advanced m-commerce services.

6.4 Limitations and Further Research

The quantitative analysis focused on early adopters and the researcher's observation of focus group participants. It cannot therefore be generalised to the whole population, as the research was not based on a random sample. However, the views of active subscribers provided important insights into how trust and risk influence the adoption of m-commerce.

Since the model was tested on early adopters, future research might determine whether the findings of the study could also be considered applicable to late adopters. It is a conjecture of this research that the model potentially pertains more to the general population, who have a lower risk tolerance

compared to early adopters. It is further suggested that future studies should focus on specific m-commerce services that are regarded as more risky, for example mobile banking.

While the study provided several interesting findings that could be used in practice by vendors of m-commerce services, the importance of specific interventions has not yet been tested by the model. It is expected that the model could potentially be expanded and used to test specific characteristics of vendors which would, in turn, increase their perceived trustworthiness. Future studies could additionally expand on the model to investigate trust and risk issues related to specific features of mobile technologies and services.

The question of whether the relationship between trust and risk is mediating or moderating, which variable mediates the relationship, or the direction of the dependencies between them, will continue to plague the trust research community as it has not been answered by this nor other studies. It is therefore suggested that future trust researchers ensure that they incorporate the necessary methodologies to allow identification of the types of relationships that exist between trust and risk.

6.5 Conclusions

The initial research question posed by the researcher focused on whether the factors that impeded the adoption of m-commerce were trust- and risk-related issues. A related question was whether these aspects inhibited mobile commerce growth in South Africa. The study established that, amongst early adopters, the benefits of m-commerce were seen to be more important than trust and perceived risk. Trust however, was still identified as a contributing factor to intention to participate in m-commerce. It is important not to underestimate the importance of trust during adoption decisions, as focus group participants reiterated that they would be unwilling to take part in more risky m-commerce ventures, like mobile banking.

The interventions proposed by the focus group respondents to increase trust and reduce risks make good business sense, and promote best business practices. With increased mobile technological capabilities, the ability to offer more advanced m-commerce services constantly increases and grows. It is essential for vendors of m-commerce services to understand the importance of these factors in influencing future m-commerce service adoption. If they succeed in increasing trust and reducing risks for consumers, they can benefit from increased usage of these services.

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8 Acronyms

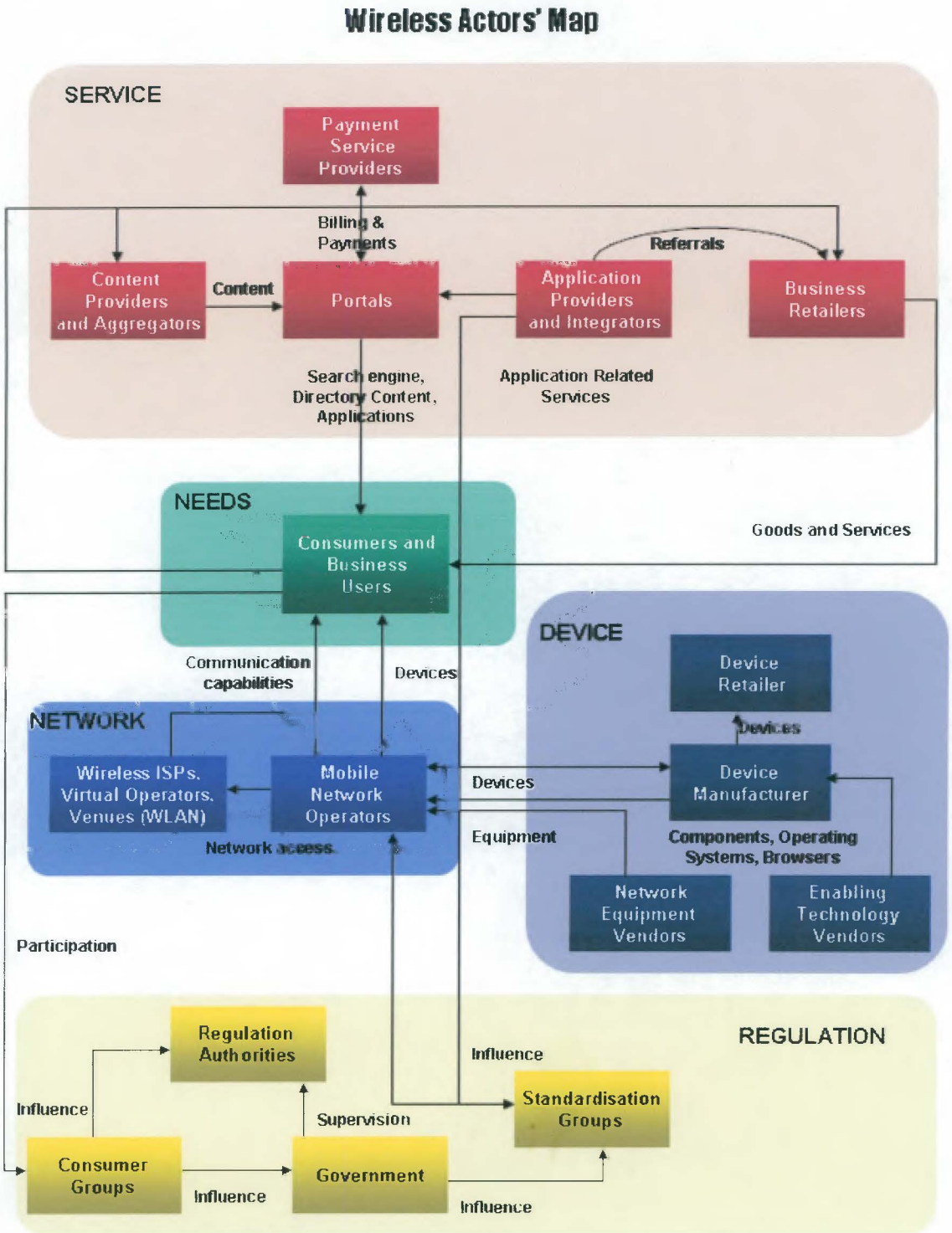
3G	Third Generation
ACA	Australian Communications Association
ARPU	Average Revenue per User
B2B	Business to Business
B2C	Business to Consumer
C2C	Consumer to Consumer
CRM	Customer Relationship Management
E-business	Electronic Business
E-commerce	Electronic Commerce
ECT Act	Electronic Communications and Transactions Act
FSI	Financial Service Institutions
GPRS	General Packet Radio Services
GSM	Global System for Mobile Communications
HSDPA	High Speed Downlink Packet Access
IC	Information Content
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
IP	Interface Properties
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunication Union
LBS	Location Based Services
LSM	Living Standards Measure
M-Commerce	Mobile Commerce
MMS	Multimedia Messaging Services
MNO	Mobile Network Operator
PAN	Personal Area Network
PC	Personal Computer
PEOU	Perceived Ease of Use
POS	Point of Sale
PRS	Premium Rated Services
PU	Perceived Usefulness
RICA	Regulation of Interception of Communications and Provision of Communication-related Information Act

SA	South Africa
SMS	Short Message Service
TAM	Technology Acceptance Model
TOMI	Trust Enhanced Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TTP	Trusted Third Parties
UMTS	Universal Mobile Telecommunications Systems
URL	Uniform Resource Locator
USSD	Unstructured Supplementary Services Protocol
VANS	Value Added Network Providers
VFT	Value Focused Thinking
VOiP	Voice over IP
WAP	Wireless Application Protocol
WAN	Wireless local area networks
WASP	Wireless Application Service Provider
WASPA	Wireless Application Service Provider Association
WiFi	Wireless Fidelity
QoS	Quality of Service

Table 25: Acronyms used by study

9 Appendix 1: Diagrams and Graphs

9.1 Stakeholders in M-Commerce



Source: Slightly adapted from Camponova et al, 2002)

Figure 46: Wireless Actors Map

9.2 Focus Groups: Enablers of M-Commerce

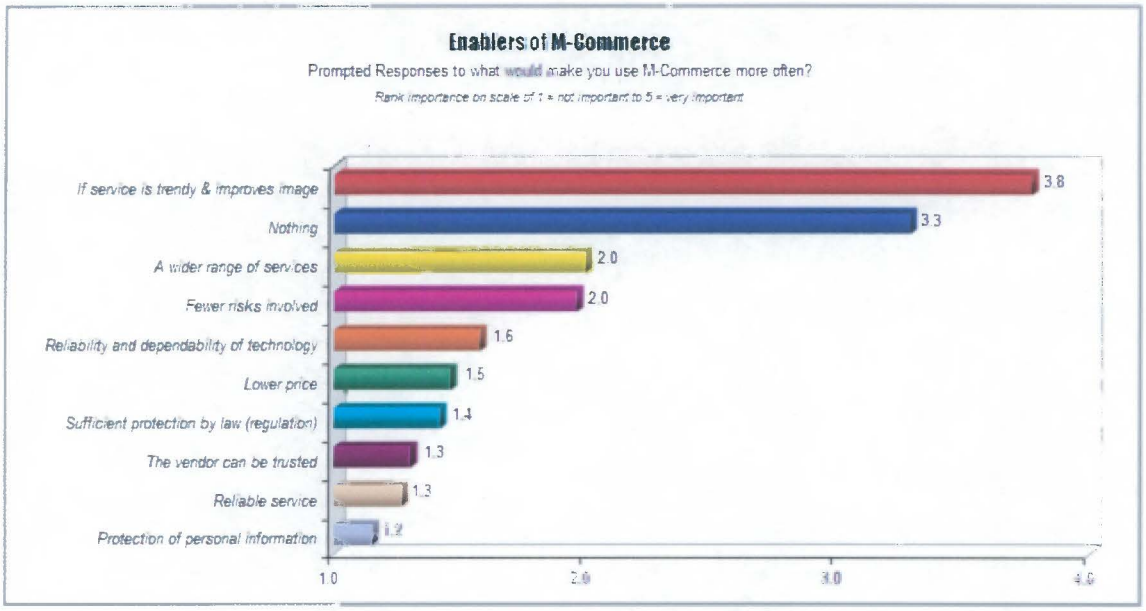


Figure 47: M-commerce Focus Group Response

9.3 Means –End Objective Network

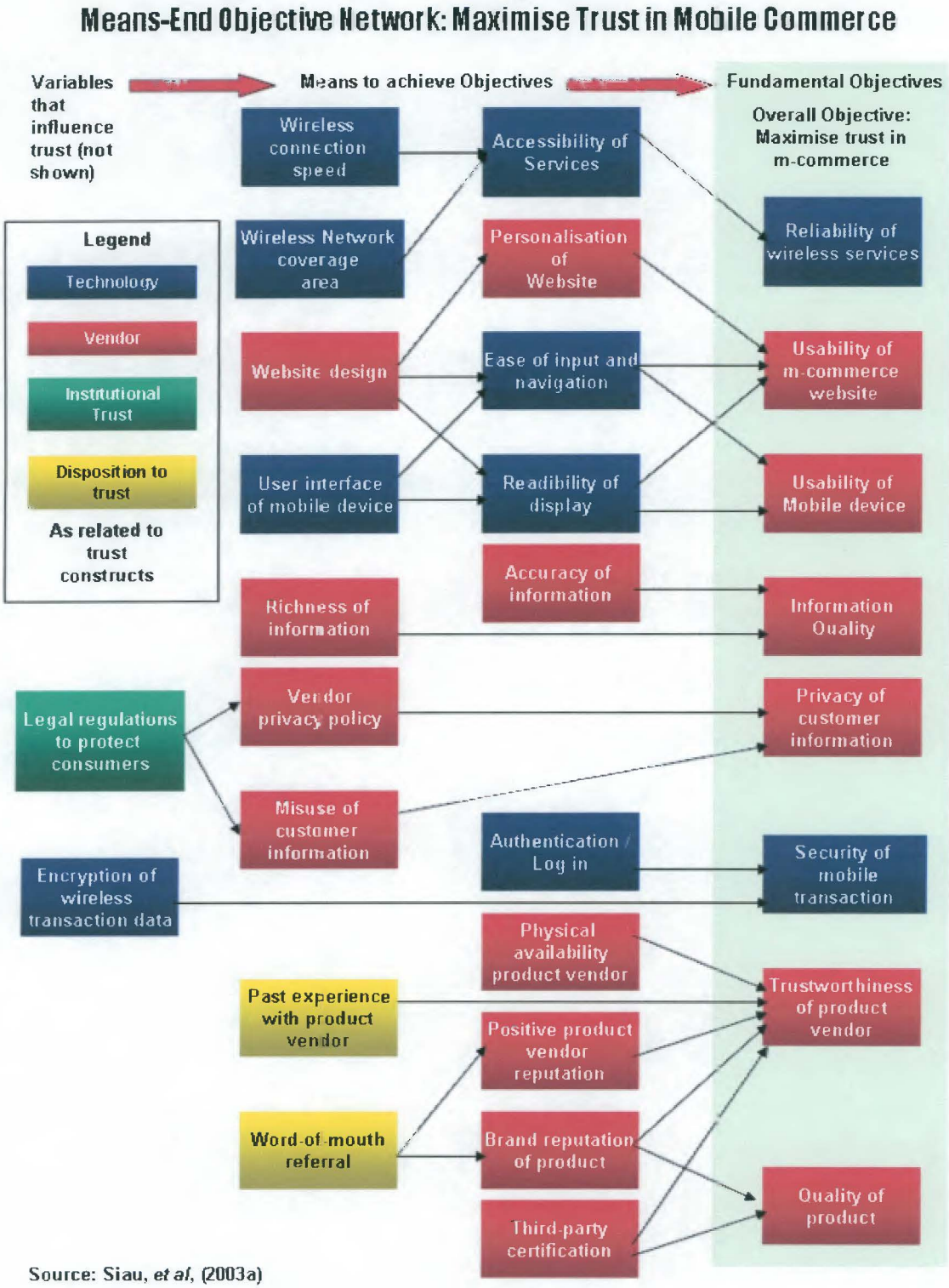


Figure 48: Means End Objective Network

10 Appendix 2: Focus Groups Design

10.1 Focus Group Guide to Moderator

Moderator Guide

Exploring ways to build trust in Mobile Commerce

Focus Groups : August 2005

Group Discussion (1hr 30 min)

[redacted]

Objective of the focus groups:

(a) Understand participants' **behaviour regarding mobile commerce** usage in general, but also in terms **of financial need and behaviour**;

(b) Understand what factors influence the adoption of m-commerce in general, as well as reasons for using m-commerce and identification of major inhibiting and enabling factors.

(c) Understand if **trust and risks are** the only **important factors** that will influence the take-up of mobile commerce by consumers and **what these trust and risk factors** in the participants' opinion are?

(d) Understand what **specific indicators** (see examples in posters on 'Terminology & Definitions') **can be provided by the vendor** (see examples in posters on 'Terminology & Definitions'), **technology** (see examples in posters on 'Terminology & Definitions') **and the legislative and dispute resolution environment** that can be used to design m-commerce services to increase trust and reduce risk, thereby supporting consumers in the adoption of mobile commerce.

e) The focus group will attempt to establish **how trust operates in m-commerce and will provide suggestions with regard to how services should be designed to stimulate trust**. Focus groups will allow a richer insight into the use, experiences and opinions of prospective and existing consumers, more so than mere quantitative research.

Note: Focus group participants will consist of both MNO 1 and MNO 2 m-commerce current or prospective users *(note that according to our recruitment criteria we are recruiting either 'low' or high' users, but no non-users).* Therefore the differences between the MNO 1 and MNO 2 participants

should be recorded. A method/(s) must be put in place to distinguish between MNO 1 and MNO 2 users (observation room important role here).

[redacted]

Poster 1	
Mobile Commerce (m-commerce)	The ability to use mobile wireless devices as a method to purchase goods, services or digital content. Mobile commerce is therefore any entertainment, information and location based services provided by a: Wireless Access Provides (WASP), Network provider (Vodacom, MTN, Vodafone) or Services providers (Vodacom Service Provider Company, Nashua etc.) It can be current or future products
Electronic Commerce (e-commerce)	E-commerce includes B2C (Business to consumer) transactions where e-commerce vendors (such as E-bucks) sell information, products or services to consumers via the Internet using web pages. It also includes the option of making on-line electronic payments for the products/services purchased.

