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Investigating Mobile Money Transfer adoption in South Africa: Applying an adapted diffusion of innovations model

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Research Report
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the University of the Witwatersrand
in Partial Fulfilment
of the Requirements
for the Degree of

Master of Commerce (Coursework)

in the field of Information Systems

Supervisor: Mitchell Hughes

University of the Witwatersrand

September 2018

Declaration of Originality

I declare that this is my own unaided work and is, to the best of my knowledge and belief, original, except as acknowledged in the text.

I have read and understood the Senate policy on plagiarism and I am aware that plagiarism is the intentional or unintentional "failure to acknowledge the ideas or writing of another" or "presentation of the ideas or writing of another as one's own". In this context "other" means any other person including a student, academic, professional, published author or other resource such as the Internet. Failing to acknowledge the use of ideas of others constitutes an important breach of the values and conventions of the academic enterprise.

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Thanks and Acknowledgements

I wish to thank:

- My parents, Godfrey and Evelyn, and my brother, Tinashe, for the encouragement to persevere through the trying times I found myself in during my studies
- My wife, Edinah, for the constant support and the helping hand when one was needed
- Above all, my God – for giving me the strength to complete this academic journey

Abstract

Banks in South Africa have joined other banks around the globe in a bid to expand customer self-service and digitization of services through mobile technology. Together with various approaches to increase self-service practices, financial institutions have identified the need to ensure financial inclusion, especially in developing countries.

Despite the growth in mobile technology usage in developing countries, the uptake of mobile banking services, specifically mobile money transfers (MMTs), has not achieved the anticipated growth. Various studies have been conducted in order to understand how adoption of mobile banking and MMTs can be engendered in developing countries in order to achieve financial inclusion. South Africa is such a country, where mobile technology has been adopted to a great degree but with a low adoption of MMTs.

This study examined the applicability of an adapted Diffusion of Innovations (DOI) framework, in comparison to the base DOI model, to investigate factors influencing the adoption of MMTs in South Africa. This study assessed the relationships of Relative Advantage, Complexity, Compatibility, Trialability, Observability and Trust with Behavioural Intention to adopt MMTs.

The adapted model was found to marginally account for the variance in behavioural intention to adopt MMTs in comparison to the base DOI model and can therefore be considered as an applicable model. Relative Advantage, Compatibility and Trust were found to be significant factors, while Complexity, Observability and Trialability were found to have insignificant effects on the Behavioural Intention to adopt MMTs.

Keywords: Mobile money, Mobile banking, MMT, Trust, Diffusion of Innovations, DOI

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1. Background and Context

From its inception and initial use in the early 2000s, the concept of mobile money has been widely adopted and implemented on a global scale by both developed and developing countries (GSMA, 2017, Chigada and Hirschfelder, 2016). The expansion of mobile money brought with it various purported benefits, such as instant transfer of funds between people who are geographically spaced, as well as a safe alternative to physical cash (Hughes and Lonie, 2017). The commonly reported benefit of mobile money is its ability to increase financial inclusion in developing countries by providing banking services to individuals who do not meet the required criteria to open bank accounts (Hughes and Lonie, 2017; Tobbin 2010; Masinge, 2010; Jenkins, 2008; Chigada and Hirschfelder, 2016, World Bank, 2009; Chitungo and Munongo, 2013).

Mobile money has been defined by the International Finance Corporation (IFC) as money that can be accessed and used through mobile devices, while the World Bank (2009) adds that it is money that can be transferred domestically and internationally via mobile devices. In a 2017 article published by McKinsey and Company, mobile money was stated to have various value-adding uses for customers, which included sending, receiving and storing monetary value that could be transferred to other individuals or entities.

The role that mobile money has played has been instrumental in growing developing economies by facilitating both informal and formal trade, with countries such as Kenya providing services for users to access short term loans and investments. In their 2017 report, GSMA highlights the fact that the adoption and use of mobile in Sub-Saharan Africa (SSA) has been a key driver of mobile user engagement for customers using both smartphones and feature phones. Rouse and Verhoef (2017) state that SSA has the highest mobile technology penetration among developing regions, with an 82% mobile account penetration. In some parts of SSA, individuals are found to own more mobile phones than they do bank accounts. According to Phillips Consulting (2013), this provides a great opportunity for the expansion of mobile money and other mobile services in Africa.

Mobile Money Transfers (MMTs) make use of telecommunication networks that provide a greater reach to people as compared to that of physical infrastructure such as bank branches and Automated Teller Machines (ATMs). This makes it possible to reach a greater portion of the population (Phillips, 2013). GSMA (2017) states that there is a prevalence of the 2G network in a considerably large part of SSA. This has allowed owners of feature phones to be

included in the use of mobile money, thus not rendering it an exclusive offering to those who can afford smartphones in the region (Hughes and Lonie, 2017). The ability to make payments without the need for bank accounts spells a significant benefit for the unbanked members of society. However, the banked population may potentially also accrue benefits of reduced transfer costs and long-distance payments (Jenkins, 2008).

It is worth noting that MMTs are not necessarily similar to technologies such as mobile banking applications and mobile wallets. Mobile banking applications and mobile wallets are typically included in service suites that are afforded banking customers. These are usually linked to a customer's bank account and are typically accessed with the use of smartphones. MMTs such as M-Pesa are usually not services offered by the banks to banking customers but are stand-alone technologies that can be accessed by individuals regardless of whether they have bank accounts or not. MMTs can be accessed via both smartphones and less sophisticated phones through the use of Unstructured Supplementary Service Data (USSD). According to GSMA (2017) the vast majority of populations in developing countries make use of basic "feature phones" which a less sophisticated than smartphones. This study considered the use of MMTs to transfer funds as opposed to the use of mobile banking technologies that are afforded bank customers.

MMTs have proven to be very successful in countries such as Kenya, with more than 2.37 million users subscribing to the M-Pesa service within a year of its launch (Chigada and Hirschfelder, 2016; Tobbin, 2010; Githui, 2011; Jenkins, 2008). As such, other developing countries, which include South Africa, Ghana, Zimbabwe, Uganda, Tanzania and Mozambique, have recently embarked on initiatives to implement MMTs to cater for the unbanked (Tobbin, 2010, Githui, 2011, Chitungo and Munongo, 2013).

In a 2017 report, GSMA highlighted that by the end of 2016 65% of the world's population had a mobile phone subscription and that this number would grow by mid-2017 to a total of approximately 5 billion. GSMA (2017) continues to state that by 2020 there would be an additional 860 million subscriptions, with developing markets contributing approximately 72% of the new subscriptions. The surge of mobile technologies has resulted in the availability of various transformational tools to impact the lives of individuals in developed, as well as developing, countries according to a 2014 publication by Ernst and Young (EY).

The use of mobile technology for facilitating payments for individuals through MMTs has been introduced through various products such as EcoCash in Zimbabwe and M-Pesa in

Kenya (Shambare, 2011). Nielsen (2016) states that mobile devices have been transforming the banking and payments industry globally and presents an opportunity for an estimated growth in cashless payments of $10 trillion expected in the next decade. In 2016, World Remit issued a report stating that there were at least 95 million mobile money accounts being used for payments. World Remit (2016) noted that in developing countries there was a reduction in bank account transfers and physical cash pick-ups in favour for MMTs. Although there were generally higher frequencies of mobile payments, as compared to bank transfers, the transaction values of MMTs were relatively lower.

GSMA (2015) wrote that although there was an increase in mobile wallets in developing countries, there was still a high prevalence of Over-The-Counter (OTC) money transfers by unregistered and unbanked individuals. This could suggest that although mobile technology has provided a means for individuals to transact in a self-service capacity, traditional methods of transferring funds through a middle-man may still be favoured. For this study, "unbanked individuals" are defined as adults who do not have access to financial services provided by banks or other financial institutions regardless of whether they meet the eligibility criteria to access them, as specified by FinScope South Africa (2014). GSMA (2016) defines "underbanked individuals" as those who may have access to a basic bank account, from which they can transact, but still have financial needs that are unmet. This definition will be utilized in this study. In South Africa, the widespread adoption of mobile technology has provided great opportunities for banking services to reach a larger consumer base, as well as cater for unbanked members of society (Shambare, 2011).

M-Pesa

M-Pesa is a mobile payment application that was introduced in Kenya in 2007 with the aim of catering for their underbanked populations. M-Pesa facilitates banking services, mostly payments from one individual to another without a formal bank account or the need to enter a branch. In order to use the services, individuals register at a retail agent and make a deposit of funds. The funds deposited are reflected as a balance that is managed through a virtual account hosted by Safaricom, one of the mobile network operators (MNO) in Kenya. Though M-Pesa has enjoyed notable success in Kenya, there has been low adoption in other countries such as South Africa, where it was introduced as a service offered by Nedbank and Vodacom.

Ecocash

Ecocash was initially developed to aid NGOs in transferring funds to refugees after the Burundi civil war, which took place between 1993 and 2005. Ecocash was commercially launched as a peer-to-peer fund transfer offering in 2011 by Econet Enterprises in Zimbabwe. Ecocash makes use of accredited agents to allow users to deposit or withdraw funds from their mobile wallets. Within 18 months of its launch, Ecocash was reported to have been subscribed for by 31% of Zimbabwe's population. Ecocash is largely used in Burundi, as well as in South Africa and Lesotho by Zimbabwean immigrants. Both M-Pesa and Ecocash have enjoyed notable success as MMT services, in some developing countries, where the need for them to cater for the unbanked populations has existed. South Africa, among other developing countries, has a similar need to cater for the unbanked population, however a low adoption rate of MMT services has been observed with initiatives such as Vodacom's M-Pesa and MTN's Wizzit.

Economic growth and poverty reduction have been listed as some of the positive impacts of utilising MMTs in developing countries (Mothobi and Grzybowski, 2017). In addition to financial inclusion, other benefits such as convenience have been observed and have aided in supporting the need for MMTs in various populations. Chigada and Hirschfelder (2016) mention the use of M-Pesa to make for such payments as utility bills, airline tickets and taxi fares as benefits that customers have been able to accrue. However, adoption of MMTs has remained generally low in SSA, regardless of the increased customer subscriptions to mobile phone technologies (Etim, 2014; Odumeru, 2013). Although most studies of adoption tend to assess factors pertaining to the technology under consideration or subjective forces influencing the potential users, other elements such as regulation should not be ignored. Literature highlights that there have been hurdles encountered with promoting adoption of MMTs in some countries, which include legislation, security and infrastructure. Rouse and Verhoef (2017) explain the policies for establishing MMT service providers in South Africa and emphasize the fact that there is need to partner with financial institutes in order to avoid the exercise of obtaining separate banking licenses. Such legislative requirements make it difficult to introduce MMTs as a service by non-financial institutions.

Problem statement

The factors influencing the adoption of MMTs in developing countries are arguably still under-investigated and not fully understood, hence limiting insights into addressing the problem of low adoption. Chigada and Hirschfelder (2016), Mothobi and Grzybowski (2017) and Tobbin (2010) support this by highlighting that literature on the adoption of MMTs is scarce, thus motivating a need for further studies on adoption factors impacting MMTs.

Statement of Purpose

The purpose of this study was to examine the applicability of an adapted Diffusion of innovations (DOI) framework, in comparison to the base DOI model, to understand factors influencing the adoption of MMTs in South Africa. Factors of DOI which were assessed included Relative Advantage, Complexity, Compatibility, Trialability and Observability. The Trust construct was included as a factor in the adaptation of the DOI model.

Research Questions

The questions that this study aims to answer were as follows:

RQ1: To what extent do Relative Advantage, Complexity, Compatibility, Trialability, Observability, and Trust predict the adoption of MMTs in South Africa?

RQ2: What is the relationship between Trust and Observability in the context of the adoption of MMTs in South Africa?

RQ3: What is the effect of including Trust in the prediction of the intention to adopt MMTs in South Africa?

RQ4: To what degree does the adapted DOI model predict behavioural intention to adopt MMTs compared to the base DOI model?

Research Objectives

The objectives of this study were to:

RO1: Review existing literature in order to identify DOI factors that have been found to be significant in influencing adoption of innovations in developing countries.

RO2: Review existing literature to understand the relationships between Trust and factors of DOI to identify potential moderating and mediating effects.

RO3: Review existing literature to obtain established instruments for measuring the various factors influencing adoption of technological innovations by individuals.

RO4: Identify or develop a theoretical model that will be tested for its applicability in predicting the adoption of MMTs in the South African context.

RO5: Collect data via the use of questionnaires survey administered to a sample of the target population.

RO6: Utilise descriptive statistics to analyse sample data.

R07: Evaluate relationships between constructs.

RO8: Conduct hypothesis testing on relationships between identified variables.

RO9: Discuss results of data analysis and highlight key findings.

R10: Discuss potential contributions to academia and to practice.

R11: Identify limitations, make recommendations and propose potential areas of future study.

2. Literature Review

Introduction

The purpose of this chapter was to review existing literature on the adoption of MMTs in developing countries. This chapter included a discussion of key findings presented in previous studies, as well as research gaps that will be covered by this study. This chapter includes the search strategy for existing literature, the discussion of the findings of existing literature and the literature shortcomings. The chapter concludes with a discussion on the theoretical underpinning of the study as well as the formulation of the hypotheses that will be tested in the study.

Literature Search Strategy

The literature review was informed by multiple searches to address the objectives stated above. Material from a broad range of publications (both national and international) was utilized for this review. Where material was written in a language other than English, acceptance for the review was only in cases where there was a comprehensive English translation of the content. Articles considered in the literature review included published and unpublished articles as well as conference proceedings from scholarly and trade journals. Google Scholar was used as a reference data source to locate other data sources that contained the literature searched for.

Material for the literature review was sourced from electronic academic databases and journals. The sources are listed as follows:

Databases

- ProQuest
- Web of Science
- EBSO Host
- Science Direct
- JSTOR
- Wiley Online

Search Strings:

Applying the **PICOS** framework as a basis for the search strings development

Population:

Individuals **OR** Young people **OR** Citizens in developing countries **OR** South Africa **OR** Sub-Sahara Africa

Intervention:

Use of Mobile Money **OR** Use of MMT **OR** Money Transfers **OR** Mobile Money **OR** Mobile Banking **OR** Cellphone Banking **OR** Internet Banking

Comparison:

NA

Outcome:

Convenient Money Transfer **OR** Safeer money transfer **OR** Faster money transfer **OR** Secure money transfer

Study Design:

Longitudinal **OR** Cross-Sectional **OR** Case Study **OR** Experimental

Inclusion Criteria:

Articles meeting the following criteria were considered for the literature review.

- Articles where the Unit of Analysis was the individual
- Focus of the study was the use of mobile money transfer as opposed to promotion of mobile money
- Population of study was in developing countries
- Quantitative and Qualitative research
- Time period was between the years 2000 and 2017
- Published and unpublished scholarly articles
- Annual practitioner reports

Exclusion Criteria:

Exclusion of articles from the literature review will be on the basis of the criteria below.

- Where the focus of study was not the adoption or use of banking services
- Population studies was in developed countries
- Unit of Analysis was not the individual

Adoption of MMTs in Developing Countries

Mobile banking technologies yield potential for financial inclusion of unbanked populations in developing countries and have received attention in the form of scholarly research (Chitungo and Munongo, 2013; Githuri, 2011; Shambare, 2011). Odumeru (2013), in a study of the adoption of mobile banking in Nigeria, found that adoption of mobile banking was still low regardless of efforts of financial institutes to establish and proliferate them. Etim (2014) conducted a study on the adoption of banking services via mobile phones to service the

unbanked. Etim's (2014) findings supported those of Odumeru (2013) that stated that although there was a high adoption of mobile phones for communication in Nigeria, there was a low subscription for higher order tasks such as mobile banking and mobile money transfers.

Other studies have been conducted on the adoption of mobile technologies in SSA to progress financial inclusion (Tobbin, 2010; Shambare, 2011; Chitungo and Munongo, 2013; Githuri, 2011), with findings highlighting various deterrents of adoption, such as lack of awareness, lack of trust in the technology, lack of education on how to use the technology and low perceived ease of use (PEOU). Awareness of the banking services, which extends to MMTs, has been noted in explaining the uptake in some instances (Shambare, 2011; Porteous, 2006; Brown and Molla, 2005). Shambare (2011) suggests that marketers should focus their efforts in advertising and educating individuals in rural areas to promote the uptake of mobile banking. Shambare (2011) further suggests that demonstrations of the use of MMTs will aid in depicting the value-add of MMTs in order to influence adoption. Porteous (2006) cites mistrust and lack of awareness among the reasons that South Africans might choose not to adopt mobile banking, in contrast with their counterparts in Kenya. Brown and Molla (2005) found that there was a greater intent to adopt internet banking services as opposed to mobile banking services, attributing the difference to a greater awareness and familiarity that the individual had to internet banking services as compared to that of cell phone banking services by mobile phone users. To support this notion, Chitungo and Munongo (2013) also make reference to the 7% out of 33.5% of mobile phone users who took on mobile banking services due to having an awareness of the services.

Cudjoe, Anim, Nyanyofio (2015), through their study of determinants of adoption of mobile banking in Ghana, recommended that banks should increase awareness of their mobile banking services through personal interactions with their customers. However, they also found that Ghanaians had a negative perception towards mobile banking due to perceived credibility and perceived costs. Perceived credibility and perceived costs were found to be more significant than perceived ease of use and perceived usefulness in predicting adoption of mobile banking services by Ghanaians. Masinge (2010) also found perceived costs to be a deterrent of adoption of mobile banking by the "Bottom of the Pyramid" in South Africa. Masinge (2010) defines "Bottom of the Pyramid", or BOP, as the low-income portion of a population. Medhi et al. (2009) found that the adoption of mobile banking services across developing countries represented by the Philippines, India, Kenya and South Africa varied

across multiple parameters which include household type, key services adopted, pace of uptake, frequency of use and ease of use. This suggests that there are multiple factors that can influence the adoption or non-adoption of mobile banking services such as MMT in developing countries.

Some studies have been conducted on the MMT adoption phenomenon in the South African context to understand the factors that influence the adoption of these mobile banking services by the unbanked population. GSMA (2017) ranked South Africa as the SSA country with the highest smartphone engagement, which shows a great opportunity to expose the population to smartphone-driven communication and non-communication services. Killian and Kabanda (2017) state that South Africa has up to a third of all the mobile subscriptions in SSA and is estimated to have 50% of all the 4G mobile data users by 2020, however the population has not widely understood or accepted mobile payments.

Killian and Kabanda (2017) noted an increase in the South African middle class and have posited that this increase provides for a good opportunity to understand the mobile phenomenon which has often been associated with poverty and low-earners. Killian and Kabanda (2017) particularly focused on the middle class of the population and found that their propensity to adopt mobile payments was as a result of their habits and social influences. In contrast to adoption in other African countries, Killian and Kabanda (2017) found that the middle class in South Africa engaged with a broader spectrum of mobile payments and did not only focus on mobile money.

Masinge (2010) conducted a study on the factors affecting adoption of mobile banking services by the BOP in South Africa and found that perceived ease of use and perceived usefulness were significant factors in influencing the adoption of mobile banking services by South Africans. Masinge (2010) also found that other factors such as perceived cost, perceived risk and trust were also significant factors in predicting the adoption of mobile banking services in South Africa.

Literature Shortcomings

The literature reviewed in this study provided insight into adoption and use of various money transfer technologies which include internet banking, mobile banking and agent banking solutions. Studies on the adoption and use of MMTs, such as M-Pesa and EcoCash, have not been conducted to great extents. Where such studies have been conducted, they have been

done so for specific populations and regions, such as Kenya and Zimbabwe. The adoption of MMTs by the unbanked in South Africa has not been widely covered. Where the transfer of money through mobile technology has been studied, it has been done so in instances where the service is provided to banking customers by banking institutions.

