FACTORS INFLUENCING SUBSCRIBER ADOPTION OF MOBILE PAYMENTS: A CASE OF SAFARICOM'S LIPA NA M-PESA SERVICE IN EMBU TOWN, KENYA.

BY

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DECLARATION

This research project is my original work and has not been presented to any other institution of higher learning for award of certificate, diploma or degree.

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DEDICATION

I gratefully dedicate this work to my father, the late Col.Geoffrey Baariu Luruti for the endeavors he made towards instilling discipline and fostering my education, also to my mother Rosemary Baariu, for her words of wisdom.

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ACRONYMS AND ABBREVIATION

ATM:	Automatic Teller Machine
CAK:	Communication Authority of Kenya
CEO:	Chief Executive Officer
CMP:	Contactless Mobile Payments
DTPB:	Decomposed Theory of Planned Behavior
ETS:	Electronic Payments System
GSM:	Global System for Mobile
GSMA:	Global System for Mobile Communications Association
IDT:	Innovation Diffusion Theory
IVR:	Interactive Voice Response
LNM:	Lipa Na Mpesa
MP:	Mobile Payments
NFC:	Near Field Communication.
OECD:	Organization for Economic Cooperation and Development
SMS:	Short Message Service
TAM:	Technology Acceptance Model
TRA:	Theory Reasoned Action
TSM:	Trusted Service Management
UICC:	Universal Integrated Circuit Development
UNCTAD:	United Nations Conference and Development
USSD:	Unstructured Supplementary Service Data
WAP:	Wireless Application Protocol
PIN:	Personal identification number
POS:	Point-of-sale

ABSTRACT

M-PESA service was introduced in the year 2007 by Safaricom Company as a business strategy to increase the company's business growth and deepen financial inclusion in Kenya. Currently it is being widely used by a population of various businesses therefore making it thrive in the midst's of many banks. Developed in 2010, Lipa Na M-PESA on the other hand is a recent service from Safaricom Ltd which allows merchants to accept payments for goods and services from their customers using M-PESA's Pay Bill and Buy Goods & Services functionalities. The study sought to establish influences of subscriber adoption of mobile payments: a case of Safaricom's Lipa Na M-PESA service in Embu town, Kenya. The study identified several variables which were used to guide the study and forming the objectives. They are demographic factors, versatility of service, technological features and other types of cashless payment methods. The research design used was descriptive. This targeted Safaricom MPESA subscribers within Embu town who are currently at 2,500 (Embu retail shop annual report, 2013-2014). Additionally, 150 Lipa Na MPESA registered businesses within Embu town were targeted. For this study therefore, the target population included all the Safaricom MPESA subscribers and merchants in Embu town who have registered the Lipa Na M-PESA service for their businesses. Using the Krejcie and Morgan formula/table a margin of error of 5% and 95% confidence interval, 108 samples from the merchants and 333 samples from the MPESA subscribers were settled on. This summed up to 441 respondents for the study. Clustered, purposive and random sampling was used. The questionnaire was tested for content and face validity. Reliability was also tested using the split-half method before administration. Two research assistants were engaged for data collection. Descriptive and inferential statistics were used to analyze, present and interpret data. The coefficient of determination indicated that 58.1% of the variation in the dependent variable can be explained by the independent variables i.e. demographic factors, technological features, types of cashless payments and versatility of service. The rest 41.9% is contributed by factors not studied in this research. The findings for this study are useful to Safaricom Limited, various merchants and businesses and indeed to mobile phone subscribers within Embu County. The study concludes that demographic factors, versatility of service, technological features and cashless payment methods all have an influence on subscriber adoption of mobile payments. The study recommends that awareness creation on LNM should be prioritized by Safaricom Ltd, the creation of a more user friendly LNM interface for subscribers, improvement on technical support response time and lastly prioritization of network coverage improvement within various merchant business premises. Ultimately, Safaricom Limited should endeavor to ensure that there is no disparity of usage amongst different categories (age, sex, income levels, business types, occupational status and education levels) of LNM subscribers.

CHAPTER ONE
INTRODUCTION

1.1Background of the study

Consumer adoption of mobile cellular phones has increased dramatically, representing, in many cases, the primary way by which people communicate across distances. Globally, 2005, there were more than 2.1 billion mobile cellular phone subscribers, representing about 34 percent of the world's population (OECD, 2012). In comparison, in 2005, the number of personal computers in use (just over 900 million) and the number of Internet users (approximately 1 billion) were less than half the number of mobile cellular phone subscribers (OECD, 2012).

Mobile financial service is a term applied to a range of financial activities conducted using mobile devices, such as cellular phones or personal digital assistants. These activities fall into two broad categories: mobile banking and mobile payments (Hashim, 2008). Mobile banking allows bank customers to check balances, monitor transactions, obtain other account information, transfer funds, locate branches or ATMs, and, sometimes, pay bills. M-payment can be understood as a point-of-sale payment made through a mobile device, such as cellular phone or personal digital assistant. According to OECD (2012) what makes M-payment particularly interesting is that the payment services for any retail purchases may well be provided by mobile operators and not by the established banking systems. That is, M-payment provides the mobile operators an opportunity to extend their business operation to financial service area. Anurag, Tyagi and Raddi, (2009) asserted that a number of businesses are able to transact directly with their customers and suppliers through a mobile phone in the palm of their hands without necessarily going through a bank and without having to leave their business premises. Elder & Rashid (2009) posit that other benefits are derived from the fact that the system does not rely on any physical infrastructure such as phone wires and is accessible to a large segment of the population and from the fast speed in transacting money transfers.

The vision 2030 proposes intensified application of Science, Technology and Innovation to raise productivity and efficiency levels across the three pillars i.e. economic, social and political, (Kenya Vision 2030, 2014). In Kenya business practices have gone through many dynamic changes the most important being the introduction of Information Communication Technology (ICT). Mobile phones have been key ICT products that have affected business

practices. This is evidenced in various areas including advertisements, marketing, and emergence of new products and new methods of payments. The methods of payment through the use of mobile phones have been the most recent development in Kenya and have revolutionized how business is conducted among many business holders (Mbiti, 2008).

In line with the Kenya Vision 2030 dream of wanting a Kenya that is advanced in technology where other countries look up to us for technology solutions, Safaricom Ltd in March 2007 launched the mobile money transfer system, the M-PESA. Since then, the mobile payment system has become popular with both the banked and the unbanked population. According to CAK quarterly report (2014), there are 19.3 million users on M-PESA which is 80% of the adult population in Kenya. The report also posits that 19.6 million Kenyans have access to the internet. Many business operators in Kenya have adopted the use of the mobile payments as a way of transacting their business because of the relative affordability of mobile phones and the mobile banking services they offer. There are various transactions carried out using mobile payments such as paying suppliers for goods and services, paying bills, sending money to friends and relatives, withdrawing cash and topping up airtime accounts. Arunga and Kahora (2007) posited that sole proprietors and small businesses in Kenya benefited hugely from the mobile phone revolution as they are able to make savings and gain access to more customers and new services. Omwansa (2009) posits that MPESA is a service whose time had come and whose implementation had occurred in the right context.

1.1.1 Lipa Na M-PESA

According to Njihia (2014), the boom in Kenyans pursuing private businesses cannot be ignored. Kenyans are very resourceful people. The resilience of Kenyans is well known all over the world when it comes to businesses. In this day and age, being employed is not guaranteed after one completes university or college in Kenya. Self-employment in Kenya is becoming the better option for many Kenyans. Safaricom Company in Kenya knows this and has stepped up to help businesses in Kenya run more smoothly. The Lipa Na MPESA service provided by Safaricom in Kenya is one of the many brilliant innovations that Safaricom continues to create. Lipa Na MPESA in Kenya is a service that is already revolutionizing the way businesses in Kenya run.

Lipa Na MPESA in Kenya is a service offered by Safaricom Company that allows business persons to receive payments for goods and services via Mpesa in Kenya (Safaricom Ltd, 2014). Business people in Kenya receive payments for goods and services through using MPESA- Buy Goods service on Safaricom mobile phone in Kenya. The process of paying for

goods and services via Mpesa in Kenya involves accessing your MPESA service, clicking on the Buy Goods option, entering the till number of the business owner and making payments. The Lipa Na Mpesa service in Kenya enables customers in Kenya to pay for goods and services without being charged the transaction fee. This means that the business owner can accept payments from KShs10 to Kshs70, 000 without the customer being charged transaction fee.

Kamau (2013) observes that business owners in Kenya can register for the Lipa Na MPESA service in Kenya by signing up at a Safaricom retail shop anywhere in Kenya. Registration for Lipa Na Mpesa service in Kenya can also be done by a Safaricom authorized dealer or MPESA agent in Kenya. There are several requirements that are needed in order for registration for Lipa Na Mpesa to occur in Kenya; one needs copies of a KRA PIN certificate, identification card and a trading license. This is to ensure that your business in Kenya is registered and you can start using the Lipa Na Mpesa service. Registration of Lipa Na Mpesa service by Safaricom in Kenya is also done to lock out conmen.

According to Safaricom (2014), the obvious advantage of Lipa Na Mpesa in Kenya is the paperless transaction enabled by the service which greatly reduces the risk of theft and fraud. Business owners in Kenya do not have to worry about fake currency while using Lipa Na Mpesa service in Kenya. The business owners in Kenya also do not have to worry about looking for loose change to give to their customers while using Lipa Na Mpesa service in Kenya. Another advantage of Lipa Na Mpesa service in Kenya is increased and enhanced business efficiency. When customers in Kenya pay via the Lipa Na Mpesa service, the business owner does not waste time on counting cash, verifying authenticity and looking for change. Customers in Kenya can also order for goods and pay for them before picking them up or having them delivered. In fact, many supermarkets in Kenya have started utilizing the Lipa Na Mpesa service to enhance online shopping in Kenya. This way a customer can shop online in Kenya, pay for the goods and await delivery from the comfort of their home.