Poster 2	
Trust	The consumer's confident expectations that mobile commerce can be relied upon in situations involving risk to the consumer.
Trust Factors	Indicators that influence the consumers perception of how trustworthy the vendor, systems and legislative and dispute resolution environment is. Examples of indicators that the *m-commerce vendor* can use are privacy policies, refund policies, vendor size, brand, reputation, design of the service and interface, user-friendliness, trusted third parties, quantity, quality and timeliness of content. Examples of *system trust indicators* include performance, reliability and security of technology, technical competence, bandwidth, network coverage area, quality of service, device reliability, access controls, no errors or broken links. Examples of *indicators in the legislative and dispute resolution environment* include legal frameworks such as the ECT (Electronic Communication Technology) Act and consumer protection associations like WASPA (Wireless Application Service Provider Association). Escalation procedures implemented by service provider and network provider.

Poster 3	
Risk	Vulnerabilities inherent to mobile commerce that can negatively impact on the consumer. Examples of *risks* include fraud, privacy, security, harmful content, unauthorized transactions, viruses and spam, unreliable network and mobile devices etc.
Risk Factors	Weaknesses that can be accidentally trigged or intentionally exploited during mobile commerce. Examples of *risk factors* include transaction failure, double and/or incorrect billing, WASPs (Wireless Application Service Provider) selling personal information to third parties, receiving illegal or harmful content, SPAM, stolen handset, charged exorbitant rates, being billed for services not requested or received, entering competitions where prizes are not awarded, misleading advertising.

[redacted]

- Participants introduce themselves (profession, hobbies etc.)
- Participants should first be asked to write down on paper:
  - their definition of electronic commerce (e-commerce)
  - their definition of mobile commerce (m-commerce)
  - their experience of mobile commerce (what service used and evaluation of service used)
  - The moderator will collect the papers and report the answers on the flip chart
  - **The moderator will then display the** POSTER 1 **('Terminology & Definitions') and run** through it with the participants

[redacted]

Moderator to direct the discussion with the participants around the following issues:

Fixed or wireless Internet usage

Do they have access to the Internet?

- **What do they access** the internet for *(what do they do on the Internet)*?
- Do they browse and/or look for specific things on the Internet?
- **How often** do they access the internet?

- At home
- At work
- Other

- Do they buy products and services on the Internet?
- Do they see m-commerce as a natural extension of e-commerce, and
- Do they see accessing mobile broadband like '3G' as a natural extension of fixed internet usage?

Mobile commerce usage:

What m-commerce services do they use? How often?

- What m-commerce services do they download content from and what (e.g. Sport, ringtones?)
- Do they access and play games on their cell phones?
- Do they use location based services such as Look4me (Vodacom service)?
- Do they browse the Internet via their cell phone,
- Do they access e-mail via their cell phone,
- Do they send MMS,
- Do they use video telephony (via cell phone),
- Do they use mobile banking?
- How did they get to know about the services they are using?
- If they are not currently using the services do they intend using it in future, and why?

[redacted]

Moderator to direct the discussion with the participants around the following issues:

Reasons for using m-commerce services:

- Do they have a **handset** with the capability and functionality to access m-commerce?
- Why do they **use m-commerce** services?
  - Is it convenient?
  - Is it easy to use?
  - Does using the m-commerce services have any status/prestige associated with it?
  - Is the Cell phone seen as the status symbol?
  - Other issues that may come up ...

Inhibitors (reasons for not using) for m-commerce:

- List the factors preventing the acceptance of m-commerce?
- List the reasons for these factors? Is it related to? USE FLIPCHART to record responses (list each reason and record the number of participants who indicate that the reason applies):
    - User experience
    - The technology
    - Slow access speed
    - Security
    - Privacy issues
    - Bad user interface
    - Cost of the services?
    - Limitation of the handset
    - Screen size of the handset?
- Why do they (participants) think other people do not use mobile commerce?

Enablers of m-commerce:

- List the factors that will lead them to make use of m-commerce more often and/or use more advanced services?
- List the reasons for these factors? Is it related to? USE FLIPCHART to record responses (list each reason and record the number of participants who indicate that the reason applies):
    - Convenience?
    - Ease of use?
    - Availability of information?
    - Pleasure-seeking or useful (functional) motivations?

M-commerce transactions:

- How do they feel about **'push' or 'subscription' services** where the mobile content vendor provides them with content on a weekly or daily basis?
- Would they **use the services**? If not, why not?
- If they use the services **how often**? Weekly, daily?

- What do they think about the reliability of m-commerce services?
- Do they have doubts about using m-commerce services?
- Do they in general believe that **m-commerce fulfill their needs and expectations**? If not, why not?
- What needs to be changed to fulfill m-commerce needs and expectations?

Cost of m-commerce transactions:

What do they currently pay for m-commerce services/transaction?

- For LOW value transactions (provide example), what would they see as a:- USE FLIPCHART to record responses (list each price mentioned and record the number of participants who agree with that price):
    - Too low-priced amount for a single, low-value m-commerce transaction
    - Reasonable amount for a single, low-value m-commerce transaction
    - Too high-priced amount for a single, low-value m-commerce transaction

- For HIGH value transactions (provide example), what would they see as a:- USE FLIPCHART to record responses (list each price mentioned and record the number of participants who agree with that price):
    - Too low-priced amount for a high-value m-commerce transaction
    - Reasonable amount for a high-value m-commerce transaction
    - Too high-priced amount for a high-value m-commerce transaction

[redacted]

Moderator to direct the discussion with the participants around the following issues:

Issue of Trust:

Participants should define what they think TRUST is (in the context of m-commerce). Then the moderator will display POSTER 2 and run through it

- How **important** is trust? Why it is important?
- What **expectations** does the participant have that must be provided by the **vendor** (do not use the word vendor / use a real example) of the m-commerce services, to instill trust?
- What are their **understanding / knowledge** of trust in m-commerce?

- What role do they think trust play when they **make decisions to use m-commerce services?**
- Do they **believe that m-commerce can be trusted** in general (now and in future)?

Issue of Risk:

Participants should define what they think RISK is (in the context of m-commerce). Then the moderator will display POSTER 3 and run through it

- Regarding risk issues, do the participants **feel** :
    - Vulnerable,
    - Unprotected, and/or
    - Unwilling to take the risk of adopting more advanced mobile commerce services?
- How do they see risks and how does it influence their decision to make use of m-commerce?
- List the risks that exist? USE FLIPCHART to record responses (list each reason and record the number of participants who indicate that the reason applies): Are they related to?
    - Not knowing exactly how much they are paying for the service?
    - Being afraid that the WASP (Wireless Applications Service Providers) might divulge their personal information to other parties?
    - Feeling exposed to receiving unwelcome SPAM?
    - Feeling vulnerable by not having proof of the transaction in case of a dispute?
- List what the participants identify as **high-risk m-commerce transactions?**
    - As an example, is location based services more risky than ringtone downloads, and why?

The relationship between trust and risk:

Is trust relevant when risks are relatively low?

- If it is a low value transaction **(give example)** are risks also low?
- If the value of the transaction is high does the participant consider trust to be even more important? Why?
- Would they be more willing to do m-commerce if the perceived risk were low?
- If they have high trust in the network or the vendor providing the service, is risk less relevant?

[redacted]

Moderator to direct the discussion with the participants around the following issues:

Personal characteristics:

- What influences their ability to trust m-commerce services?
- Do they generally believe that most m-commerce services can be trusted/relied on?
- Are they more attentive when using m-commerce than when using e-commerce (as far as trust and risk are concerned)?
- Would they **only buy from vendors or WASPs** (Wireless Application Service Providers) **that they know**?
- List the characteristics of a vendor with bad reputations? Would they buy from them even if they have an excellent product/service?

Vendor trust:

- **Does having trust in the vendor influence their usage of m-commerce?**
- What specific factors of the vendors do they look for?
- **Is the following attributes of the vendor important. USE FLIPCHART to record responses (list** each attribute and record the number of participants who indicate that the attribute applies):
    - Size
    - Brand
    - Reputation
    - Familiarity with the vendor?
- Is the **interface design of the service important** (i.e. information must be easy to find)?
- Does the **presence of errors** (in service rendering) **minimize trust**?
- Do they look for security certifications, privacy policies?
- Do they look for refund and return policies, warranties and references?
- **Do they think that the vendor will act fairly and not take unfair advantage of them if the** opportunity arises?
- Can they rely on WASP (Wireless Application Service Provider) to act fairly, fulfill their promises, be effective and competent?

Technology trust:

- **Do they trust the technology enabling m-commerce?**
- Are they familiar with the enabling technologies such as
    - WAP,
    - USSD,
    - GPRS,
    - SMS,
    - 3G?
- Do they trust some enabling technologies more than others, which one's and why?
- Are the **performance, reliability and security** of the various technologies more or less the same or different?
- If they **experience an error** do they think it is the network's fault or the vendor's or the technology's?
- What do they feel/experience when a connection fails during the m-commerce transaction?
- Are the **response times** (i.e. speed) of the services reasonable?

Institutional/Regulatory Based trust:

- Are they aware of the consumer protection provisions of the **ECTA** (Electronic Communications and Transaction) **Act**?
- Are they aware that consumer protection associations like **WASPA** (Wireless Application Service Providers Association) exist?
- Do they know where to escalate their m-commerce service problems to?
- Does their Network Provider help them to resolve a disagreement with the WASP?
- Does their Service Provider assist them during a disagreement?
- Are they skeptical about the ability of South African law to protect them?
- If their m-commerce problems are currently not being effectively resolves what measures do they propose being put into place to resolve their problems more efficiently?

[redacted]

The moderator to ask participant to briefly describe their ideal mobile commerce transaction experience. How should it be designed to increase trust and reduce risk, thereby supporting them to adopt more advanced mobile commerce services?

USE FLIPCHART to record responses (list each attribute of the transaction and record the number of

participants who indicate that the attribute applies)

10.2 Focus Group Survey

Thank you for your valuable participation in the group discussion. In order to better understand who you are, we are asking you to complete the questionnaire below. We will ensure that your anonymity as well as your answers to the questions below will be handled with the strictest confidentiality.

Questionnaire

Date of the group discussion: ..... **Time:** ..... **Your cell no**: .....

Can you please tell me your **gender**?

Male	Female
1	2

What is your **home language?** *(Please ONLY tick **ONE** LANGUAGE)*

English	Afrikaans	An African language	Other ***Specify :*** .....
1	2	3	4

3. Which **age** bracket you belong to?

Less than 16	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	More than 66
1	2	3	4	5	6	7	8	9	10	11	12

What is your highest **education** level?

Less than St. 8 (less than grade 10)	St. 8 to St. 9 (Grade 10 to 11)	Matric (Grade 12)	Technikon Diploma/ Certificate/Degree	University Degree	University Post-graduate
1	2	3	4	5	6

5. How **much do you spend**, on average per month, on your cellular calls/bill?

Less than R50	R51 - R100	R101 - R500	R501 - R1000	R1001 - R2000	R2001 - R3000	More than R3000
1	2	3	4	5	6	7

6. How **much do you spend**, on average per month, on your cellular calls/bill?

Less than R30	R31 - R50	R51 - R100	R101 - R200	R201 to R300	R301 to R400	More than R400
1	2	3	4	5	6	7

7. For how long have you been using your **current cellular number** ?

Less than 6 months	6 months to 1 year	1 to 2 years	2 to 3 years	3 to 5 years	More than 5 years
1	2	3	4	5	6

What type of **bearer service** do you **trust,** in terms of reliability?
Please rate the services from '1 = not reliable at all' to '5 = very reliable'. If you DON"T KNOW, make a cross below the bearer you do not know of.

SMS	WAP	USSD	GPRS	3G	Comments
					.....

What type of **M-Commerce service** do you **trust,** in terms of reliability?
Please rate the services from '1 = not reliable at all' to '5 = very reliable'. If you DON"T KNOW, make a cross below the service you do not know of.

Location services like Look 4me	Information services like Lotto	Games	Ringtones	Dating	E-mail access	Internet access	Banking

What is **more important to you**? *(please CIRCLE the preferred option. If you DON"T KNOW, make a cross on the line between the two options).*

		Option 1	Option 2
1.	The price of M-Commerce services or the trust in the services?	Price	Trust
2.	The vendor of a M-Commerce service or its price?	Vendor	Price
3.	The vendor of a M-Commerce service or the service?	Vendor	Service
4.	The network provider (e.g. Vodacom or MTN) or the vendor of the service?	Network Provider	Vendor
5.	The benefits of the service or its price?	Benefits	Cost
6.	Being trendy (by using M-Commerce services) or trusting M-Commerce?	Trendy	Trust
7.	Being trendy or incurring a perceived risk related to the use of M-Commerce?	Risk	Trendy
8.	The benefits of the service VS the perceived risk attached to using the service?	Risks	Benefits

		Option 1	Option 2
9.	The trust in the law regulating M-Commerce VS the trust in the service's vendor?	Vendor	Law
10.	For **low cost** service, what is more important, trust or price?	Trust	Price
11.	For **high cost** service, what is more important, trust or price?	Price	Trust
12	Will you rather buy from a large or a small vendor company?	Small company 1	Large company 2

The next question should be answered in two parts:

What would PREVENT you from using M-Commerce services more often?
Please rate each of the factors listed below on a scale ranging from 1= very importance to 5=not important at all

	Factor	*Rating*
1	Nothing	
2	Receiving SPAM	
3	Receiving illegal and harmful content	
4	The WASP has a bad reputation	
5	Billing errors	
6	Not knowing what I'm paying	
7	Leaking of my personal information	
8	Handset does not have the functionality	
9	The services do not fulfill my needs	
10	Unreliable M-Commerce technology	
11	Other *please expand:*	

What would MAKE you use M-Commerce services more often?
Please rate each of the factors listed below on a scale ranging from 1= very importance to 5=not important at all

	Factor	*Rating*
1	A wider range of service	
2	If the service is reliable	
3	It the service is considered trendy and improves my image	
4	The WASP can be trusted	
5	Lower price	
6	Protection of personal information	
7	The reliability and dependability of the technology	
8	Nothing	
9	Fewer risks involved	
10	Sufficient protection by law (regulation)	
11	Other *please expand:*	

Please use the space below for any comment you wish to make:
.....
.....
.....

- Thank you very much for completing this questionnaire -

11 Appendix 3: Focus Groups Analysis

11.1 Focus Group Survey Responses

Participants per group:

	MNO		Gender		Home Language	
Number of Respondents per group	MNO 1	MNO 2	Male	Female	English	Afrikaans
Group 1: Low users	5	4	5	4	6	3
Group 2: High users	2	4	3	3	3	3
Group 3: High users	3	3	2	4	5	1
Group 4: High users	2	4	4	2	3	3
Total	**12**	**15**	**14**	**13**	**17**	**10**

Question 2: GENDER

Can you please tell me your **gender**?	N respondents	Percentage
Male	16	59%
Female	11	41%
Total	**27**	**100%**

Question 3: LANGUAGE

What is your home **language**?	N respondents	Percentage
English	17	63%
Afrikaans	10	37%
An African language	0	0%
Other	0	0%
Total	**27**	**100%**

Question 4: AGE

Which **age** bracket you belong to?	N respondents	Percentage
<16	0	0%
16-20	1	4%
21-25	13	48%
26-30	2	7%
31-35	4	15%
36-40	3	11%
41-45	2	7%
46-50	0	0%
51-55	1	4%
56-60	1	4%
61-65	0	0%
>65	0	0%
Total	**27**	**100%**
Average	26-35	

Question 5: EDUCATION

What is your highest **education** level?	N respondents	Percentage
< St. 8	1	4%
St. 8 to St. 9	0	0%
Matric	5	19%
Diploma/ Certificate	17	63%
University Degree	2	7%
Post-graduate	2	7%
Total	**27**	**100%**
Average	Technikon Diploma/ Certificate/Degree	

Question 6: AVERAGE SPEND PER MONTH

How **much do you spend**, on average per month, on your cellular calls/bill?	N respondents	Percentage
< R50	0	0%
R51 - R100	2	7%
R101 - R500	16	59%
R501 - R1000	7	26%
R1001 - R2000	2	7%
R2001 - R3000	0	0%
> R3000	0	0%
Total	**27**	**100%**
Average	R101 - R500	

Question 7: LENGTH OF AFFILIATION TO MNO

For how long have you been using your **current cellular number?**	N respondents	Percentage
< 6 months	3	11%
6 - 12 months	2	7%
1 - 2 years	4	15%
2 - 3 years	2	7%
3 - 5 years	7	26%
> 5 years	9	33%
Total	**27**	**100%**
Average	2 to 3 years	

Question 8: TRUST IN TYPE OF BEARER SERVICE

What type of **bearer service** do you **trust**, in terms of reliability? Please rate the services from '1 = not reliable at all' to '5 = very reliable'.