Though the literature covers various theoretical models to determine the factors that influence the adoption of MMTs in developing countries, a pertinent question that remains unanswered was whether the target users of MMTs perceive it to provide the benefits that are reported. The dominant narrative in the reviewed literature was that in most developing countries there was a considerable number of unbanked individuals, who would greatly benefit from the use of MMTs. Countries such as South Africa are known to have advanced banking systems, with some service made available for the unbanked Chigada and Hirschfelder (2016). This prompts the questions on whether the benefits of MMTs reported in other developing countries would be perceived in the South African context.

Theoretical Underpinning

Various theories and frameworks have been used to explain the phenomena of adoption of mobile technologies by individuals, which include Diffusion of Innovations (DOI); Theory of Planned Behaviour (TPB); Technology Acceptance Model (TAM); and Perceived Trust (Al-Jabri and Sohail, 2012; Tobbin, 2010; Adebiyi, Alabi, Ayo, Adebiyi, 2013). The DOI and TAM frameworks have been among the more popular theories used in literature to understand the adoption of innovations and technologies (Aboelmaged and Gebba, 2013; Lule, Omwansa and Waema, 2012), with a considerable amount of focus being put on developing countries.

Korpelainen (2011) states that TAM and DOI are two of the theories that have been made use of in most adoption studies, appearing first and third, respectively, in the list of most cited adoption theories. Most recently, studies on the adoption influences of mobile based commerce and banking have cited these two theories (Tobbin, 2010; Chitungo and Munongo, 2013; Al-Jabri and Sohail, 2012; Masinge, 2010; Van de Boor, Oliveira and Veloso, 2015; Oliveira, Thomas and Baptista, 2016). DOI seeks to explain how new ideas are spread and adopted in communities and how communication media and opinion leaders shape the adoption (Korpelainen, 2011). Korpelainen (2011) describes TAM as a theory that seeks to explain ICT usage behaviour based on perceived usefulness and perceived ease of use.

TAM explains adoption processes and underlying influences of acceptance of technology by individuals in an organisational context (Lule et al., 2012). Lule et al. (2012) cite some of the limitations of using TAM and highlight that the TAM model is not suitable for the study of mobile technology adoption unless it is extended. For this reason, this study made use of the DOI framework. Characteristics of DOI take into consideration diffusion through perceptions of the innovations themselves itself, as well as the decision-making factors that facilitate the diffusion as stated by Botha and Atkins (2005).

Various additional constructs have been used to extend adoption frameworks, such as Trust, Age and Income Levels, to state a few. Trust has been assessed as an adoption factor in several studies and has been considered from the perspectives of "trust in the technology" and "trust in the service providers" (Gefen, 2000; Kim, Chung and Lee, 2011; Van Slyke, Belanger and Comunale, 2004). Trust will be used as an additional construct to extend DOI in this study, as it was proven to be a significant factor for adoption in other developing countries (Chung and Lee, 2011; Tobbin, 2010).

Diffusion of Innovations

DOI framework has been used to determine the factors for predicting the adoption of various innovations by individuals of a society or group. According to Rogers (1995), diffusion theory is not an all-encompassing theory, but a set of perspectives that pertain to the overall concept of diffusion. Rogers (2003) describes diffusion as the process through which new ideas are communicated through certain channels over time among members of a social system. Rogers (2003) uses the definition of diffusion to draw on four elements of diffusion namely the Innovation itself, communication channels, time and social system which impact diffusion.

Rogers (2003) puts forward the notion that innovation is the perceived newness of an idea and that this perception will influence how individuals react to the idea. Rogers proceeds to highlight that innovation is not restricted, in definition, to new knowledge but could also be viewed as the development or establishment of an attitude towards an idea that is already in existence and has been communicated.

According to Rogers, a technological innovation creates some uncertainty in the minds of intended adopters, as well as an opportunity to reduce uncertainty in a different sense. This uncertainty is reduced by the presentation of information regarding the innovation which aids

in the decision-making process that will determine whether the innovation is adopted or not. Rogers (2003) proceeds to state that individuals are concerned with information about what the innovation does to achieve an outcome as well as what the advantages and disadvantages of using the innovation are.

Rogers (2003) explains that the rate at which innovations are adopted by individuals depends on the innovation's perceived characteristics which include *Relative Advantage, Compatibility, Complexity, Trialability and Observability*. These factors have been examined to determine their applicability in predicting adoption among individuals (Tan and Teo, 2000; Al-Jabri and Sohail, 2012; Odumeru, 2013; Tobbin, 2010; Adebiyi et al., 2013).

Relative Advantage refers to the degree to which individuals perceive the innovation as being better than the idea that supersedes it (Rogers, 2003). The objective advantage that is proposed by the innovation is not deemed as important as the perception of the advantage that individuals will have of the innovation (Rogers, 2003). In the context of MMTs, relative advantage will be defined as the degree to which individuals perceive MMTs to be better than traditional payment methods such as direct bank deposits and exchange of physical cash.

According to Rogers, Compatibility refers to the degree to which an innovation is perceived as being consistent with individuals' value systems and needs. Prior adjustments to value systems may have to be in place before a seemingly incompatible innovation can be adopted by individuals. In the MMT context, Compatibility is the degree to which the individual perceives MMTs to satisfy their needs in a manner that is consistent with their lifestyle, and their preference for fund transfers.

Rogers describes Complexity of Innovations as the degree to which innovations are perceived as being difficult to understand and use. Rogers (2003) states that the lower the complexity of an innovation, the faster the rate of adoption can be expected to be. As MMTs may be facilitated by an underlying mobile technology, there could be a degree of education required by the individual in how to use it. This level of education could determine how well the individual grasps the technology and is inclined to use MMTs.

Trialability refers to the degree to which an innovation can be experimented with on a limited basis (Rogers, 2003). Rogers puts forward the notion that when an innovation is tried prior to adoption by an individual there is a reduction in the individual's uncertainty of the innovation as there is information available to make a decision on whether to adopt the innovation or

not. For this study, Trialability will be defined as the extent to which individuals will be able to explore the features of MMTs and conduct simulations of the transfers prior to committing to using MMTs.

Rogers (2003) describes innovation Observability as the degree to which the results of an innovation are made visible. The visibility/experience of the results of an innovation used by an individual can draw attention and, subsequently, discussion from the individual's peers as they seek information to evaluate the innovation prior to adopting it. With the use of MMTs some results may become visible to individuals who are using it and those who are still to make a decision to use it. For this study, Observability will be defined as the extent to which the individual perceives positive results of the use of MMTs for fund transfers.

In the case of MMTs, apart from the technology that is presented to the individuals to conduct the task of transferring funds, there is an aspect of their perceptions of service providers that needs to be assessed. As the individuals will not be interacting directly with the service providers there could be resistance to adopt MMTs as the individuals could perceive the service as unsafe. With this notion there was the need to assess whether the individual's trust in the MMT service, and the service providers, was a key factor in their likelihood to adopt MMTs.

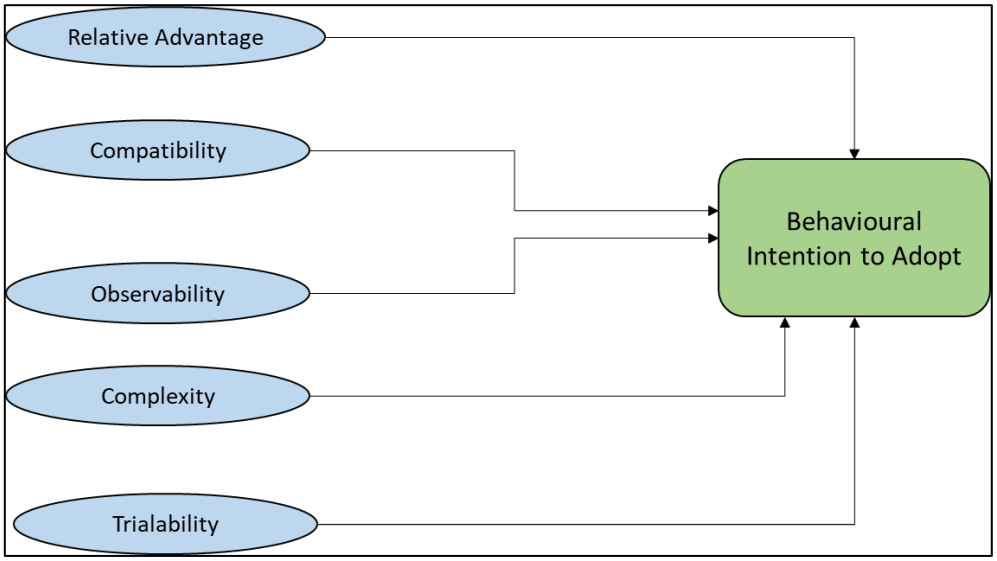


Figure 1: Base Diffusion of Innovations Model

Trust

Trust has been highlighted as a key influence for adoption by individuals (Killian and Kabanda, 2017; Gefen, 2000; Kim, Chung and Lee, 2011; Van Slyke, Belanger and Comunale, 2004). Gefen (2000) defines trust as the confidence that one has in their favourable expectations of what others will do based on previous interactions. Gefen (2000) states that in the absence of trust, individuals are likely to abstain from engaging in an activity. This could manifest in individuals refraining from adopting MMTs if they think that, perhaps, using them could potentially result in an unfavourable outcome for them. This may suggest that a level of predictability and transparency in the use of MMTs or in the providers of the service needs to be established for individuals to trust and, subsequently, adopt the MMTs. Roca, Garcia and De la Vega (2008) state that where there is uncertainty with the use of an innovation, trust becomes a key strategy in reducing the uncertainty and fear.

Roca et al. (2008) posits that in order for consumers to establish trust in a technological innovation there has to be a conformance between what the innovation is purported to deliver and what it actually delivers. In addition to this conformance the innovation's perceived information accuracy and its ability to perform expected activities needs to be evident to the consumers in order for their trust to be strengthened (Roca et al., 2008). In their study of intention to use web merchants, Van Slyke et al. (2004) found that there was a significant relationship between trust to use web merchants and the intention to use the web merchants by individuals. Kim, Chung and Lee (2011) highlight trust as a feeling of security and willingness and the behavioural intention of reliance involving vulnerability and uncertainty. Kim et al. (2011) found that customers were more likely to purchase products and services from the e-commerce website where they perceived them to be trustworthy. Medhi et al. (2009) found a contrasting distinction between adopters of MMTs in South Africa and those in Kenya, where those in the former are hindered by lack of trust in the unfavourable event of the funds not reaching their recipients. In Kenya, Medhi et al. (2009) found that the adopters had a great deal of trust in the process due to clear marketing by Safaricom, the service provider, as well as strong ties with the service agents. Kim, Ferrin and Rao (2007) highlighted Ability, Benevolence, and Integrity as three characteristics of trust which have been observed to increase trust in an innovation. Killan and Kabanda (2017) found Trust to be a significant factor in influencing adoption of mobile payments by the middle class in South Africa and stated that this was increased with the increased perceived risk in using mobile payments.

Proposed Model

The adapted model made use of the Trust construct in conjunction with the DOI constructs as antecedents to Behavioural Intention to adopt MMTs by individuals in South Africa. While the DOI framework provides insight into how innovations diffuse in a population, Trust can be used to predict the future commitment of individuals to an innovation (Mukherjee and Nath, 2003). This study regarded Trust as the individual's perception of the service providers' propensity to act in the favour of the customers, as well as trust in the MMTs service to achieve its intended purpose.

Dependent Variable

For the model that was developed for this study, the dependent variable used was Behavioural Intention to adopt MMTs. Karahanna et al. (1999) suggests that an individual's intention to adopt an innovation is a suitable predictor for their adoption behaviour. Karahanna et al. (1999) proceeds to state that behavioural intention to adopt is determined by two basic factors, one's reflection on personal interests and one's reflection on social influences. Karahanna et al. (1999) highlights antecedents of these basic factors, and their descriptions are shown in Appendix E. It is evident that DOI lends itself to the factors that influence an individual's personal interests and the social influences that determine their intentions to adopt innovations. Behavioural Intention to adopt MMTs was therefore investigated using the DOI factors. The relationship between Trust and Behavioural Intention was also investigated, as Trust may influence the interests of individuals in the use of MMTs.

Hypothesis Development

Relative Advantage (RA). The degree to which individuals perceive an innovation as being better than the idea that supersedes it influences its adoption (Rogers, 2003). This suggests that the adoption of MMTs by individuals is influenced by their perception of whether it provides them an advantage as compared to existing alternatives. MMTs will allow individuals to transfer funds to each other without the need of using traditional money transfer processes which include manual deposits in bank branches. MMTs provide individuals the ability to transfer funds from any geographical location, as well as at any given time, eliminating the reliance on branch banking services that are only provided during banking hours. Al-Jabri and Sohail (2012) found that RA was a significant factor in

predicting adoption by individuals with Adebiyi et al. (2013) finding that RA was the strongest unique contributor to an individual's intention to adopt.

H1: The greater the perceived relative advantage of using Mobile Money services, the greater the Behavioural Intention to adopt MMTs.

Compatibility (Comp). As Rogers (2003) stated, Compatibility takes into consideration the degree to which the individual perceives that an innovation is aligned to their value system or their lifestyle. Tan and Teo (2000) found that Compatibility has a significant influence in the adoption of internet banking services, which contrasted Taylor and Todd's (1995) finding that Compatibility was not a significant predictor of adoption. Al-Jabri and Sohail (2012) found that compatibility was the most significant factor in determining adoption of mobile banking services by individuals, which suggests that individuals are more likely to adopt mobile banking services if they allow them to carry out tasks that are important to them. This is supported by Adebiyi et al. (2013) and Odumeru (2013), who found compatibility to be significant in predicting the adoption of mobile banking services. Medhi et al. (2009) found that individuals did not adopt mobile banking technologies for any other services besides MMT.

H2: The greater the perceived Compatibility of using MMTs, the greater the Behavioural Intention to adopt MMTs

Observability (Obs). When the results of an innovation are made visible they can draw the attention of individuals who are potential users of the innovation (Rogers, 2003). Observing other users drawing benefits from the innovation could encourage potential users to experiment with the innovation and, ultimately, adopt it. As individuals begin to draw the benefits purported by MMT service providers, such as instant fund transfer between individuals who are significant distances apart, could prompt non-user to adopt MMTs to enjoy the benefits. Observability was found by Al-Jabri and Sohail (2012) to be a significant factor for the adoption of mobile services.

H3: The more MMT benefits are observed, the greater the Behavioural Intention to adopt MMTs.

Trust (Tr). Tobbin (2010) found that Perceived Trust had a significant effect on consumers' intention to adopt MMTs. Tobbin (2010) argues that consumers trust in the vendor of the MMT service, as well as the perceived reliability of the MMT service provided, influence the

consumers' behaviour towards conducting mobile money transfers as the consumer feel that their transactions can be carried out with no hindrance.

H4: The higher the Trust in MMT, the higher the Behavioural Intention to adopt MMTs.

Since Observability may entail influencing potential users to adopt MMTs by demonstrating the Ability, Benevolence and Integrity of the service providers and the technology, it could be perceived that Observability may have an effect on Trust.

H5: The higher the Observability of MMT benefits, the higher the Trust in MMTs.

Complexity (Compl). The degree to which the innovations are perceived as being difficult to understand and use has an impact on its adoption (Rogers, 2005). Al-Jabri and Sohail (2012) found that much of the barrier that individuals experience in the adoption of mobile banking technologies is due to the technical complexity presented. Individuals may not find it favourable to use an innovation that requires a high degree of technical skill, prompting them to learn the skills prior to using the innovation, hence creating potential resistance against the innovation. If the process of transferring funds through MMT requires complex processes and tasks in order to complete, individuals might opt for an easier approach to transferring funds which would reduce the likelihood of adoption of the innovation.

H6: The greater the Complexity of using MMT, the less the Behavioural Intention to adopt MMTs.

Trialability (Trial). The degree to which an innovation can be experimented on, by the individual, to ensure that they gain familiarity with the innovation and reduce uncertainty (Tan and Teo, 2000). Features of the innovation can also be experienced by the individual, thus cementing the perception of some of the advantages of using the innovation. It is therefore expected that the ability of the individual to experiment with the innovation makes it more likely that the individual will adopt the innovation.

H7: The greater the Trialability of MMTs by individuals, the greater the Behavioural Intention to adopt MMTs.

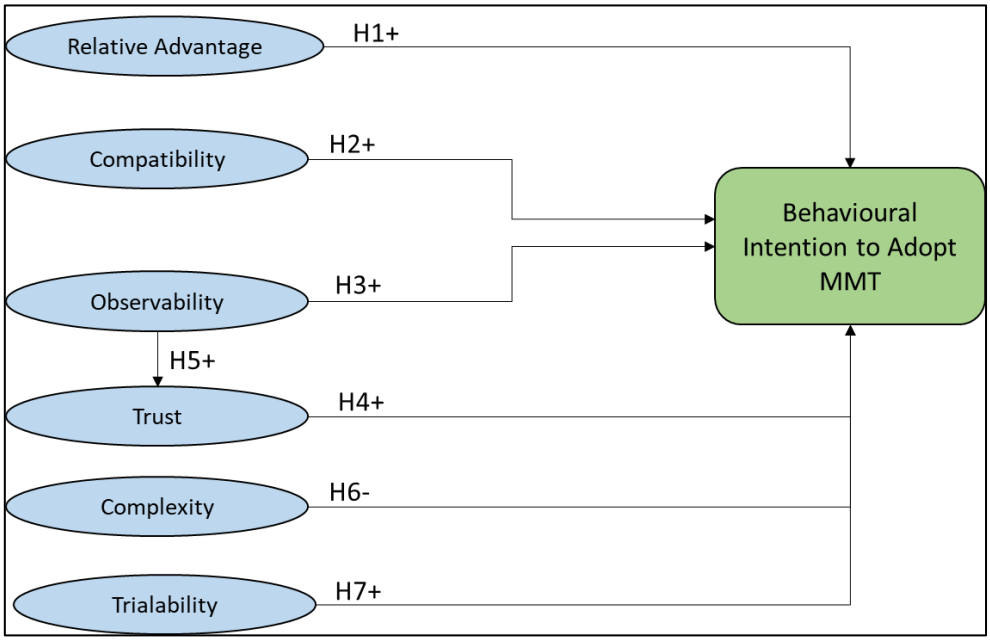


Figure 2: Adapted DOI Model

Table 1, below, summarises the hypotheses that will be tested in this study.

Construct	Hypothesis Number	Hypothesis Description
Relative Advantage	**H1**	The greater the perceived relative advantage of using Mobile Money services, the greater the Behavioural Intention to adopt MMTs.
Compatibility	**H2**	The greater the Compatibility of using MMTs, the greater the Behavioural Intention to adopt MMTs
Observability	**H3**	The more MMT benefits are observed, the greater the Behavioural Intention to adopt MMTs.
Trust	**H4**	The higher the Trust in MMT, the higher the Behavioural Intention to adopt MMTs.
Observability - Trust	**H5**	The higher the Observability of MMT benefits, the higher the Trust in MMTs.
Complexity	**H6**	The greater the Complexity of using MMT, the less the Behavioural Intention to adopt MMTs.
Trialability	**H7**	The greater the Trialability of MMTs by individuals, the greater the Behavioural Intention to adopt MMTs.

Table1: Summary of Hypotheses

3. Research Methodology

Introduction

The purpose of this chapter is to discuss the methodology used in this study. The chapter discussed the data collection, instrument testing and the ethical considerations observed in the study.