Njihia (2014) posits that Safaricom Company has been on the forefront of major innovations in the telecommunication world in Kenya. Safaricom Company in Kenya has enabled regular Kenyans to access products and services that were previously unavailable to them. Businesses in Kenya can greatly benefit from this Lipa Na Mpesa service. The benefits and convenience make Lipa Na Mpesa service very valuable to all business owners in Kenya.

1.1.2 Mobile Payment Participants

The consumer initiates the mobile payment on a product or service provided by the content provider, using the infrastructure, hardware and software platform provided by the application developers. The transaction is conducted between the consumer and the merchant. The mobile network used to do this comprises elements as a mobile device and a mobile transaction provider. However, the merchant's transaction provider could be different to the consumer therefore the two transaction providers have to be able to interoperate.

The solid arrows in Figure 1 represent a relatively long term relationship between participants whereas the broken arrows represent a transaction specific relationship. This could be for example: the relationship between the consumer and the mobile transaction provider represented in a solid arrow is relatively long term relationship whereas the relationship between the mobile transaction provider and the merchant is a transaction specific relationship.
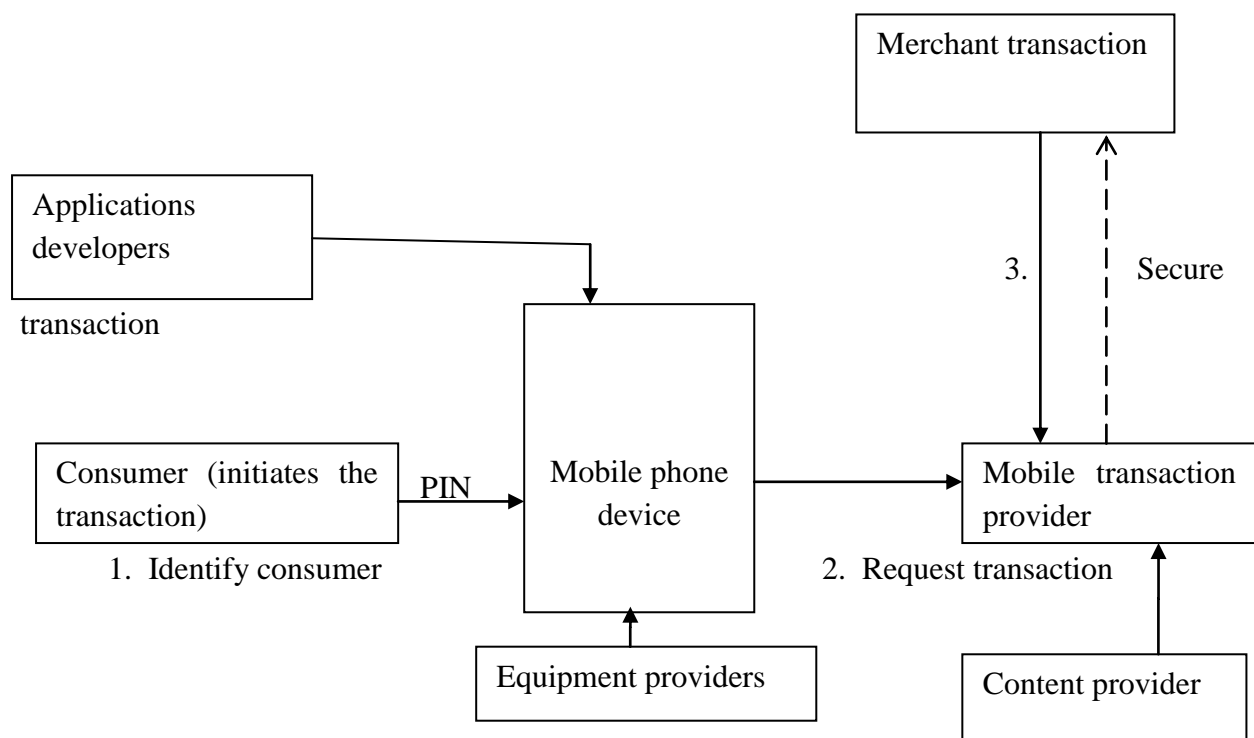
Figure 1: Mobile Payment Participants – (Adapted from: Herzberg (2003); Lehner& Watson (2001)

According to Herzberg (2003), a secure mobile payment transaction comprises of three independent processes: The first is identification, which can be physical identification i.e. possessing the mobile device or use of passwords, biometrics and other identifying methods.

Secondly, we have authentication, where the mobile provider authenticates the transaction from the mobile device. Lastly, is secure performance, where the transaction is performed by the transaction provider possibly involving the merchant's transaction provider and/or other transaction providers.

1.2 Statement of the problem

M-PESA service was introduced in the year 2007 by Safaricom Company as a business strategy to increase the company's business growth and deepen financial inclusion in Kenya. Currently it is being widely used by a population of various businesses therefore making it thrive in the midst's of many banks. Lipa Na M-PESA on the other hand is a recent service from Safaricom Company which allows merchants to accept payments for goods from their customers using M-PESA's Buy Goods service. Customers can also pay bills using the service. According to Safaricom Limited (2014) the buy good functionality is available on the M-PESA menu under payment services. The Pay bill and Buy Good Services were launched by the company in 2010.

By using M-PESA payment services, business owners can accept payment of goods and services from their customers. Customers also handle less cash and are therefore less susceptible to risks associated with cash handling such as theft and fake currency. It is believed that Lipa Na M-PESA will also help traders enhance business efficiency. The diffusion and adoption of mobile phone technology and its application has not only become a conduit for economic development in various sectors of the world's economy but also in the personal lives of its users (Mwabu, 2012). In his survey to determine the product characteristics that influenced the rapid adoption of M-Pesa in Kenya, Mdindi (2012) revealed that the most distinctive factors were that MPESA had relative advantage in terms of simplicity, innovations, safety, and communication both from and to the service among others.

However, previous studies reveal that this application has not yet caught on in the market. According to a study done by Hughes (2013), most of the participants who were considered in the bottom of the economic pyramid that owned a phone did not use it for any applications other than M-PESA. This was primarily due to lack of awareness and marketing, and confusion about the applications. According to Omwansa (2009), several factors had influenced the superior adoption of M-PESA and one of them was the effectiveness of campaigns and customer awareness.

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In spite of the weighty investments, passionate advertising and promotional campaigns, media reports indicate that the usage of Lipa Na MPESA service a product of MPESA, is negligible although there are more than 19 million registered MPESA subscribers (Kamau, 2013). Safaricom Ltd Newsletter (2014) reports suggest that despite the enormous opportunities, subscribers seem incredulous and hesitant to try and use the services. According to Safaricom Ltd newsletter (2014), there are 122,000 Lipa Na MPESA merchants recruited from all business types e.g. hardwares, supermarkets, cafes, hotels etc. of who 40,000 are actively using the service. It is noted that 98% of transactions in Kenya are still cash based. Leading to the question as to, why such a low number of Lipa Na Mpesa transactions?

As an academic scholar and an employee of the company owning the service, the need was thus felt to study other factors influencing adoption of mobile pay service within Embu town focusing on the Lipa Na M-PESA service from Safaricom Company.

1.3 Purpose of the study

The study assessed factors influencing subscriber adoption of mobile payments: A case of Safaricom's Lipa Na M-PESA service in Embu town, Kenya.

1.4 Objectives of the study

The objectives of this study were:

1. To determine how demographic factors influence subscriber adoption of mobile payments in Embu town.
2. To establish the influence of cashless payment methods on subscriber adoption of mobile payments in Embu town.
3. To establish the relationship between versatility of service and subscriber adoption of mobile payments in Embu town.
4. To evaluate how technological features influence subscriber adoption of mobile payments in Embu town.

1.5 Research Questions

The study was guided by the following questions;

1. How do demographic factors influence subscriber adoption of mobile payments in Embu town?
2. How do cashless payment methods influence subscriber adoption of mobile payments in Embu town?

3. What is the relationship between versatility of service and subscriber adoption of mobile payments in Embu town?
4. How do technological features influence subscriber adoption of mobile payments in Embu town?

1.6 Significance of the study

The findings on influences of subscriber adoption of mobile payments are expected to be of benefit to the competitors of Safaricom Ltd as well as other providers of cashless payments. They can use the information in improvement of their own services that will serve as competition to Safaricom's Lipa Na Mpesa.

Secondly, the study findings also enlighten merchants who are not registered on Lipa Na Mpesa on the benefits of the service as well as provide knowledge on its positive and negative impact on their businesses.

The study recommendations are expected to benefit Safaricom Ltd Company in improvement of their mobile pay service (Lipa Na Mpesa) in order to widen their market coverage which in turn will increase the company revenues.

The literature will be useful to scholars as reference material when carrying out research on issues of mobile payments. Further research may be carried out by scholars and researchers who may be interested in closure of study gaps that may have arisen from this research.

1.7 Delimitation of the study

The study was delimited to Lipa Na M-PESA mobile service offered by the Safaricom Company and factors influencing its adoption. Focus was on Safaricom subscribers as well as the business merchants within the town. The locality was delimited to estates within Embu town in Embu County, eastern Kenya with merchant data being targeted from Dallas, Blue valley, Majengo and Embu CBD. Subscriber data was collected from the Safaricom Embu retail shop.

1.8 Limitation of the study

Research studies are prone to challenges posed by field data collection. Some respondents were not willing to disclose any information for unknown fears. Clarification of the academic purpose of the study was done for the assurance of confidentiality of the information being disclosed. Harsh weather influenced data collection considering that data was to be collected from selected businesses within different estates in Embu town. The study faced limitations of illiteracy as some of the subscribers did not know how to read and write therefore guidance

was provided during data collection. These limitations were mitigated by using volunteers who understood the region as well as the local language of the residents for data collection.

1.9 Assumptions of the study

The assumptions of the study were that the sampled population provided adequate and honest information during data collection. It was also assumed that Lipa Na M-PESA service was available in Embu town and that the sampled population would be easily accessible during the data collection procedure.