	N respondents							
Bearer Service?	**1**	**2**	**3**	**4**	**5**	**Don't know**	**Total**	**Average**
SMS	0	0	3	5	15	4	27	5
WAP	1	4	6	3	2	11	27	3
USSD	0	0	0	2	5	20	27	5
GPRS	1	0	8	5	4	9	27	4
3G	0	0	2	4	4	17	27	4

	Percentage							
Bearer Service	1	2	3	4	5	Don't know	Total	Average
SMS	0%	0%	11%	19%	56%	15%	100%	5
WAP	4%	15%	22%	11%	7%	41%	100%	3
USSD	0%	0%	0%	7%	19%	74%	100%	5
GPRS	4%	0%	30%	19%	15%	33%	100%	4
3G	0%	0%	7%	15%	15%	63%	100%	4

Question 9: TRUST IN TYPE OF M-COMMERCE SERVICES

What type of **M-Commerce service** do you **trust**, in terms of reliability? Please rate the services from '1 = not reliable at all' to '5 = very reliable'.

	N respondents							
M-Commerce Service	1	2	3	4	5	Don't know	Total	Average
Location services like 'Look 4me'	1	1	5	0	3	17	27	3
Information services like Lotto	6	3	3	1	5	9	27	3
Games	4	3	4	5	0	11	27	3
Ringtones	3	4	5	3	4	8	27	3
Dating	2	2	1	2	2	18	27	3
E-mail access	3	4	2	1	4	13	27	3
Internet access	1	6	4	5	3	8	27	3
Banking	6	5	0	4	1	11	27	2

	Percentage							
M-Commerce Service	1	2	3	4	5	Don't know	Total	Average
Location services like 'Look 4me'	22%	11%	11%	4%	19%	33%	100%	3
Information services like Lotto	15%	11%	15%	19%	0%	41%	100%	3
Games	11%	15%	19%	11%	15%	30%	100%	3
Ringtones	7%	7%	4%	7%	7%	67%	100%	3
Dating	11%	15%	7%	4%	15%	48%	100%	3
E-mail access	4%	22%	15%	19%	11%	30%	100%	3
Internet access	22%	19%	0%	15%	4%	41%	100%	2
Banking	22%	11%	11%	4%	19%	33%	100%	3

Question 10: IMPORTANCE

What is **more important** to you?	N respondents				Percentage			
The price of M-Commerce services or the trust in the services?	**Price**	**Trust**	**Don't know**	**Total**	**Price**	**Trust**	**Don't know**	**Total**
	12	15	0	27	44%	56%	0%	100%
The vendor of a M-Commerce service or its price?	**Vendor**	**Price**	**Don't know**	**Total**	**Vendor**	**Price**	**Don't know**	**Total**
	16	11	0	27	59%	41%	0%	100%
The vendor of a M-Commerce service or the service?	**Vendor**	**Service**	**Don't know**	**Total**	**Vendor**	**Service**	**Don't know**	**Total**
	3	24	0	27	11%	89%	0%	100%
The network provider (e.g. Vodacom or MTN) or the vendor of the service?	**Network Provider**	**Vendor**	**Don't know**	**Total**	**Network Provider**	**Vendor**	**Don't know**	**Total**
	14	12	1	27	52%	44%	4%	100%
The benefits of the service or its price?	**Benefits**	**Cost**	**Don't know**	**Total**	**Benefits**	**Cost**	**Don't know**	**Total**
	15	11	1	27	56%	41%	4%	100%
Being trendy (by using M-Commerce services) or trusting M-Commerce?	**Trendy**	**Trust**	**Don't know**	**Total**	**Trendy**	**Trust**	**Don't know**	**Total**
	5	20	2	27	19%	74%	7%	100%
Being trendy or incurring a perceived risk related to the use of M-Commerce?	**Risk**	**Trendy**	**Don't know**	**Total**	**Risk**	**Trendy**	**Don't know**	**Total**
	21	4	2	27	78%	15%	7%	100%
The benefits of the service VS the perceived risk attached to using the service?	**Risks**	**Benefits**	**Don't know**	**Total**	**Risks**	**Benefits**	**Don't know**	**Total**
	11	15	1	27	41%	56%	4%	100%
The trust in the law regulating M-Commerce VS the trust in the service's vendor?	**Vendor**	**Law**	**Don't know**	**Total**	**Vendor**	**Law**	**Don't know**	**Total**
For **low cost** service, what is more important, trust or price?	**Trust**	**Price**	**Don't know**	**Total**	**Trust**	**Price**	**Don't know**	**Total**
	17	10	0	27	63%	37%	0%	100%
For **high cost** service, what is more important, trust or price?	**Price**	**Trust**	**Don't know**	**Total**	**Price**	**Trust**	**Don't know**	**Total**
	5	22	0	27	19%	81%	0%	100%
Will you rather buy from a large or a small vendor company?	**Small company**	**Large company**	**Don't know**	**Total**	**Small company**	**Large company**	**Don't know**	**Total**
	3	22	2	27	11%	81%	7%	100%

Moderator to direct the discussion with the participants around the following issues:

Personal characteristics:

- What influences their ability to trust m-commerce services?
- Do they generally believe that most m-commerce services can be trusted/relied on?
- Are they more attentive when using m-commerce than when using e-commerce (as far as trust and risk are concerned)?
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- Does the **presence of errors** (in service rendering) **minimize trust**?
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- Do they look for refund and return policies, warranties and references?
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    - USSD,
    - GPRS,
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    - 3G?
- Do they trust some enabling technologies more than others, which one's and why?
- Are the **performance, reliability and security** of the various technologies more or less the same or different?
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- What do they feel/experience when a connection fails during the m-commerce transaction?
- Are the **response times** (i.e. speed) of the services reasonable?

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- Does their Network Provider help them to resolve a disagreement with the WASP?
- Does their Service Provider assist them during a disagreement?
- Are they skeptical about the ability of South African law to protect them?
- If their m-commerce problems are currently not being effectively resolves what measures do they propose being put into place to resolve their problems more efficiently?

[redacted]

The moderator to ask participant to briefly describe their ideal mobile commerce transaction experience. How should it be designed to increase trust and reduce risk, thereby supporting them to adopt more advanced mobile commerce services?

USE FLIPCHART to record responses (list each attribute of the transaction and record the number of

- What role do they think trust play when they **make decisions to use m-commerce services**?
- Do they **believe that m-commerce can be trusted** in general (now and in future)?

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    - Unprotected, and/or
    - Unwilling to take the risk of adopting more advanced mobile commerce services?
- How do they see risks and how does it influence their decision to make use of m-commerce?
- List the risks that exist? USE FLIPCHART to record responses (list each reason and record the number of participants who indicate that the reason applies): Are they related to?
    - Not knowing exactly how much they are paying for the service?
    - Being afraid that the WASP (Wireless Applications Service Providers) might divulge their personal information to other parties?
    - Feeling exposed to receiving unwelcome SPAM?
    - Feeling vulnerable by not having proof of the transaction in case of a dispute?
- List what the participants identify as **high-risk m-commerce transactions?**
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- If it is a low value transaction **(give example)** are risks also low?
- If the value of the transaction is high does the participant consider trust to be even more important? Why?
- Would they be more willing to do m-commerce if the perceived risk were low?
- If they have high trust in the network or the vendor providing the service, is risk less relevant?

M-commerce Inhibitors: Prompted feedback on m-commerce inhibitors

Question 11: What would PREVENT you from using M-Commerce services more often? Please rate each of the factors listed below on a scale ranging from 1 = very important to 5= not important at all.

Prompted Response	N respondents	Mean rank	Std. Deviation	Minimum	Maximum
Nothing	18	3.9	1.7	1	5
Receiving SPAM	27	2.2	1.5	1	5
The service do not fulfil my needs	26	2.2	1.5	1	5
The vendor has a bad reputation	27	2.0	1.4	1	5
Unreliable M-Commerce technology	26	1.9	1.3	1	5
Handset does not have the functionality	25	1.9	1.3	1	5
Leaking of my personal information	26	1.6	1.3	1	5
Billing errors	26	1.5	0.9	1	4
Not knowing what I'm paying	26	1.5	1.0	1	5
Receiving illegal and harmful content	26	1.3	0.9	1	5
Other: *'too high price'*	*1*	*1.0*	-	*1*	*1*

Question 12: What would MAKE you use M-Commerce services more often? Please rate each of the factors listed below on a scale ranging from 1 = very important to 5= not important at all.

Prompted Response	N respondents	Mean rank	Std. Deviation	Minimum	Maximum
It the service is considered trendy and improves my image	26	3.8	1.4	1	5
Nothing	21	3.3	1.8	1	5
A wider range of service	26	2.0	1.4	1	5
Fewer risks involved	26	2.0	1.4	1	5
The reliability and dependability of the technology	26	1.6	1.2	1	5
Lower price	26	1.5	1.1	1	5
Sufficient protection by law (regulation)	26	1.4	0.9	1	5
The vender (WASP) can be trusted	26	1.3	0.7	1	4
If the service is reliable	26	1.3	0.8	1	5
Protection of personal information	26	1.2	0.8	1	5
Other: 'Free advert'/'Info explaining everything'	*2*	*1.0*	*0.0*	*1*	*1*

13. Comment made by the participants:

	N respondents
Cost need to be lower	3
Provide knowledge on how to use M-Com services	2
Free advert to educate people about M-Comm services	1
M-Comm on cell phone too convoluted. PC way more user-friendly, will only use cell phone in very remote area	1
Speed needs to be higher	1
To be trusted the technology (bearer) need to be basic & efficient	1
Needs virus checking, spyware checking, secure connections	1
MNO1 is a reliable provider, only problem with 3G signal	1

11.2 Index for Study of Trust

Index for study of Trust in m-commerce

1	**Definitions**
1.1	E-commerce
1.2	M-commerce
2	**M-commerce behaviour**
2.1	Fixed or wireless internet usage
2.2	m-commerce usage
2.3	is M-commerce extension of e-commerce?
2.4	How do you hear about it?
3	**Factors influencing adoption**
3.1	Reasons for using
3.2	Inhibitors
3.3	Enablers
3.4	Cost of transactions
4	**Awareness of trust and risk**
4.1	Trust
4.2	Risk
4.3	Relationship between trust and risk
5	**Factors influencing behaviour**
5.1	Personal characterisitics
5.2	vendor trust
5.3	Technology trust
5.4	Institutional trust
6	**Ideal m-commerce transaction**
7	**Other key issues (not covered above)**

Table 26: Index for Study Trust

11.3 M-Commerce Relationships

LABEL

Research	Relationship	RdR
	Context	RdC
Trust	Personal	TPc
	Vendor	TV
	Technology (Systems)	TS
	Institution	TI
	Trust	TT
	Participation	TP
Risk	Vendor	RV
	Systems	RS
	Institution	RI
Innovation Diffusion	Relative Advantage	IdRA
	Compatibility	IdCT
	Complexity	IdCP
	Trialibility	IdT
	Observability	IdO
	Image	IdI
	Cost	IdC

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
Risk - Vendor	Bank provided insurance that minimise risks						P	x	x								
Technology - CP	Technology on handset complex			x			N						x				
	Convenience, price comparison						P				x						x
	Safety overrided by convenience						N										
Risk - Privacy (Vendor)	Privacy						N	x									
CP - O	Don't know how, ask colleague						N						x		x		
RA	e-mail productivity, easy to use						P				x		x				
CP - Vendor	SP's make setup easy		x				P						x				
	Phone manual easy Vendor handset manufacturer						P	x					x				
RA - CT	Once comfortable (RA), u use for convenience - positive reinforcement (fits 2 lifestyle)						P				x	x					
Risk - vendor	Surf reports not up to date		x				N	x									
Risk - CP - Technology	Not knowing how it works			x			N		x				x				
Risk - CP - Vendor	Don't know how to look into it LOT		x				N	x									
Risk - Vendor	Proof of purchase buy physical products		x				N	x									
Risk - Vendor - CT	Cricket score updates too much		x				N	x				x					
Risk - Vendor - CT - C	Too little info to pay for more on PC		x				N	x				x					x
Risk - Techn - CP	Setup hard			x			N	x					x				
Risk - Techn - CP - O	Someone need to show me			x			N		x				x		x		
Risk - Technology	New phone latest model			x			N		x								
Risk - Tech - O	Other people must have new phones or service			x			N		x						x		
Risk - Tech - Vendor	Bought phone but network not setup		x	x			N	x	x								
Risk - Technology	Takes too long - half the picture			x			N		x								

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
Risk - Tech - Vendor	Security, third parties, credit card		x	x			N	x	x				x				
Risk - Tech - Vendor - CP	Not complete, need proof, track record, faceless SPs		x	x			N	x	x				x				
Risk - Tech - Vendor - CP	Do transaction twice		x	x			N	x	x				x				
Risk Technology - Cost	Pay 4 everything costly						N		x								x
Risk - Technology - Vendor	SMS proof of transaction or bank						P		x								
Risk - Vendor	SPAM, LOT						N	x									
Risk - Vendor	Privacy						N	x									
Risk Technology	Stealing info						N		x								
Risk Technology	Nails battery						N		x								
Risk Technology	Use battery						N		x								
Risk Technology	Speed phone block half transaction						N		x								
Risk Technology - RA - C	Errors waste time and cost money						N		x		x						x
Risk Technology - Vendor	Busy network prevents SMS						N	x	x								
Risk Technology - Vendor	Screensize of handset						N	x	x								
Risk Technology - Vendor - CP - C	Cost not defined and do not understand how it works						N	x	x				x				x
C - Technology	Cost of handset			x			N										x
C - Risk Technology	Errors						N		x								x
Risk Vendor - RA	SMS bundles given incorrect info						N	x			x						
Vendor - RA	Miss Nokia most user friendly		x				P				x						
Vendor - CP	Try and teach yourself						N	x					x				
Risk Technology	Damage						N		x								
Risk Technology-RA	Software versions not phone emergency services						N		x	x							
Risk Technology - RA	Battery flat, can't use services						N		x		x						
Risk Vendor - RA	game score late						N	x			x						
Personal - CP	Older people can't use it	x											x				
Personal - T	Young people fiddle around	x												x			

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
RA	Speed up your life - free up time for more quality time						P				x						
Trust	First tower and evolve with MNO		x			x											
Personal - T	Being technology minded	x		x										x			
Personal - RA	Situation if need for it	x									x						
Personal - CT	Personalisation of ringtones and MMS	x										x					
Technology - RA	Technology advanced makes live easier			x							x						
Vendor - RA	Ease to use and setup VL		x	x							x						
Technology - T	Playing around to figure out - no practical benefit			x										x			
RA	If you have a need and can utilise it										x						
O	Millions of other people using it																
CT - T	Fun, pleasure, bored											x		x			
I - RA	Convenience and show professionalism and efficiency										x					x	
C	Expensive																x
C - Risk Vendor	prices not clear							x									x
C - Technology	e-mail cheaper than voice so cut down on call time using e-mail, saving money								x								x
C - Risk Technology	spend a lot of money by browsing								x								x
C - Risk Technology	Lose connection and paid R22 but did no get download								x								x
C - Risk Vendor	Paid R10 for truetone but only received chorus line, expexted whole song							x									x
Trust - C	Black hole taking money					x											x
Trust	Big unknown					x											
Trust - Risk Technology	Security					x			x								
Trust - Risk Technology	SPAM					x			x								

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
Trust - Risk Vendor	If they find out more details trust will be broken					x		x									
Trust - Risk Vendor	Opt-in service builds trust					x		x									
Trust - Vendor	Give u what u ask		x			x	P										
Trust - Risk Vendor	Know who to contact when have problem					x		x									
Trust - Risk Vendor	Stick with them if problem					x		x									
Trust - Risk Vendor	Heard of bad experiences					x		x									
Trust - Risk Vendor - RA	Don't have time & energy to hassle over R15					x		x		x							
Trust - Risk Vendor - C	Spend more on phone call than losing money							x									x
Trust - Vendor - Risk Technology	Vodacom removed MMS viruse		x			x			x								
Trust - Vendor	Guarantee that site is secure like FNB		x			x											
Trust - Vendor Risk	No guarantee for game download					x		x									
Trust - Vendor Risk - Cost	MNO's have monopoly - agree on price					x		x									x
Trust - Technology	Everything is going to work technologically			x		x											
Trust - Risk Vendor	Download a ringtone and receive SPAM bridge trust		x			x		x									
Risk Technology - C	Stolen phone lost ringtones								x								x
Risk Technology - O	New technology but used a lot, low risk								x						x		
Risk Technology	Risk viruses - no virus program								x								
Risk Vendor - Cost	Pay for info but you don't receive it							x									x
Risk Vendor - Risk Technology	Loss of records							x	x								
Personal - Risk Vendor - C	like taking risks for free games	x						x									x
Risk Vendor	Will not give out personal detail							x									
Personal	will not take risks	x						x	x								
Risk Vendor - Risk Technology - C	losing money							x	x								x
Risk Vendor	sell data							x									