Research Paradigm and Approach

This study was informed by a positivist paradigm, taking a deductive research approach. The research made use of an established framework that was selected to investigate the phenomenon of the adoption of MMTs in South Africa. The selected framework was the Diffusion of Innovations (DOI) model, with an additional construct of Trust. The selected framework was used to test hypotheses signifying the relationships between independent variables and the dependent variable. Webber (2004) states that positivist research places reliability on the quantitative analysis of data, hence measurements of data pertaining to the variables were conducted and expressed in quantity, thus rendering this research quantitative. Quantitative results of the data were analysed, using appropriate statistical methods, in order to investigate the relationships depicted by the proposed model in determining the adoption of MMTs in South Africa.

Research Design and Methodology

As this study identified cause and effect relationships, it was therefore relational in nature, describing associations between variables. Relational studies involve hypothesis testing of the relationships under investigation, providing an indication of the magnitude of the relationship and, seldom, temporal precedence (Bhattacherjee, 2012). A consequence of not observing the temporal precedence is that the cause and effect relationship between the variables may not be confirmed hence making it possible that the perceived cause may be a result of the perceived effect (Bhattacherjee, 2012).

According to Bhattacherjee (2012), the two potential forms of field surveys that could have been used for this study were cross-sectional and longitudinal, where the former measures independent and dependent variables simultaneously, while the latter measures the independent variable first and dependent variables at a later point. This study made use of a

cross-sectional field study due to anticipated time constraints in investigating the temporal effects of the variables. As noted earlier, a notable risk presented of using a cross-sectional survey is that the cause and effect relationship between variables may not be observed.

Data Collection Methods

Research Instrument Design

As this study considered the unit of analysis to be the individual, a structured survey questionnaire was best suited for the data collection. Bhattacherjee (2012) states that collection of data through survey questionnaires is an appropriate choice for studies in which the individual is the unit of analysis as they possess the strength of measuring an array of unobservable variables. Another strength of the survey questionnaires that was exploited for this study was the ability to collect data that was spread over a vast geographical area.

The operationalisation of the variables highlighted in the model was based on those validated in existing literature on mobile banking, e-commerce and mobile money. Operationalisation of constructs carried out in initial framework development, such as Ajzen (1991), was considered for the study. To the identified measures of the constructs, the context of MMT adoption in South Africa was applied. Measurable items for Relative Advantage, Compatibility, Observability, Complexity and Trialability were adapted from Tan and Teo (2000), Lin (2011), Poon (2008) and Laukkanen (2005). Trust measures are derived from Chen (2006), Chung and Kwon (2009), Kim et al. (2009) and McCole (2002). Items for the measurement of Behavioural Intention were adapted from Hsu and Chiu (2004). The measurement items were contextualised to align to the phenomenon of mobile money adoption that was being investigated in this study. The table below provides the specific measurement items per construct.

Construct	Items	Source

Relative advantage	- convenient way to transfer money - transfer money efficiently - transfer money effectively - control over money transfer	Tan & Teo 2000
Compatibility	- fits well with the way I like to transfer money - compatible with my lifestyle - fits into my working style	Lin 2011
Observability	- can be accessed anytime and anywhere when in South Africa - queueing for money transfer services - can see the effect of a transaction immediately	Poon 2008
Complexity	- requires a lot of mental effort - requires technical skills - can be frustrating to use	Tan & Teo 2000 Laukkanen & Cruz 2009
Trialability	- trial for at least one month - trial basis to see how mobile money works	Tan & Teo 2000
Trust	- Mobile Money Transfer service providers have integrity. - Mobile Money Transfer service providers are reliable. - Mobile Money Transfer service providers are trustworthy. - Mobile Money Transfer is safe - Mobile Money Transfer transactions are reversible	Chen (2006) Chung & Kwon (2009) Kim et al. (2009) McCole (2002)
Behavioural Intention to Adopt/Adoption of MMT	- intent to adopt mobile money transfer technology as soon as possible - intent to use mobile money transfer technology in the future	Hsu and Chiu (2004)

	- Intent to regularly use mobile money transfer technology in the future	

Table 2: Measurement Items for Research Model Constructs

The Likert scale was chosen as the measurement instrument suitable for this study since, according to Kothari (2004), these are better suited for respondent-based studies. The decision to use a 5-point Likert scale instead of a 7-point or 9-point Likert scale was based on findings by Babakus and Mangold (1992) that a 5-point Likert scale resulted in less participant frustration and increased response rates. Appendix A shows the questionnaire.

Data Collection

In order to obtain a sample that was representative of individuals that are likely to use MMTs, the locations that were targeted were those that were likely to have a high number of unbanked individuals. In order to select the participants, a mall intercept was made use of. The mall intercept was used as it is a form of non-probabilistic convenience sampling. According to Bush (1983), mall intercepts offer a lower rate of refusal by participants, as compared to methods such as email and online responses.

In order to engage high volumes of individuals, shopping malls and shopping centres were targeted for the study. Administrators of the surveys were identified and allocated to particular shopping malls and centres to collect responses. The administrators were briefed on the objectives of the study as well as the content of the questionnaire. The administrators were also briefed on the ethical considerations of the survey, specifically the need to obtain the participant consent and privacy. Due to the mall intercept method being used, there was no specific training, provided to the administrators, on predetermining whether a participant was unbanked. Administrators applied their discretion in identifying participants.

The study did not predefine, the malls or shopping centres from which the responses would be acquired so as to achieve a random sample of varying income and lifestyle. The administrators were instructed to solicit responses throughout the course of the day, with no set time periods.

Respondents were expected to provide their responses to the questions that were modelled using the measurement items depicted in Table 2. The questionnaire comprised short

sentences in English and survey administrators were advised to translate the questions to any languages native to South Africa if required. A potential pitfall of carrying out mall intercepts is that they may prove to be costly due to incentives that may be given to survey administrators who will solicit responses.

Population and Sampling

The study on MMT adoption was likely to apply to the population of people who use mobile technology to transfer funds to recipients. For this study, no specific categorisation was made for the population that was considered. The administrators of the survey were instructed to select participant randomly. There was selection criteria employed to filter the population to participants with the required characteristics.

Tobbin (2010) found that MMTs were mainly composed of transactions initiated by individuals in urban area for receipt by individuals in rural areas. As such, the sample that was considered for this study comprised individuals who resided in the cities of Johannesburg and Sebokeng, South Africa.

Instrument Testing

Bhattacherjee (2012) suggests that a pre-test should be conducted in order to uncover any ambiguities, lack of clarity, or biases in the questionnaire wording. For this study, staff members of the University of the Witwatersrand were engaged for pre-testing.

A pilot test was later conducted to establish rapport with the participants, as well as to ensure that the measures used were reliable and valid as recommended by Bhattacherjee (2012) and Kothari (2004). Pilot testing considered the random selection of members of the 2016 MCom (Information Systems) class at the University of the Witwatersrand. This selection was based on the perception that these individuals possessed the characteristics typical of the target population as users of mobile phones who may have had the need to transfer funds to other individuals throughout the country. These individuals were, therefore, part of the target population of the study. The measurement instrument (questionnaire) was administered to the

pilot participants via email and the responses were assessed. All inconsistencies that were reported with the measurements were addressed.

Validity and reliability of the instrument were assessed to ensure the coverage and consistency of the measuring scales respectively. The validities that were assessed included internal, external, convergent, discriminant, face and content validities. Convergent validity refers to the degree to which the variables relate to the construct that they represent while discriminant validity refers to the degree to which the variables only represent the constructs that they are associated to and not any other constructs (Bhattacherjee, 2012).

According to Kothari (2004), internal validity refers to the ability of a research design to measure what it aims to measure whereas external validity refers to the designs generalizability to populations, settings, treatments variables, and measurement variables. this study makes use of a survey in the form of a questionnaire and, according to Battacherjee (2012), the downside of surveys is their week ability to provide internal validity (cause-effect relationships) while a strength is the ability to provide external validity (generalization).

Principal Component Analysis was used to assess these validities, details of which are highlighted in Chapter 4. The grouping of measurement items indicated their convergence to measuring a particular variable while the separation of grouping indicated that they did not measure multiple variables simultaneously. Face validity refers to how well an indicator measured an underlying construct on its face (Bhattacherjee, 2012). Face validity was addressed through pre-testing that the instrument underwent. Content validity is described by Bhattacherjee (2012) as the extent to which a set of measurement items matches with the relevant content domain of the construct. The assumption made in this study is that content validity was addressed in the literature that was used to validate the measurement items included in Table 2, hence content validity was not assessed in this study.

Ethical Considerations

This study observed the following ethical principles described by Battacherjee (2012:

1. **Voluntary participation and harmlessness** – the objective of research ethics was to ensure that no harm came to the participants or subjects of research. Ensuring that participation was voluntary allowed participants to avoid any harm that they believed they were exposed to during the research. Participants were informed that the withdrawal of their participation did not have negative implications to them.

2. **Anonymity and confidentiality** – this principle ensured that the participants interest and future well-being were safeguarded and not impacted as a result of the research. Anonymity ensures that the researcher does not identify the participants and their responses in the research investigation. Confidentiality allows for cases where the responses of the participants are revealed, however the researcher ensured that in this case, the identities of the participants will not be revealed with regards to the research.
3. **Disclosure** – this principle related to disclosing details of the research to the participants. Such details include who's conducting the research, why the research was being conducted, how the results are used. When fully disclosed, the participants are in a better position to decide if they want to proceed or withdraw their participation from the research exercise.
4. **Analysis and reporting** – this principle related to the ethical reporting of data once collected and analysed. The researcher has an obligation to report the findings as they have been observed in the research and not embellish or alter them in order to provide a more "suitable" conclusion to their research as this will be grounds for dishonesty.

The study was conducted using the standard ethical processes as prescribed by the University of the Witwatersrand. This study was approved by the School of Economic and Business Sciences with protocol number CINFO/1153 (refer to Appendix D). Prior to administering the questionnaire, the survey administrators informed participants that participation was voluntary, as stated in the participant consent form (refer to Appendix C). Furthermore, to address anonymity and confidentiality concerns, the survey administrators informed participants prior to administering the questionnaire that anonymity and confidentiality will be maintained by disallowing unauthorized access to the responses collected. This was also stipulated in the letter of informed consent that participants had to sign before participating in the study. This letter authorised the researcher to make use of the data collected in the questionnaire.

Conclusion

This chapter described the strategies concerning data collection and instrument development and testing, as well as the sampling strategy used. The administration of the data collection instrument, the questionnaire, was also discussed in this chapter.

4. Data Analysis

Introduction

The purpose of this chapter presents the findings of the study. Both descriptive and inferential statistics are presented. The chapter concludes by comparing the degrees to which the base DOI and the adapted DOI models explained variances in the Behavioural Intention to adopt MMTs.

127 survey responses were collected, coded and captured on a Microsoft Excel spreadsheet. The data was assessed for its degree of suitability for use in analysis. Five survey responses were found to either have the majority of the questions unanswered or were unusable as they contained the same rating for all the questions presented. These responses were removed, resulting in a data set of 122 usable responses. The data set was imported into IBM SPSS for analysis.

Missing Values

Six of the responses were found to have missing values. Missing values can result from respondents not understanding the questions, the questions being ambiguous or the questions being too sensitive (Bhattacherjee, 2012). Bhattacherjee (2012) suggests replacing missing values with an imputed value such as the average of the scores provided by other respondents. Bhattacherjee (2012), however, cautions against using this imputation when there is a large number of missing values as they may significantly affect the results of the analysis. Only twelve values were missing in the set of usable responses hence the decision made was to replace these with the series means of the respective variables.

Outliers

Keller and Warrack (2003) state that an outlier comes about as a result of either an error in capturing the responses, inclusion of a response that does not represent the general characteristics of the sample, or an accurately captured response with an unusually high value. Box plots were plotted for each of the variables in order to identify any outliers. Twelve outliers were identified. The responses were reviewed to identify whether there were errors in capturing the data. As there were no errors, it stands that these were either responses not representing the sample or unusually high values that would skew the results. A decision was taken to discard the outliers from the analysis. Box plots of the composite scores were

plotted in order to assess if there were any additional outliers. Box plots of the variables are contained in Appendix E. No additional outliers were identified.

Reverse Scoring

The questionnaire did not phrase any questions negatively and, hence, there was no reverse scoring required for analysis.

Descriptive Statistics

The sample comprised 65 males and 57 females, which translates to 46.7% and 53.3%, respectively as shown in Table 3 below.

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	65	53.3	53.3	53.3
	Male	57	46.7	46.7	100.0
	Total	122	100.0	100.0	

Table 3: Gender Statistics

Table 4 shows that 47.5% of the respondents indicated that they were employed, while 32.8% indicated that they were not employed.

Employment				
	Frequency	Percent	Valid Percent	Cumulative Percent
Employed	58	47.5	47.5	47.5
Unemployed	40	32.8	32.8	80.3
Self Employed	20	16.4	16.4	96.7
Prefer Not to Say	4	3.3	3.3	100.0
Total	122	100.0	100.0	

Table 4: Employment Statistics

Table 5 represents the statistics on bank account ownership. 91% of the respondents indicated that they had a bank account, while 6.6% indicated that they did not have a bank account.

Bank_Account_Ownership					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	111	91.0	91.0	91.0
	No	8	6.6	6.6	97.5
	Prefer Not to Say	3	2.5	2.5	100.0
	Total	122	100.0	100.0	

Table 5: Bank Account Statistics

Table 6 represents the frequencies for monthly income bands that were recorded. Regarding the income levels of the respondents, 18.9% indicated that they earned below R1000 monthly, with a cumulative 50.8% earning a maximum monthly income of R9000. 11.4% of the respondents indicated that they earned above R18000 monthly. The coding for monthly income is highlighted in the sample questionnaire in Appendix A.

Monthly_Income					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<R1000	23	18.9	18.9	18.9
	R1000 – R5000	27	22.1	22.1	41.0
	R5001 – R9000	12	9.8	9.8	50.8
	R9001 – R14000	11	9.0	9.0	59.8
	R14001 – R18000	6	4.9	4.9	64.8
	R18001 – R22000	1	.8	.8	65.6
	R22001 – R26000	2	1.6	1.6	67.2
	R26001 – R30000	6	4.9	4.9	72.1
	>R30000	5	4.1	4.1	76.2
	Prefer not to say	29	23.8	23.8	100.0
	Total	122	100.0	100.0	

Table 6: Monthly Income Statistics

Table 7 shows the sample composition of individuals' knowledge of mobile money. 75.4% of the respondents indicated that they had knowledge of what mobile money was, while 21.3% indicated that they did not know what mobile money was.

Knowledge of Mobile Money					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	92	75.4	75.4	75.4
	No	26	21.3	21.3	96.7
	Prefer Not to Say	4	3.3	3.3	100.0
	Total	122	100.0	100.0	

Table 7: Knowledge of Mobile Money

Table 8 shows the use of mobile among the responses. In some cases the specific mobile money product was selected. 57.4% of the respondents indicated that they did not use mobile money, while an accumulated 42.6% used either EcoCash, MPesa, Wizzit or other specified mobile money platforms.

Use of Mobile Money					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	70	57.4	57.4	57.4
	MPesa	9	7.4	7.4	64.8
	EcoCash	8	6.6	6.6	71.3
	Wizzit	1	.8	.8	72.1
	Other	34	27.9	27.9	100.0
	Total	122	100.0	100.0	

Table 8: Use of Mobile Money

According to Bhattacherjee (2012), cross-tabulations are useful representations of bivariate data, as they describe combinations of multiple variables. Through cross-tabulation it was found that only a total of 50 of the 122 participants knew what mobile money was and used it, while 42 of the 122 knew what mobile money was but did not. This translates to 41% and 34% respectively.

Knowledge of Mobile Money * Use of Mobile Money Cross-tabulation							
		Use_MM					
		No	MPesa	EcoCash	Wizzit	Other	Total
Knowledge of Mobile Money	Yes	42	9	8	1	32	92
	No	25	0	0	0	1	26
	Prefer Not to Say	3	0	0	0	1	4
Total		70	9	8	1	34	122

Table 9: Cross-tabulation of Knowledge and Use of Mobile Money

It was found that 29 of the respondents were employed and did not use mobile money, while another 29 was employed and used mobile money. It was also found that 29 respondents were unemployed and did not use mobile money, while 11 indicated that they were unemployed but used mobile money.

Employment * Use of Mobile Money Cross-tabulation							
		Use_MM					
		No	MPesa	EcoCash	Wizzit	Other	Total
Employment	Employed	29	7	5	0	17	58
	Unemployed	29	2	1	0	8	40
	Self Employed	8	0	2	1	9	20
	Prefer Not to Say	4	0	0	0	0	4
Total		70	9	8	1	34	122

Table 10: Cross-tabulation of Employment and Use of Mobile Money

Regarding those who indicated that they had bank accounts, 63 did not use mobile money, while 48 used mobile money. Of the 8 respondents who indicated that they did not have bank accounts, 4 indicated that they did not use mobile money, while another 4 respondents indicated that they used mobile money.

Bank Account Ownership * Use of Mobile Money Cross-tabulation

		Use_MM					
		No	MPesa	EcoCash	Wizzit	Other	Total
Bank_Account	Yes	63	7	6	1	34	111
	No	4	2	2	0	0	8
	Prefer Not to Say	3	0	0	0	0	3
Total		70	9	8	1	34	122

Table 11: Cross-tabulation of Bank Account Ownership and Use of Mobile Money

Cross-tabulation between monthly income and use of mobile money revealed that 13.1% of the respondent earned below R1000 and did not use mobile money, while 5.7% at the same income level used mobile money. Those that indicated a monthly earning of more than R18000 had 3.3% that did not use mobile money, while 8.2% used mobile money.

Monthly Income * Use of Mobile Money Cross-tabulation

		Use_MM					
		No	MPesa	EcoCash	Wizzit	Other	Total
Monthly Income	<R1000	16	0	2	1	4	23
	R1000 – R5000	20	1	1	0	5	27
	R5001 - 9000	6	1	2	0	3	12
	R9001 – R14000	5	1	2	0	3	11
	R14001 – R18000	3	2	0	0	1	6
	R18001 – R22000	0	0	0	0	1	1
	R22001 – R26000	1	0	0	0	1	2
	R26001 – R30000	1	0	0	0	5	6
	>R30000	2	1	0	0	2	5
	Prefer not to say	16	3	1	0	9	29
Total		70	9	8	1	34	122

Table 12: Cross-tabulation of Monthly Income and Use of Mobile Money

Principle Component Analysis

According to Bhattacherjee (2012), Factor Analysis is a reduction method used to represent a large number of observed values as a smaller set of unobserved values called factors. Factor analysis should be carried out on the assumption of adequate sampling (Pallant, 2013). The KMO and Bartlett tests were carried out on the sample and produced a result of 0.864 at a 0.000 significance level. This result ensured that factor analysis could be conducted on the data.

Principal Component Analysis (PCA), as a form of factor analysis, was conducted with 7 factors as the theoretical model, adapted DOI, has been constructed with 7 factors. It was found that 7 factors accounted for 77.6% of the total variance in the model. Coefficients of less than 0.50 were suppressed from the results for visual clarity. The Varimax method of rotation was used as it is found to minimize the number of variables which have high loadings on a factor in order to only have variables which load strongly on the factors.

The Rotated Component Matrix in Table 13 below shows the loadings for the 7 components. Measures of Compatibility and Behavioural Intention to adopt MMT were observed to load into the same component but will be treated as different components as the coefficient between them is 0.669 and not closer to 1, which would entail they are the same construct. This could suggest how closely the respondents linked Compatibility to Behavioural intention to adopt MMT. The first measure of Complexity was observed to load into a different component from the other two measures of Complexity, which may suggest that the first measure used for Complexity was not a true measure of Complexity.