1.10 Definition of Significant Terms as Used in the Study

Cashless Payment Methods: Form of transacting where cash is not directly exchanged for goods and services. They include contactless payments e.g. mobile payments credit, debit cards, store cards and cheques

Demographic Factors: Involves the statistical study of human populations. It encompasses the study of the size, structure, and distribution of these populations, and spatial and/or temporal changes in them in response to time, birth, migration, aging, and death.

Mobile Payments: Payment transactions initiated or confirmed using a person's mobile cellular phone or personal digital assistant**.**

Subscriber: The term used to refer to a person that has an account with a mobile network carrier. They are called so because they subscribe to the carrier's mobile phone services.

Technological Features: In this usage, technology features refers to entities, both material and immaterial, created by the application of mental and physical effort in order to achieve some value e.g. security, user friendliness and customer support on user problems.

Versatility of service: This refers to the capability of an intangible commodity to do many things competently.

1.11 Organization of Study

This paper was divided into five chapters. Chapter one was the introduction to the study. It incorporated the background of the study, statement of the problem, purpose of the study, four research objectives and questions, significance of the study, delimitation of the study, limitations of the study, assumptions of the study and an operational definition of key terms used within the study.

Chapter two was the literature review. It showed what previous researchers have found out in the area. This consisted of a review of the study objectives followed by the theoretical framework and conceptual framework. The last part of this chapter was the summary and gaps to be filled by the study.

Research methodology was chapter three of the study. This commenced with an introduction to the chapter and its components. This was followed by a discussion on the research design, target population, sampling design and data collection instruments. The data collection instruments section had pilot testing explanation, validity and reliability tests. This was followed by the data collection procedure, methods of data analysis, ethical considerations and operational definition of variables table and summary containing a brief description of the main issues in the chapter.

Chapter four was data analysis, presentation and interpretation. Analysis of data was done and then interpreted in an effort to answer the research questions. Both descriptive and inferential statistics were used for this particular study. These were used to determine if relationships and differences can be considered real or just a chance fluctuation. Estimation of population parameters from sample data was also done.

Chapter five was the last. This comprised of the summary, discussions, conclusion and recommendations as drawn from the results in chapter four. The chapter summarized the findings, indicated results in broad terms, discuss finding by comparing and contrasting with empirical findings reviewed in chapter two, drew conclusions and provided recommendations for improvement and for further studies.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter entails contribution from other scholars on the study objectives which include; cashless payment methods, versatility of service, technology features of mobile pay services and demographic factors influencing adoption of mobile payments. This chapter concludes with the theoretical, conceptual framework and lastly summary and gaps to be filled by the study. This study is important as it added up more knowledge on mobile pay service and its adoption by subscribers. Sources of literature review included books, journals, publications and internet literature.

2.2 Subscriber Adoption of Mobile Payments

Mobile financial services such as mobile payments can offer consumer benefits in terms of convenience, as well as economy-wide productivity gains. By employing innovation diffusion theory (IDT) and the decomposed theory of planned behavior (DTPB), Brown *et al*. (2003) surveyed 162 respondents and discovered that perceived advantages, the opportunity to try out cell phone banking, the number of banking services required by respondents and perceived risk significantly influenced people to adopt mobile banking. A study by Lee *et al.* (2003) where they performed eight interviews to collect transcripts from participants, concluded that relative advantages and compatibility were positive factors affecting the adoption of mobile banking, perceived risk was negative factor affecting the adoption of mobile banking, and consumer previous experience and self-efficacy generalized their beliefs (a negative or positive attitude) toward the adoption of mobile banking.

Suoranta and Mattila (2004) took the Bass model of diffusion to separate 1253 respondents into non-users, occasional users, and regular users according to their mobile banking usage experience and density. The Bass diffusion model assumes that potential adopters of an innovation are influenced by two types of communication channels: mass media and interpersonal word-of-mouth, and the adoption rate can be described by S-shaped diffusion curves. They empirically identified that interpersonal influence over mass media affected user's adoption of mobile banking. This Contrasted the study of Laforet and Li (2005) where they surveyed 128 respondents randomly selected in the city streets and indicated that awareness significantly influenced the adoption of online and mobile banking, while consumer awareness was effectively increased through mass media rather than word-of-mouth communications. Given that the reference group did not significantly affect the

adoption of online and mobile banking, Laforet and Li (2005) came to a conclusion that mass media was much more important than interpersonal word-of-mouth in affecting people to adopt mobile banking.

By adding one trust-based construct and two resource-based constructs, Luarn and Lin (2005) employed the extended technology acceptance model (TAM) to explore human behavioral intention to use mobile banking. They collected 180 respondents in Taiwan and discovered that perceived self-efficacy, financial cost, credibility, easy-of-use and usefulness had positive effects on the behavioral intention to use mobile banking. Likewise, due to the parsimony and predictive power of TAM, *Amin et al.* (2008) used an extended TAM containing five constructs - perceived usefulness, perceived ease-of-use, perceived credibility, the amount of information, and normative pressure to explore the adoption of mobile banking. A total number of 158 valid questionnaires were gathered in Malaysia which supported that perceived ease-of-use markedly influenced perceived usefulness and credibility whereas human intentions to adopt mobile banking was significantly influenced by perceived usefulness, perceived ease-of-use, perceived credibility, the amount of information, and normative pressure.

Laukkanen *et al.* (2007) summarized 18 factors into five barriers, namely Usage, Value, Risk, Tradition, and Image barriers drawing from the theory of innovation resistance. The theory of innovation resistance, adapted from the psychology and the IDT of Rogers (Rogers 2003) aims to explain why customers resist innovations even though these innovations were considered necessary and desirable. Laukkanen *et al.* (2007) investigated 1525 usable respondents from a large Scandinavian bank and uncovered that the value and usage barriers were the most intense barriers to mobile banking adoption, while tradition barriers like as preferring to chat with the teller and patronizing the banking office were not an obstacle to mobile banking adoption.

A study by Yang (2011) on the Rasch measurement model and item response theory to survey 178 students from one of largest university in south Taiwan found that the speed of transactions and special reductions in transaction fees encouraged mobile banking adoption, while factors inhibiting mobile banking adoption were safety and initial set-up fees. Similar to the finding of Cruz *et al.* (2010) surveyed 3585 online respondents in Brazil and supported that the cost of Internet access and service and perceived risk were top two barriers for adopting mobile banking services.

Sripalawat *et al.* (2011) collected 195 respondents based on TAM and TPB research structure and found subject norms to be the most influential factor, perceived usefulness to be the

second influential factor, and self-efficacy to be the third influential factor in mobile banking adoption. Based on the extended TAM and through collecting 325 valid responses from MBA students in India, Dasgupta *et al.* (2011) first employed the exploratory factor analysis to identify seven antecedents to behavioral intention toward the adoption of mobile banking. Thereafter, they utilized the regression technique to examine the effects of these antecedents on behavioral intention. Their empirical results supported six of seven antecedents, except for risk. The six antecedents were perceived image, perceived usefulness, perceived ease-of-use, perceived value, self-efficacy, perceived credibility, and tradition, which significantly influenced the behavioral intent to use mobile banking. Recently by using interpretive structure modeling and mapping of mobile banking influences in India, Ketkar *et al.* (2012) systematically plotted key mobile banking barriers and enablers on the two dimensional map. By treating driving power of enablers as positive and that of barriers as negative, their work identified "facility to get quick updates", "time and cost saving", "reach of telecom distribution" and "need for telecoms to improve customer retention" as the crucial drivers for the adoption of mobile banking.

2.3 Demographic factors and Adoption of Mobile Payments

According to Rogers (2003) numerous studies have discussed the effects of demographics on new technology adoption. Traditional innovation diffusion studies reveal earlier adopters of technological innovations as typically younger in age, having higher incomes, better educated, and having higher social status and occupation. According to Joshua and Koshy (2009) typical users of electronic banking are relatively young while a study by (Laukkanen *et al.* 2007) discovered that the elderly had more resistances to change and negative attitude toward using mobile banking services. Also certain studies by Suoranta & Mattila (2004) found that respondents aged 50 or over were most eager to use mobile payments.

Laforet and Li (2005) randomly interviewed 300 respondents in the streets in six major Chinese cities and reported that mobile payments main users were not necessarily young and highly educated. A study by Laukkanen *et al.* (2007) used age (over 55 or not) to separate Finnish respondents into two groups they identified that two groups differed in the risk, tradition, and image barriers. Cruz et al. (2010) investigated 3585 respondents in Brazil and claimed that older people perceived mobile payments as more difficult to use than younger people did. Likewise, by Puschel et al. (2010) collected 666 respondents in Brazil and observed that typical users of mobile payments were less than 30 years old.

Nysveen*et al*. (2005) study on gender and technology found a stronger proportion of perceived usefulness of mobile services among men than among women. Cruz *et al* (2010) assert that the reason is men appear more task-oriented than women and electronic banking services are typically motivated by goal achievement. Studies by Nysveen *et al*. (2005) have revealed the statistical difference between female and male respondents in the mobile service/banking setting. For example, women perceive more risk in an online purchase than men do, and peer opinions have a higher effect on females in mobile services. According to Koenig-Lewis (2010) men are more likely to use mobile payments than women are and men are more concerned on the cost of Internet access and service fees than women are when using mobile banking services.

Riquelme and Rios (2010) used gender as a moderating variable in an extended TAM, they sampled 681 respondents in Singapore and found that the influence of social norm on intention to adopt and perceived ease-of-use on the perception of perceived usefulness were stronger among women than among men. A contrast study by Pousttchi *et al*. (2010) was done where they collected 666 respondents in Brazil and discovered that mobile banking users were predominantly males. Joshua and Koshy (2011) through gathering 553 respondents in India observed that men might use mobile payment services more than women would.