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
Risk Vendor - Risk Technology - C	Service did not work - money should have gone 2 her, but it did not			x					x								x
Risk Vendor - Risk Technology - RA	decision-making if benefits more than risks							x	x		x						
Risk Technology	I would rather do things in secure environment, like go to bank								x								
Risk Vendor	don't know who u dealing with, only shortcode							x									
Risk - Institution	No recourse like in bank									x							
Risk Vendor - RA	Call centre cannot deal with problem							x		x							
Risk Vendor - C	Speak 2 someone that took your money							x									x
Trust - Vendor	Terms and Conditions minimise risks					x	P	x									
Trust - Risk Vendor	Terms and Conditions increase risks protects vendor					x	N	x									
Trust - Vendor	well known large one		x			x	P										
Trust - Vendor	name branded one like Makro		x			x	P										
Trust - Vendor	Rating scheme like E-bay		x			x	P										
Trust - Vendor - RA	Vodacom done check and balance you can use it		x			x	P				x						
Technology - Trust	More technology advanced, just the next step			x		x	P										
Technology - Trust	is 3G the same as Internet - better way of doing it - faster, better and more convenient, also cheaper			x		x					x	x					x
Technology - Risk Technology - RA	Concept is brilliant but it is slow			x			N		x		x						
Risk Technology - CP - C	Complained about cost and complexity								x				x				x
Risk Technology	Network coverage and download speeds								x								
Risk Institutional - RA	Ombudsman long way round									x	x						

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
Risk Institutional - Risk Vendor	In case of e-mailing website with problem, no-one has olbigation to answer							x		x							
Institution - Vendor	why haven't our SP told us		x		x												
Institution - Vendor	why haven't our SP told us		x		x												
Institution - Risk Vendor, Risk Technology	Need to know my rights - just a fault or a con						P	x	x	x							
Institution - C	Can go somewhere and get money back				x		P										x
Institution - Vendor - O	Advertise so people can hear how effective it is		x		x		P								x		
Institution - Vendor	Must go on Vodacom's website		x		x		P										
Institution - Vendor -CP	Must make it simple in laymens terms		x		x		P						x				
Risk Institution - Risk Technology - Risk Vendor	Can law protect u, they've put laws on cars, but everyone in room had problem - doubts to police							x	x	x							
Risk Institution	is not applicable to cell phones									x							
Risk Institution	One thing having Law other to police it									x							
Vendor	Authentication		x				P										
Institution	Highlight the governing bodies		x		x		P										
Vendor - Risk Technology	Endorse as virus-free		x				P		x								
Technology - Technology Risk	Purchases will get delivered otherwise technology must know it did not come through			x			P		x								
Vendor - Risk Technology	Virus free phones endorse		x				P		x								
Vendor - Risk Technology	Privacy statement every transaction		x				P		x								
Vendor - Risk Technology	Guarantee on security with recourse		x				P		x								
Vendor - Risk Technology	Guarantees to be advertised, TV, newsletter		x				P		x								

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
Vendor - Risk Technology	Only pay for successful transaction		x				P		x								
Vendor - C	Cost clearly defined up front		x				P										x
Vendor - C - CP	Must be lower cost and know what the cost is		x				P						x				x
Vendor - Risk Technology	Show it is secure with Internet lock		x				P		x								
Risk Technology	Just so easy to connect						N		x								
Vendor - Risk Technology	Virus protection, hacking protection, bluetooth protection		x				P		x								
Vendor - Risk Technology	Everybody will buy antivirus protection from Vodacom		x				P		x								
Technology	reliable system or service			x			P										
Vendor - Risk Vendor - Risk Technology	Proof of refund		x				P	x	x								
Risk Vendor - Risk Technology	The longer u connect the greater the risk from third parties when u downloading game						N	x	x								
Vendor - RA	Ease of use, user friendly		x				P				x						
Vendor - CP	Simple and clearly defined		x				P						x				
Vendor - Technology	Menu on phone - history of transactions - not itemised billing		x	x			P										
Risk Technology	Proof not SMS, scared they might lose it						N	x	x								
Vendor - Technology	Proof readily available not once a month		x	x			P										
Vendor - Technology - C	Proof must be free (itemised transactions)		x	x			P										x
Vendor - Risk Vendor - Risk Technology - O	A forum that reports bad experiences		x				P	x	x						x		
Vendor - RA - C	Physical products for reasonable prices or reduced prices		x				P				x						x
Vendor - RA	Preview products like ringtones		x				P				x						
Vendor - C	Free service where you can get your money back		x				P										x

Research		Trust						Risk			Innovation Diffusion						
RdR	RdC	TPc	TV	TS	TI	TT	TP	RV	RS	RI	IdRA	IdCT	IdCP	IdT	IdO	IdI	IdC
Vendor - Risk Vendor - Risk Technology	In case of problems if all else fails I go to SP		x				N	x	x								
Vendor - Vendor Risk - Vendor Technology - RA	Vodacom must authorise and discipline WASPs		x				P	x	x		x						
Technology - Risk Technology	Reliability - no doubt in mind that transaction went trrough			x			P		x								
Vendor - Risk Vendor - Risk Technology - C	Limitation on amount of m-commerce		x					x	x								x

Table 27: Focus Group Relationships

11.4 Focus Group Definitions

Participants seemed to have a fair idea of e-commerce and m-commerce, although a few misconceptions existed. The primary distinguishing factor relate to the ubiquity of mobile devices, where e-commerce involve commercial transactions conducted via the Internet, while m-commerce are 'doing business on the move'. Overall, the definitions and discussions indicated a greater unfamiliarity with m-commerce.

Focus Groups on M-Commerce held on 30th and 31st August 2005: Definitions given by the participants at the beginning of each group discussion

The definitions are reported for each participant. The number of participants in each group is as follows:

Group 1 – 5 MNO 1 & 4 MNO 2 participants
Group 2 – 2 MNO 1 & 4 MNO 2 participants
Group 3 – 3 MNO 1 & 3 MNO 2 participants
Group 4 – 2 MNO 1 & 4 MNO 2 participants

Definition of E-Commerce

Group 1 (low users of M-Commerce):

- *'Electronic trading between suppliers and users i.e. companies placing electronic orders via the Internet'*
- *'Internet cornmunication for business, study etc. For example, you can order books from amazon.corn'*
- *'I think E-Commerce has to do with Internet related products'*
- *'E-Commerce is a thing we use everyday e.g. cell phone. We must have it to make life easier'*
- *'Don't know'*
- *'Any transaction (financial) done via electronic means'*

- *'Do transactions via your computer'*
- *'Television communication, radio'*
- *'Electronic banking / finance / web based stock market research / accessing global financial markets'*

Group 2 (high users of M-Commerce):
- *'Business communication through electronic means such as internet, fax, e-mail, websites, pop-ups'*
- *'Business that would traditionally be conducted in a physical location is then conducted via secure internet connection with the aid of credit cards / bank transfers'*
- *'Computer based electronic transactions'*
- *'Anything that has to do with a PC communication, for example e-mails'*
- *'Purchasing of goods & services via internet, telephone, SMS'*
- *'Don't know'*

Group 3 (high users of M-Commerce):
- *'Business done over the internet'*
- *'Using electronic equipment to do your business e.g. cell phone, laptop or computer'*
- *'Commercial transactions of different types which can be conducted electronically (on computer)'*
- *'Hardware installations (marketing posters, computers, cell phones, printers)'*
- *'Financial transactions via electronic medium, such as internet'*
- *'Commerce via internet i.e. banking, shopping etc.*

Group 4 (high users of M-Commerce):
- *'Purchasing of goods on-line'*
- *'E-mail via internet using PC, etc'*
- *'Business transactions conducted via the internet (no paper work required)'*
- *'Don't know'*
- *'Commercial transactions conducted using electronic media such as computer'*
- *'Internet based buying & selling e.g. E-Bucks, internet banking'*

Definition of M-Commerce

Group 1 (low users of M-Commerce):
- *'Any purchase of items or services using your mobile device. Electronic banking, airtime purchase, purchase ring tones / graphics / games etc.*
- *'No idea/don't know'* (2 respondents)
- *'M-Commerce deals with cell phone related products'*
- *'A person must have a cell phone to make life easier to communicate every day'*
- *Any financial transaction performed by means of mobile communication devices'*
- *'Do transactions via your cell phone'*
- *'MTN and Vodacom'*
- *'Similar to E-Commerce (web based access to unlimited sites, be it banking/movies/sport / news)'*

Group 2 (high users of M-Commerce):
- *'Business communication through cellular telephones – like the ads at the end of a 'Please Call Me' or ring tones that you can order through your cell phone'*
- *'Conduct transactions using your cell phone over GPRS/3G network with vendors e.g. FNB, Western Union (international on-line money transfers)'*
- *'Cell based transactions'*
- *'Data you retrieve via your mobile phone'*
- *'Purchasing pictures, ring tones, cell phone goodies via cell phone web pages'*
- *'Don't know (maybe my 3G phone)'*

Group 3 (high users of M-Commerce):
- *'Conducting business operations with the use of a cell phone'*
- *'M-Commerce will be to do business while on the move i.e. in different places with electronic*

equipment'
- *'Transactions that can be done in different places with e-technology'*
- *'Network (marketing of industry/services) providing the communication of hardware'*
- *'Financial transactions using mobile technology (e.g. cell phones)'*
- *'Commerce via cell phone i.e. banking, faxes, downloads etc.'*

Group 4 (high users of M-Commerce):
- *'Using your mobile phone through the internet via a server'*
- *'Transactions using a cell phone'*
- *'Business conducted in a situation where the user is remote (face-to-face relation not necessary)'*
- *'Don't know'*
- *'Commercial transactions using cellular technology'*
- *'Cell phone based buying & selling e.g. MTN Banking'*

M-Commerce services personally used by participants

Group 1 (low users of M-Commerce):
- *'Exactmobile, MTNLoaded'*
- *'No idea/don't know'* (5 respondents)
- *'None, unless M-Commerce includes receiving bank statements via mobile e-mail'*
- *'At work use Vortal (MWeb Commerzone) for all purchases. On my cell phone I do not do internet banking or download games & ring tones'*
- *'News & banking. I don't use it currently, I used it about 2 years ago'*

Group 2 (high users of M-Commerce):
- *'Exact Mobile, MTN Loaded'*
- *'Buying airtime, wall papers, ring tones, mobile games'*
- *'Downloads, e-mails'*
- *'Internet, MMS, SMS'*
- *'Vodafone Live'*
- *'Don't know'*

Group 3 (high users of M-Commerce):
- *'SMS s sent from MTNLoaded website. (Have just set up MSN on my cell phone, and trying to set up e-mail'*
- *'Use laptop and cell phone during my travel'*
- *'Don't know'*
- *'MTN – Autopage, Vodacom'*
- *'None used yet'*
- *'MTN, Vodacom'*

Group 4 (high users of M-Commerce):
- *"Don't know'* (5 participants)
- *'Download ring tones'*

11.5 E-Commerce Benefits and Enablers

The benefits of e-commerce are described as (1) convenience; (2) low cost (3) wide availability of information (4) any time purchases. Convenience relate to "*being in one place"* and *"anytime shopping*". This means that they themselves remain in one location, but have access to a wide

variety of resources at any time, where they can browse to compare prices, perform electronic payments and the products get delivered to their home. Participants relate e-commerce enabler to primarily three IDT characteristics and not trust and risk aspects as shown in Table 28: E-commerce Benefits.

Category	Explanation
Relative Advantage	E-commerce increases their productivity by allowing them more time to spend on other activities.
Compatibility	Compatibility with lifestyle motivations relate primarily to the ability to do 'any time shopping'.
Cost	The advantage of e-commerce is that it can allow them to browse and compare prices of different products, allowing them to choose a better price.

Table 28: E-commerce Benefits

The rationale for using m-commerce primarily relate to the following reasons as shown in Table 29: Reasons for using M-Commerce.

Category	Explanation
Needs-driven	A need which can be either functional or pleasure motivated should exist.
Convenience	Focus group participants described convenience as "anytime, anywhere access" and always on the move, always in contact". M-commerce was additionally described as useful in situations where the PC is out of reach or when participants are travelling abroad.
Ease of use	Participants often describe the pre-configuration of services and the complexity of the handset as issues, stating that initial services was difficult to use and required extensive knowledge, as one participant mentioned "a 100-page user manual is not needed".
Time-savings	Participants state that 'time is money" indicating the busy world we live in and that they would use m-commerce when immediate access is required.
Entertainment	It was especially the younger participants which describe this as a motivation because it "keeps you busy when you bored" and provides pleasure because new ringtones are 'funky'.
Curiosity	Again, the younger users were more significantly predisposed to playing around and figuring the services out, although some of the older participants also admitted to indulging in this pastime.

Table 29: Reasons for using M-Commerce

11.6 E-Commerce and M-Commerce Services Used

Most of the participants are Internet users. They use the Internet from home and work to support both work and private use, almost everyday. Participants use the Internet to perform a specific function like e-mail, banking or purchases. Specific services used include banking where they perform transfers, statements and payments between recipients. The two banks mentioned are FNB and ABSA. FNB users are very impressed with the service and the security provided by the 'in-contact' service. In-

contact provides SMS confirmations during Internet transactions, creating a feeling of security, because they always know what is happening in their bank accounts. They buy physical products like DVD's and books and intangible products like airtime, stocks, bookings. They use e-mail and chat to stay in contact and the browse the Internet to look for specific information such as confirmation of flight tickets. They usually have a goal in mind when browsing such as looking for accommodation and comparing prices.

M-commerce services used include ringtones, screen-savers, games from vendors like the MNO's or WASPs. Some respondents preferred international WASPs over local WASPs indicating a wider range of products as well as more reasonable prices. A few participants used subscription services such as news, weather and sports updates, but complained about the quality of the information. Mobile e-mail was seen in its infancy and slow although Blackberry users seemed to be happy with the quick set-up and said that it showed professionalism. Video telephony users loved the technology but others complained about the lack of reception. They thought that mobile Internet access through 3G is too slow. MMS was great but you need the latest model and others must have the same facilities, otherwise they do not have anyone to MMS to. One participant complained about WIG banking which took 15 SMS's to setup and is still not working. They described location based services as 'clever' but also not too sure about how it works and the cost.

With the exception of reducing price and making it more easy to use, the participants feel that new technology such as 3G and Bluetooth as well as the software versions of new handsets are problematic. They state that "*the more expensive phone you buy the more updates you need*". They also mention damage to the phone as a risk that relates to m-commerce. One participant described an emergency situation where "*I was at a client and my phone wouldn't switch on. I couldn't call emergency services*".