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
SMEAN(RA1)			.778				
SMEAN(RA2)			.579				
SMEAN(RA3)			.846				
SMEAN(RA4)			.695				
SMEAN(Comp1)	.663						
SMEAN(Comp2)	.622						
SMEAN(Comp3)							
SMEAN(Obs1)							
SMEAN(Obs2)		.651					
SMEAN(Obs3)		.667					
SMEAN(Obs4)		.724					
SMEAN(Obs5)		.696					
SMEAN(Compl1)							.744
SMEAN(Compl2)						.857	
SMEAN(Compl3)						.684	
SMEAN(Tri1)					.893		
SMEAN(Tri2)					.928		
SMEAN(Tri3)					.782		
SMEAN(Tru1)				.820			
SMEAN(Tru2)				.870			
SMEAN(Tru3)				.882			
SMEAN(Int1)	.764						
SMEAN(Int2)	.851						
SMEAN(Int3)	.792						

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Table 13: Rotated Component Matrix

Normality Tests

Composite scores were calculated for each of the factors by averaging scores of the items measuring the variable. The composite scores were tested for normality to determine if they were representative of a normally distributed population. Table 14 displays the scores of skewness and kurtosis of each of the variables tested. The scores of skewness show that most of the variables were negatively skewed except for Complexity, which was positively skewed.

The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to compare the distributions of the data against reference normal distributions. These tests yielded non-significance scores ($p<0.05$), which indicated that there was a significant deviation from the normal distribution. The conclusion on the distributions of the factors was to not assume normal distribution of the variables. This, in turn, meant that non-parametric tests were to be used since the assumptions of normality were not met. Kothari (2004) supports this by stating that when the assumption of normality is not being held then the research should employ non-parametric tests. Appendix E shows the plots of the normality tests for each of the variables.

Factor	**Skewness**	**Kurtosis**
RA	-0.361	-0.369
Comp	-0.524	-0.362
Obs	-0.369	-0.567
Compl	0.413	-0.106
Tri	-0.305	-0.944
Tru	-0.049	-0.660
Int	-0.459	-0.739

Table 14: Skewness and Kurtosis

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeRA	.118	119	.000	.936	119	.000
CompositeComp	.154	121	.000	.939	121	.000
CompositeObs	.132	120	.000	.945	120	.000
CompositeCompl	.123	116	.000	.943	116	.000
CompositeTri	.139	122	.000	.946	122	.000
CompositeTru	.114	116	.001	.957	116	.001
CompositeInt	.146	119	.000	.910	119	.000

a. Lilliefors Significance Correction

Table 15: Test of Normality

Validity and Reliability

The psychometric properties of the measurements scale, reliability and validity, are the yardsticks by which the adequacy and accuracy of the measurements are determined (Bhattacherjee, 2012). SPSS was used for the evaluation of these properties. Cronbach's alpha (α) has been stated as the most widely used measure of reliability using internal consistency (Bhattacherjee, 2012; Tavakol and Dennick, 2011). A α of 0.70 was considered the threshold, above which the reliability of each construct was acceptable. The α value of 0.70 is generally accepted as the threshold for reliability in most studies (Bhattacherjee, 2012; Pallant, 2013). Reliabilities were assessed for Relative Advantage (RA), Compatibility (Comp), Observability (Obs), Complexity (Compl), Trialability (Tri), Trust (Tru) and Behavioural Intention to adopt MMT (Int). Table 16 highlights the values of α that were observed for each of the constructs.

The reliabilities of the constructs under consideration were found to be acceptable, with α values above 0.70 except for the reliability of Complexity. A decision was made to drop the first item measuring Complexity in order to raise the α score. A α value of 0.656 was obtained for Complexity and accepted on the basis that it can be rounded-up to 0.7. Subsequent analyses involving Complexity excluded the dropped item.

Component	**Cronbach Alpha (α)**	**Observation**
RA	0.834	Acceptable
Comp	0.856	Acceptable
Obs	0.814	Acceptable
Compl	0.656	Acceptable
Tri	0.875	Acceptable
Tru	0.879	Acceptable
Int	0.885	Acceptable

Table 16: Cronbach Alpha Values

Hypothesis Testing

Composite values of the independent and dependent constructs were computed in SPSS and correlation analysis was conducted to determine strengths of the relationships between them. The Spearman correlation was used as this study did not assume a normal distribution for the variables, hence the use of non-parametric tests.

Hypothesis 1

H1: The greater the Relative Advantage of using Mobile Money services, the greater the Behavioural Intention to adopt MMTs.

The relationship between Relative Advantage and Behavioural Intention to adopt MMT was found to be statistically significant (0.581, $p<0.001$) using the Spearman test. This finding provided support for H1, that the greater the perceived relative advantage the greater the Behavioural Intention to adopt MMT.

Correlations

			CompositeRA	CompositeInt
Spearman's rho	CompositeRA	Correlation Coefficient	1.000	.581**
		Sig. (2-tailed)	.	.000
		N	119	116
	CompositeInt	Correlation Coefficient	.581**	1.000
		Sig. (2-tailed)	.000	.
		N	116	119

**. Correlation is significant at the 0.01 level (2-tailed).

Table 17: Correlation of RA and Behavioural Intention to adopt MMT

Hypothesis 2

H2: The greater the Compatibility of using MMTs, the greater the Behavioural Intention to adopt MMTs

The relationship between Compatibility and Behavioural Intention to adopt MMT was found to be statistically significant (0.645, $p<0.001$). This finding provided support of H2, that the greater the perceived Compatibility the greater the Behavioural Intention to adopt MMT.

Correlations				
			CompositeInt	CompositeComp
Spearman's rho	CompositeInt	Correlation Coefficient	1.000	.645**
		Sig. (2-tailed)	.	.000
		N	119	118
	CompositeComp	Correlation Coefficient	.645**	1.000
		Sig. (2-tailed)	.000	.
		N	118	121
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 18: Correlation of Compatibility and Behavioural Intention to adopt MMT

Hypothesis 3

H3: The more MMT benefits are observed, the greater the Behavioural Intention to adopt MMTs.

The relationship between Observability and Behavioural Intention to adopt MMT was found to be statistically significant (0.494, $p<0.001$). This finding provided support of H3, that the greater the benefits of MMTs are observed the greater the Behavioural Intention to adopt MMT.

Correlations				
			CompositeInt	CompositeObs
Spearman's rho	CompositeInt	Correlation Coefficient	1.000	.494**
		Sig. (2-tailed)	.	.000
		N	119	117
	CompositeObs	Correlation Coefficient	.494**	1.000
		Sig. (2-tailed)	.000	.
		N	117	120
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 19: Correlation of Observability and Behavioural Intention to adopt MMT

Hypothesis 4

H4: The higher the Trust in MMT, the higher the Behavioural Intention to adopt MMTs.

The relationship between Trust and Behavioural Intention to adopt MMT was found to be statistically significant (0.490, $p<0.001$). This finding provided support of H4, that the higher the Trust the greater the Behavioural Intention to adopt MMT.

Correlations				
			CompositeInt	CompositeTru
Spearman's rho	CompositeInt	Correlation Coefficient	1.000	.490**
		Sig. (2-tailed)	.	.000
		N	119	114
	CompositeTru	Correlation Coefficient	.490**	1.000
		Sig. (2-tailed)	.000	.
		N	114	116

**. Correlation is significant at the 0.01 level (2-tailed).

Table 20: Correlation of Trust and Behavioural Intention to adopt MMT

Hypothesis 5

H5: The higher the Observability of MMT benefits, the higher the Trust in MMTs.

The relationship between Trust and Observability was found to be statistically significant (0.513, $p<0.001$). This finding provides support of H5, that the higher the Observability of MMT benefits, the higher the Trust in MMTs.

Correlations				
			CompositeTru	CompositeObs
Spearman's rho	CompositeTru	Correlation Coefficient	1.000	.513**
		Sig. (2-tailed)	.	.000
		N	116	114
	CompositeObs	Correlation Coefficient	.513**	1.000
		Sig. (2-tailed)	.000	.
		N	114	120

**. Correlation is significant at the 0.01 level (2-tailed).

Table 21: Correlation of Trust and Observability

Hypothesis 6

H6: The greater the Complexity of using MMT, the less the Behavioural Intention to adopt MMTs.

The relationship between Complexity and the Behavioural Intention to adopt MMT was found to be statistically insignificant (-0.351, $p<0.001$). The finding of a negative relationship showed that there was sufficient evidence to support H6.

Correlations				
			CompositeInt	CompositeCompl
Spearman's rho	CompositeInt	Correlation Coefficient	1.000	-.351**
		Sig. (2-tailed)	.	.000
		N	119	113
	CompositeCompl	Correlation Coefficient	-.351**	1.000
		Sig. (2-tailed)	.000	.
		N	113	116
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 22: Correlation of Complexity and Behavioural Intention to adopt MMT

Hypothesis 7

H7: The greater the Trialability of MMTs by individuals, the greater the Behavioural Intention to adopt MMTs.

The relationship between Trialability and the Behavioural Intention to adopt MMT was found to be statistically insignificant (-0.289, p=0.001). The negative relationship between Trialability and Behavioural Intention to adopt MMTs leads to a rejection of H7.

Correlations				
			CompositeInt	CompositeTri
Spearman's rho	CompositeInt	Correlation Coefficient	1.000	-.289**
		Sig. (2-tailed)	.	.001
		N	119	119
	CompositeTri	Correlation Coefficient	-.289**	1.000
		Sig. (2-tailed)	.001	.
		N	119	122
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 23: Correlation of Trialability and Behavioural Intention to adopt MMT

Below is a summary of the outcomes of the testing of the seven hypotheses for the relationships in the model:

Construct	Hypothesis	Hypothesis Description	Result
Relative Advantage	**H1**	The greater the Relative Advantage of using Mobile Money services, the greater the Behavioural Intention to adopt MMTs.	Supported
Compatibility	**H2**	The greater the Compatibility of using MMTs, the greater the Behavioural Intention to adopt MMTs	Supported
Observability	**H3**	The more MMT benefits are observed, the greater the Behavioural Intention to adopt MMTs.	Supported
Trust	**H4**	The higher the Trust in MMT, the higher the Behavioural Intention to adopt MMTs.	Supported
Observability - Trust	**H5**	The higher the Observability of MMT benefits, the higher the Trust in MMTs.	Supported
Complexity	**H6**	The greater the Complexity of using MMT, the less the Behavioural Intention to adopt MMTs.	Supported
Trialability	**H7**	The greater the Trialability of MMTs by individuals, the greater the Behavioural Intention to adopt MMTs.	Rejected

Table 24: Summary of Hypothesis Testing Outcomes

Multiple Regression

Kothari (2004) discusses various options for testing multivariate situations and suggests conditions that the researcher should assess in order to decide. Among these conditions, Kothari (2004), highlights that if there is only one dependent variable and multiple independent variables related to it then multiple regression should be used to assess how the independent variables predict the dependent variable. As the models in this study had only one dependent variable each and multiple independent variables related to them, multiple regression was used.

Standard linear regression was carried out to determine the effect of each independent variable on the dependent variable. In order to compare the base DOI model against the adapted model, multiple linear regression was conducted for each of the models.

Base DOI Model Regression

Based on the R^2 value, the DOI model comprising of RA, Comp, Compl, Tri and Obs accounted for 45.8% of the variance of the Behavioural Intention to adopt MMT, as shown in Table 25. This was significant at the $p<0.001$ level. Of the independent variables, Relative Advantage (RA) and Compatibility (Comp) were found to have significant effects on the Behavioural Intention to adopt MMT, with standardized beta coefficients of 0.256 and 0.351 respectively and levels of significance of $p<0.05$. Complexity (Compl), Trialability (Tri), and Observability (Obs) were found to have insignificant effects on the behavioural Intention to adopt MMT, with levels of significance of 0.277, 0.112, and 0.565 respectively. Table 26 highlights the coefficients and levels of significance of the variables in the base DOI model.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.676[a]	.458	.432	.62672

a. Predictors: (Constant), CompositeTri, CompositeRA, CompositeCompl, CompositeComp, CompositeObs

b. Dependent Variable: CompositeInt

Table 25: Base DOI Model Summary

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.451	.606		2.392	.019	.248	2.653					
	Composite RA	.339	.130	.256	2.611	.010	.082	.597	.561	.245	.186	.528	1.893
	Composite Comp	.334	.097	.351	3.444	.001	.142	.527	.610	.316	.245	.489	2.047
	Composite Obs	.081	.140	.060	.577	.565	-.197	.358	.519	.056	.041	.463	2.159
	Composite Compl	-.092	.084	-.091	-1.093	.277	-.260	.075	-.373	-.105	-.078	.737	1.357
	Composite Tri	-.088	.055	-.123	-1.600	.112	-.197	.021	-.286	-.153	-.114	.861	1.161

a. Dependent Variable: CompositeInt

Table 26: Multiple Regression Coefficients of Base DOI Model Variables

Adapted DOI Model Regression

Standard Linear regression was conducted on the adapted model comprising RA, Comp, Compl, Tri, Obs, and Tru. The R^2 value indicates that the model accounted for a 48.1% variance of the Behavioural Intention to adopt MMT, as shown in Table 27. This was more than the variance explained by the base DOI model, albeit marginally. RA, Comp, and Tru were found to have significant effects on the Behavioural Intention to adopt MMTs with respective levels of significance of 0.036, 0.002, and 0.033, which are less then p = 0.05. Compl, Tri, Obs were found to have insignificant effects on the Behavioural Intention to adopt MMTs, with levels of significance of 0.228, 0.250, and 0.897 respectively. Table 28 highlights the coefficients and levels of significance of the variables in the adapted DOI model.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.694[a]	.481	.451	.61638

a. Predictors: (Constant), CompositeTru, CompositeCompl, CompositeTri, CompositeComp, CompositeRA, CompositeObs

b. Dependent Variable: CompositeInt

Table 27: Adapted DOI Model Summary

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	1.345	.607		2.216	.029	.141	2.548					
	CompositeRA	.282	.132	.212	2.130	.036	.019	.544	.561	.205	.151	.507	1.973
	CompositeComp	.308	.097	.323	3.159	.002	.115	.501	.610	.297	.224	.481	2.079
	CompositeObs	.019	.142	.014	.130	.897	-.264	.301	.519	.013	.009	.444	2.252
	CompositeCompl	-.102	.084	-.100	-1.212	.228	-.270	.065	-.373	-.119	-.086	.735	1.361
	CompositeTri	-.065	.056	-.090	-1.158	.250	-.175	.046	-.286	-.113	-.082	.829	1.206
	CompositeTru	.181	.084	.189	2.158	.033	.015	.347	.501	.208	.153	.660	1.515

a. Dependent Variable: CompositeInt

Table 28: Multiple Regression Coefficients of Adapted DOI Model Variables

The resultant path coefficients for both the base DOI model and the adapted DOI model are represented in Figure 3 and Figure 4 respectively.

Base DOI patch coefficients

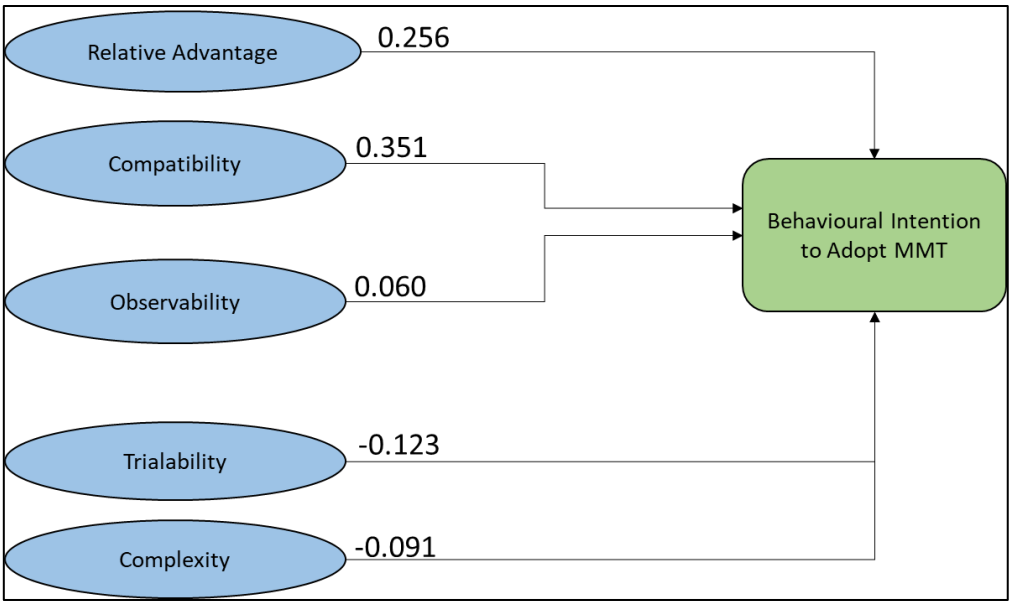


Figure 3: Path Coefficients of Base DOI Model

Adapted DOI patch coefficients

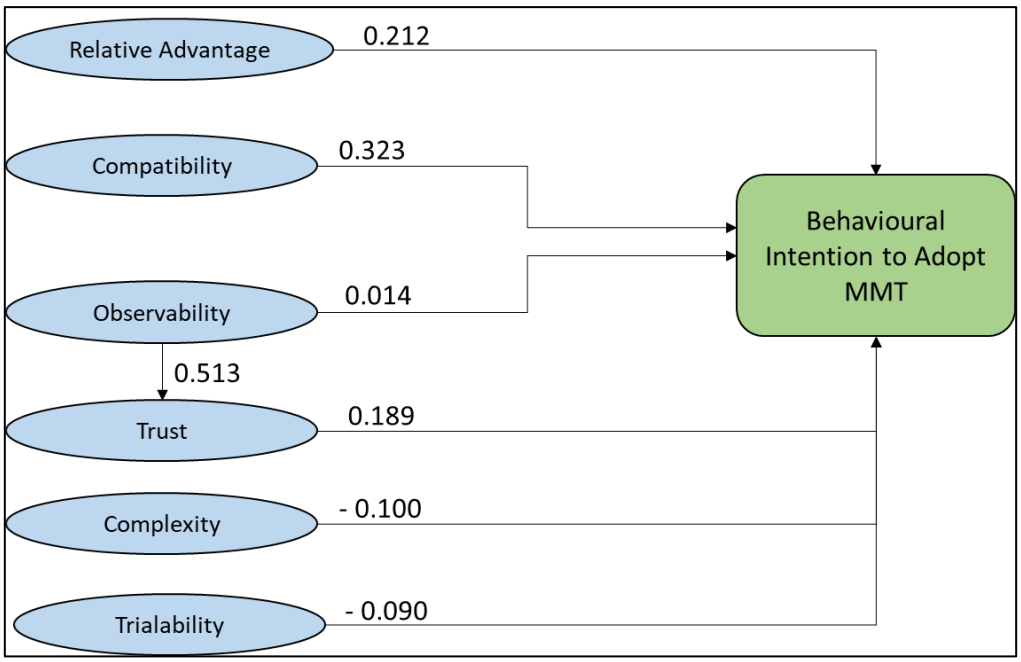


Figure 4: Path Coefficients of Adapted DOI Model

5. Discussion

This chapter presents a discussion of the findings presented in Chapter 4. The outcomes of the hypothesis tests are discussed for each variable with recommendations of how they may be influenced. A comparison is conducted between the degrees to which the base DOI and the adapted DOI models explained the variances to the Behavioural Intention to adopt MMTs. On this basis, a recommendation is made as to the applicability of the adapted DOI model in the context of this study.