2.4 Cashless Payment Methods and Adoption of Mobile Payments

According to Zhang & Kong (2011) mobile payment is "any transaction with a monetary value that is conducted via a mobile telecommunications network''. According to Pousttchi (2003) mobile payment (MP) is that type of payment transaction processing in the course of which within an electronic procedure (at least) the payer employs mobile communication techniques in conjunction with mobile devices for initiation, authorization or realization of payment." Siau et al (2010) posit that a mobile payment is a transfer of monetary means (prepaid, debit or credit -based) in return for a good or service, processed by a mobile and wireless device (meaning any portable device that has access to telecommunication networks but most commonly a mobile phone) and where the payer is involved in the initiation, authorization and confirmation of the payment."

There are two distinct types of mobile payments have been defined; *proximity payments* which is also known as close payments or contactless payments) and *remote payments*, (Goeke and Pousttchi, 2010). For proximity payments, sometimes more known as contactless payments or "contactless mobile payments" (CMP), the consumers´ and merchants´

equipment are generally in the same location and communicate directly with each other using contactless technologies for data transfer exchanged over the air. When processing a payment in stores at merchants this way, the payment is said to take place at the Point-of-Sale (PoS).

In remote payments, the transaction is conducted over telecommunication networks such as 2G, 3G, 4G or the internet, and can be made independently of the payer´s location and his/her equipment (Porteous, 2006). The mobile device is often used to authenticate personal information from a resident software application or a mobile web browser (Rhoda, 2010). Remittances, i.e. transfers of funds from a foreign worker to his/hers home country, form a huge market for remote payments, especially in the developing world and countries such as India, China, Mexico and the Philippines (Mobey Forum, 2011). A main facilitator for this type of payment in these markets is the lack of banking infrastructure and available alternatives. Remote payments via the mobile browser or software application are also commonly used for purchases of goods or services online. Buying applications (apps), games and music in such a way is currently one of the fastest growing areas within the mobile payments sphere (Mobey Forum, 2011). Most adoptive technologies that enable remote payments include Short Message Service (SMS) and its related Universal Integrated Circuit Card (UICC), Unstructured Supplementary Service Data (USSD), Interactive Voice Response (IVR) and Wireless Application Protocol (WAP) (OECD, 2012).

In North America mobile payments is a hot topic, and NFC leads the way. As many companies try to obtain a piece of the NFC pie, the last couple of years have marked the beginning of many new initiatives. One of the most important initiatives with its headquarters in the U.S. has been *Isis*; formed in November 2010 as a joint- venture between a number of major mobile operators, namely AT&T Mobility, T-Mobile USA and Verizon Wireless. Isis utilizes NFC for CMP and in February 2012 they announced their first three banking partners to enable their credit, debit and prepaid cards to be placed into the *Isis Mobile Wallet*, (Isis, 2012).

Visa and *MasterCard* has naturally been two actors to also launch new payment alternatives. These do not entirely evolve around mobile phone usage, but instead by utilizing the contactless NFC technology to use in their payment cards. Both actors have further developed and manufactured new types of payment terminals, which is used at the point of sale to do transactions with NFC compatible cards. Visa´s NFC initiative goes under the brand *Visa Pay Wave*, while MasterCard named their solution *MasterCard Pay Pass* (Paypers, 2012).

Most progressive CMP adoption has so far been seen in France, the UK, the Czech Republic, Slovakia, Turkey and Poland, and the majority of those initiatives have been built on NFC

technology. In Nice, France, the so called *Cityzi* project have been going on since 2009, and is seen as a pioneer project in terms of building a commercial wide-scale infrastructure on contactless mobile services (OECD, 2012). The project was developed in conjunction with numerous stakeholders; mobile operators, transit authorities, banks and merchants, and was further supported by the French government. The project´s aim was to facilitate payments with NFC compatible mobile phones in restaurants, supermarkets and local stores, as well as to use it for city buses and tramways throughout Nice. Regarding the business model, the stakeholders came to agree upon SE placement on the SIM card, and the operators and banks agreed upon a common interoperability model based on technical and functional specifications that was first field tested in other French cities. The Cityzi initiative also included Visa and MasterCard to make sure that the infrastructure deployed met internationally recognized standards and specifications. This ensured some degree of security for the NFC enabled transactions, and ensured interoperability between banks and mobile operators (Guidobaldi, 2011).

In the UK, CMP at PoS initiatives like *Quick Tap* have started to get solid attachments on the market (NFC, 2012). Quick Tap is a NFC payment solution launched by mobile operator Orange UK and card issuer Barclaycard, which allows consumers to make purchases of £15 by tapping their NFC compatible mobile devices (Samsung smartphones) against a contactless terminal today available at over 50 000 stores in the UK. These terminals are provided by MasterCard (PayPass terminals). The Dutch digital security company Gemalto provides *Trusted Service Management* (TSM) services which enable the secure deployment and management of the payments (Paypers, 2012).

According to Guidobaldi (2011) Africa leads the mobile payment market with no less than 130 mobile payment systems launched this year. While 80 per cent of the African population does not own a bank account, 80 per cent of the worldwide m-payment transactions originate in East Africa. Thus, Africa remains the foremost continent in the world in the use of mobile payment solutions with Europe and the Americas lagging somewhat behind. According to a 2012 study carried out by the United Nations Conference on Trade and Development (UNCTAD), "Mobile Money for business development in the East African Community", in East African countries, the dominant mobile money service is the m-transfer, especially for domestic transfers. UNCTAD explains that the people migrating to urban areas in Kenya use m-payment services like M-PESA, Airtel money, Orange Money and YU money to send money to their extended families living in rural regions as it appears to be a much more reliable method to transfer money than their traditional methods. Preferably banks have

started using their Automatic Teller Machine (ATM) cards as methods of payments of goods and services in Kenya and the larger East Africa. Internationally recognized cards like Visa, MasterCard and PayPal are also finding ways into the local market.

According to Njihia (2014), the levies on some of the payment channels are; Safaricom on its Lipa na Mpesa service takes 1% of each transaction value, Equity Bank with their transport centric service BebaPay which is in partnership with Google take 5%, while PesaPal a payment services aggregator levies a 3.5% transaction fee on e-commerce, bill payments and invoicing and 5% on ticketing (Njihia, 2014).

2.5 Versatility of Service and Adoption of Mobile Payments

Njihia (2014) observes that mobile money competes with cash and it therefore suffices to look at the cost benefit of using cash. A good number of enterprise entities have jumped aboard the mobile money bandwagon, but the real growth for the providers lies in the on boarding of small and medium enterprises that number in the hundreds of thousands. He comparatively observes that for a consumer to utilize cash it takes a series of steps involving both time and money; a visit to the ATM or bank branch and thereafter a visit to the retailer or service provider. For the service provider, depending on their vertical, there is the cost of handling cash and that of real-estate to handle foot traffic.

Herzberg (2003) observes that while cash and cheques are still prevalent, and indeed dominate in some parts of the world, electronic payment mechanisms and especially mobile payments, are gaining consumer acceptance in many economies due to infrastructure support. In some countries, advanced smart payment systems are in operation. For instance, in Hong Kong, a contactless and rechargeable smart card allows consumers to pay their bus and train fares, buy snacks at vending machines and cafes, pay parking fees and also pay for access to sporting facilities (Yoon, 2001). For more than a decade, there have been several attempts to integrate smart card technology into 'mobile devices' to enable mobile payments for business to consumer (B2C) payment transaction processing. In the era of third generation (3G) mobile network, mobile payment is eminent (Yoon, 2001).

Electronic payment systems lack 'transparency 'and this transparency factor has had limited attention. An emergent view is that ETS create a mental 'decoupling' and that the *pain of paying* (the emotion consumer experience in parting with money) is decreased (Soman, 2001). Soman (2001) suggests that payments by cash and cheques are both memorable and painful and that electronic transfers are less so. As the electronic payment mode is low in both salience and vividness, this causes an underestimate of past spending, and an increased

propensity to spend more in the current transaction. He concludes that, the use of cash renders the experience of parting with money vividly and thus highly salient and thus more 'painful'.

According to Chen (2008), for users in the developing world, the appeal of these m-banking/m-payments systems may be less about convenience and more about accessibility and affordability. Mobile phone operators have identified m-banking/m-payments systems as a potential service to offer customers, increasing loyalty while generating fees and messaging charges (Innopay, 2012). Financial institutions, which have had difficulty providing profitable services through traditional channels to poor clients, see m-banking/m-payments as a form of "branchless banking" (Ivatury & Mas, 2008), which lowers the costs of serving low-income customers.

Most m-banking/m-payments systems in the developing world enable users to do three things: (a) Store value (currency) in an account accessible via the handset. If the user already has a bank account, this is generally a question of linking to a bank account. If the user does not have an account, then the process creates a bank account for her or creates a pseudo bank account, held by a third party or the users' mobile operator. (b) Convert cash in and out of the stored value account. If the account is linked to a bank account, then users can visit banks to cash-in and cash-out. In many cases, users can also visit the GSM providers' retail stores. In the most flexible services, a user can visit a corner kiosk or grocery store perhaps the same one where he or she purchases airtime and transact with an independent retailer working as an agent for the transaction system. (c) Transfer stored value between accounts. Users can generally transfer funds between accounts linked to two mobile phones, by using a set of SMS messages (or menu commands) and PIN numbers (OECD, 2012).

The new services offer a way to move money from place to place and present an alternative to the payment systems offered by banks, remittance firms, pawn shops, etc. The uptake of m-banking/m-payments systems has been particularly strong in the developing countries Availability of mobile payments has increased the purchase power of many consumers in that they have easy access to their monies as opposed to traditional methods which required them to queue in the bank to get money. Impulse buying has been facilitated by technology; hence those wise enough have been able to stay away from m-payments. People are able to buy goods from anywhere as long as the merchant is registered.

2.6 Technological Features and Adoption of Mobile Payments

Concerning safety and security cashless mobile payment (CMP) transactions cannot be less secure than that of existing payment cards if users are to consider and adopt mobile payments. In Europe, cards with "chip and pin" (EMV chip cards) are widely distributed and have reached a high level of security and acceptance, making this objective everything but crude. Security issues discussed around CMP concerns both the mobile devices and the back-end systems involved, making both the merchants and consumers reluctant to different degrees (Mallat, 2007). Other security threats come from skimming, eavesdropping or tracking (Innopay, 2012). Most CMP initiatives today however claim that their solutions are even more secure than card payments.