11.7 Focus Group Models

11.7.1 Handset Manufacturer Role in building Trust

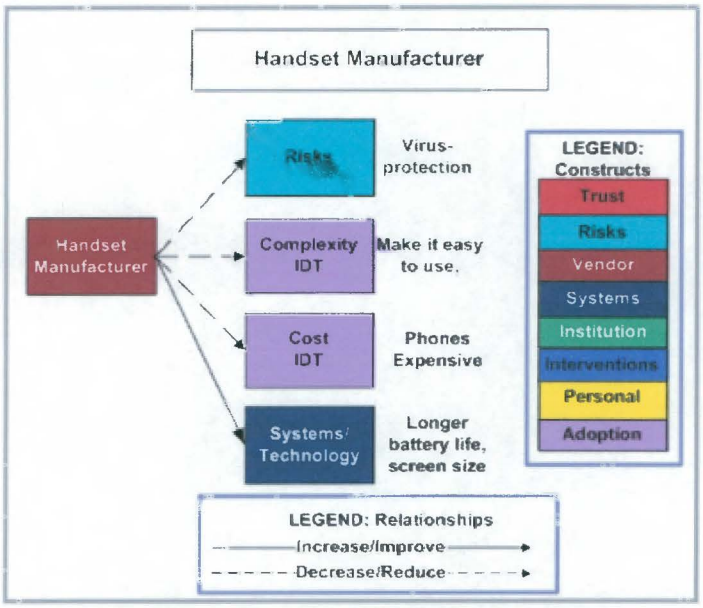

Figure 49: Role of Handset Manufacturer in Trust Building

11.7.2 Vendor Trust

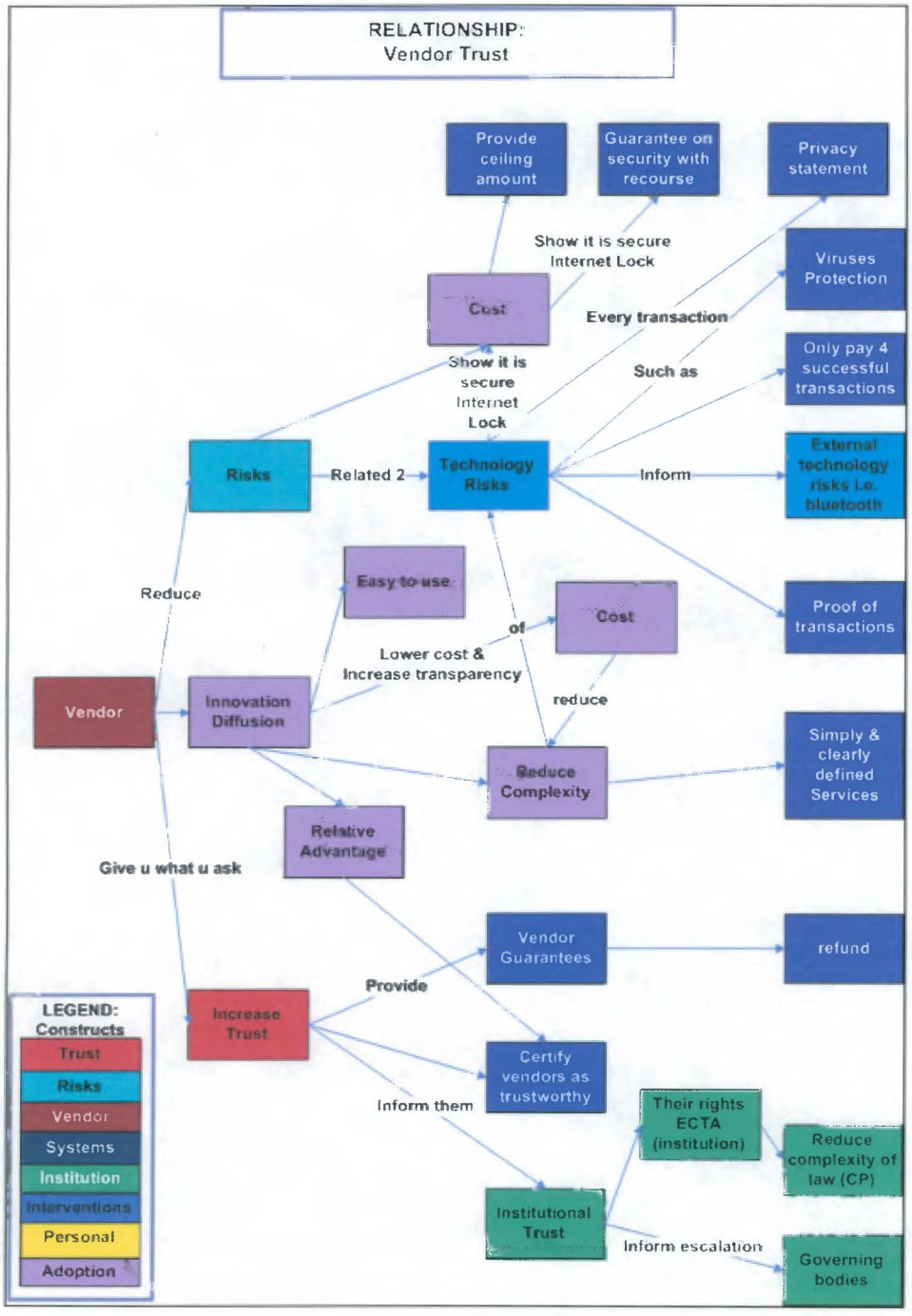

Figure 50: Building Vendor Trust

11.7.3 Inhibitors of M-Commerce

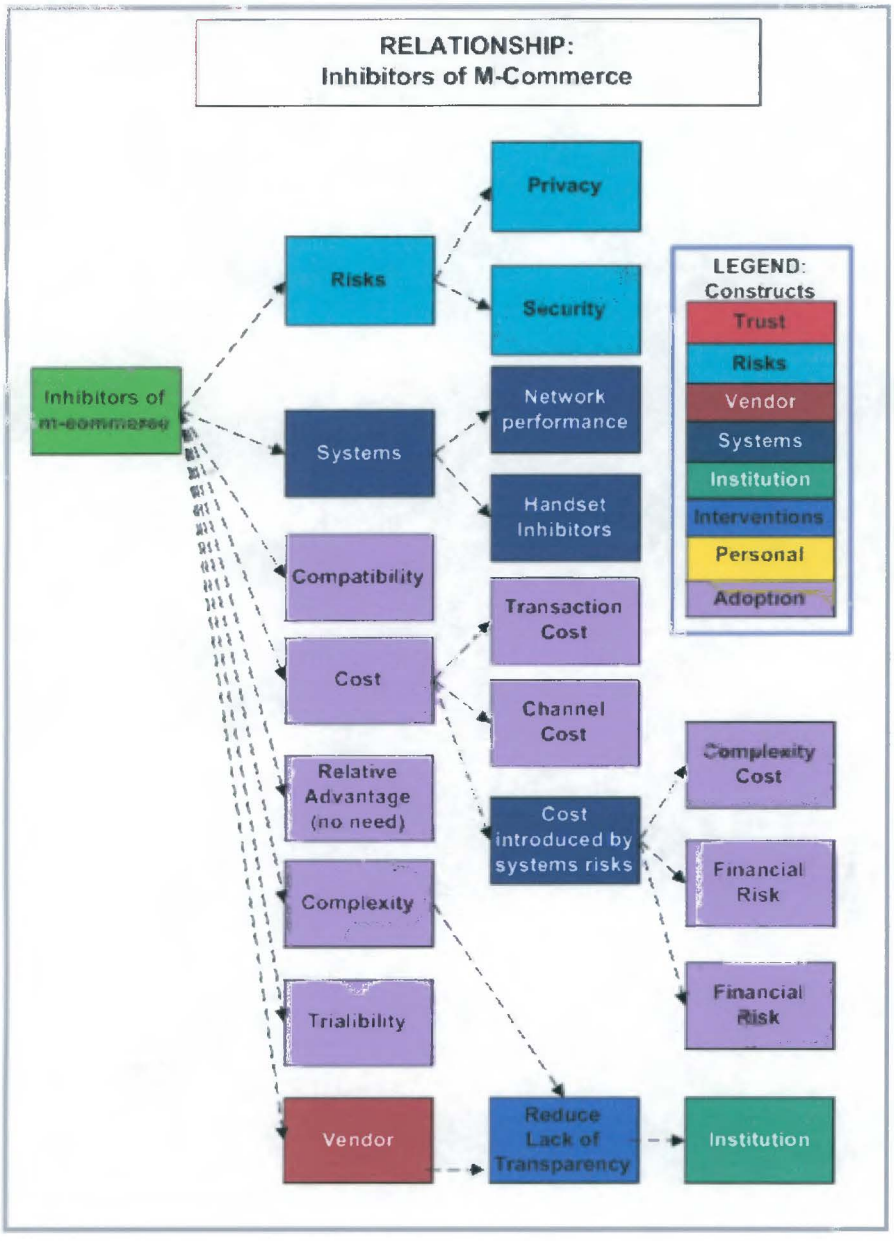

Figure 51: Inhibitors of M-Commerce

11.7.4 Cost Within the Trust and Risk Environment

Cost is explained by using Figure 52. The participants highlighted three types of cost. The first related to the pure IDT 'cost' characteristic, where the transaction cost is considered too high. An example of such was that it was cheaper to download ring tones via the Internet. The second related to the cost of the channel. This term was used by participants to describe the cost relating to the service and the handset (excluding the cost of the transaction). Participants frequently felt that the cost of the service (the tariff package than the customer was using) may be too expensive; prepaid, for example, was

considered expensive. New model handsets were also perceived to be pricey.

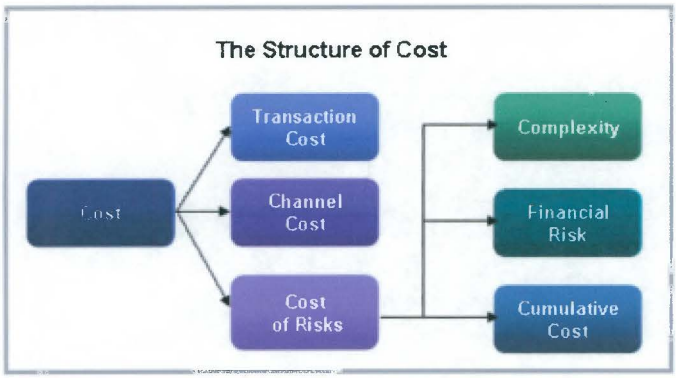

Figure 52: The Complexity of Cost

The third aspect of cost described technology risks. During the course of the study, three types were identified: (1) Concerns about cost relating to risks introduced by the complexity of the m-commerce services: The participants did not know how the service or technology functioned and stated that, "cost is not always clearly defined when you use new technology." (2) Cost additionally was found to relate to the financial risk of losing money, as participants mentioned that, "paying for errors is free airtime you can have." (3) Respondents also considered the cumulative cost of risks, as, "when you keep purchasing for small amounts, it eventually does add up."

11.7.5 Ideal M-commerce Transaction Experience

The ideal m-commerce transaction experience designed by the focus group participants includes:

Increasing Trust in the Vendor:

Participants wanted to know who was accountable for the service. The WASP should provide a toll-free number to facilitate complaints. Participants further requested that the terms and conditions of the transaction should be made clear at the start of the transaction. A privacy guarantee, or a 'prompt', "with every single transaction... yes, you must click one more time," was requested.

Participants also required proof of the transaction in the form of e-mail or faxes. SMS is not sufficient as it might be deleted. They also requested a transaction history as proof of the transaction and proof of refund if needed. It was also felt that they, "don't want to pay for it. I want it on my menu. I want it there for free. If I am not on the Internet or my mobile I want to see." This therefore implies that they wanted an application on their handset that records these m-commerce transactions, similar to a call history currently available on cellphones. Participants furthermore made application for m-commerce transaction to be designed according to a risk management process; with various stages and validations built in. The participants wanted to know which stage they were in during the transaction.

Participants insisted on greater upfront disclosure with regard to how much the transaction would cost. "A telephone call cost so much a minute or a second," and it should be the same price as the, "time that you are on the Internet to do your transactions." They additionally requested that only downloads actually received should be paid for, and that products and services should be reasonably priced. It was furthermore recommended that a structured (bundle) package for m-commerce be offered so that, "it can be on some kind of sliding scale. If you are a person who purchase movie tickets regularly ... if it is 10 for the month then it is free."

Participants called for a forum that provides references from past and current users, like a "chat room" or "a forum with experiences". They additionally requested that the MNO should endorse or certify WASPs. In the instance that there might be problems, the MNO should refund consumers and the WASP should refund the network. This process was described is the following manner: "If I have a problem with them (WASPs), I must go to my Service Provider and, if all of us have problems with them, we go to our Service Provider. So, on a monthly basis they can say – they had thousand of problems with WASPs and they can say to them – you are off our list of providers."

Increasing Trust in the System:

Some participants felt that security issues could be resolved by the technology; such as providing 'security certificates' and 'opt-in' mechanisms. Respondents desired an indication illustrating that they were entering a secure site. "If you're giving out sensitive info... there should be a change [modification] on the [network] connection. It shouldn't just be the same old boring connection and they promise me it's secure." They also proposed that, "it [would] be a very good idea for the MNO to start marketing an anti-virus protection. Everybody is going to buy it." Participants further requested greater speed and reliability of the network connection.

Increasing Trust in the Institution:

Participants requested that the Service Providers and MNO's should explain their consumer rights and educate them. It was felt that the existence of organsiations like WASPA, and the provisions of the ECT Act, should be widely publicised. A better knowledge about the regulatory bodies would potentially increase their confidence in m-commerce services.

Increased Usability:

Participant's required quick and easy set-up or a, "phone with all your stuff on there," i.e. pre-loaded. They suggested that the menu set-up should be the same as Internet and that the services should be user-friendly, clear and simply defined. Participants wished to preview the products, stating, "I wish I could have seen it beforehand – I wouldn't even bother." In addition, a wider variety of available m-commerce services were requested, indicating that the major reason for not using certain m-commerce services was linked to an absence of a need for the service rather than a trust issue.

12 Appendix 4: Cover Letter and Survey

12.1 Cover Letter

Please note that the presentations format was slightly adapted to accommodate inclusion into the Appendix section of this thesis. The cover letter fitted on one page.

Trust in Mobile Commerce Survey

25 May 2006

Dear Sir/Madam,

Re: Trust in Mobile Commerce

I am currently completing a Masters degree in Information Systems at the University of Cape Town. The topic for my research is the perception of users with regard to trust in mobile commerce. Mobile commerce, or m-commerce, is the use of your mobile phone to purchase goods, services or digital content. This research is focused on 'your-phone-is-your-wallet' types of m-commerce services which will allow you to pay bills, buy goods and do banking using your mobile phone.

Previous international research showed a significant 'leap of faith' would be required in order for customers to be comfortable using their mobile phones for financial transactions. This research project therefore aims to establish the validity of these research results for South African customers.

Due to your status of 'early adopter' within the key mobile market segment, you have been selected as the target group for this study. Not only is the knowledge which you have with regard to mobile industry and the relevant technology substantial, you are furthermore quick to learn how to navigate and use services, in other words, you are 'm-commerce savvy'. The familiarity which you have acquired in current mobile content services, vendors and related technologies is also an important characteristic of early adopters.

Your assistance in the completion of this survey would be greatly appreciated. Even if you are not currently using these forms of mobile commerce services, your input would nevertheless be valuable in determining the relevant information. Please note that a neutral middle option has been added into the questionnaire. This option has been labelled as *'neither agree nor disagree'*. If at all possible, please attempt to determine whether you lean more towards the *'agree'* or *'disagree'* end of the scale. Remember that there is really no wrong or right answer; the most important thing is to attempt to respond to all questions. Even where it may seem that a question has been repeated, or sounds similar to an earlier question, please keep in mind that each question has an important function.

The completion of the questionnaire is voluntary, and the information anonymous. No personal details are requested and no information will be provided to outside parties. Furthermore, no individual or

company details will be published in the final report.

Please include your e-mail address in the comments section – Section C, page 2 – of the survey if you would like to view the final report. Any queries regarding the questionnaire, or the overall study, can be addressed to either me or my mentor, Dr Jean-Paul Van Belle. Please be assured that all correspondence will be handled in the strictest confidence.

Thank you for your contribution.

Yours sincerely,

Janine Joubert
021 4408363 (w)
082 99921254 (c)
janine.joubert@vodacom.co.za

Dr Jean-Paul Van Belle
Department of Information Systems - UCT
021 6504256 (w)
jvbelle@commerce.uct.ac.za

12.2 Survey of Trust in Mobile Commerce

Please note that the format was slightly changed to accommodate inclusion within the Appendix. The Survey fitted on two pages and the Likert Scales was reproduced at the top of each page.

UNIVERSITY OF CAPE TOWN

Survey of Trust in Mobile Commerce

The survey will take approximately 10 minutes of your time. No personal questions have been asked.

M-Commerce refers to the use of your mobile phone to buy goods, services or digital content. The focus is on future 'your–phone-is-your-wallet' m-commerce services which will allow for the payment of bills; the purchase of goods and banking. The provider of these services is called a vendor. Please note that this excludes banks.