Descriptive Statistics

The results showed that a relatively small percentage of individuals made use of MMTs, with 42.6% indicating that they used MMTs and 57.4% indicating that they did not. Previous studies on the adoption of MMTs in the African context have highlighted the lack of awareness as one of the key factors hindering the adopting of MMTs (Shambare, 2011; Porteous, 2006; Brown and Molla, 2005). Shambare (2011) suggests that efforts need to be made in the marketing of MMTs and their benefits in order to increase adoption. The results showed that there was considerable awareness of MMTs among the respondents, as shown by the 75.4% of the respondents indicating that they knew what mobile money was. However, only 40.9% of the respondents indicated that they knew what mobile money was and used it. This may imply that, in the context of the sample, awareness alone may not have been enough to influence the adoption of MMTs where more traditional alternatives exist, such as the case in South Africa where banks offer various means of transferring money between peers.

It was found that 91% of the respondents had bank accounts, which could suggest that there is a high likelihood that they would rely more on traditional banking services to transact and transfer money as opposed to alternatives. Alternative methods may be deemed to not provide the same convenience or perceived security as traditional services provide. This may also suggest that if individuals were to transfer money, they would probably transfer to a bank account belonging to an intended beneficiary, as supported by the fact that only 39.3% of the respondents had bank accounts and used MMTs, as opposed to 51.6% who had bank accounts and opted not to use MMTs. This may be evidence of a preference for alternative forms of money transfers through traditional financial services such as cash payments, electronic fund transfers and direct deposits to bank accounts. Chigada and Hirschfelder (2016) found that South Africa showed a high rate of bank account ownership amongst households and state

that this prevalence poses a hindrance in any ideas to transform traditional banking services into mobile money.

The prevalence of bank account ownership within the sample may raise the question of how applicable the concept of the "unbanked" is to the South African context. From the findings of the analysis, it may be argued that the use of MMTs as an approach to serve the unbanked may be viewed as invalid or ineffective to address the issue of financial inclusion, as most of the respondents preferred to operate in the confines of the banking services provided by the financial institutions with which they held bank accounts. This is consistent with the findings of Rouse and Verhoef (2017), as well as those of Chigada and Hirschfelder (2016), that while adoption of mobile money in countries such as Zimbabwe and Kenya were successful, the South African adoption rates were underwhelming due to the presence of a more advanced banking system. Chigada and Hirschfelder (2016) also found that banks in South Africa provide services similar to those provided by MMTs, like M-Pesa, allowing individuals without bank accounts to either receive or remit funds. Rouse and Verhoef (2017) added that South African banks had progressed in efforts to make banking easily accessible to the low-income earners. Although this may be the case, consideration may still need to be made to those who may not have access to, or opt not to use, banks as they may require unique services to allow them to transfer funds. Such is the case for a considerably large number of transactions that take place within the informal sector in Kenya (Hughes and Lonie, 2007). This could be an opportunity to introduce the use of MMTs to serve the purpose of some of the existing traditional banking services to individuals who opt not to use bank accounts while operating in the informal sector.

Jenkins (2008) states that one of the benefits of using MMTs is the low costs associated with transfers. Masinge (2010) found perceived costs of mobile banking to be deterrents to the adoption of mobile banking by "Bottom of the Pyramid" South Africans, meaning low-income individuals will most likely opt for MMTs as opposed to higher cost banking services. According to a 2016 article in the Business Tech publication, the "Emerging Middle" level income band starts at a monthly income of R9084. Below this level is the upper bound of the low-income earning band. This study considered groups that earned a maximum of R9000 monthly as low-income against those that earned over R18000 monthly as middle-to-high-income. The study found that 34.4% of the respondents were low-income individuals who did not use MMTs, whereas 16.4% were low-income individuals who used

MMTs. 3.3% of the respondents were middle-to-high-income earners who did not use MMTs, while 8.2% were middle-to-high-income earners who used MMTs.

Although there were more low-income earners using MMTs as compared to the middle-to-high-income earners, it was found that there was a greater percentage of low-income earners not using MMTs than those using MMTs. This contradicts the findings by Masinge (2010) and Tobbin (2010) that lower-income individuals preferred to use MMTs. This may mean that, among the respondents, perceived cost of transacting was not viewed as a hindrance to adoption of MMTs. Surprisingly, although relatively low, there was a greater percentage of middle-to-high-income earners using MMTs than there was of the same group not using it. This may indicate that there are other benefits, apart from cost saving, that exist for encouraging adoption of MMTs by middle-to-high-income earners. However, Mothobi and Grzybowski (2017) found that once individuals have adopted MMTs, all income levels benefit equally, and that income level does not determine the use of MMTs. There is a possibility that higher-income earner may opt to use MMTs in order to transact with individuals who may not have bank accounts, perhaps in cases where they are supporting family members in other locations far from them. A survey conducted by Statistics South Africa (2016) showed that Gauteng is the province that received the biggest number of migrants in South Africa. These migrants comprised individuals migrating from outside South Africa, as well as those migrating from other provinces in South Africa. If a number of these migrants were primary bread-winners, then it was likely that they required a means to transfer funds to family members not in the same locale as they were. The findings of the study supported this notion with the fact that 16.4% of the respondents were primary bread-winners and used MMTs, as opposed to 13.9% who were bread-winners and did not use MMTs.

With respect to employment, 23.8% of the respondents indicated that they were employed but not using MMTs, and an equal 23.8% indicated that they were employed and used MMTs. An additional 23.8% indicated that they were unemployed and did not use MMTs, while 9.0% indicated that they were unemployed and used MMTs. From this it is not apparent if the status of employment has a bearing on the adoption or use of MMTs. Unemployment generally means significantly low-to-no income and it may be expected that unemployed individuals would opt to use MMTs, but that was not the case as found in this study. The lower use of MMTs in the unemployed group is, therefore, consistent with the lower use of MMTs in the low-income earners.

Hypothesis Testing

Relative Advantage

The study tested the relationship between Relative Advantage (RA) and the Behavioural Intention to adopt MMTs through the hypothesis "H1: The greater the perceived relative advantage of using Mobile Money services, the greater the Behavioural Intention to adopt MMTs". This hypothesis was supported, as there was a positive correlation of 0.581. Linear regression revealed that RA had a significant effect in predicting the behavioural intention to adopt MMTs in both the base DOI model and the adapted model. Rogers (2003) defined Relative Advantage as the degree to which individuals perceive an innovation as being better than the idea that supersedes it influences its adoption.

Based on the low use of MMTs and the significance of RA, it could be perceived that respondents did not find MMTs to be a better alternative to the traditional banking services available to them. This may be due to the benefits of MMTs not being clearly articulated, as shown by the fact that only 40.9% of the sample knew what MMTs are and used it, while the rest of the participants either knew of MMTs but did not use it or did not know what MMTs were. The notion that banks in South Africa provide similar services to MMTs, as highlighted by Chigada and Hirschfelder (2016), may influence individuals to believe that the benefits from the banking services that they receive may be the same or supersede those of the MMTs. Traditional banking services may be preferred as they provide individuals with other important services in addition to those of transferring funds, such as saving and investing. Shoprite, one of the largest retailers in South Africa, currently offers a service to allow individuals to transfer money within South Africa and across the borders at a small fee (Rouse and Verhoef, 2017). This service allows the recipient to withdraw the funds from one of the branches, as well as to purchase goods against the balance (Rouse and Verhoef, 2017). Such alternatives may influence individuals to continue using them as a preference and avoid engaging with other means of fund transfers.

Compatibility

The study tested the relationship between Compatibility and Behavioural intention to adopt MMTs by testing the hypothesis "H2: The greater the Compatibility of using MMTs, the greater the Behavioural Intention to adopt MMTs". The study supported the hypothesis and

found that Compatibility was a significant factor in predicting the Behavioural Intention to adopt MMTs in both the base DOI and the adapted DOI models. This may indicate that in order to increase adoption of MMTs there has to be a strong alignment between the offerings of MMTs and the lifestyles and value systems of the participants. The findings of low adoption, then, translate to the implication that the current offerings of MMTs did not align with the way the participants preferred to transact and did not fit well with their lifestyles. The significance of Compatibility as a factor for predicting the adoption of MMTs is consistent with the findings of Adebiyi et al. (2013) and Odumeru (2013), who found compatibility to be significant in predicting the adoption of mobile banking services.

Observability

The study tested the relationship between Observability and Behavioural intention to adopt MMTs by testing the hypothesis "H3: The more MMT benefits are observed, the greater the Behavioural Intention to adopt MMTs". The study supported the hypothesis. However, Observability was found to be insignificant in both the base DOI model and the adapted DOI model. This finding contradicts that of Al-Jabri and Sohail (2012) that Observability is a significant factor for the adoption of mobile services.

Rogers (2003) states that when the results of an innovation are made visible, they can draw the attention of individuals who are potential users of the innovation. The findings may imply that, in South Africa, the benefits presented through the use of MMTs may be perceived as marginal and not concrete enough to establish a preference for the technology.

The results showed a low prevalence of unbanked individuals and a low utilisation of MMTs, which could suggest that there may have been inadequate demonstration of the benefits of using MMTs as the use of bank transfers or deposits may be a greater preference among the respondents. This could also imply that the users of MMTs in the context of the sample may not have identified the benefits of using MMTs apart from the ability to transact with unbanked individuals, which they may find other alternatives for, such as sending ATM vouchers for cardless transactions. Consideration should be made of the factors that present disadvantages which outweigh the advantages of using MMTs, as these may adversely impact Observability.

Trust

The study tested the relationship between Trust and Behavioural Intention to adopt MMTs by testing the hypothesis "H4: The higher the Trust in MMT, the higher the Behavioural Intention to adopt MMTs". The findings in this study supported the hypothesis and found a positive relationship between Trust and the Behavioural intention to adopt MMTs in the sample observed. The effect of Trust in Behavioural Intention to adopt MMTs was tested on the adapted model, as Trust is not a base DOI factor. The effect of Trust was found to be significant. With Trust included, there was an increase in the model's ability to explain the variance of Behavioural Intention to adopt MMTs. Trust was considered in terms of consumers' trust in the vendor of the MMT service and the perceived reliability of the MMT service. The mean score for Trust was 3.59, meaning that most of the respondents indicated that they generally trusted the vendor of the MMT service, as well as the MMT service.

The relationship between Observability and Trust was also tested through the hypothesis "H5: The higher the Observability of MMT benefits, the higher the Trust in MMTs". H5 was supported and was found to be a significant relationship. This may indicate that due to observing others obtaining benefits of MMTs, potential users will develop trust in MMTs. This finding may suggest that individuals could develop trust in a technology by observing others using it rather than simply being made aware of aspects that increase trustworthiness in the technology and its service providers.

Complexity

The relationship between Complexity and Behavioural Intention to adopt MMTs was tested through the hypothesis "H6: The greater the Complexity of using MMT, the less the Behavioural Intention to adopt MMTs". The results indicate that there was a negative relationship between complexity and the Behavioural Intention to adopt MMTs, thus supporting the hypothesis. Linear regression found complexity to have an insignificant effect on the Behavioural Intention to adopt MMTs in the context of the sample. This was found to be the case for both the base DOI and the adapted DOI models. This is consistent with the findings of Al-Jabri and Sohail (2012), which revealed an insignificant effect of complexity on the adoption of mobile banking in Saudi Arabia.

Trialability

The relationship between Trialability and Behavioural Intention to adopt MMTs was tested through the hypothesis "H7: The greater the Trialability of MMTs by individuals, the greater the Behavioural Intention to adopt MMTs". The study found that a relationship existed between Trialability and the Behavioural Intention to adopt MMTs, however it was found to be negative. This finding implies that the greater the Trialability, the less likely MMTs will be considered for adoption. This contradicts the logic that one may need to experiment with a technology first before making a decision to adopt it. It is possible that, due to the wording of the Trialability items in the questionnaire, the participants may have understood the notion to mean that they **have to** complete a mandatory tutorial or training before they can use the MMTs. However, this may also mean that the respondents believed that MMT technologies would be relatively easy to grasp and, thus, scored Trialability low as they would not need to engage with it on a trial basis.

The effect of Trialability was found to be insignificant in both the base DOI and the adapted DOI models. Individuals could possibly opt not to use a technology on a trial basis if they perceived that the technology will do what it is supposed to do and not deviate from their expectations. This could imply a relationship with Trust that indicates that the greater the trust in an innovation, the less the need for a trial. Another perspective could be that if the user interface and experience are positive and intuitive then the individual does not need to trial the innovation as the technology would be self-explanatory and easy to follow. Taking these perspectives into consideration, it could be argued that the respondents may have interacted with innovations similar to MMTs and, hence, trust the concept and believe that the experience of using MMTs would be intuitive. This may then lead to a reduction of their need for a trial of the innovation.

Applicability of the Adapted DOI Model

To conclude the previous chapter, a comparison between the base DOI and the adapted DOI models was conducted. It was found that the base DOI model accounted for 45.8% of the variance of behavioural intention to adopt MMTs, while the adapted model accounted for 48.1% of the variance. Relative Advantage and Compatibility were found to be significant

factors in both models, while Trust was found to be significant in the adapted model, where it had been included as the adaptation.

Trust was found to be significant in influencing adoption and use of technology in various studies (Gefen, 2000; Kim, Chung and Lee, 2011; Van Slyke, Belanger and Comunale, 2004; Tobbin 2010). This may suggest that, apart from the innovation and communication aspects necessary in diffusing technology, the trust that an individual has in the technology and service providers is a key influence for adoption, especially in situations where the adoption and use are voluntary. The development and deployment of various social technologies such as Facebook, Instagram and WhatsApp seldom include user manuals or proof of service security, yet they draw high rates of adoption. Tsay-Vogel, Shanahan and Signorielli (2018) found that, on initial engagement, users of Facebook were less concerned about privacy risks and safeguards as the data they shared was low online self-disclosure. Over time, as the online self-disclosure increased, users developed higher levels of concern regarding privacy risks and controls. In light of this, it could be argued that Trust may have a hindering effect on adoption of technology if individuals perceive the data required as being highly sensitive and prone to access and abuse by the service providers or other parties.

This study, therefore, proposes that the adapted model, with the inclusion of Trust as a factor, is applicable to study the adoption of innovations within the context of the study. The element of trust would have to be considered in the context of social influence and information privacy, in addition to trust in the innovation and its service providers.

6. Conclusion

This chapter summarises the findings of the study, highlighting the potential contributions to academia and practice. Limitations and suggestions for future study are also discussed in this chapter.

The purpose of this study was to examine the applicability of an adapted DOI model by comparing it to the base DOI model and to assess how well it predicted the Behavioural Intention to adopt MMTs. The determinants that were used for the behavioural intention to adopt MMTs were Relative Advantage, Compatibility, Complexity, Observability, Trialability and Trust, where Trust was added to the base DOI model as an adaptation. A key finding of the study was that, with the inclusion of Trust as a determinant, there was an increase in the model's ability to explain the variance of behavioural intention to adopt MMTs. Relative Advantage and Compatibility were found to be significant factors in both the base DOI and the adapted DOI models.

Contributions to Academia and Practice

The contributions that are anticipated to be made through this study can be classified as academic and practitioner contributions. From an academic perspective, this study may extend the body knowledge by adding to existing literature on the adoption of mobile money services in Sub-Saharan Africa. Chigada and Hirschfelder (2016) and Tobbin (2010) supports the need for extending the body of knowledge by stating that there is a scarcity of academic research on the phenomenon of bringing financial services to the unbanked. With the inclusion of the South African context of the adoption of MMTs, there could be greater generalisation established regarding the factors influencing the adoption of MMTs to developing countries (Chitungo and Munongo, 2013). Crabbe, Standing and Standing (2009), Chitungo and Munongo (2013) and Lin (2011) have suggested further studies to explore social and cultural factors determining the adoption of technology, as well as other frameworks and theories of innovation diffusion in the interest of understanding additional antecedents and constructs shaping the beliefs and intentions to adopt MMTs in developing countries. The findings of this study may contribute to academia in this respect.

For practitioners, the findings made in this study may provide some insight into the aspects of mobile money that are assessed to improve the likelihood of adoption and utilisation of MMTs by individuals in developing countries. Practitioners consuming this study's findings may be aided in establishing positions on possible strategies that they could implement to improve adoption of MMTs by controlling the factors to positively influence individuals and reduce barriers to adoption. A potential contribution of this study is to provide some insight into the factors that are perceived as significant for the South African context, based on the sample responses, which could be used to understand and influence adoption of other technologies offered by financial service institutions.

The finding on the significance of Trust to influence the behavioural intention to adopt MMTs can be used by practitioners to better inform designs of information privacy and protection, as well as user assurance in the technologies. The differentiators of MMTs from traditional banking services may be addressed by providers of MMT services in line with the findings that Relative Advantage and Compatibility are significant factors for influencing the adoption of MMTs. Practitioners may find it worthwhile to revisit the notion of MMTs being driven by the unbanked population in the South African context as findings suggest that the "unbanked" may have an insignificant presence, hence, effect as a driver of adoption of MMTs. Other drivers of MMTs may need to be investigated to supplement the understanding of why MMTs may be adopted by individuals. With Sub-Saharan Africa contributing a large portion of the world's unbanked individuals, the findings of this study could aid practitioners in understanding how to reach various classes of individuals in the region and potentially in other developing areas of the world.

Limitations of the Study

In interpreting the findings and recommendations of this study, the following limitations posed should be taken into consideration:

Cross-sectional Survey

The field survey that was selected for this study was cross-sectional in nature, meaning that the independent and dependent variables were assessed simultaneously. The decision to select a cross-sectional study was based on a time constraint presented by the timeline in which the

study was to be completed. The risk presented was that the cause and effect relationship may have been poorly observed, thus rendering some variables less significant than others.

Sample Size

The study conducted data analysis on 122 usable responses, which may be deemed as a considerably small sample size. Bhattacherjee (2012) states that generalizability would be compromised due to small sample sizes. It may appear difficult to generalize the result of this study to the South African population due to the small sample size used for the data analysis.

Geographical Setting

The scope of this study was to include only respondents from Johannesburg. Although individuals from multiple sites within Johannesburg participated, the geographical coverage was relatively small. As a result, generalization of the results to a wider geographical context, such as Gauteng or South Africa, may have been compromised.

Group Comparisons

The respondents of the study were largely considered as a single group, ignoring some of the criteria that distinguish them into separate groups. Such criteria include age, sex, location, literacy etc. Separating the respondents into sub-groups based on these criteria could have provided for richer interpretation of the data as comparisons would have been carried out between groups.

Suggestions for Future Research

Chigada and Hirschfelder (2016) reiterate the notion that there is limited literature on mobile money, especially in the Sub-Saharan Africa context. This study aims to add to the body of knowledge in that respect and, in light of the limitations to the study, suggest areas for future research in mobile money.

For future studies, the researcher could consider a more stringent definition of what an unbanked population is in order to compare adoption factors significant to the truly unbanked as opposed to those who are banked and may be underserved. The effect of age, sex and literacy on Behavioural Intention to adopt MMTs could be considered for future research in

order to provide a more informed view of the motivations of individuals in the unique groups defined by these criteria.

Longitudinal studies may be considered in future in order to get a better understanding of the relationships between identified adoption factors and their intended effect of influencing adoption of MMTs. According to Bhattacherjee (2012), longitudinal field surveys present the advantage of assessing sets of variables over a period of time. This could identify the changes in the effects of the variables in order to determine their applicability as pre-adoption and post-adoption influences of MMTs. Future research may also consider an expansion of the study to other geographical areas within South Africa, as well as outside South Africa, in order to improve the ability to generalize to a greater population. Exploring why some factors are more significant in some contexts and not others may be a potential future research area which could make use of a qualitative approach as opposed to the quantitative approach used in this study.