Mobile devices can also eliminate the inconvenience of carrying multiple plastic cards like physical wallets do, by enabling consumers to link mobile payments to those card accounts. These card accounts could include general purpose credit, debit, and prepaid cards, as well as merchant-specific cards that entitle the user to rewards or discounts. The term *mobile wallet* is often used to describe a mobile application with the functionality to replace a conventional wallet and more. According to Shin (2009) a mobile wallet is a much advanced versatile application that includes elements of mobile transactions, as well as other items one may find in a wallet, such as membership cards, loyalty cards and travel cards. It also stores personal and sensitive information like passports, credit card information, PIN codes, online shopping accounts, booking details and insurance policies that can be encrypted or password-protected". That definition describes many of the advantages the mobile device can have beyond merely payments.

Over the past few years, wireless networks' enhanced data transfer capabilities and handsets' increased processing power and display capabilities have allowed for the addition of Internet-based mobile services. This access to more data-rich content has clearly raised mobile commerce's potential compared to a SMS-only environment. Wireless service providers have in fact developed content portals with Web browsing that offer various fee-based services, such as downloadable ringtones, games, and video. However, in recent years, "off-portal" (i.e., not from the service providers themselves) mobile content offered by third-party suppliers has been a growing part of the mobile marketplace, a development that parallels the experience in the early years of home-based Internet access, also originally done solely through the ISPs' portals (Hashim, 2008).

Some of the consumer issues associated with premium services and content are addressed in the U.K. through Phone payplus, a non-profit agency established in 2007 to carry out the day-

to-day regulation of the phone-paid services market (wire line and mobile) on behalf of the U.K.'s Office of Communications (Ofcom). In early 2009, new mobile-specific measures were issued to address three main areas of concern: subscription-based services, promotional text messages, and the provision of adequate information.

Associating cell phones with personal financial data obviously raises security questions, as noted in consumer surveys, as well as in a number of other reports. In a 2008 review of banking security, just over half of the American FIs surveyed were found to be lacking strong authentication for their mobile banking systems (Isis, 2002). Finland has experienced some specific mobile commerce security gaps, where "people have managed to take out an instant loan with a text message in another person's name by using this person's mobile phone and ID number" (Finish Consumer Ombudsman / Consumer Agency 2007)

As mobile phones increasingly link to payment and banking functions, this may increase the allure of stealing devices, and lead to ID theft and risks of financial losses. The "taxi mishap" which is inadvertently leaving your mobile phone somewhere is already a significant threat for cell phone users today when handsets do not have password protection or password protection has not been activated, and the handset itself stores personal information. Modern handsets contain a myriad of sensitive data, including geo-location data, personally identifiable information about the user, carrier information, information from other applications cached on the handset, email information, and passwords" (FTC 2009).

Consumers may not yet fully understand how the various new mobile payment options are expanding the importance of one's cell phone number. In light of the growing number of goods and services that 'mobile' consumers can pay for by typing their cell phone number. However, Shin (2010) warns consumers to protect their cell phone number with the same vigilance that they would a credit card. He further observes that the situation may become even more complex if pre-paid funds come to be commonly stored on mobile devices, for use in the marketplace.

The technological breakthroughs that are enabling new mobile financial services, as well as their security problems, may also serve to enable consumer protection tools. Yeo (2008) suggests voice biometrics as a possible approach to securing mobile payments. Applications that remotely encrypt data when the cell phone is stolen and send information with the location of the phone are also being tested (Miller 2008). Further, handset manufacturers are reportedly starting to implement additional security features directly in some of their devices, particularly smart phones (McAfee 2009).

Many consumers are increasingly become accustomed to using their mobile device to access online information and use various applications, this new form of business-to-consumer transaction clearly has the potential to reach much higher levels of usage and the applications may take unexpected directions (Mbiti, 2008). However, building on the experience with electronic commerce, uptake is also dependent on reviewing mobile commerce's particularities and addressing challenges to the consumer protection framework and consumer trust. Many key players revolve around the mobile marketplace, and cooperation may be necessary to address the challenges raised by this trend. Such multi-stakeholder approaches are already the norm for today's fast-paced Internet economy, the overarching context in which mobile commerce would continue to evolve.

2.7 Theoretical Framework

The study was underpinned by three theories; the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM) and Diffusion of Innovation Theory.

The first was Theory of Reasoned Action (TRA).This theory which was developed by Fishbein and Ajzen in 1975 posits that the best predictor of adoption of a technology is the intention to adopt. According to Lam & Hsu (2006), the concept of behavioral intention is central with two basic determinants for intention; attitude towards act or behavior and subjective norm. Lam & Hsu (2004) define attitude as the individual's behavior positive or negative feelings about performing an act while subjective norm is defined as individual's perception of whether people important to the individual think the behavior should be performed or not. They define subjective norm as "individual perception X motivation.

Hence from a mobile payment adoption perspective, subjective norm and attitude may be important factors in helping to study an individual's behavior in a social atmosphere. TRA model is concerned only with behaviors and not with the outcomes as a result of these behaviors. Therefore, the model may be helpful in studying factors affecting behavior that may lead to mobile payment adoption.

The second theory was Technology Acceptance Model (TAM). Technology Acceptance Model (TAM) was proposed by Davis (1986). This model assumes that Perceived Usefulness (PU) and Perceived Ease of Use (PeU) are the main drivers of technology and determine an individual's intention to adopt a technology. The intention to use serves as mediator of the actual adoption of technology (Davis, 1986). According to TAM, the decision to adopt a technology follows the four stages, explained below (Rhoda, 2010): Stage one is, external variables such as individual users' beliefs or differences with IT. Their evaluation is reflected

in Perceived Usefulness (PU) and Perceived Ease of Use (PeU). Whereas perceived usefulness is a user perception that using the new system would increase his/her performance in the organization and perceived ease of use is the extent to which using the new system would require minimal effort on a user's behalf. Stage two is attitude. This is the consequence of the user's beliefs of using a technology drives the user's attitude towards accepting/rejecting the technology. Stage three is intention i.e. the attitude predicts the desirability of the user using the system and the extent of them using it. Stage four is actual use i.e. Users' intentions determine how well they would actually use the system. The adoption of technology depends on personal behavior and also external environment. People perceived that by using of technology, they increase job performance without doing much physical and mental effort. After acceptance of technology then people think to adopt it.

The last was Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962. It is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. Adoption means that a person does something differently than what they had previously (i.e. purchase or use a new product, acquire and perform a new behavior, etc.). The key to adoption is that the person must perceive the idea, behavior, or product as new or innovative. It is through this that diffusion is possible. Rogers (2003), notes that adoption of a new idea, behavior, or product (i.e."innovation") does not happen simultaneously in a social system; rather it is a process whereby some people are more apt to adopt the innovation than others.   Researchers have found that people who adopt an innovation early have different characteristics than people who adopt an innovation later. When promoting an innovation to a target population, it is important to understand the characteristics of the target population that would help or hinder adoption of the innovation. There are five established adopter categories, and while the majority of the general population tends to fall in the middle categories, it is still necessary to understand the characteristics of the target population. When promoting an innovation, there are different strategies used to appeal to the different adopter categories. The first category is innovators - These are people who want to be the first to try the innovation. They are venturesome and interested in new ideas. These people are very willing to take risks, and are often the first to develop new ideas. Very little, if anything, needs to be done to appeal to this population. Secondly, we have the early Adopters - These are people who represent opinion leaders. They

enjoy leadership roles, and embrace change opportunities. They are already aware of the need to change and so are very comfortable adopting new ideas. Strategies to appeal to this population include how-to manuals and information sheets on implementation. They do not need information to convince them to change. The third category is the early majority - These people are rarely leaders, but they do adopt new ideas before the average person. That said they typically need to see evidence that the innovation works before they are willing to adopt it. Strategies to appeal to this population include success stories and evidence of the innovation's effectiveness. Fourthly is the late majority - These people are skeptical of change, and will only adopt an innovation after it has been tried by the majority. Strategies to appeal to this population include information on how many other people have tried the innovation and have adopted it successfully. The last category is that of the laggards - These people are bound by tradition and very conservative. They are very skeptical of change and are the hardest group to bring on board. Strategies to appeal to this population include statistics, fear appeals, and pressure from people in the other adopter groups. According to Rogers (2003), the stages by which a person adopts an innovation, and whereby diffusion is accomplished, include awareness of the need for an innovation, decision to adopt (or reject) the innovation, initial use of the innovation to test it, and continued use of the innovation. There are five main factors that influence adoption of an innovation, and each of these factors is at play to a different extent in the five adopter categories. One of the factors is relative advantage. This is the degree to which an innovation is seen as better than the idea, program, or product it replaces. Compatibility is another of the factors. This refers to how consistent the innovation is with the values, experiences, and needs of the potential adopters. Thirdly we have complexity. It refers to how difficult the innovation is to understand and/or use. Another of the factors is triability. It is the extent to which the innovation can be tested or experimented with before a commitment to adopt is made. Lastly, we have Observability. This is the extent to which the innovation provides tangible results.

2.8 Conceptual framework

The types of cashless payment methods, versatility of service, technological features and demographic factors were the independent variables for the study. The indicators for every variable were as highlighted on the framework. The dependent variable was the subscriber adoption of mobile payments. The relationship between the independent variables and the dependent variable was therefore independent for each. Moderating and intervening variables within the study were as presented on the Conceptual Framework on Figure 2.