A. Please answer all of the following questions:

	Please rate how strongly you agree or disagree with each of the following statements by placing a check mark in the appropriate box.	How much do you agree or disagree?						
	Your-phone-is-your-wallet services will allow you to do monthly bill payments (e.g. municipal services) and once-off payments (e.g. traffic fines). You can pay vendors, such as repairmen (e.g. electricians); pay for purchases, such as clothing at flee markets; buy tickets (e.g. movie, plane tickets) and perform person-to-person payments. Even though you are not currently using 'your-phone-is-your-wallet' m-commerce services, how do you feel about the following statements?	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly agree
1	**I would be able to trust vendors to provide the services effectively and competently.**							
2	**I am concerned about lack of security when using m-commerce services.**							
3	**I am confident that other people can be trusted.**							
4	**I run the risk of losing the network signal during the transaction.**							
5	**Using m-commerce services will fit in well with my everyday routine.**							
6	**I feel that the transaction speed is too slow.**							
7	**I take the risk of not knowing exactly how much I am paying for the transaction.**							
8	**I am confident that my rights as a m-commerce consumer are protected by law.**							
9	**I am concerned about potential loss of confidentiality.**							
10	**Using m-commerce services will improve my quality of life.**							
11	**In general, I believe that m-commerce services can be trusted.**							
12	**I am concerned about paying for unsuccessful transactions.**							
13	**I am willing to share my personal information with vendors.**							
14	**I am concerned that my phone could be used for purchases if stolen.**							
15	**I expect that m-commerce will be difficult to use.**							
16	**One cannot be too careful when dealing with people.**							
17	**I am concerned that a network error could cause me to pay more than I should.**							
18	**I would be happy to count on vendors to act honestly and fairly.**							
19	**I feel that using my mobile phone for purchases is not as safe as buying on the Internet.**							
20	**If I had many opportunities to use m-commerce services, I would try them.**							

	Please rate how strongly you agree or disagree with each of the following statements by placing a check mark in the appropriate box.	How much do you agree or disagree?						
21	I trust the technology (e.g. WAP, USSD, 3G) to deliver the transaction successfully.							
22	I place myself in danger by not knowing where to complain.							
23	I know which external party will assist me to resolve the disagreement with the vendor.							
24	I run the risk of someone stealing my identity when using m-commerce services.							
25	Using m-commerce services will improve my image amongst friends.							
26	In general, I have doubts about using m-commerce services.							
27	I feel exposed to the risk of viruses.							
28	If given the opportunity to use new services, I would try them.							
29	I am worried that I could lose valuable information whilst my phone is being repaired.							
30	I expect that m-commerce services will be too expensive.							
31	I believe that most people can be trusted.							
32	Losing the network connection is not a concern of mine.							
33	I believe that vendors can be described as reliable and dependable.							
34	I feel that it is safe to use m-commerce services.							
35	I expect that the transaction speed will be sufficiently fast.							
36	I am concerned that no guarantees are being offered by vendors.							
37	I would first like to see how other people use m-commerce services.							
38	I know I am protected by the law while using m-commerce.							
39	I am afraid that my personal information is vulnerable to abuse.							
40	On the whole, I assume that I can trust m-commerce services.							
41	I feel uncomfortable that I might enter the wrong code and will then still be required to pay.							
42	Using m-commerce services will be compatible with my lifestyle.							
43	I intend to use m-commerce services quite frequently.							
44	I am worried that my phone battery could discharge while I am transferring money.							
45	Using m-commerce services will increase my productivity.							
46	I have faith that most people can be relied upon.							
47	I am worried that the slow service response times could result in the failure of the transaction.							
48	I believe that m-commerce transactions will be easy to use.							
49	I am sceptical of the skills and competence of vendors.							
50	I feel that security is an overrated issue.							
51	I need the opportunity to play around and figure the services out.							
52	I can be sure that sufficient network coverage exists during the transaction.							
53	I feel anxious about not having proof of the transaction.							
54	The use of m-commerce services will not make me seem trendy.							
55	I know which external authority to contact to help resolve a disagreement with the							

	Please rate how strongly you agree or disagree with each of the following statements by placing a check mark in the appropriate box.	How much do you agree or disagree?						
	vendor.							
56	I feel exposed to receiving unwelcome SMSs (SPAM) from vendors.							
57	I expect that m-commerce services will, in general, be affordable.							
58	In general, I believe that m-commerce will completely fulfil my needs and expectations.							
59	I am concerned that I might enter the wrong amount during the m-commerce transaction.							
60	I would be willing to link my cellphone number to my bank account to do banking.							
61	I am concerned that the screen size of my handset is too small for m-commerce services.							
62	I will only use m-commerce services if many other people are using them.							
63	I would be willing to provide my credit card details to vendors.							
64	I feel that the law will punish vendors if they act dishonestly.							

B. Use of Services:

	In a typical week, how often would you, on average, use your mobile phone to do the following? If you never use the services, please mark the never option. (Please place a check mark in the appropriate box).	Daily	Few times a week	Weekly	A few times a month	Seldom	Never
65	Download ring tones, operator logos, pictures and graphics.						
66	Download games.						
67	Receive information alerts, such as shares, lotto, astrology or weather.						
68	Take part in competition lines.						
69	Play interactive games and dating.						
70	Use location services, e.g. Look4Me, Look4it.						
71	Use Vodafone Live or MTN Loaded.						
72	Using your mobile phone to browse the Internet.						
73	Use your mobile phone to do banking transactions offered by the banks.						

C. Please use the space below for additional comments or provide your e-mail address if you want a copy of the final report:

Thank you very much for you time and assistance (Janine Joubert 0829921254)

13 Appendix 5: Statistical Analysis

13.1 Exploratory Factor Analysis

13.1.1 Summary of Exploratory Factor Analysis

The conclusion that can be drawn from the EFA is summarised in the following extract presented in appendix. Only the more relevant and conclusive relationships between sets of variable are shown indicated by grouping of factor loadings indicated as high (above 0.3) or very high (above 0.6) in the following table:

		Factor 1	F2	F4	F15	Summary
IdC1	q30	0.42				All of the IDT characteristics load into one factor with the exception of Observability and Image. Furthermore these factors load into the same factor as Overall trust and Participation in m-commerce.
idC2	q57	0.5				
IdCP1	q15	0.28				
IdCP2	q48	0.57				
IdCT1	q5	0.78				
IdCT2	q42	0.72				
IdRA1	q10	0.68				
IdRA2	q45	0.73				
idT1	q28	0.41			0.51	IDT Trialibility loads into its own factor.
idT2	q51				0.33	
RS2	q4			0.3		Some of the system related risks load into their own factor.
RS4	q14			0.63		
RS7	q24			0.66		
RS8	q27			0.78		
TP1	q20	0.74	0.23	-0.03	0.03	Intention to participate and IDT factors, as well as overall trust load into same factor.
TP2	q43	0.83	0.19	0.03	-0.01	
TP4	q60	0.57	0.13	-0.21	-0.03	
TPc1	q3		0.67			Personal characteristics load into the same factor as vendor and intention to participate
TPc2	q16		0.43			
TPc3	q31		0.79			
TPc4	q46		0.76			
TS1	q21	0.4	0.43			Trust in the systems load into both factor one and 2
TS2	q34	0.33	0.48			
TS3	q35	0.39	0.25			
TS4	q50	-0.04	-0.22			
TS5	q52	0.33	0.43			
TT1	q11	0.42	0.41			Overall trust load into both factor 1 and 2.
TT2	q26	0.34	0.2			
TT3	q40	0.4	0.59			
TT4	q58	0.51	0.15			
TV1	q1	0.13	0.6			Trust in the vendor load into the

TV2	q13	0.35	0.37			same factor as intention to participate and personal characteristics.
TV3	q18	0.15	0.62			
TV4	q33	0.11	0.78			

Table 30: Summary of Exploratory Factor Analysis

13.1.2 Complete Exploratory Factor Analysis

Rotated Component Matrix(a)

		Component														
		Factor 1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15
id01	q37	-0.20	-0.33	0.60	0.08	-0.04	0.00	0.08	0.21	-0.09	0.19	0.21	-0.13	0.22	0.00	0.14
id02	q62	-0.10	0.08	0.19	0.00	0.00	0.11	0.04	0.24	0.23	0.18	0.61	-0.34	0.21	-0.01	0.09
IdC1	q30	0.42	0.04	-0.14	-0.09	0.24	0.29	-0.25	0.22	0.13	-0.08	-0.21	0.19	-0.21	0.37	0.00
idC2	q57	0.50	0.07	0.07	0.10	0.05	0.25	0.10	0.55	-0.14	-0.06	-0.14	-0.06	-0.11	0.11	-0.12
IdCP1	q15	0.28	-0.03	-0.01	-0.02	0.16	0.00	0.03	0.01	-0.11	0.02	-0.09	0.08	-0.77	-0.05	0.07
IdCP2	q48	0.57	0.17	0.13	-0.06	-0.13	0.08	-0.08	0.51	-0.02	-0.14	0.12	0.03	-0.06	0.04	0.13
IdCT1	q5	0.78	0.00	-0.07	0.06	0.16	0.06	0.00	0.14	0.32	-0.09	0.02	0.03	-0.10	-0.08	-0.03
IdCT2	q42	0.72	0.20	0.16	-0.15	-0.26	-0.03	0.03	0.08	-0.06	-0.14	-0.08	-0.08	0.01	-0.15	0.03
IdI1	q25	0.22	0.23	-0.15	-0.01	-0.03	0.05	-0.14	-0.04	-0.07	-0.04	0.70	0.09	0.07	0.15	0.17
IdI2	q54	-0.01	-0.08	-0.11	-0.04	0.05	-0.07	0.03	-0.12	-0.20	-0.07	0.12	-0.05	-0.13	0.05	0.62
IdRA1	q10	0.68	-0.01	-0.08	-0.02	0.19	-0.09	0.05	0.21	0.15	0.02	0.01	0.10	-0.20	-0.15	0.05
IdRA2	q45	0.73	0.21	-0.03	-0.10	-0.02	-0.06	0.14	-0.03	0.16	-0.10	-0.23	0.07	-0.03	0.08	0.08
idT1	q28	0.41	0.18	0.01	-0.13	0.25	0.22	-0.11	0.07	-0.01	0.08	0.12	-0.13	0.15	-0.12	0.51
idT2	q51	0.29	-0.16	0.39	0.05	0.21	-0.14	0.08	0.17	0.09	0.15	0.15	0.11	-0.13	-0.17	0.33
RI1	q22	0.00	-0.25	0.40	0.44	-0.32	-0.14	-0.04	-0.17	-0.17	-0.23	-0.27	0.06	0.06	-0.03	0.13
RI2	q53	0.05	0.01	0.79	0.12	0.04	0.04	0.08	-0.20	0.14	0.11	-0.05	0.10	-0.10	0.08	-0.08
RS1	q2	0.00	-0.19	0.04	0.16	-0.11	-0.07	0.73	-0.08	0.02	-0.01	0.08	0.23	-0.07	-0.04	-0.19
RS10	q32	0.27	0.40	0.04	0.10	0.16	0.15	0.02	0.01	0.01	0.11	-0.10	-0.09	-0.16	-0.62	0.04
RS11	q44	-0.09	0.15	0.05	0.20	-0.53	-0.31	0.09	-0.05	0.18	0.18	-0.07	-0.27	-0.16	0.25	-0.01
RS12	q47	-0.17	-0.04	0.42	0.16	-0.48	-0.23	0.39	-0.01	0.05	0.01	0.11	0.02	0.01	-0.09	0.00
RS13	q59	0.15	-0.14	0.24	0.21	-0.10	-0.15	-0.03	-0.03	0.55	0.20	0.02	-0.02	-0.16	0.19	-0.32
RS14	q61	-0.05	0.07	0.17	0.07	-0.03	0.13	0.08	-0.09	0.10	0.81	0.06	-0.03	0.06	0.05	0.00
RS2	q4	-0.20	-0.10	-0.15	0.30	-0.20	-0.22	0.12	0.18	0.15	0.38	0.21	0.35	-0.01	0.05	-0.31
RS3	q6	-0.04	-0.02	-0.09	0.11	-0.73	0.05	0.20	-0.06	0.01	0.00	0.04	0.16	0.25	0.14	-0.21
RS4	q14	0.12	-0.12	0.11	0.63	0.05	-0.09	0.07	-0.11	0.43	0.07	0.08	0.12	0.22	-0.16	0.12
RS5	q17	-0.08	0.02	0.27	0.39	-0.17	-0.33	0.20	-0.04	0.30	0.17	-0.18	0.25	0.12	0.08	0.25
RS6	q19	-0.32	0.05	0.31	0.14	-0.11	-0.04	-0.18	-0.01	-0.10	0.21	0.28	0.10	-0.09	0.55	0.04
RS7	q24	-0.23	-0.21	0.37	0.66	-0.07	-0.06	0.11	-0.04	0.01	0.00	-0.02	-0.20	0.01	-0.07	-0.17
RS8	q27	-0.11	0.10	-0.02	0.78	-0.13	0.01	0.17	-0.09	0.17	0.00	0.10	-0.02	-0.13	0.18	-0.06
RS9	q29	0.06	0.11	0.11	0.17	-0.22	-0.08	0.73	0.01	-0.01	0.18	-0.17	-0.05	0.01	-0.12	0.17
RV1	q7	0.01	0.00	0.04	0.21	-0.27	-0.39	0.19	-0.04	0.06	0.37	0.27	-0.04	-0.15	0.05	-0.08
RV2	q9	-0.06	-0.37	0.11	0.57	0.03	-0.21	0.14	0.16	-0.04	0.22	-0.12	0.11	-0.06	-0.12	-0.17
RV3	q12	0.00	-0.06	0.21	0.28	0.35	-0.38	0.38	-0.16	-0.05	0.19	-0.09	-0.02	0.14	0.36	-0.13
RV4	q36	-0.28	-0.10	0.61	0.04	0.27	-0.22	0.30	0.04	-0.07	-0.19	-0.04	-0.02	0.09	-0.01	-0.13
RV5	q39	0.03	-0.06	0.46	0.27	-0.04	-0.11	0.29	0.17	0.49	-0.01	-0.01	0.03	0.01	0.17	-0.07
RV6	q41	-0.07	-0.08	0.59	0.08	-0.34	-0.19	-0.10	0.03	0.16	0.13	-0.24	-0.11	0.09	-0.01	-0.04
RV7	q56	0.17	-0.02	0.04	0.10	-0.04	0.06	0.01	-0.05	0.80	0.06	0.03	0.14	0.09	-0.12	-0.13
TI1	q8	0.21	0.33	-0.07	-0.13	0.15	0.07	-0.14	0.71	0.02	-0.07	0.05	-0.04	0.11	-0.04	-0.11
TI2	q23	0.12	0.14	-0.09	-0.24	0.02	0.49	0.07	0.34	-0.12	0.23	0.24	-0.03	-0.06	-0.10	0.02

TI3	q38	0.02	0.51	-0.13	-0.09	0.18	0.37	-0.21	0.44	0.06	-0.12	0.17	0.13	-0.05	-0.05	0.03
TI4	q55	0.01	0.17	-0.09	-0.04	0.05	0.86	-0.09	0.04	0.02	0.03	0.00	-0.03	0.00	-0.04	-0.02
TI5	q64	0.10	0.23	-0.06	0.04	0.10	0.33	-0.16	0.20	-0.02	-0.43	0.16	0.09	0.14	0.19	0.15
TP1	q20	0.74	0.23	-0.17	-0.03	0.23	0.01	-0.06	-0.09	0.04	0.03	0.28	-0.10	-0.07	-0.14	0.03
TP2	q43	0.83	0.19	-0.06	0.03	0.05	0.10	-0.21	-0.14	-0.09	0.01	0.27	-0.01	0.06	-0.08	-0.01
TP4	q60	0.57	0.13	-0.13	-0.21	0.13	0.12	0.07	0.24	-0.19	0.20	-0.07	0.05	0.17	0.06	-0.03
TP5	q63	0.20	0.20	-0.18	0.06	0.14	0.12	-0.51	0.25	-0.23	-0.06	0.09	0.38	0.18	-0.03	-0.12
TPc1	q3	0.22	0.67	-0.13	-0.07	0.01	-0.13	0.14	0.12	0.02	0.04	0.13	-0.19	0.26	-0.12	-0.14
TPc2	q16	0.04	0.43	-0.19	-0.36	0.02	0.05	-0.44	-0.18	-0.05	-0.24	0.15	-0.02	-0.18	-0.13	-0.10
TPc3	q31	0.01	0.79	-0.06	-0.10	-0.06	-0.04	-0.11	0.02	0.21	0.11	0.08	-0.03	-0.04	0.03	0.13
TPc4	q46	0.20	0.76	-0.03	0.03	0.00	0.11	-0.12	0.11	-0.19	0.10	0.00	-0.14	-0.06	0.01	0.04
TS1	q21	0.40	0.43	-0.05	0.05	0.22	0.05	-0.08	0.25	-0.13	-0.08	0.27	-0.17	-0.15	-0.02	0.27
TS2	q34	0.33	0.48	-0.17	-0.09	0.40	0.36	-0.26	0.04	-0.15	-0.04	0.14	0.05	0.03	-0.15	-0.02
TS3	q35	0.39	0.25	-0.03	0.07	0.62	0.11	-0.10	0.20	0.05	-0.09	-0.08	-0.19	-0.14	0.14	0.09
TS4	q50	-0.04	-0.22	0.08	0.00	-0.17	-0.04	0.12	-0.10	0.20	0.00	-0.07	0.72	-0.05	0.15	-0.05
TS5	q52	0.33	0.43	0.14	-0.13	0.41	0.19	-0.08	-0.05	-0.07	-0.33	0.15	-0.15	0.01	-0.01	-0.23
TT1	q11	0.42	0.41	-0.02	-0.14	0.12	0.37	0.02	0.37	0.09	-0.14	0.12	0.00	0.12	-0.20	-0.08
TT2	q26	0.34	0.20	-0.24	-0.36	0.31	0.37	-0.10	0.09	-0.05	-0.16	0.13	0.07	-0.05	-0.09	-0.10
TT3	q40	0.40	0.59	-0.04	-0.16	-0.02	0.21	-0.18	0.05	-0.12	-0.08	0.25	0.02	-0.10	-0.07	0.04
TT4	q58	0.51	0.15	-0.10	0.01	0.18	0.44	-0.21	0.15	0.02	0.22	-0.02	-0.07	0.00	0.22	-0.04
TV1	q1	0.13	0.60	-0.04	-0.03	0.13	0.12	-0.07	0.19	0.04	-0.23	-0.05	0.52	-0.15	-0.18	-0.06
TV2	q13	0.35	0.37	0.21	-0.08	-0.14	-0.04	-0.11	0.04	-0.35	0.12	0.13	0.22	0.46	-0.03	-0.11
TV3	q18	0.15	0.62	-0.03	0.07	0.12	0.13	-0.19	0.30	-0.19	-0.13	-0.12	-0.17	0.29	-0.15	-0.12
TV4	q33	0.11	0.78	-0.09	-0.10	0.02	0.16	0.16	0.03	-0.08	0.02	-0.02	0.07	0.11	0.08	-0.02
TV5	q49	-0.01	0.21	-0.40	-0.14	-0.04	0.05	-0.34	0.08	-0.24	-0.13	-0.24	-0.05	0.30	-0.08	0.23

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 39 iterations.