The focus of this study was on adoption and not use, hence studies on the use of MMTs could be considered in future where such models as UTAUT, IS Continuance and Expectation Confirmation Theory could be employed for the exploration of other related dependent variables. UTAUT could aid in providing an understanding of the Usage Behaviour following Behavioural Intention to adopt MMTs in light of such factors as Social Influence. The Expectation Confirmation Theory would seek to explain post-adoption satisfaction in MMTs and how user expectations, perceived performance and disconfirmation of beliefs affect this. IS Continuance could, then, provide insight into how post-adoption continual use of MMTs would be influenced by user satisfaction in the use of MMTs.

To expand on Trust-based adaptations, future research may investigate the intention to adopt MMTs, or other technologies, in high-risk countries such as Nigeria, or in countries where the banking services are not as developed.

Trialability was found to be an insignificant factor in influencing the behavioural intention to adopt MMTs in this study. This could have possibly been due to the respondents misunderstanding the questions pertaining to Trialability. In light of this, future research may consider studies to determine the context in which Trialability may be significant in influencing adoption.

Final Remarks

In a 2017 report by GSMA, the expansion of mobile money in Sub-Sahara Africa was cited as a facilitator for new opportunities for productivity and efficiency gains by individuals, governments and enterprise as it has provided access to more complex financial products. Financial inclusion seems to be the hot topic driving mobile money in Africa, with the aim of serving the unbanked. However, based on findings of this study, South Africa may have a different narrative regarding the unbanked as there may be evidence of this group being small or being addressed through banks that provide mobile money services to the unbanked. The relevance of the unbanked as an anchor to the adoption of mobile money in South Africa, then, becomes questionable and prompts for investigation into what would drive the adoption of mobile money in this context.

Mobile money can still be considered to be in its infancy, with great potential to grow and evolve to other uses in both developed and developing regions. Perhaps the drivers for the adoption of mobile money are beginning to become less about the need to serve the unbanked and more about other agendas such as promoting paperless money economies and instant cross-border remittances. Understanding the key factors in the adoption of MMTs becomes of high importance in order to ensure a high up-take for such uses. Research studies such as these could then be called upon to provide insight, to academia and practice, on adoption factors that are significant for developing regions.

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Mobile Money Transfer Adoption Questionnaire	
Section 1 - Demographics	
1. Please indicate your age	
2. Please indicate your gender	
3. Please indicate your monthly income:	☐ < R1000 ☐ R1000 – R5 000 ☐ R5 001 – R9 000 ☐ R9 001 – R14 000 ☐ R14 001 – R18 000 ☐ R18 001 – R22 000 ☐ R22 001 – R26 000 ☐ R26 001 – R30 000 ☐ > R30 000 ☐ Prefer not to say
4. What is your employment status?	☐ Employed ☐ Unemployed
5. If employed, what sector do you work in?	☐ Formal Sector ☐ Informal Sector ☐ Other (*Please Specify*).....

6. Do you have a bank account?	☐ Yes ☐ No
7. Are you the primary income earner in your household	☐ Yes ☐ No
8. Do you know what Mobile Money is?	☐ Yes ☐ No
9. Do you currently use mobile money transfer applications? If so which	☐ No ☐ M-Pesa ☐ EcoCash ☐ Wizzit

Section 2 - Mobile Money Transfer Adoption Questions

Question	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. Mobile money transfer would be a convenient way to send	1	2	3	4	5
2. Mobile money transfer would allow me to send money to	1	2	3	4	5
3. Mobile money transfer would allow me to send money to	1	2	3	4	5
4. Mobile money transfer would give me greater control of how I	1	2	3	4	5
5. Based on my daily activities, I would prefer to send money to people using mobile money transfers as opposed to other	1	2	3	4	5
6. Mobile money transfer would be compatible with my lifestyle.	1	2	3	4	5
Question	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
7. Mobile money transfer would fit into my working style.	1	2	3	4	5
8. I would use mobile money transfer as I can access it at any	1	2	3	4	5

9. Using mobile money transfers means I will not need to get into	1	2	3	4	5
10. I believe that if I send money via mobile money transfer, the people I am sending the money	1	2	3	4	5
11. I would prefer to use mobile money transfer as it can be accessed when I am travelling	1	2	3	4	5
12. I believe I will be able to see immediate results from the use of mobile money transfer	1	2	3	4	5
13. I think I will need a lot of technical knowledge in order to be able to use mobile money	1	2	3	4	5
14. Transferring money from my phone could become frustrating.	1	2	3	4	5
15. I would find it difficult to use mobile money transfer.	1	2	3	4	5
16. I want to try Mobile Money Transfer for at least one month before I start using it full-time	1	2	3	4	5
17. I want to use Mobile Money Transfer on a trial basis to see	1	2	3	4	5
18. I want to try mobile money transfer first without using real money in order to see how it	1	2	3	4	5
19. I think my money will be safe if I transfer it using my mobile network operator (e.g.	1	2	3	4	5
20. I think my mobile network operator (e.g. Vodacom, MTN, Cell C etc.) would be reliable	1	2	3	4	5
21. I trust my mobile network operator (e.g. Vodacom, MTN, Cell C etc.) to successfully	1	2	3	4	5
Question	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
22. I will use Mobile Money Transfer if it is made available	1	2	3	4	5
23. I intend to use Mobile Money Transfer in the future.	1	2	3	4	5

24. I will regularly use Mobile Money Transfer in the future.	1	2	3	4	5
25. Would you be comfortable to use mobile money transfers?	☐ Yes ☐ No				
26. How much money are you comfortable with sending via mobile money transfer?	☐ <R1000 ☐ R1 000 – R5 000				
27. What would you be comfortable with using mobile money transfer for?	☐ Sending money to family and friends. ☐ Sending money for business transactions. ☐ Payments for municipality bills e.g. electricity, water and rates				

Participation Letter

Good Day

My name is Simbarashe Garapo and I am a Masters student in the Information Systems Division at the University of the Witwatersrand, Johannesburg. I am conducting research on the factors influencing the adoption of mobile money transfers in South Africa. Mobile money transfer is viewed as a means by which money can be transferred between individuals with the use of mobile phones.

As an adult and user of mobile phones, you are invited to take part in this survey. The purpose of this survey is to find out the extent to which adoption factors contribute to the take-up of mobile money transfer services.

Your response is important and there are no right or wrong answers. This survey is both confidential and anonymous. Anonymity and confidentiality are guaranteed by not needing to enter your name, Identification Number, Phone Number, or any details that may be used to identify you on the questionnaire. Your participation is completely voluntary and involves no risk, penalty, or loss of benefits whether or not you participate. You may withdraw from the survey at any stage.

The first part of the survey captures some demographic data. Please tick whichever boxes are applicable. The second part of the survey comprises 25 statements. Please indicate the extent to which you agree with each statement by ticking the appropriate box. The entire survey should take between 10 to 15 minutes to complete. Please note that the University of the Witwatersrand maintains a strict adherence to ethical conduct, and as such, this study has been reviewed and awarded an ethical certificate. The ethics certificate **Protocol Number is CINFO/1153.**

Thank you for considering participating. Should you have any questions, or should you wish to obtain a copy of the results of the survey, please contact me at 1323953@students.wits.ac.za or 084 278 2204. My supervisor's name and email are: Mitchell Hughes Mitchell.Hughes@wits.ac.za.

Kind regards

Simbarashe Garapo
Masters Student: Division of Information Systems
School of Economic and Business Sciences

Appendix C – Consent Form

Participation Consent Form

Title of research project: Investigating Mobile Money Transfer adoption in South Africa: Applying an adapted diffusion of innovations model

Name/s of principal researcher/s: Simbarashe Garapo.
Department/research group address: Information Systems.
Telephone: 084 278 2204.
Email: 1323953@students.wits.ac.za

Nature of the research:
A quantitative research that will make use of data analysis of participant responses to determine significance of factors influencing the adoption of mobile money transfers in South Africa.

Participant's involvement:
To provide responses to the questionnaire administered.

What's involved?
Risks: None
Benefits: Gaining an understanding of the intention to adopt mobile money transfers by individuals through assessing their responses on the factors that influence the adoption.

I, the Participant, acknowledge the following:

- I agree to participate in this research project.
- I have read this consent form and the information it contains and had the opportunity to ask questions about them.
- I agree to my responses being used for education and research on condition that my privacy is respected, subject to the following:
  - I understand that my personal details will not / may be included in the research / will be used in aggregate form only, so that I will not be personally identifiable (delete as applicable.)
  - I understand that I am under no obligation to take part in this project.
  - I understand I have the right to withdraw from this project at any stage.

Signature of Participant:

Signature of person who sought consent:

Name of person who sought consent: Simbarashe Garapo

Appendix D – Ethics Certificate

Faculty of Commerce, Law and Management
University of the Witwatersrand, Johannesburg

School of Economic and Business Sciences
Private Bag X3, WITS, 2050, South Africa • Telephone: +27 11 717 8004 •
email: Siyabonga.Molaba@wits.ac.za

CLEARANCE CERTIFICATE **PROTOCOL NUMBER: CINFO/1153**

PROJECT: **INVESTIGATING MOBILE MONEY TRANSFER ADOPTION IN SOUTH AFRICA: APPLYING AN ADAPTED DIFFUSION OF INNOVATIONS MODEL**

INVESTIGATOR: Simbarashe Garapo

STUDENT NUMBER: **1323953**

SCHOOL: SEBS

DATE CONSIDERED: 03 August 2017

DECISION OF THE ETHICS COMMITTEE: Approved

NOTE

Unless otherwise specified this ethics clearance is valid for 1 year and may be renewed upon application.
Please remember to include the protocol number above to your participation letter.

DATE: 11/08/2017 **CHAIRPERSON: Jean-Marie Bancilhon**

cc: Supervisor:

Mitchell Hughes

SCHOOL OF ECONOMIC & BUSINESS SCIENCES

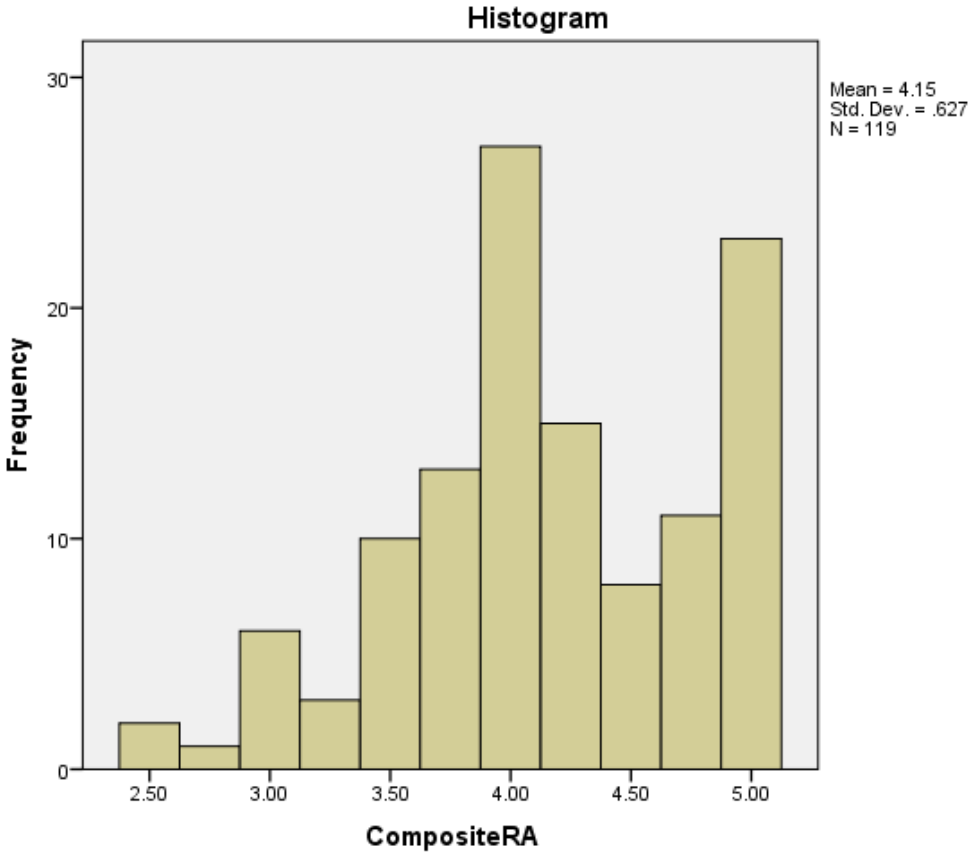
Rotated Component Matrix[a]							
	Component						
	1	2	3	4	5	6	7
SMEAN(RA1)				.759			
SMEAN(RA2)							
SMEAN(RA3)				.810			
SMEAN(RA4)				.706			
SMEAN(Comp1)	.700						
SMEAN(Comp2)	.738						
SMEAN(Comp3)							
SMEAN(Obs1)							
SMEAN(Obs2)		.553					
SMEAN(Obs3)		.665					
SMEAN(Obs4)		.808					
SMEAN(Obs5)		.715					
SMEAN(Compl1)							.788
SMEAN(Compl2)						-.782	
SMEAN(Compl3)						-.678	
SMEAN(Tri1)					.860		
SMEAN(Tri2)					.919		
SMEAN(Tri3)					.797		
SMEAN(Tru1)			.784				
SMEAN(Tru2)			.838				
SMEAN(Tru3)			.881				
SMEAN(Int1)	.714						
SMEAN(Int2)	.800						
SMEAN(Int3)	.691						
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							
a. Rotation converged in 7 iterations.							

Descriptive Statistics of Composites

Descriptive Statistics			
	Mean	Std. Deviation	N
CompositeInt	4.0107	.83175	119
CompositeRA	4.1534	.62700	119
CompositeComp	3.8334	.87311	121
CompositeObs	4.1668	.62210	120
CompositeCompl	2.0023	.81649	116
CompositeTri	3.2033	1.16148	122
CompositeTru	3.5905	.86654	116

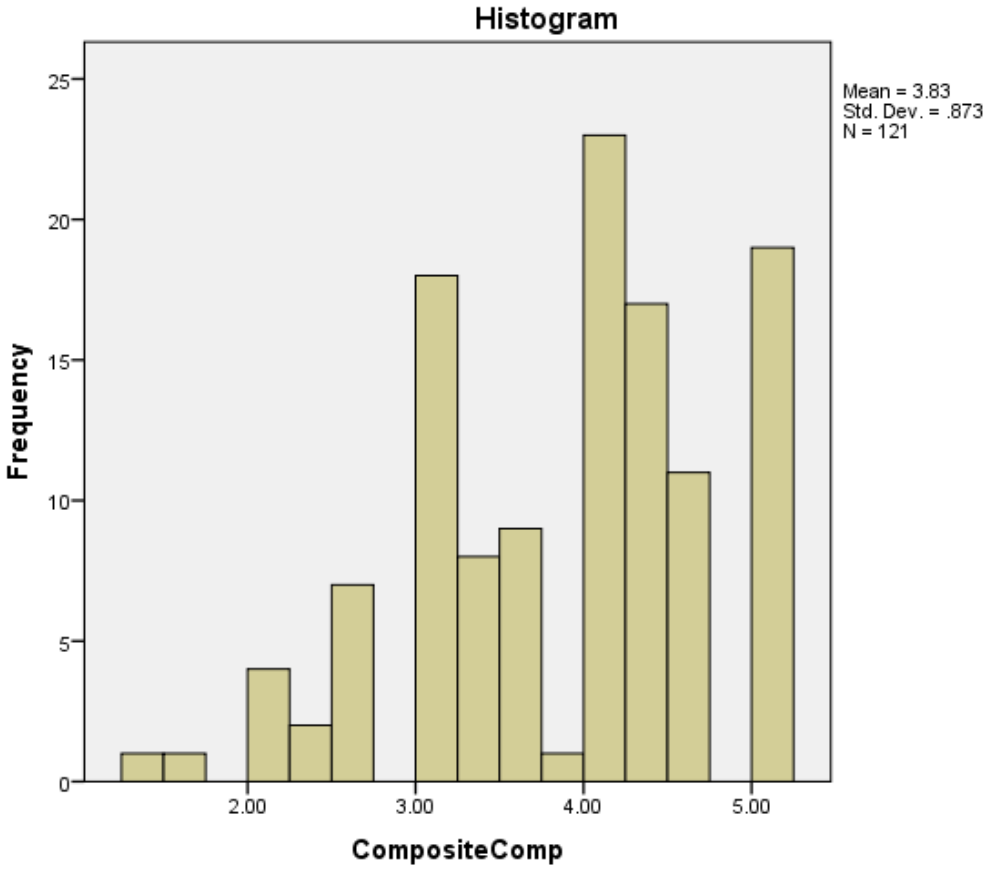
Distribution of Relative Advantage (RA)

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeRA	.118	119	.000	.936	119	.000
a. Lilliefors Significance Correction						



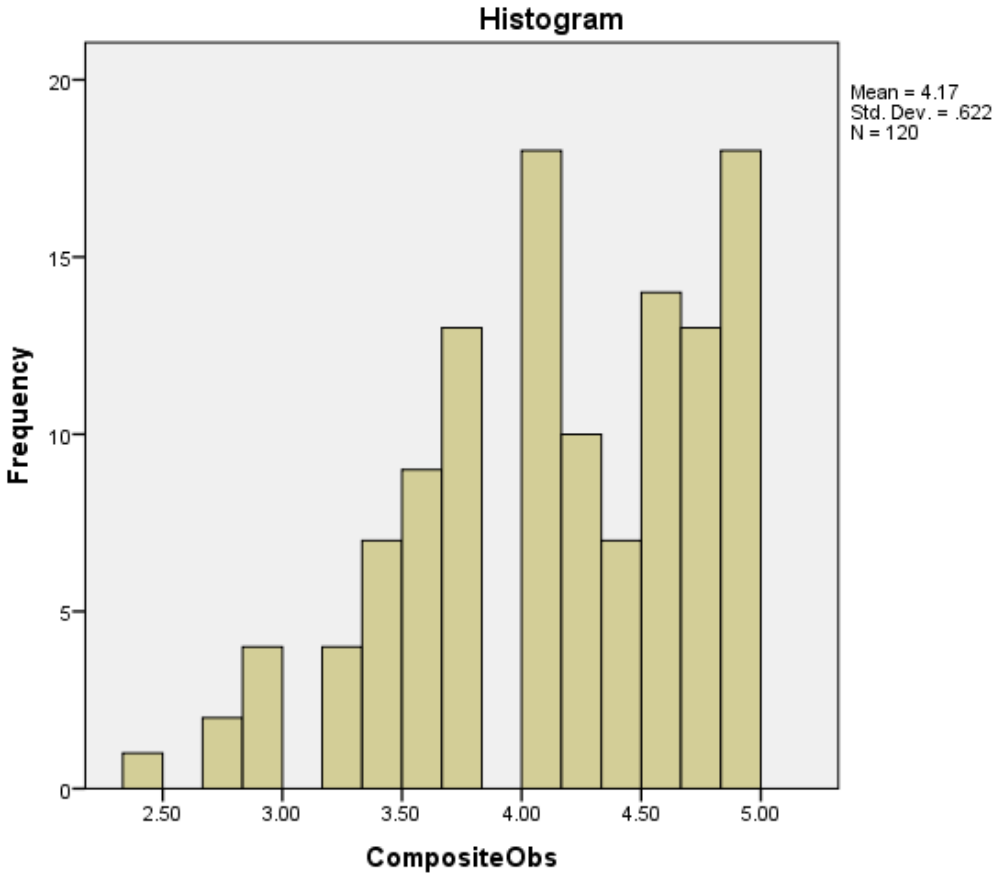
Distribution of Compatibility

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeComp	.154	121	.000	.939	121	.000
a. Lilliefors Significance Correction						


Histogram
Mean = 3.83
Std. Dev. = .873
N = 121
Frequency
25
20
15
10
5
0
2.00
3.00
4.00
5.00
CompositeComp