Independent variable

Demographic factors
- Gender
- Occupation
- Age
- Education
- Income

Cashless payment methods
- Competition analysis of Lipa Na Mpesa
- Rating of Lipa Na Mpesa against other modes.
- Recommendation of LNM usage
- Most preferred mode of cashless payment

Versatility of service
- Ease of use of LNM
- Mobility of LNM
- Adaptability to many different functions

Technological features
- Security features
- User friendliness of device interface
- Customer support on technological challenges

Moderating variable
- Safaricom's network availability
- Trading culture of subscribers

Dependent variable

Subscriber adoption of mobile payments
- Trends in usage of the service i.e. Frequency and long-term use
- Preferred modes of payment

- Attitude towards mobile payments
- Perception towards mobile payments

Intervening variables

Figure 2: Conceptual framework

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2.9 Summary and Gaps to be filled by the Study

M-PESA service was introduced in the year 2007 by Safaricom Company as a business strategy to increase the company's business growth and deepen financial inclusion in Kenya. Currently it is being widely used by a population of various businesses therefore making it thrive in the midst's of many banks. Lipa Na M-PESA on the other hand is a recent service from Safaricom Company which allows merchants to accept payments for goods from their customers using M-PESA's Buy Goods service. Customers can also pay bills using the service. According to Safaricom Limited (2014) the buy good functionality is available on the M-PESA menu under payment services. The Pay bill and Buy Good Services were launched by the company in 2010.

By using M-PESA payment services, business owners can accept payment of goods and services from their customers. Customers also handle less cash and are therefore less susceptible to risks associated with cash handling such as theft and fake currency. It is believed that Lipa Na M-PESA will also help traders enhance business efficiency. The diffusion and adoption of mobile phone technology and its application has not only become a conduit for economic development in various sectors of the world's economy but also in the personal lives of its users (Mwabu, 2012). In his survey to determine the product characteristics that influenced the rapid adoption of M-Pesa in Kenya, Mdindi (2012) revealed that the most distinctive factors were that MPESA had relative advantage in terms of simplicity, innovations, safety, and communication both from and to the service among others.

However, previous studies reveal that this application has not yet caught on in the market. According to a study done by Hughes (2013), most of the participants who were considered in the bottom of the economic pyramid that owned a phone did not use it for any applications other than M-PESA. This was primarily due to lack of awareness and marketing, and confusion about the applications. According to Omwansa (2009), several factors had influenced the superior adoption of M-PESA and one of them was the effectiveness of campaigns and customer awareness.

In spite of the weighty investments, passionate advertising and promotional campaigns, media reports indicate that the usage of Lipa Na MPESA service a product of MPESA, is negligible although there are more than 19 million registered MPESA subscribers (Kamau, 2013). Safaricom Ltd Newsletter (2014) reports suggest that despite the enormous opportunities, subscribers seem incredulous and hesitant to try and use the services. According to Safaricom Ltd newsletter (2014), there are 122,000 Lipa Na MPESA merchants

recruited from all business types e.g. hardwares, supermarkets, cafes, hotels etc. of who 40,000 are actively using the service. It is noted that 98% of transactions in Kenya are still cash based. Leading to the question as to, why such a low number of Lipa Na Mpesa transactions?

As an academic scholar and an employee of the company owning the service, the need was thus felt to study other factors influencing adoption of mobile pay service within Embu town focusing on the Lipa Na M-PESA service from Safaricom Company.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

The chapter discussed about the research methods which were used in the research. This included the research design, target population, sampling procedure, methods of data collection, validity and reliability, the methods of data analysis and ethical issues.

3.2 Research Design

The study employed a descriptive survey research design. According to Kothari (2007), descriptive survey research design is a type of research used to obtain data that can help determine characteristics of a phenomenon in its natural setting. A descriptive survey involves asking questions (often in the form of a questionnaire) from a large group of individuals either by mail, telephone or in person. The main advantage of survey is the potentiality it provides when dealing with a large sample of individuals. This was appropriate because the study involved a large sample and focused on obtaining quantitative data from MPESA subscribers within Embu town.

3.3 Target Population

According to Mutai (2001), target population is the entire group a researcher is interested in or the group about which the researcher wishes to draw conclusions. This study targeted Safaricom MPESA subscribers within Embu town who are currently at 2,500 (Embu retail shop annual report, 2013-2014). Additionally, 150 Lipa Na MPESA registered businesses within Embu town were also targeted. Therefore, the target population included all the merchants in Embu town who have registered the LNM service for their businesses as well as MPESA subscribers in Embu town. This was as presented on Table 3.1.

Table 3.1 Registered Businesses on LNM and MPESA subscribers within Embu town

Category	No. of registered businesses on LNM and MPESA subscribers	Percentage%
Dallas merchants	55	2.1
Blue valley merchants	16	0.6
Majengo merchants	10	0.4
Embu CBD merchants	69	2.6
Embu MPESA subscribers	2500	94.3
Total	**2650**	**100**

Source: Embu Retail Shop Consumer Sales Records (2013-2014)

3.4 Sampling Procedure

The purpose of sampling was to determine parameters or characteristics of the whole population in order to generalize the results of the study.

3.4.1 Sample Size

To obtain the sample size for this population the researcher used the Krejcie and Morgan (1970) sample size table whose formula is as shown:

$s = X^2 NP (1 - P) \div d^2 (N - 1) + X^2 P (1 - P)$

Where,

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

Using this formula our sample size for merchants as can be seen on the Krejcie and Morgan table annexed as Appendix 4, was 108 respondents with a margin of error of 5% and 95% confidence interval.

It is noted that Safaricom MPESA subscribers within Embu town are 2,500 as listed on the Embu retail shop records 2013-2014. Hence for the subscribers' survey, 333 informants was the sample size. This was also based on the Krejcie and Morgan formula/table employed for determining the merchants' sample size. This was also at 95% confidence interval and 5% margin of error. Total sample size was as presented on table 3.2.

Table 3.2 Sample Size of the Population

Type of population	Total population	Sample size
Safaricom subscribers	Average 2,500	333
Lipa na M-PESA merchants	150	108
Total	**2,650**	**441**

3.4.2 Sampling Technique

These 108 merchants were sampled specifically from the Dallas and Embu CBD clusters so as to enhance efficiency in data collection. Therefore, cluster sampling technique was employed. Clustered sampling is used when it is not possible to obtain a sampling frame because the population is either very large or scattered over a large geographical area (Mugenda and Mugenda 2003).

Since Lipa Na MPESA service operates on the MPESA platform, the respondents for the survey were registered MPESA users. Therefore, the MPESA subscribers were purposively sampled from the Embu Safaricom retail shop because this was where the units of observation had the required characteristics i.e. the probability of getting registered MPESA respondents was higher there. Random sampling was then employed to obtain the 333 actual samples of cases required.

3.5 Research Instruments

The questionnaire were used for data collection because as Malhorta (2005) observed, it offers considerable advantages in administration, it presents an even stimulus potentially to large numbers of people simultaneously and provides the investigation with an easy accumulation of data. Gay (1976) maintains that questionnaires give respondents freedom to express their views and also make decisions. Thus the questionnaire was preferred for its suitability to this study because it allows the researcher to reach out to a large sample within a short period of time. There were two categories of questionnaires that were used; the customer's (subscriber's) questionnaire and the merchant's questionnaire.

This MPESA subscriber's questionnaire was designated for the Safaricom MPESA subscribers. It has been annexed as appendix 2. This was issued to sampled subscribers at the Safaricom retail shop. The merchant's questionnaire was designated for the merchants using the Lipa Na M-PESA services in their business premises. It has been annexed as appendix 3. This was administered to the sampled merchants within Embu town.

3.5.1 Pilot Study

A pilot study was conducted two weeks prior to the actual data collection day. Questionnares were administered to 50 respondents of the target population who were not be used in the actual study. The pilot sample was derived from subscribers within University of Nairobi premises – Embu campus. Questionnaires were collected and information analyzed, questions which were not properly framed were edited for the actual data collection process.

3.5.2 Validity of Instrument

Validity is the degree to which instrument measures what it is supposed to measure, Orodho & Kombo, 2002). The researcher aimed to focus on content validity, which is the accuracy with which an instrument measures the factor under study. Content validity was measured through cross checking of research questions and piloting of the questionnaires formulated. Face validity was checked by presenting the questionnaire to two experts at University of Nairobi in the department of Extramural studies for scrutiny and examination.

3.5.3 Reliability of Instrument

Mugenda and Mugenda (2003) describe reliability as the precision and accuracy of the instrument. Such instrument should yield similar results when used on a similar context. Questions were phrased accurately to avoid ambiguity. This led the respondents to a particular answer to ensure their reliability. The researcher used the split half method to measure reliability of the instruments of data collection. This involved scoring two-halves of the test questionnaire separately for each person in the sample and then calculating a correlation coefficient for the two sets of scores. The resulting coefficient indicated the degree to which the two halves of the test provide the same results.

3.6 Data Collection Procedure

Administration of the subscriber questionnaire was done for a period of at least two days at the Embu retail shop. This was based on approval from the retail shop manager. Customers were requested to voluntarily fill and return in one week or alternatively voluntarily fill before they leave the premises under the guidance of the researcher when the need arose.

The merchant questionnaires on the other hand were delivered to the merchants or businesses randomly sampled from the Dallas and Embu CBD cluster. They were encouraged to voluntarily fill the questionnaire within the same day of issuance or alternatively fill within a period of one week after which they would be picked by the researcher.

Follow up with the respondents was done via phone as their numbers were collected after issue of questionnaire. After one week all the questionnaires were compiled, coded, tabulated and analysis commenced.

3.7 Data Analysis Techniques

Analysis of data is the process of inspecting, cleaning, transforming, and modeling data with the aim of highlighting useful information, suggestions, conclusions, and supporting decision making. It is aimed at consolidating information collected into an orderly structure. The process of data analysis started by first editing the data collected so that what had little

relevance was ignored. Then the data was organized according to the objectives and research questions. Quantitative data was analyzed using SPSS version 22 (Statistical Package for Social sciences) software programme. This is because SPSS is fast, flexible and provides more accurate analysis resulting in dependable conclusions. Descriptive statistics i.e. mean, mode, median, standard deviation as well as inferential statistics such as chi-square correlation and regression were used for data analysis of the independent and dependent variables.