Table 31: Exploratory Factor Analysis

13.2 Principle Components Analysis

13.2.1 Summary of Principle Components Analysis

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Explanation
id01						0.485097			Image load cleanly into factor 6
id02						0.744402			
IdC1	0.393283				0.394857				Cost load more strongly into factor 5
idC2	0.503972				0.527202				
IdCP1	0.307914						0.403832		Compatibility, relative advantage and trialibility loads into one factor.
IdCP2	0.655519								
IdCT1	0.757094								
IdCT2	0.740671								
IdRA1	0.700176								
IdRA2	0.705467								

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Explanation
idT1	**0.463011**						**0.301803**		
idT2	**0.409490**								
IdI1						0.406889		0.413069	Image does not load cleanly into construct.
IdI2									
RI1									Do not load cleanly.
RI2				0.314711					
RS13				0.683130					Some of the risk related to vendor and risk related to systems questions load cleanly into factor 4
RS2				0.528680					
RS5				0.450844					
RS7				0.333465					
RS8				0.608549					
RV1				0.341633					
RV2				0.379084					
RV5				0.565225					
RV7				0.634181					
TI1			0.342843		0.593208				Trust in the institution load more strongly into factor 5
TI2					0.484751	0.395156			
TI3			0.471472		0.573119				
TI4					0.565116				
TI5					0.352641				
TP1	0.699819								Participation load into factor 1. Var63 result of mean distribution.
TP2	0.772153								
TP4	0.562313								
TP5								0.489965	
TPc1			0.731846						Personal trust load more strongly in factor 3
TPc2		0.384207	0.419009					0.395856	
TPc3			0.740637						
TPc4			0.746857						
TS1	0.440805	0.046202	0.444309						Trust in systems load more strongly in factor 3
TS2			0.480248						
TS3	0.342742								
TS5			0.473290						
TT1	0.427276		0.448516						Overall trust load more strongly in factor 1
TT2	0.307692	0.412914							
TT3	0.400949		0.592782						
TT4	0.446175								
TV1			0.532225		0.356362				Trust in vendor load more strongly in factor 3
TV2	0.347042		0.401433						
TV3			0.680157		0.374951				
TV4			0.749297						
	6.802541	4.620502	6.289632	4.437493	4.429264	2.678960	3.357233	3.103515	
	0.106290	0.072195	0.098276	0.069336	0.069207	0.041859	0.052457	0.048492	

Table 32: Summary of Factor Analysis using Principle Components Analysis

13.2.2 Complete Principle Component Analysis

		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
id01	Var37	-0.102554	-0.605772	-0.294024	-0.072600	0.065091	0.485097	-0.076192	-0.031527
id02	Var62	-0.040548	-0.120137	0.145954	0.079020	0.111973	0.744402	0.012672	0.067898
IdC1	Var30	0.393283	0.232318	-0.066783	0.140791	0.394857	-0.235363	0.199965	0.332262
idC2	Var57	0.503972	-0.140787	0.072341	0.008571	0.527202	-0.036972	0.030241	-0.099283
IdCP1	Var15	0.307914	0.175066	-0.107679	0.081985	-0.075304	-0.173669	0.403832	-0.110437
IdCP2	Var48	0.655519	-0.120305	0.174218	-0.057531	0.311480	0.068333	-0.100966	0.146480
IdCT1	Var5	0.757094	0.115878	0.032690	0.280426	0.171736	-0.119933	0.212618	0.009441
IdCT2	Var42	0.740671	-0.114955	0.254230	-0.155034	-0.015957	-0.130240	-0.137818	-0.070040
IdI1	Var25	0.247355	0.247920	0.242916	-0.010077	-0.078814	0.406889	-0.071884	0.413069
IdI2	Var54	0.082758	0.067555	-0.106449	-0.310465	-0.334754	0.131460	0.182687	0.083376
IdRA1	Var10	0.700176	0.126982	-0.003042	0.164005	0.102092	-0.078593	0.222584	-0.106195
IdRA2	Var45	0.705467	0.058363	0.200970	0.100730	-0.035915	-0.275271	0.022161	-0.091994
idT1	Var28	0.463011	0.045910	0.189037	-0.264245	0.086830	0.285084	0.301803	0.135808
idT2	Var51	0.409490	-0.307074	-0.165003	0.107795	-0.031503	0.235807	0.255117	-0.063190
RI1	Var22	0.005252	-0.599472	-0.208029	0.019119	-0.293594	-0.280377	-0.204980	0.053145
RI2	Var53	0.048609	-0.598956	-0.028325	0.314711	-0.061615	0.064115	0.108315	0.012716
RS1	Var2	0.001127	-0.083035	-0.172193	0.288743	-0.053681	-0.047714	-0.179315	-0.583262
RS10	Var32	0.263838	0.032455	0.455583	-0.014130	0.106144	-0.038159	0.322248	-0.273406
RS11	Var44	-0.088233	-0.114158	0.153356	0.288380	-0.444435	0.104292	-0.332616	-0.112630
RS12	Var47	-0.096284	-0.458058	-0.007208	0.164933	-0.264744	0.134165	-0.399909	-0.315758
RS13	Var59	0.109679	-0.135757	-0.156211	0.683130	-0.091436	0.052247	-0.036572	0.011777
RS14	Var61	-0.057077	0.018054	0.026006	0.279629	-0.036579	0.560837	-0.078617	-0.191121
RS2	Var4	-0.193165	0.116359	-0.125005	0.528680	0.025176	0.166345	-0.405247	-0.136243
RS3	Var6	-0.059819	0.023874	-0.001882	0.147758	-0.067541	-0.023196	-0.789731	-0.105321
RS4	Var14	0.099125	-0.260444	-0.059561	0.577183	-0.144699	0.060981	0.041579	-0.021756
RS5	Var17	-0.025943	-0.389699	-0.016864	0.450844	-0.298214	-0.028118	-0.202010	-0.135181
RS6	Var19	-0.287951	-0.218846	-0.042810	0.197717	-0.123347	0.353530	-0.161104	0.409799
RS7	Var24	-0.272295	-0.561276	-0.124995	0.333465	-0.108483	0.064495	0.019232	-0.136354
RS8	Var27	-0.170353	-0.165804	0.120145	0.608549	-0.152816	0.046609	-0.035601	-0.033342
RS9	Var29	0.107457	-0.210137	0.134614	0.098167	-0.159120	0.083296	-0.161684	-0.716031
RV1	Var7	0.036130	-0.028241	0.016058	0.341633	-0.389746	0.319216	-0.220920	-0.205133
RV2	Var9	-0.068842	-0.310993	-0.330195	0.379084	-0.009799	-0.021811	-0.028034	-0.267537
RV3	Var12	-0.064649	-0.345871	-0.065593	0.286206	-0.222075	0.043768	0.156283	-0.240524
RV4	Var36	-0.253335	-0.673487	-0.071963	-0.004301	0.027359	-0.045105	0.176847	-0.202480
RV5	Var39	0.054087	-0.490127	-0.062295	0.565225	0.051354	0.064375	-0.034923	-0.146850
RV6	Var41	-0.032616	-0.580511	-0.064936	0.138536	-0.157837	0.017234	-0.248903	-0.009091
RV7	Var56	0.147020	0.066730	-0.015302	0.634181	0.077447	-0.028568	-0.020033	-0.011177
TI1	Var8	0.248890	0.011996	0.342843	-0.082874	0.593208	0.075994	0.001157	0.089526
TI2	Var23	0.164096	0.270771	0.123476	-0.174732	0.484751	0.395156	-0.004030	-0.089245
TI3	Var38	0.054932	0.209536	0.471472	-0.020288	0.573119	0.068749	0.114128	0.269710
TI4	Var55	-0.044654	0.252305	0.147042	-0.071235	0.565116	0.130512	0.100741	0.111502
TI5	Var64	0.104241	-0.000621	0.216701	-0.112194	0.352641	-0.065229	0.041030	0.416566
TP1	Var20	0.699819	0.275257	0.283177	0.034321	-0.047307	0.115266	0.295396	0.066761
TP2	Var43	0.772153	0.167197	0.243966	-0.013705	-0.019241	0.082338	0.083804	0.242775
TP4	Var60	0.562313	0.160179	0.124191	-0.173718	0.311123	0.066368	-0.043711	-0.101719
TP5	Var63	0.180034	0.161804	0.182956	-0.078229	0.393900	-0.133268	-0.105292	0.489965
TPc1	Var3	0.181547	0.086939	0.731846	-0.038041	0.059408	0.119500	-0.077320	-0.153860
TPc2	Var16	0.007712	0.384207	0.419009	-0.240262	-0.038029	-0.171101	0.118368	0.395856

TPc3	Var31	0.020741	0.173360	0.740637	0.115089	-0.061308	0.109059	-0.009827	0.130337
TPc4	Var46	0.176860	0.067887	0.746857	-0.097955	0.099309	0.093010	0.056262	0.092898
TS1	Var21	0.440805	0.046202	0.444309	-0.115322	0.099726	0.213965	0.316187	0.155597
TS2	Var34	0.272685	0.291619	0.480248	-0.164044	0.367066	0.020413	0.331154	0.257823
TS3	Var35	0.342742	0.010211	0.235462	0.036994	0.272745	-0.033923	0.630719	0.137611
TS4	Var50	-0.002826	0.027109	-0.328145	0.372017	0.011454	-0.276916	-0.343550	0.038563
TS5	Var52	0.243493	-0.036952	0.473290	-0.111720	0.259250	-0.091021	0.402166	0.193490
TT1	Var11	0.427276	0.088204	0.448516	-0.056479	0.555450	0.051422	0.066359	0.001764
TT2	Var26	0.307692	0.412914	0.190962	-0.211916	0.425211	-0.062944	0.250840	0.134373
TT3	Var40	0.400949	0.208303	0.592782	-0.140508	0.142185	0.075955	0.043276	0.241023
TT4	Var58	0.446175	0.213914	0.117807	0.083200	0.394763	0.156955	0.159505	0.216062
TV1	Var1	0.142830	0.132834	0.532225	0.125318	0.356362	-0.360720	0.029038	0.123278
TV2	Var13	0.347042	-0.185151	0.401433	-0.210517	0.110627	0.100986	-0.388829	0.159249
TV3	Var18	0.104689	-0.105888	0.680157	-0.224899	0.374951	-0.078030	0.029578	0.098064
TV4	Var33	0.074204	0.139767	0.749297	-0.047982	0.176732	-0.014307	-0.073338	-0.056464
TV5	Var49	-0.012621	0.239266	0.219137	-0.483444	0.069489	-0.198841	-0.108391	0.223654
	Expl.Var	6.802541	4.620502	6.289632	4.437493	4.429264	2.678960	3.357233	3.103515
	Prp.Totl	0.106290	0.072195	0.098276	0.069336	0.069207	0.041859	0.052457	0.048492

Table 33: Factor Analysis

13.3 Descriptive Statistics

13.3.1 Analysis of Factor Analysis

Variable	Factor	Valid N	Mean	Std.Dev.
RV	Factor 3	102	5.441176	1.638482
RV	Factor 3	102	5.225490	1.578989
RV	Factor 3	102	5.284314	1.625158
RV	Factor 3	100	5.070000	1.492439
TI	Factor 4	101	4.039604	1.748833
TI	Factor 4	102	4.088235	1.647698
TI	Factor 4	101	3.465347	1.852373
TI	Factor 4	101	4.514851	2.128915
TP	Factor 1	100	4.820000	1.701930
TP	Factor 1	101	4.247525	1.663766
TP	Factor 1	101	4.524752	1.977848
TP	Factor 4	101	4.524752	1.977848
TP	Factor 4	102	2.735294	1.812642
TPc	Factor 2	100	3.250000	1.659834
TPc	Factor 2	100	2.370000	1.447080
TPc	Factor 2	101	3.158416	1.718911
TPc	Factor 2	102	3.558824	1.691994
TS	Factor 1	102	4.960784	1.610126
TS	Factor 2	101	3.861386	1.463077
TS	Factor 1	102	4.470588	1.533170
TS	Factor 2	101	4.396040	1.631436
TS	Factor 1	101	4.128713	1.553469
TS	Factor 2	100	3.930000	1.615925
TS	Factor 1	101	4.227723	1.624076

Variable	Factor	Valid N	Mean	Std.Dev.
TS	Factor 4	101	3.237624	1.644071
TV	Factor 2	102	3.745098	1.816788
TV	Factor 2	101	2.970297	1.851785
TV	Factor 2	101	4.079208	2.008398
TV	Factor 2	102	3.431373	1.613739

Table 34: Factor Loading Items Descriptive Statistics

13.3.2 Descriptive Statistics

	Valid N	Mean	Median	Mode	Frequency of Mode	Std.Dev.	Standard Error
TV1	99	3.717172	4	6	22	1.778789	0.178775
RS1	99	5.272727	6	6	37	1.633940	0.164217
TPc1	97	3.237113	3	2	25	1.669414	0.169503
RS2	99	4.494949	5	6	26	1.769202	0.177812
IdCT1	98	4.775510	5	6	30	1.726271	0.174380
RS3	98	3.918367	4	4	43	1.419115	0.143352
RV1	99	4.393939	5	6	24	1.910327	0.191995
TI1	98	4.367347	4	4	24	1.737327	0.175497
RV2	97	5.381443	6	6	31	1.550828	0.157463
IdRA1	99	4.949495	5	6	35	1.452470	0.145979
TT1	98	4.132653	4	4	31	1.570592	0.158654
RV3	99	5.404040	6	6	36	1.647008	0.165531
TV2	98	2.928571	2	1	32	1.857001	0.187585
RS4	96	5.197917	6	Multiple	27	1.750908	0.178701
IdCP1	99	4.626263	4	4	39	1.374594	0.138152
TPc2	97	2.391753	2	1	34	1.461711	0.148414
RS5	97	4.845361	5	4	21	1.666710	0.169229
TV3	98	4.010204	4	Multiple	16	1.997395	0.201767
RS6	98	3.908163	4	4	26	1.729589	0.174715
TP1	97	4.824742	5	6	39	1.664647	0.169019
TS1	99	4.939394	5	6	37	1.621401	0.162957
RI1	98	4.775510	5	7	24	1.923970	0.194350
TI2	98	4.030612	4	4	22	1.772959	0.179096
RS7	98	4.724490	5	Multiple	22	1.757345	0.177519
Idl1	99	3.595960	4	4	31	1.968731	0.197865
TT2	98	3.275510	3	4	24	1.648371	0.166511
RS8	97	4.597938	5	5	25	1.668706	0.169431
idT1	98	5.316327	6	6	40	1.537148	0.155275
RS9	98	5.326531	6	6	30	1.660800	0.167766
IdC1	98	3.826531	4	4	33	1.478544	0.149356
TPc3	98	3.122449	3	2	23	1.706660	0.172399
RS10	99	3.535354	3	Multiple	23	1.716149	0.172479
TV4	99	3.404040	3	2	24	1.615734	0.162387
TS2	98	3.897959	4	4	36	1.453682	0.146844
TS3	99	4.505051	4	4	32	1.534460	0.154219
RV4	99	5.181818	6	6	33	1.580259	0.158822
id01	99	5.202020	6	6	35	1.603439	0.161152
TI3	99	4.090909	4	4	31	1.648072	0.165637
RV5	99	5.242424	6	6	29	1.629391	0.163760
TT3	97	3.938144	4	4	24	1.625413	0.165036
RV6	97	5.051546	5	6	31	1.495626	0.151858
IdCT2	96	4.802083	5	6	30	1.546608	0.157850
TP2	98	4.255102	4	4	28	1.645432	0.166214
RS11	99	4.454545	5	6	28	1.727761	0.173647