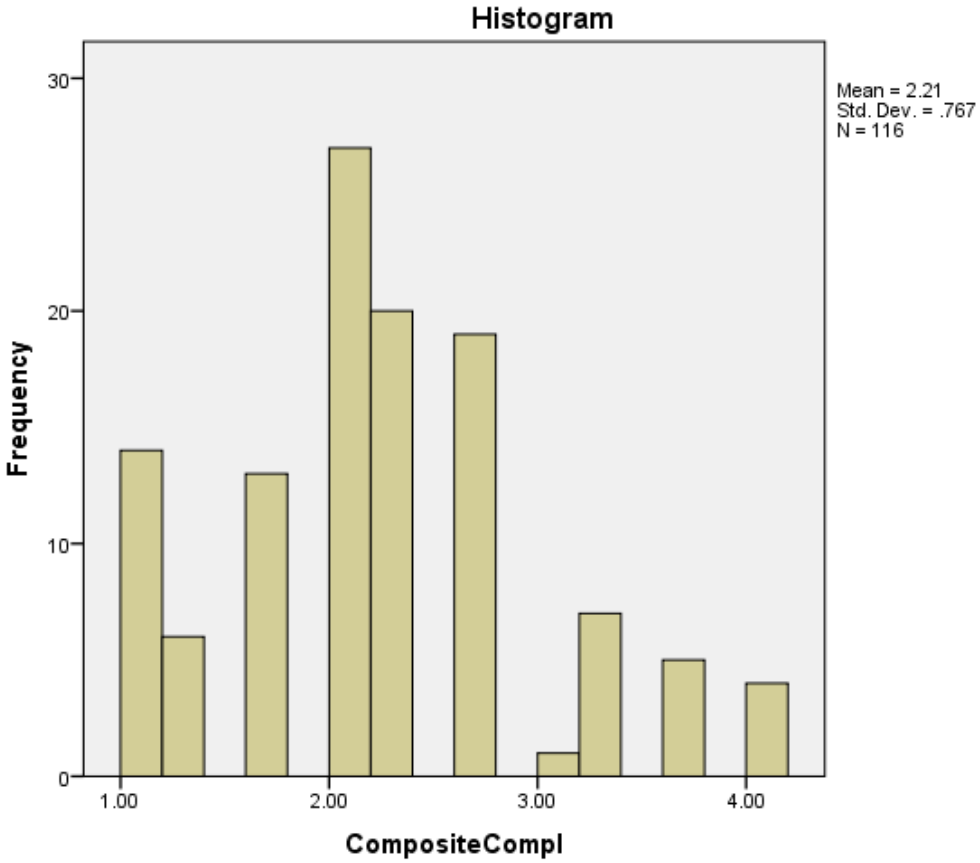
Distribution of Observability

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeObs	.132	120	.000	.945	120	.000
a. Lilliefors Significance Correction						



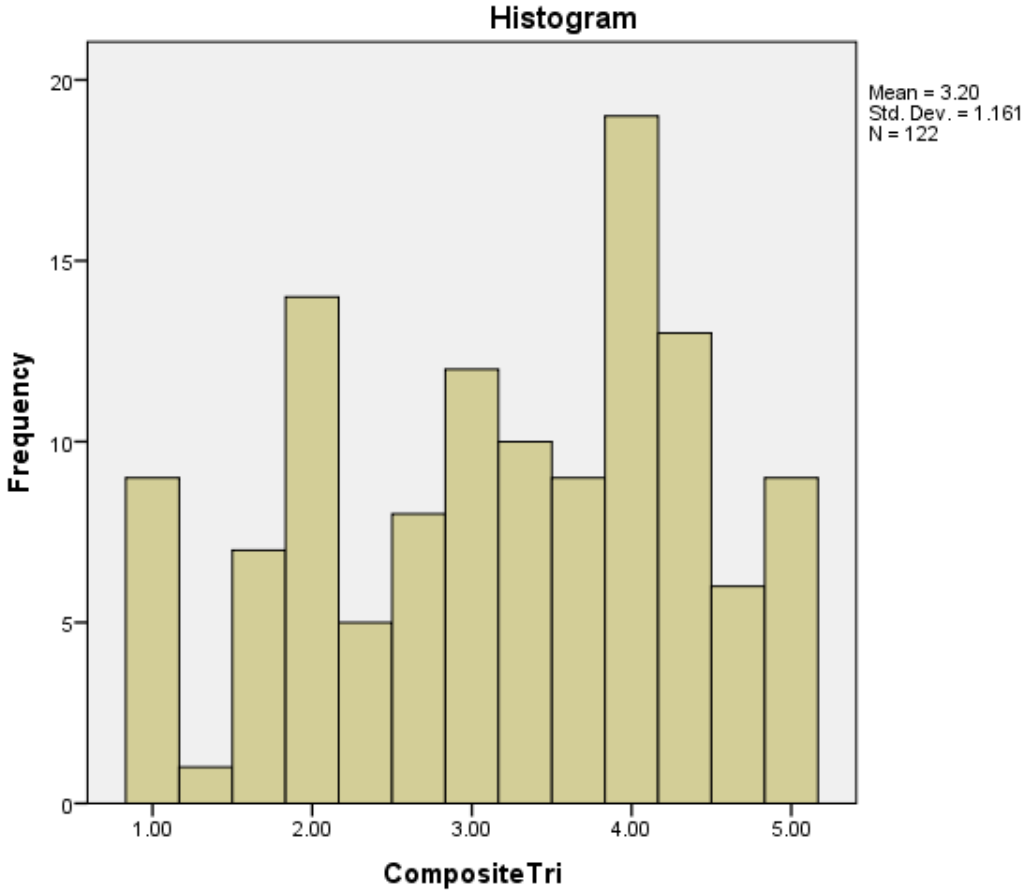
Distribution of Complexity

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeCompl	.123	116	.000	.943	116	.000
a. Lilliefors Significance Correction						



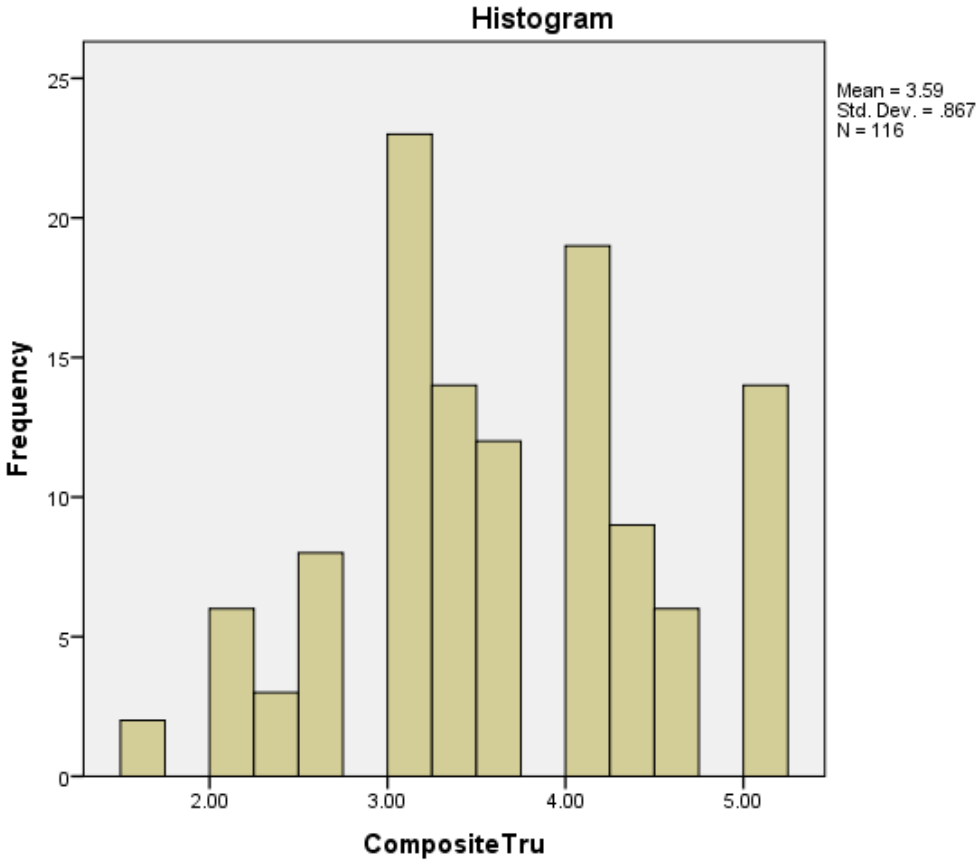
Distribution of Trialability

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeTri	.139	122	.000	.946	122	.000
a. Lilliefors Significance Correction						



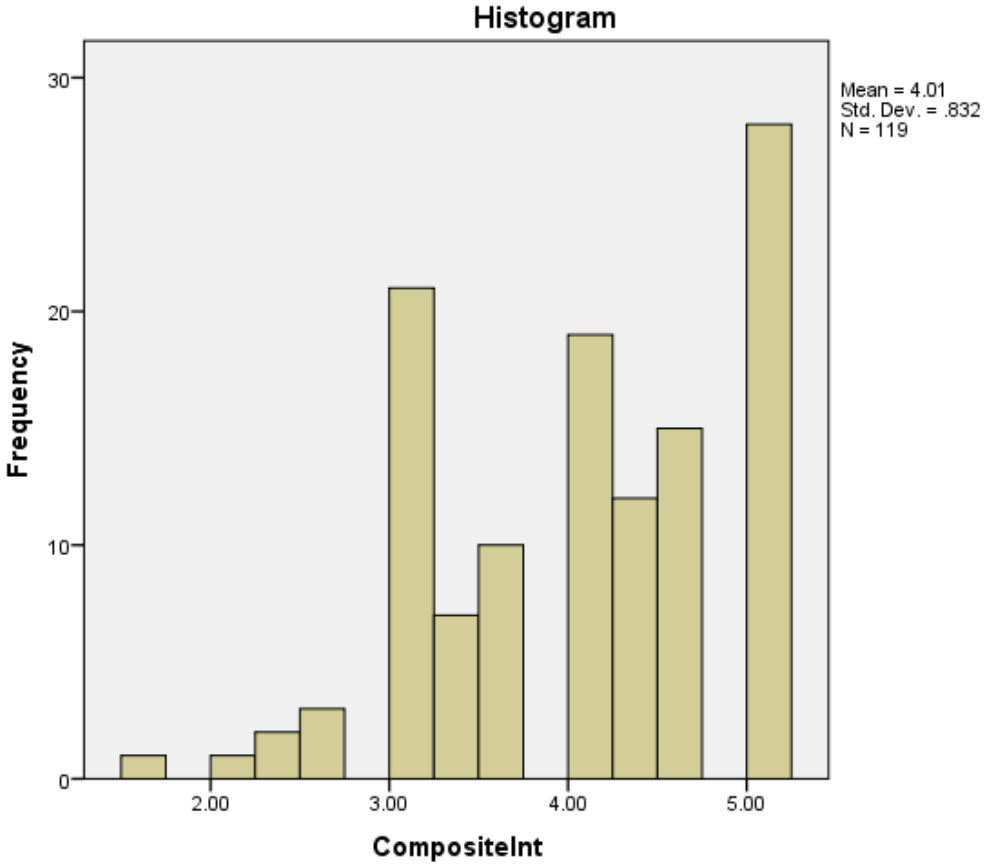
Distribution of Trust

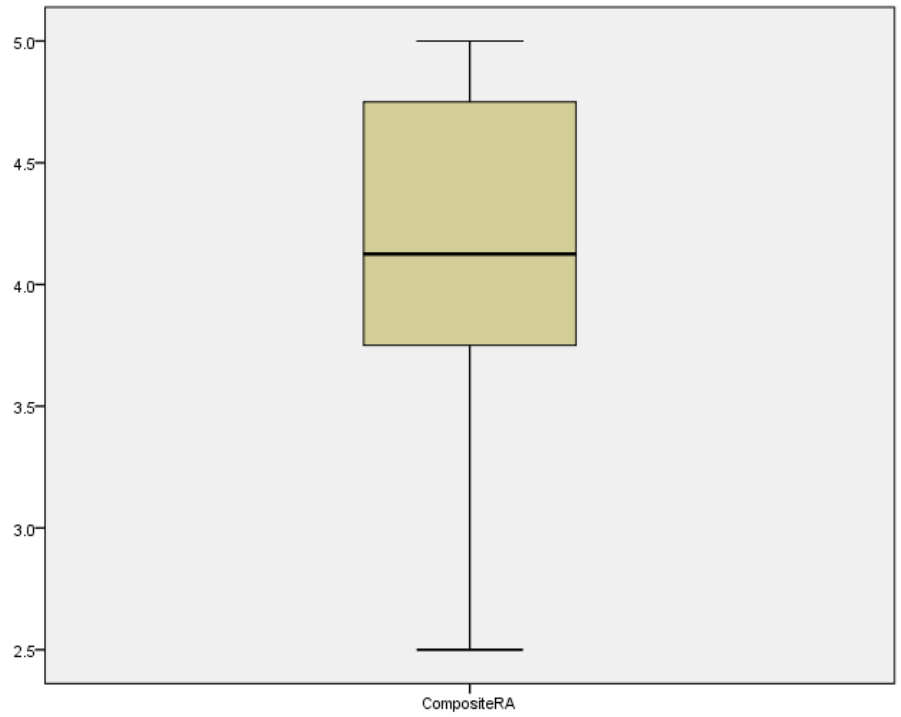
Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeTru	.114	116	.001	.957	116	.001
a. Lilliefors Significance Correction						



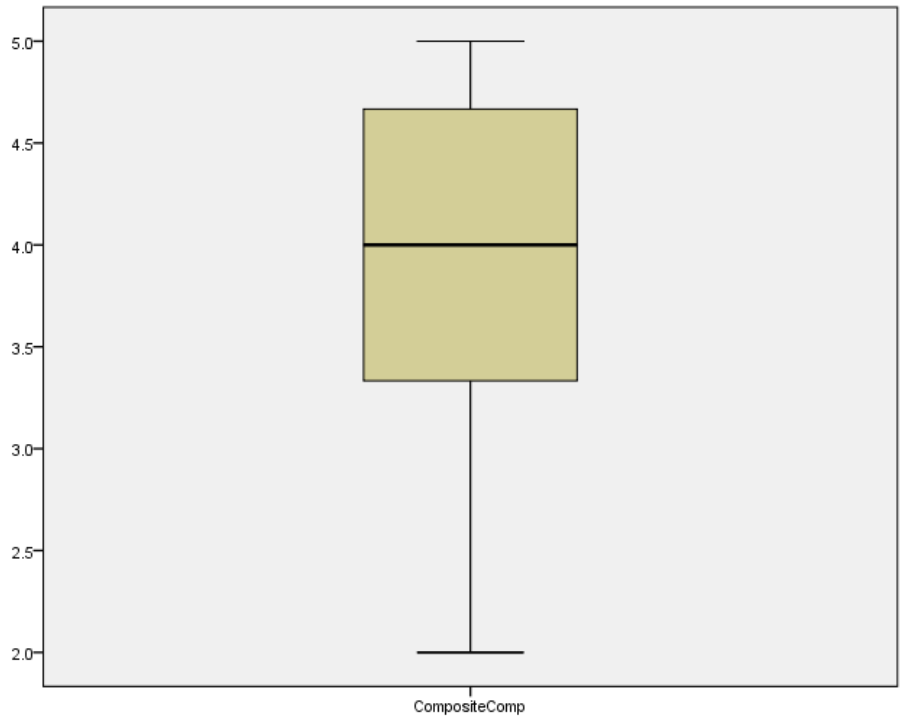
Distribution of Behavioural Intention to Adopt

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CompositeInt	.146	119	.000	.910	119	.000
a. Lilliefors Significance Correction						