3.8 Ethical Considerations

Ethical guidelines in research include, but are not limited to informed consent, deception, confidentiality, anonymity, harm to subjects and privacy. Participation in research must be voluntary, and people have the right to refuse to divulge certain information about themselves (Mugenda and Mugenda, 2003). Participation in the research was on voluntary basis. The questions were phrased in a way which did not embarrass the respondents so as to not cause harm. The respondents were supplied with all the necessary information including the purpose and nature of the research, and their right to choose whether or not to participate. This was necessary, so that the respondents would not feel nervous about the whole process.

3.9 Operational Definition of Variables

The study variables were operationalized as presented on Table 3.3.

Table 3.3 Operationalization table

Objective	Types of variables	Indicators	Measurement scale	Tools of analysis	Types of analysis
To determine how demographic factors influence subscriber adoption of mobile payments	Demographic factors	Gender, Employment status, Age, Education level, Income	Nominal Ratio	Frequency distribution tables & percentages Regression	Descriptive Inferential
To establish the influence of other types of cashless	Cashless Payment methods	Competition analysis, Rating of LNM against other modes,	Nominal Ratio Ordinal	Frequency distribution tables & percentages Correlation	Descriptive Inferential

		LNM usage recommendation, Most preferred mode of cashless payment, Credibility of Lipa Na Mpesa		Regression	
payment methods on subscriber adoption of mobile payments					
To establish the relationship between versatility of service and subscriber adoption of mobile payments	Versatility of service	Ease of use of LNM, Mobility of LNM, Adaptability to many business functions	Nominal Ordinal	Frequency distribution tables & percentages Chi-square tests Regression	Descriptive Inferential
To evaluate how technological features influence subscriber adoption of mobile payments	Technological features	Security features, User friendliness of Lipa Na Mpesa interface, Customer support on technological challenges	Nominal	Frequency distribution tables & percentages Regression Chi-square tests	Descriptive Inferential
	Subscriber adoption of mobile payments	Period of Lipa Na Mpesa registration and active usage by merchants and subscribers. Preferred mode of receiving and making payment by merchant and subscribers Monthly usage of Lipa Na Mpesa	Nominal Ratio	Frequency distribution tables & percentages Chi-square tests Correlation Regression	Descriptive Inferential

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter is a presentation of results and findings obtained from field responses and data presentation findings of the analysis, based on the objectives of the study where descriptive statistics have been employed and the issues discussed in the best way possible. Hence this chapter entails the presentation of data collected in the questionnaires and the analysis of the findings. The findings were presented in the form of tables, charts, pie charts and narratives.

4.2 Questionnaire Return rate

The study sample size was 441 respondents. The questionnaires were administered to the subscribers and merchants respondents. From these 400 were returned. From those returned, 300 were from the subscribers and 100 were from the merchants. This represented a 90.7 % response rate which was well above the acceptable level of 75%. This was as presented on Table 4.1.

Table 4.1 Return rate

Questionnaires	No. of respondents	Percentage (%)
Returned	400	90.7
Not returned	41	9.3
Total	441	100

From the questionnaire successfully retrieved 300 (75%) were from subscribers and 100 (25%) were from the merchants as shown on Table 4.2.

Table 4.2 Respondents

Questionnaires	No. of respondents	Percentage (%)
Subscribers	300	75
Merchants	100	25
Total	400	100

4.3 Demographic Factors

Background information was collected during the study and this section seeks to present the demographics of the respondents relevant to this study. The areas covered in this section are gender of respondents, age-group, academic qualifications, business dealt in, length of operation in the business, registration with Lipa Na MPESA, average monthly income and occupational status . The aim was to get an understanding of respondent knowledge and suitability to the study as well as determining how they relate with adoption of Lipa Na Mpesa.

4.3.1 Distribution of Respondents by Gender

The study sought to find out the gender of respondents from both groups of respondents subscribers and merchants). Table 4.3 represents this distribution.

Table 4.3 Distribution of Respondents by Gender

Respondents	Male	Percentage (%)	Female	Percentage (%)
Subscribers	149	49.7	151	50.3
Merchants	53	53	47	47
Total	202	50.5	198	49.5

Table 4.3 shows that 49.7% of the respondents from the subscribers were male and 50.3% were female. The merchants 53% were male and 47% were female. This shows more men than women were involved in the study in Embu County. The study further conducted a cross tabulation of gender distribution and respondents preferred mode of making and receiving payments. The findings are summarized on Table 4.4.

Table 4.4 Cross tabulation of gender distribution and respondents who prefer LNM

	LNM (subscribers)	LNM (merchants)
Male	22 (20.0%)	13 (38.2%)
Female	88 (80.0%)	21 (61.8%)
Total	110 (100%)	34 (100%)

The findings showed that amongst the subscribers who preferred Lipa Na Mpesa as their preferred mode of payment 20% were male whereas 80% were female. As for the merchants

38.2% were male and 61.8% were female. This showed that there is gender disparity amongst the respondents who prefer using Lipa Na Mpesa to make and receive payments.

4.3.2 Distribution of Respondents by Age

The findings presented on Table 4.5 show the subscriber's age distribution.

Table 4.5 Subscribers Age Distribution

Age (years)	No. of respondents	Percentage (%)
18-30	78	26.0
31-40	33	11.0
41-50	99	33.0
Above 50	90	30.0
Total	300	100

26% of the total respondents were of age 18-30years, 11% were between 31-40 years of age, 33% were between 41-50 years of age, and 30% were above 50 years of age. According to the survey, majority of the respondents were between the ages brackets of 41-50 years of age Table 4.6 presented the merchant's age distribution.

Table 4.6 Merchants' Age Distribution

Age (years)	No. of respondents	Percentage (%)
18-30	4	4
31 – 40	25	25
41 – 50	26	26
Above 50	45	45
Total	100	100

The findings on Table 4.6 shows that the 4% of the total respondents were of age 18-30years, 25% were between 31-40 years of age, 26% were between 41-50 years of age, and 45% were above 50 years of age According to the survey, majority of the respondents were between the ages brackets of above 50 years of age.

The study further conducted a cross tabulation of age distribution and respondents preferred mode of making and receiving payments. The findings are summarized on Table 4.7.

Table 4.7 Cross tabulation of Age and respondents who prefer Lipa Na Mpesa

Age (years)	Lipa Na Mpesa subscribers	Lipa Na Mpesa merchants
18-30	8 (7.3%)	0 (0%)
31-40	6 (5.5%)	4 (11.8%)
41-50	50 (45.5%)	13 (38.2%)
Above 50	46 (41.7%)	17(50%)
Total	110 (100%)	34(100%)

The cross tabulation showed that of the subscribers who preferred Lipa Na Mpesa; 7.3% were of age 18-30 years, 5.5% were of age 31-40 years, 45.5% were of 41-50 and 41.7% were above 50 years. For the merchants 0 were for of age 18-30 years, 11.8% were of age 31-40, 38.2% were of 41-50 and 50% were above 50 years of age. This showed that majority of the respondents who preferred Lipa Na Mpesa were above the age of 40 years. There is age disparity amongst the respondents who prefer Lipa Na Mpesa.

4.3.3 Distribution of respondents by Level of Education

The findings as represented on Table 4.8 show the respondents' highest level of education.

Table 4.8 Distribution of Respondents by Level of Education

Education level	Subscriber	Merchant	Total	Percentage (%)
Primary	75	26	101	25.25
Secondary	145	14	159	39.75
Tertiary	80	60	140	35
Total	300	100	400	100

It varied from primary qualifications to tertiary qualification specifically 25.25% had primary level, 39.75% were at secondary level and 35% were at tertiary level. Table 4.8 shows the level of education of the respondents where most of the respondents had attained secondary level this being an indicator that they are able to understand the concept of mobile payments and would therefore shed more insight into the study.

The study further conducted a cross tabulation of level of education and respondents preferred mode of making and receiving payment. A summary was presented on Table 4.9.

Table 4.9 Cross tabulation of Education Level and Respondents who prefer LNM

Education level	Lipa Na Mpesa subscribers	Lipa Na Mpesa merchants
Primary	6 (5.5%)	5 (14.7%)
Secondary	66 (60.0%)	0 (0%)
Tertiary	38 (34.5%)	29 (85.3%)
Total	110 (100%)	34 (100%)

The subscribers who preferred Lipa Na Mpesa as their preferred mode of payment 5.5% had attained primary level as their highest level of education, 60% at secondary level and 34.5% at tertiary level. As for the merchants 14.7% were at primary level, none at secondary and 85.3% were at tertiary level. This showed that there was disparity of Lipa Na Mpesa preference amongst respondents of various educational backgrounds. Majority of those with secondary qualifications and above preferred Lipa Na Mpesa.

4.3.4 Distribution of respondents by Occupation Status

This study sought to find out the occupational status of the subscribers and the findings are represented by Table 4.10.

Table 4.10 Occupation Status

Occupational status	Frequency	Percentage (%)
Employed	129	43
Self Employed	150	50
unemployed	21	7
Total	300	100

The findings show that 50% are self-employed, 43% are employed while 7% are unemployed .This showed that most respondent were employed and so had a stream of revenue in which they would use to transact in Lipa Na Mpesa service. This study further conducted a cross tabulation of occupation status against subscribers' preferred mode of making payment. A summary was presented on Table 4.11.

Table 4.11 Cross tabulation of Occupation status and respondents who preferred LNM

Occupation status	Lipa Na Mpesa subscribers
Employed	15 (13.6%)
Self employed	82 (74.5%)
Unemployed	13 (11.8%)
Total	110 (100%)

Amongst the respondents who preferred Lipa Na Mpesa as their preferred mode of payment 13.6% were employed, 74.5% were self-employed and 11.9% were unemployed. This showed that Lipa Na Mpesa was very popular amongst the self-employed.

4.3.5 Distribution of respondents by Merchant's business type

This study sought to enquire which type of business the merchants engaged in and Table 4.12 represents the findings.