	Valid N	Mean	Median	Mode	Frequency of Mode	Std.Dev.	Standard Error
IdRA2	97	4.371134	4	4	27	1.733972	0.176058
TPc4	99	3.535354	4	4	24	1.686157	0.169465
RS12	99	4.797980	5	4	29	1.384903	0.139188
IdCP2	97	4.721649	5	6	31	1.434270	0.145628
TV5	97	2.948454	3	2	28	1.536847	0.156043
TS4	97	4.907216	5	7	28	1.882388	0.191128
idT2	96	5.666667	6	6	35	1.193550	0.121816
TS5	98	4.438776	4	4	28	1.618618	0.163505
RI2	96	5.562500	6	Multiple	30	1.434995	0.146459
IdI2	98	3.602041	4	4	39	1.511057	0.152640
TI4	98	3.489796	3.5	4	20	1.862516	0.188143
RV7	98	5.336735	6	6	36	1.598607	0.161484
idC2	96	4.635417	5	4	28	1.570248	0.160263
TT4	98	4.204082	4	4	35	1.636939	0.165356
RS13	99	4.858586	5	Multiple	28	1.511926	0.151954
TP4	98	4.500000	5	6	35	1.996130	0.201640
RS14	99	3.989899	4	4	30	1.723161	0.173184
id02	99	3.969697	4	4	21	1.711036	0.171966
TP5	99	2.707071	2	1	37	1.797121	0.180617
TI5	98	4.479592	5	7	25	2.150184	0.217201

Table 35: Descriptive Statistics – All Variables

13.4 Multiple Regression

13.4.1 All Variables

Regression Summary for Dependent Variable: TP (JP stats3) R= .85696673 R^2= .73439197 Adjusted R^2= .68639052 F(15,83)=15.299 p<.00000 Std.Error of estimate: .78665

	Beta	Std.Err. of Beta	B	Std.Err. of B	t(83)	p-level
Intercept			0.141511	0.943778	0.14994	0.881175
TPc	-0.069883	0.096452	-0.078559	0.108428	-0.72453	0.470776
TV	0.250523	0.100108	0.311027	0.124285	2.50253	**0.014293**
TT	0.007945	0.111879	0.009469	0.133343	0.07101	0.943560
TI	-0.143687	0.085840	-0.154981	0.092587	-1.67390	0.097914
TS	0.170746	0.088763	0.251256	0.130617	1.92361	0.057831
RS	-0.035185	0.079335	-0.060122	0.135564	-0.44349	0.658563
RV	-0.097405	0.081120	-0.156297	0.130164	-1.20076	0.233258
RI	-0.155830	0.068887	-0.161609	0.071442	-2.26211	**0.026304**
IdO	0.082566	0.070004	0.081183	0.068832	1.17944	0.241594
IdT	0.138561	0.071282	0.167363	0.086099	1.94383	0.055304
IdRA	-0.010519	0.099683	-0.010512	0.099618	-0.10553	0.916213
IdI	0.159839	0.066660	0.176540	0.073625	2.39783	**0.018736**
IdCT	0.472226	0.096653	0.456415	0.093417	4.88577	**0.000005**
IdCP	-0.115511	0.071652	-0.145037	0.089967	-1.61211	0.110734
IdC	0.240472	0.095013	0.258837	0.102269	2.53093	**0.013263**

Table 36: Multiple Regression All variables

13.4.2 Additional Significant Relationships

13.4.2.1 Trust influence on Risks: Simple Regression

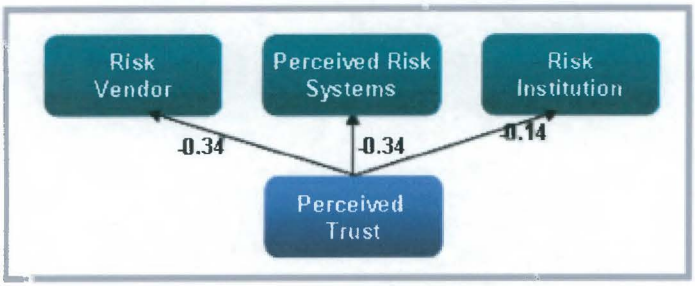

Figure 53: Trust influence Risks

Variable	T-value	P-value	Adjusted R^2	Beta	Supported
Risk Systems	-3.51565	0.000669	0.103875	-0.336183	YES
Risk Vendor	-3.56837	0.000560	0.106925	-0.340644	YES
Risk Institution	-1.34905	0.180461	0.008297	-0.135708	NO

Table 37: Trust influence Risks

13.4.2.2 Risks influence on Vendor and Institution-based Trust: Multiple Regression

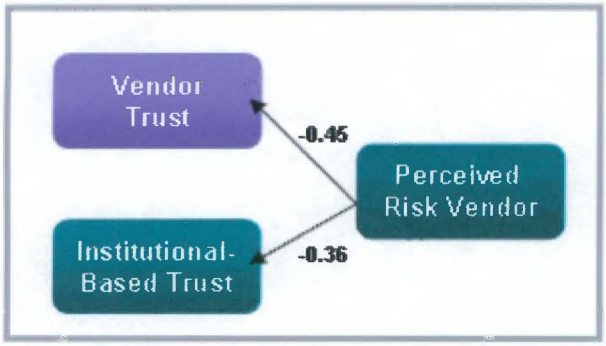

Figure 54: Perceived Risk vendor influence Institutional Based trust and Vendor Trust

Variable	T-value	P-value	Adjusted R^2 Whole model	Beta	Supported
Influence of Risk Vendor on Vendor Trust	-3.57529	0.000552	0.187192	-0.405930	YES
Influence of Risk Vendor on Institutional Trust	-2.36160	0.020237	0.113431	-0.280033	NO

Table 38: Trust influence Risks

13.5 Correlation Matrix

13.5.1 Correlation Matrix: All Items

	TI1	TI2	TI3	TI4	TI5	TP1	TP2	TP4	TP5	TPc1	TPc2	TPc3	TPc4	TS1	TS2	TS3	TS5	TT1	TT2	TT3	TT4	TV1	TV2	TV3	TV4
TI1	1.000	0.449	0.612	0.179	0.364	0.318	0.297	0.431	0.370	0.427	0.245	0.272	0.375	0.422	0.456	0.404	0.329	0.508	0.359	0.499	0.234	0.368	0.192	0.507	0.319
TI2	0.449	1.000	0.431	0.375	0.270	0.245	0.196	0.187	0.267	0.105	0.135	0.153	0.294	0.303	0.277	0.096	0.133	0.287	0.303	0.357	0.293	0.111	0.120	0.182	0.190
TI3	0.612	0.431	1.000	0.442	0.513	0.275	0.273	0.321	0.436	0.345	0.362	0.436	0.453	0.450	0.580	0.412	0.391	0.487	0.433	0.516	0.358	0.513	0.117	0.489	0.464
TI4	0.179	0.375	0.442	1.000	0.323	0.037	0.151	0.090	0.207	0.034	0.214	0.109	0.223	0.076	0.362	0.205	0.216	0.416	0.260	0.258	0.389	0.195	0.090	0.206	0.249
TI5	0.364	0.270	0.513	0.323	1.000	0.187	0.296	0.197	0.395	0.149	0.291	0.248	0.356	0.330	0.324	0.334	0.261	0.319	0.321	0.411	0.273	0.270	0.160	0.380	0.302
TP1	0.318	0.245	0.275	0.037	0.187	1.000	0.761	0.526	0.268	0.417	0.317	0.315	0.358	0.651	0.555	0.403	0.427	0.447	0.467	0.529	0.471	0.302	0.247	0.251	0.312
TP2	0.297	0.196	0.273	0.151	0.296	0.761	1.000	0.529	0.426	0.311	0.270	0.257	0.359	0.526	0.596	0.360	0.409	0.428	0.390	0.562	0.453	0.275	0.392	0.272	0.278
TP4	0.431	0.187	0.321	0.090	0.197	0.526	0.529	1.000	0.332	0.267	0.092	0.129	0.284	0.390	0.467	0.335	0.282	0.371	0.394	0.357	0.355	0.211	0.298	0.329	0.316
TP5	0.370	0.267	0.436	0.207	0.395	0.268	0.426	0.332	1.000	0.044	0.273	0.182	0.293	0.304	0.466	0.134	0.155	0.288	0.286	0.300	0.306	0.447	0.408	0.364	0.267
TPc1	0.427	0.105	0.345	0.034	0.149	0.417	0.311	0.267	0.044	1.000	0.345	0.530	0.421	0.452	0.378	0.237	0.354	0.456	0.344	0.521	0.188	0.344	0.191	0.453	0.536
TPc2	0.245	0.135	0.362	0.214	0.291	0.317	0.270	0.092	0.273	0.345	1.000	0.396	0.411	0.279	0.425	0.198	0.384	0.235	0.459	0.477	0.107	0.393	0.071	0.320	0.311
TPc3	0.272	0.153	0.436	0.109	0.248	0.315	0.257	0.129	0.182	0.530	0.396	1.000	0.561	0.387	0.372	0.210	0.304	0.346	0.153	0.439	0.241	0.484	0.119	0.374	0.536
TPc4	0.375	0.294	0.453	0.223	0.356	0.358	0.359	0.284	0.293	0.421	0.411	0.561	1.000	0.498	0.548	0.395	0.310	0.412	0.281	0.646	0.360	0.440	0.290	0.578	0.649
TS1	0.422	0.303	0.450	0.076	0.330	0.651	0.526	0.390	0.304	0.452	0.279	0.387	0.498	1.000	0.586	0.466	0.394	0.461	0.498	0.582	0.348	0.391	0.115	0.364	0.427
TS2	0.456	0.277	0.580	0.362	0.324	0.555	0.596	0.467	0.466	0.378	0.425	0.372	0.548	0.586	1.000	0.551	0.514	0.597	0.652	0.657	0.379	0.532	0.247	0.480	0.462
TS3	0.404	0.096	0.412	0.205	0.334	0.403	0.360	0.335	0.134	0.237	0.198	0.210	0.395	0.466	0.551	1.000	0.441	0.442	0.369	0.392	0.429	0.226	-0.003	0.347	0.281
TS5	0.329	0.133	0.391	0.216	0.261	0.427	0.409	0.282	0.155	0.354	0.384	0.304	0.310	0.394	0.514	0.441	1.000	0.548	0.436	0.438	0.403	0.397	0.305	0.305	0.314
TT1	0.508	0.287	0.487	0.416	0.319	0.447	0.428	0.371	0.288	0.456	0.235	0.346	0.412	0.461	0.597	0.442	0.548	1.000	0.485	0.544	0.489	0.489	0.422	0.393	0.411
TT2	0.359	0.303	0.433	0.260	0.321	0.467	0.390	0.394	0.286	0.344	0.459	0.153	0.281	0.498	0.652	0.369	0.436	0.485	1.000	0.525	0.369	0.403	0.027	0.310	0.293
TT3	0.499	0.357	0.516	0.258	0.411	0.529	0.562	0.357	0.300	0.521	0.477	0.439	0.646	0.582	0.657	0.392	0.438	0.544	0.525	1.000	0.364	0.522	0.237	0.431	0.555
TT4	0.234	0.293	0.358	0.389	0.273	0.471	0.453	0.355	0.306	0.188	0.107	0.241	0.360	0.348	0.379	0.429	0.403	0.489	0.369	0.364	1.000	0.231	0.273	0.207	0.270
TV1	0.368	0.111	0.513	0.195	0.270	0.302	0.275	0.211	0.447	0.344	0.393	0.484	0.440	0.391	0.532	0.226	0.397	0.489	0.403	0.522	0.231	1.000	0.189	0.391	0.530
TV2	0.192	0.120	0.117	0.090	0.160	0.247	0.392	0.298	0.408	0.191	0.071	0.119	0.290	0.115	0.247	-0.003	0.305	0.422	0.027	0.237	0.273	0.189	1.000	0.268	0.252
TV3	0.507	0.182	0.489	0.206	0.380	0.251	0.272	0.329	0.364	0.453	0.320	0.374	0.578	0.364	0.480	0.347	0.305	0.393	0.310	0.431	0.207	0.391	0.268	1.000	0.484
TV4	0.319	0.190	0.464	0.249	0.302	0.312	0.278	0.316	0.267	0.536	0.311	0.536	0.649	0.427	0.462	0.281	0.314	0.411	0.293	0.555	0.270	0.530	0.252	0.484	1.000

Table 39: Extract of Correlation Matrix

13.5.2 Correlation Matrix: Variables

		TPc	TV	TT	TI	TS	TP	RS	RV	RI	Risk	IdO	IdT	IdRA	IdI	IdCT	IdCP	IdC
Personal Char	TPc	1.00	0.74	0.58	0.46	0.55	0.48	-0.14	-0.28	-0.18	-0.25	0.05	0.17	0.34	0.32	0.32	0.13	0.24
Vendor Trust	TV	0.74	1.00	0.60	0.47	0.51	0.54	-0.28	-0.45	-0.26	-0.41	-0.04	0.10	0.23	0.18	0.31	0.12	0.23
Overall Trust	TT	0.58	0.60	1.00	0.64	0.71	0.66	-0.34	-0.34	-0.14	[illegible]	0.02	0.32	0.53	0.28	0.54	[illegible]	0.62
Institution Trust	TI	0.46	0.47	0.64	1.00	0.50	0.43	-0.29	-0.36	-0.17	-0.33	0.07	0.20	[illegible]	[illegible]	0.28	0.21	0.56
Trust Systems	TS	0.55	0.51	0.71	0.50	1.00	0.59	-0.20	-0.18	-0.02	-0.15	0.01	0.34	0.41	0.25	0.45	0.42	0.48
Trust Participation	TP	0.48	0.54	0.66	0.43	0.59	1.00	-0.29	-0.33	-0.13	-0.29	0.05	0.45	0.57	0.35	0.69	0.34	0.50
Risk Systems	RS	-0.14	-0.28	-0.34	-0.29	-0.20	-0.29	1.00	0.58	0.38	0.77	[illegible]	-0.14	-0.09	-0.04	-0.07	-0.09	-0.26
Risk Vendor	RV	-0.28	-0.45	-0.34	-0.36	-0.18	-0.33	0.58	1.00	0.34	0.76	0.22	-0.09	-0.05	-0.26	-0.05	-0.06	-0.12
Risk Institution	RI	-0.18	-0.26	-0.14	-0.17	-0.02	-0.13	0.38	0.34	1.00	0.82	0.31	0.14	0.12	-0.03	0.11	-0.01	0.06
Risk Overall	Risk	-0.25	-0.41	-0.32	-0.33	-0.15	-0.29	0.77	0.76	0.82	1.00	[illegible]	0.00	0.02	-0.13	0.02	-0.06	-0.10
Observability	IdO	0.05	-0.04	0.02	0.07	0.01	0.05	[illegible]	0.22	0.31	0.37	1.00	0.20	-0.04	0.23	0.05	-0.11	-0.12
Trialibility	IdT	0.17	0.10	0.32	0.20	0.34	0.45	-0.14	-0.09	0.14	0.00	0.20	1.00	0.41	0.24	0.46	[illegible]	0.21
Relative Advantage	IdRA	0.34	0.23	0.53	0.30	0.41	0.57	-0.09	-0.05	0.12	0.02	-0.04	0.41	1.00	0.17	0.75	0.42	0.58
Image	IdI	0.32	0.18	0.28	0.33	0.25	0.35	-0.04	-0.26	-0.03	-0.13	0.23	0.24	0.17	1.00	0.14	0.10	0.15
Complexity	IdCT	0.32	0.31	0.54	0.28	0.45	0.69	-0.07	-0.05	0.11	0.02	0.05	0.46	0.75	0.14	1.00	0.48	0.45
Compatibility	IdCP	0.13	0.12	0.37	0.21	0.42	0.34	-0.09	-0.06	-0.01	-0.06	-0.11	[illegible]	0.42	0.10	0.48	1.00	0.42
Cost	IdC	0.24	0.23	0.62	0.56	0.48	0.50	-0.26	-0.12	0.06	-0.10	-0.12	0.21	0.58	0.15	0.45	0.42	1.00

Table 40: Correlation Matrix All Variables