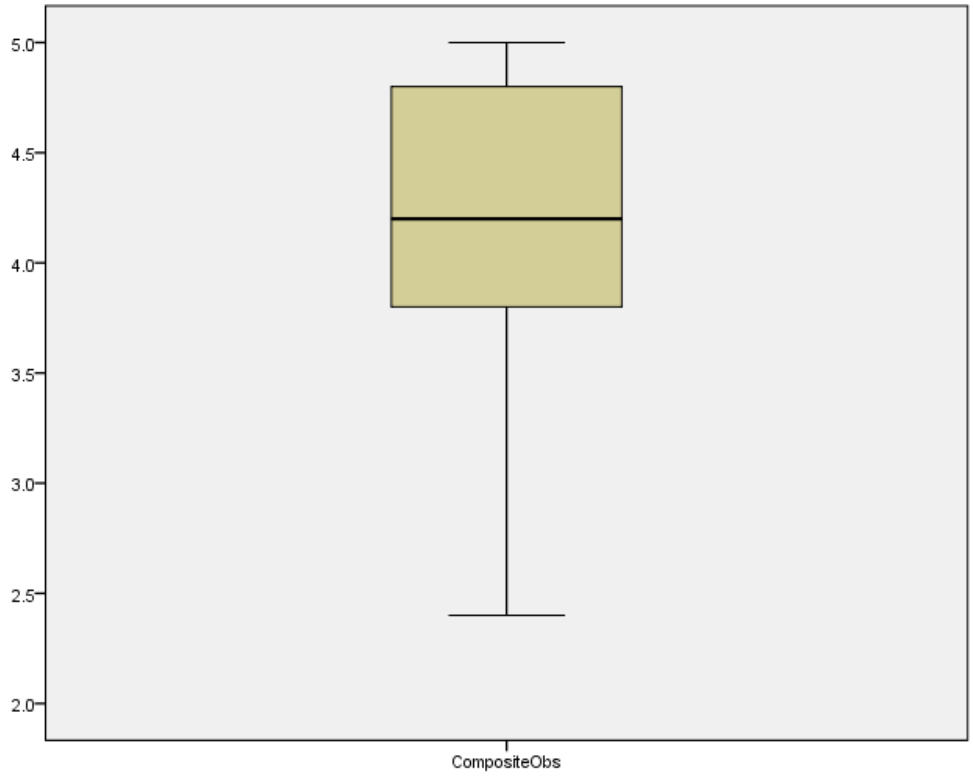




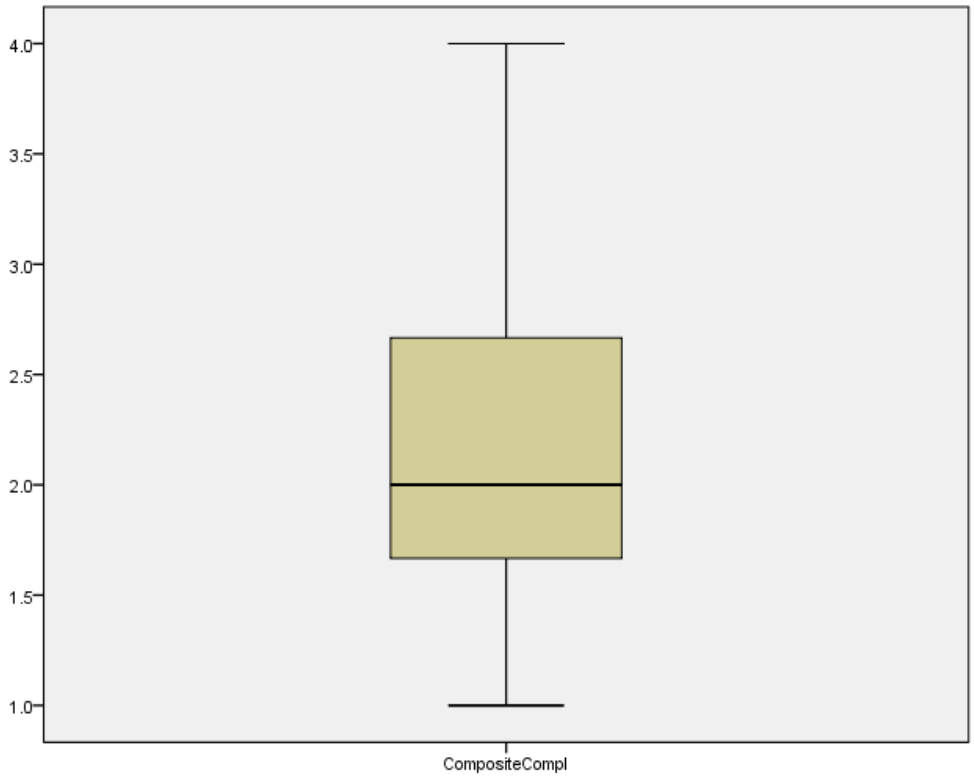
Relative Advantage (RA) Box Plot



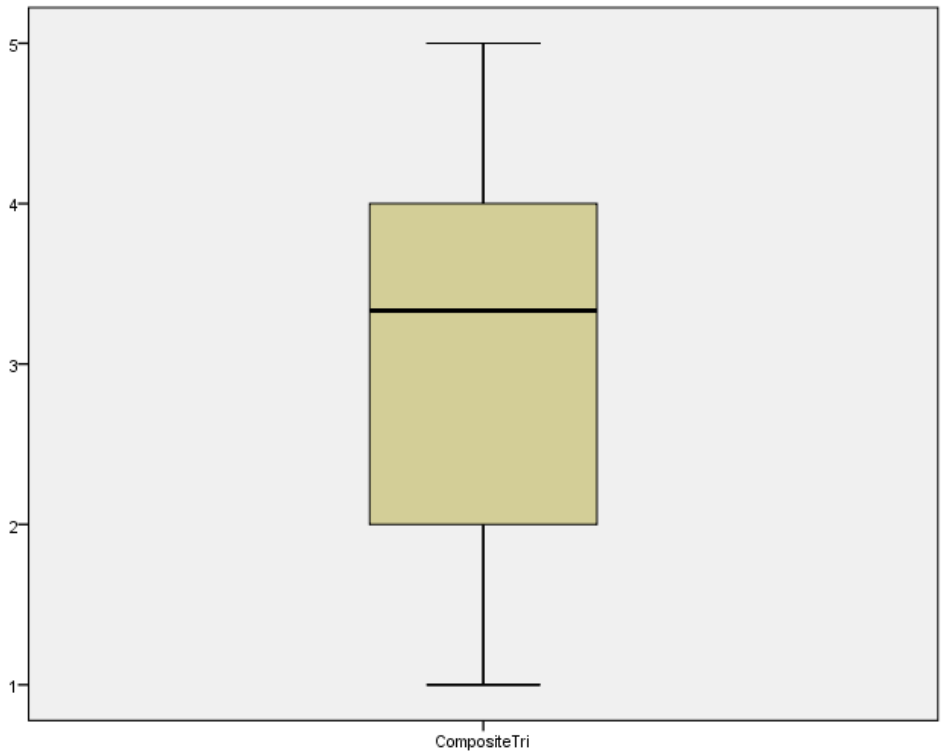
Compatibility (Comp) Box Plot



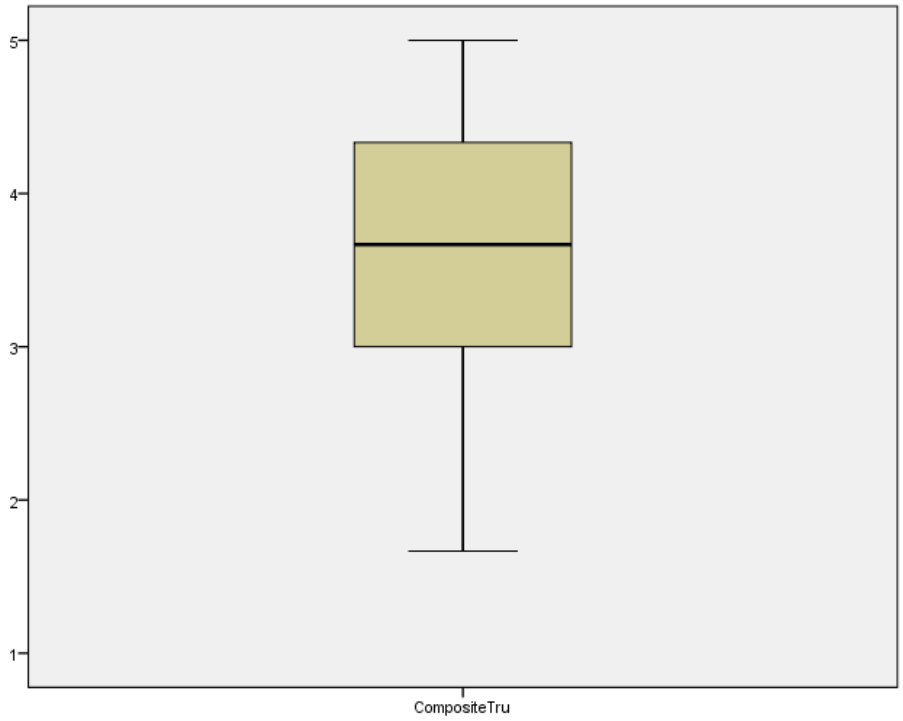
Observability (Obs) Box Plot



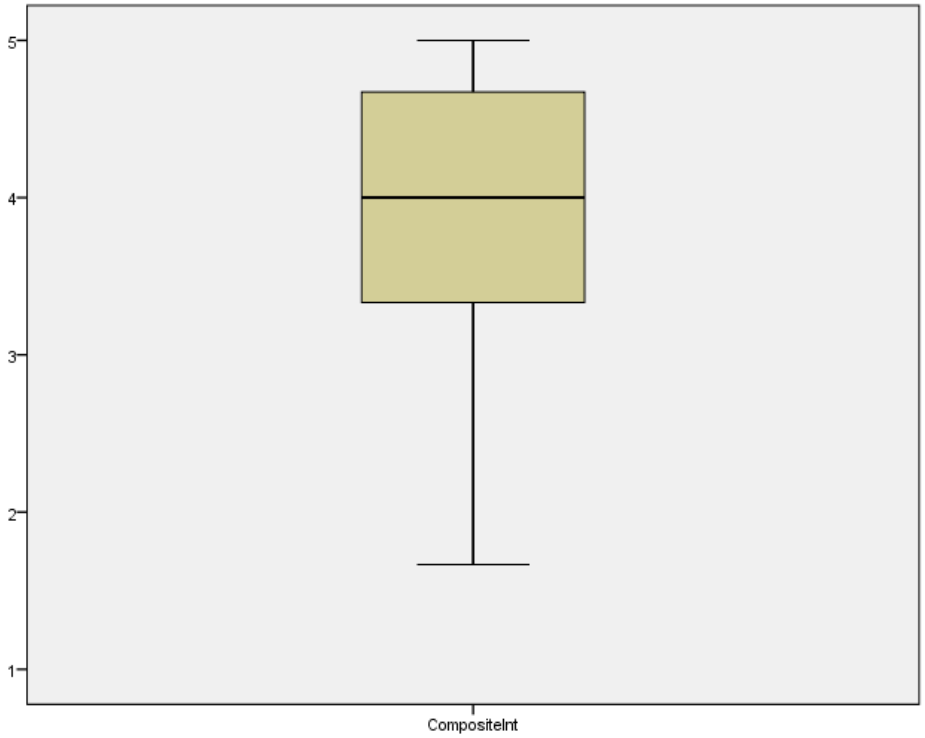
Complexity (Compl) Box Plot



Trialability (Tri) Box Plot



Trust (Tru) Box Plot



Behavioural Intention to Adopt (Int) Box Plot

Reliability of Relative Advantage

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.834	.839	4

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SMEAN(RA1)	12.345	3.804	.754	.637	.755
SMEAN(RA2)	12.210	3.930	.633	.539	.803
SMEAN(RA3)	12.538	3.573	.681	.496	.782
SMEAN(RA4)	12.748	3.631	.607	.400	.820

Reliability of Compatibility

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.856	.861	3

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SMEAN(Comp1)	7.732	3.193	.669	.497	.864
SMEAN(Comp2)	7.642	3.244	.829	.694	.712
SMEAN(Comp3)	7.627	3.368	.705	.580	.822

Reliability of Observability

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.814	.814	5

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SMEAN(Obs1)	16.683	6.689	.561	.368	.791
SMEAN(Obs2)	16.451	7.061	.463	.227	.818
SMEAN(Obs3)	16.684	6.155	.656	.480	.762
SMEAN(Obs4)	16.718	6.360	.649	.473	.765
SMEAN(Obs5)	16.801	6.132	.695	.529	.750

Reliability of Complexity

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.510	.550	3

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SMEAN(Compl1)	4.005	2.667	.217	.053	.656
SMEAN(Compl2)	4.483	3.035	.369	.242	.346
SMEAN(Compl3)	4.746	3.084	.443	.263	.260

Reliability of Trialability

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.875	.879	3

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SMEAN(Tri1)	6.454	5.662	.802	.709	.785
SMEAN(Tri2)	6.410	5.831	.814	.716	.778
SMEAN(Tri3)	6.356	5.709	.674	.455	.908

Reliability of Trust

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.879	.880	3

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SMEAN(Tru1)	7.211	3.235	.715	.520	.876
SMEAN(Tru2)	7.147	3.187	.819	.678	.785
SMEAN(Tru3)	7.185	3.133	.770	.628	.826

Reliability of Behavioural Intention to Adopt

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.885	.887	3

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SMEAN(Int1)	7.982	3.105	.755	.573	.856
SMEAN(Int2)	7.940	2.991	.804	.647	.814
SMEAN(Int3)	8.143	2.683	.779	.614	.840

Correlations							
		CompositeInt	CompositeRA	CompositeComp	CompositeObs	CompositeCompl	CompositeTri
Pearson Correlation	CompositeInt	1.000	.561	.610	.519	-.373	-.286
	CompositeRA	.561	1.000	.623	.620	-.345	-.145
	CompositeComp	.610	.623	1.000	.656	-.356	-.228
	CompositeObs	.519	.620	.656	1.000	-.439	-.248
	CompositeCompl	-.373	-.345	-.356	-.439	1.000	.346
	CompositeTri	-.286	-.145	-.228	-.248	.346	1.000
Sig. (1-tailed)	CompositeInt	.	.000	.000	.000	.000	.001
	CompositeRA	.000	.	.000	.000	.000	.057
	CompositeComp	.000	.000	.	.000	.000	.006
	CompositeObs	.000	.000	.000	.	.000	.003
	CompositeCompl	.000	.000	.000	.000	.	.000
	CompositeTri	.001	.057	.006	.003	.000	.
N	CompositeInt	119	116	118	117	113	119
	CompositeRA	116	119	119	119	114	119

	CompositeComp	118	119	121	120	115	121
	CompositeObs	117	119	120	120	114	120
	CompositeCompl	113	114	115	114	116	116
	CompositeTri	119	119	121	120	116	122

KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.864
Bartlett's Test of Sphericity	Approx. Chi-Square	2144.242
	df	276
	Sig.	.000

Regression Tests

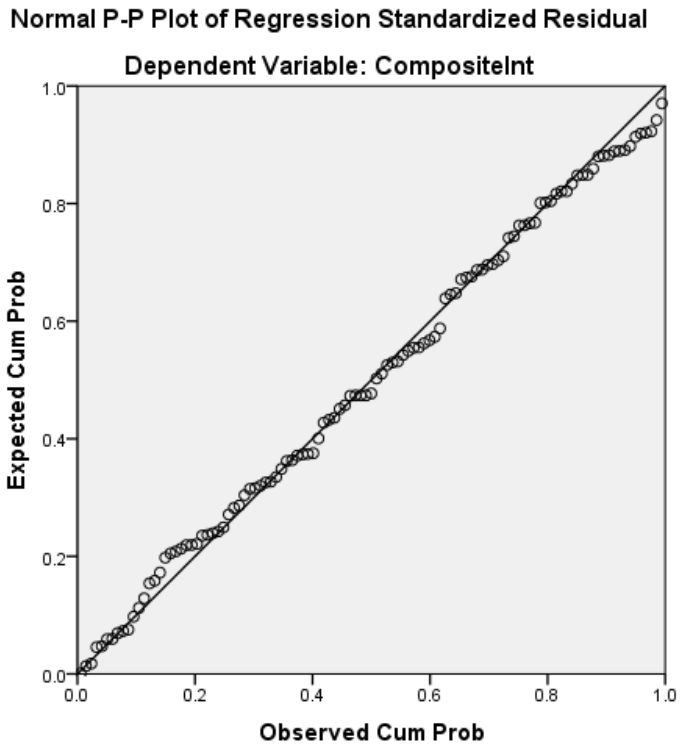
ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.456	5	7.091	18.054	.000[b]
	Residual	42.027	107	.393		
	Total	77.483	112			

a. Dependent Variable: CompositeInt

b. Predictors: (Constant), CompositeTri, CompositeRA, CompositeCompl, CompositeComp, CompositeObs

Collinearity Diagnostics[a]									
				Variance Proportions					
Model	Dimension	Eigenvalue	Condition Index	(Constant)	CompositeRA	CompositeComp	CompositeObs	CompositeCompl	CompositeTri
1	1	5.703	1.000	.00	.00	.00	.00	.00	.00
	2	.184	5.573	.00	.00	.02	.01	.27	.10
	3	.081	8.412	.00	.00	.00	.00	.44	.80
	4	.018	17.894	.11	.04	.83	.05	.08	.07
	5	.009	25.881	.09	.93	.02	.28	.01	.00
	6	.006	30.330	.80	.03	.13	.67	.20	.04

a. Dependent Variable: CompositeInt



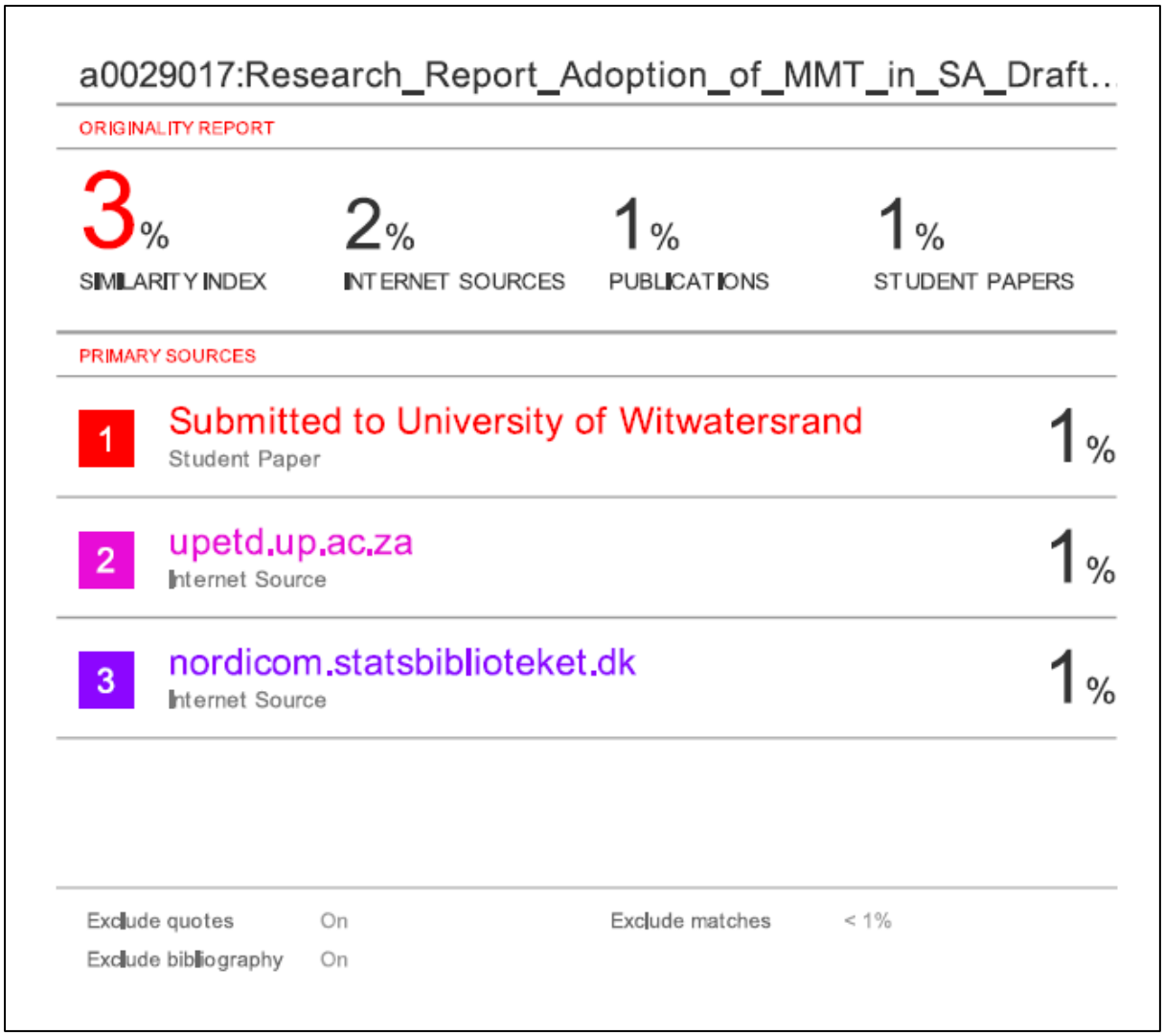
Correlations

		CompositeInt	CompositeRA	CompositeComp	CompositeObs	CompositeCompl	CompositeTri
Pearson Correlation	CompositeInt	1.000	.561	.610	.519	-.373	-.286
	CompositeRA	.561	1.000	.623	.620	-.345	-.145
	CompositeComp	.610	.623	1.000	.656	-.356	-.228
	CompositeObs	.519	.620	.656	1.000	-.439	-.248
	CompositeCompl	-.373	-.345	-.356	-.439	1.000	.346
	CompositeTri	-.286	-.145	-.228	-.248	.346	1.000
Sig. (1-tailed)	CompositeInt	.	.000	.000	.000	.000	.001
	CompositeRA	.000	.	.000	.000	.000	.057
	CompositeComp	.000	.000	.	.000	.000	.006
	CompositeObs	.000	.000	.000	.	.000	.003
	CompositeCompl	.000	.000	.000	.000	.	.000
	CompositeTri	.001	.057	.006	.003	.000	.
N	CompositeInt	119	116	118	117	113	119
	CompositeRA	116	119	119	119	114	119
	CompositeComp	118	119	121	120	115	121
	CompositeObs	117	119	120	120	114	120
	CompositeCompl	113	114	115	114	116	116
	CompositeTri	119	119	121	120	116	122

Perceived Innovation Attributes	Definition
Relative Advantage (Perceived Usefulness)	the degree to which adopting/using the IT innovation is perceived as being better than using the practice it supersedes
Image	the degree to which adoption/usage of the innovation is perceived to enhance one's image or status in one's social system
Compatibility	the degree to which adopting the IT innovation is compatible with what people do
Complexity (Ease of Use)	the degree to which using a particular system is free of effort
Trialability	the degree to which one can experiment with an innovation on a limited basis before making an adoption or rejection decision
Visibility	the degree to which the innovation is visible in the organization
Result Demonstrability	the degree to which the results of adopting/using the IT innovation are observable and communicable to others

Factors influencing Attitude and Beliefs in Social Norms (Source: Karahanna at al.(1999))

Appendix F – Plagiarism Report (Turnitint)



a0029017:Research_Report_Adoption_of_MMT_in_SA_Draft..

ORIGINALITY REPORT

3%	2%	1%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Witwatersrand Student Paper	1%
2	upetd.up.ac.za Internet Source	1%
3	nordicom.statsbiblioteket.dk Internet Source	1%

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		