Table 4.12 Merchant's type of business

Type of business dealt in	Frequency	Percentage (%)
Both	17	17
Services	46	46
Goods	37	37
Total	100	100

From the response it was found out that 46% engaged in service, 37% engaged in selling goods and lastly 17% dealt with both goods and service. This shows it was able to get diverse views for the study from different markets

This study further conducted a cross tabulation of merchants' type of business and merchants' preferred mode of receiving payment. A summary was presented on Table 4.13.

Table 4.13 Cross tabulation of merchants' business type and merchants who preferred LNM

Type of Business	Lipa Na Mpesa merchants
Goods	11 (32.4%)
Services	21 (61.8%)
Both	2 (5.9%)
Total	34 (100%)

Amongst the respondents who preferred Lipa Na Mpesa as their preferred mode of payment 32.4% were in involved in goods only, 61.8% were involved in services and 5.9% were involved in both. This showed that Lipa Na Mpesa was mostly preferred in the service industry.

4.3.6 Distribution of respondents by Period of Business Operation

This study sought to find out how long the businesses had been in operation and the following response on the Table 4.14 was retrieved from the respondents.

Table 4.14 Period of Business Operation

Period	Frequency	Percentage (%)
0-3 years	25	24
4-7 years	39	39
8-10 years	36	17
above 10 years	0	20
Total	100	100

It emerged that 39% were in operations for 4-7 years, 24% had operated for 0-3 years, 17% had operated for 8-10 years and lastly 20% had been in operation for above 10 years. This showed that the study was able to get response from various businesses which had operated for different period and this enabled the study to get responses that gave greater in-depth on variables being studied.

This study went on to conduct a cross tabulation between period of business operation and merchants' preferred mode of making payments. Table 4.15 is a summary showing those who preferred Lipa Na Mpesa.

Table 4.15 Cross tabulation of period of business operation and Merchants who preferred Lipa Na Mpesa

Period	Lipa Na Mpesa merchants
0-3 years	10 (29.4%)
4-7 years	10 (29.4%)
8-10 years	4 (11.8%)
above 10 years	10 (29.4%)
Total	34 (100%)

Businesses operating between 0-3, 4-7, and above 10 years were 29.4% for each category whereas 8-10 years were 11.8%.Table 4.15 shows that there was no disparity within the distribution of merchants who preferred Lipa Na Mpesa and their duration of business of operation. There was almost equal distribution of Lipa Na Mpesa respondents who preferred Lipa Na Mpesa.

4.3.7 Distribution of respondents by Monthly Income level

This study sought to find out the average monthly income of the subscriber respondent in the study and presented on Table 4.16.

Table 4.16 Monthly Income level

Monthly income	Frequency	Percentage (%)
0-40,000	91	30.3
40,000-70,0000	60	20.0
70,000-100,000	107	35.7
above 100, 0000	42	14.0
Total	300	100

From the findings on the Table 4.16, 30.3% earned 0-40,000, 20.0% earned 40,000-70, 0000, 35.7% earned 70,000-100,000, and 14% earned above 100, 0000. This showed the level of income amongst respondents varied and it was an indicator of their capability to transact on Lipa Na Mpesa.

The study went on to conduct a cross tabulation of monthly income and subscribers who preferred Lipa Na Mpesa. The table 4.17 presented this summary.

Table 4.17 Cross tabulation of Monthly Income against subscribers who preferred LNM

Monthly Income (KES)	Lipa Na Mpesa subscribers
0-40,000	15 (13.6%)
40,000-70,0000	8 (7.3%)
70,000-100,000	58 (52.7%)
above 100, 0000	29 (26.4%)
Total	110 (100%)

Table 4.17 showed that those earning 0-40, 0000 KES and preferred Lipa Na Mpesa were at 13.6%, 40,000-70,000 KES were at 7.3%, 70,000-100,000 KES were at 52.7% and above 100,000% were at 26.4%. This showed that majority of the subscribers who preferred Lipa Na Mpesa were high income earners.

4.4 Cashless Payment Methods

The areas covered in this section are determination of competitors of LNM, establishing the most preferred cashless payment methods, rating of LNM by respondents, determination of the relationship of other types of cashless payments with adoption of LNM, credibility of LNM with respect to other modes of payment and influence on LNM from other modes of cashless payment. The aim was to establish the influence of other types of cashless payment methods on subscriber adoption of LNM.

4.4.1 Competitors of Lipa Na Mpesa

Table 4.18 shows, the findings from subscribers on their knowledge and use of other cashless payment methods.

Table 4.18 Lipa Na Mpesa Competition

Questions	Yes	Percentage	No	Percentage
Do you use cashless payment for goods and services?	237	79	63	21
Do you own credit card or ATM cards?	210	70	90	30
Do you do mobile banking using your mobile phone?	115	38.3	185	61.7
Do you know the Lipa Na M-PESA service?	255	85	45	15
Do you make payments of goods or services over the internet?	22	7.3	278	92.7

From the findings, when asked whether they use cashless payment for goods and services 79% responded Yes, they used the method and 21% responded No. The respondents were also asked whether they owned a credit card or ATM, 70% responded Yes and 30% responded they did not have them. The study sought to find out whether respondents knew of Lipa Na Mpesa service and 85% responded in the affirmative and 15% responded they did not know the service. When asked whether they make payment over the internet 7.3% responded in the affirmative and 92.7% responded that they did not use the internet to pay for goods or services.

4.4.2 Subscriber Rating of Lipa Na Mpesa service

The subscribers were asked to rate Lipa Na Mpesa service against other cashless modes of payment. The findings were as represented on Table 4.19.

Table 4.19 Rating of Lipa Na Mpesa

Rating on Lipa Na Mpesa	Frequency	Percentage (%)
very inferior	43	14.3
inferior	89	29.7
average	122	40.7
superior	31	10.3
very superior	15	5.0
Total	300	100.0

It was noted that 14.3% of the respondents rated it very inferior, 29.7% found the service to be inferior, 40.7% found the service to be on average,10.3% gave superior rating and 5% considered it very superior to the other cashless payment modes.

A correlation to find out the strength and direction of association between rating of Lipa Na Mpesa and Period of Lipa Na Mpesa active usage by subscriber in Embu town was conducted and presented on Table 4.20.

Table 4.20 Correlation of Response on LNM rating and Period of active usage

			Response on LnM rating against other cashless modes of payment	Period of LnM active usage
Spearman's rho	Response on LnM rating against other cashless modes of payment	Correlation Coefficient	1.000	.152[**]
		Sig. (2-tailed)	.	.008
		N	300	300
	Period of LnM active usage	Correlation Coefficient	.152[**]	1.000
		Sig. (2-tailed)	.008	.
		N	300	300

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

The correlation analysis produced a weak positive correlation of 0.152. This means that as the rating on LNM increased so did the period of active usage by the subscriber. Similarly, as one variable decreases in value, the second variable also decreases in value. Since Sig. (2-tailed) is indicated by 0.008 which is less than 0.01, it can be concluded that the positive correlation had statistical significance at 99% confidence interval. There is directional relationship between LNM rating and Period of active LNM usage by subscriber.

4.4.3 Recommendation of Lipa Na Mpesa

The subscribers were asked if they would recommend Lipa Na Mpesa to others and results were as on Table 4.21.

Table 4.21 Recommendation of Lipa Na Mpesa.

Question	Yes	Percentage	No	Percentage
Would you recommend the use of Lipa Na MPESA to others?	250	83.3	50	16.7

83.3% responded they would, while 16.7% responded that they would not. This indicated that the subscribers derived good service from Lipa Na Mpesa.

4.4.4 Most Preferred Mode of Cashless Payment

The study sought to find out from the merchants, the most preferred modes of cashless payment that they accept and receive. Table 4.22 shows the response.

Table 4.22 Preferred Modes of Cashless Payments

Other Mode of Cashless Payments	Frequency	Percentage (%)
ATM cards/ Credit cards (VISA)	48	48
Lipa Na Mpesa	36	36
Electronic Funds Transfer	12	12
Others	4	4
Total	100	100

From the findings 48% preferred the use of visa cards, 36% preferred the use of Lipa Na Mpesa, 12% percent preferred electronic funds transfer and lastly 4% preferred other (cheques, near field communication, bank deposit slip etc.) means. This showed that majority of the merchants preferred visa payments despite being registered on Lipa Na Mpesa.

4.4.5 Credibility of Cashless Payment Methods

The study sought to find out whether the merchants found Lipa Na Mpesa service credible. The study further continued to find out whether the traditional methods of payment are affecting the Lipa by Mpesa service. The results were presented on Table 4.23.

Table 4.23 Credibility of Cashless Payment Methods

Credibility of Cashless Payment Methods	Yes	Percentage	No	Percentage
Do you find the Lipa Na MPESA service credible?	95	95	5	5
Do you think traditional modes of payment are affecting its adoption?	63	63	37	37

95% responded in the affirmative, while 5 % responded they didn't find it credible. 63% felt traditional methods of payment are affecting the Lipa by Mpesa service and 37% felt that they did not affect. This showed that majority of the merchants believed in Lipa Na Mpesa despite the existence of other payment options.

4.5 Versatility of Service

The aim was to establish the relationship between versatility of LNM and subscriber adoption of LNM. The areas covered in this section are determination of the experience on ease of usage of LNM by the respondents, comparison of usage between Paybill and Buy goods & services functionalities of LNM, determination of mobility of LNM in Embu town, test of association between adaptability and preferred mode of making payments by the subscribers and an inquisitive on respondent awareness of versatility of LNM and associated benefits.

4.5.1 Ease of use

The study sought to find out from the subscribers, how easy it is to use Lipa Na Mpesa service.

Table 4.24 Ease of use

Ease of use rating	Frequency	Percentage (%)
Very Easy	26	8.7
Easy	71	23.7
Average	106	35.3
Difficult	52	17.3
Very Difficult	45	15.0
Total	300	100.0

Table 4.24 shows that 8.7% found the service to be very easy to use, 23.7% considered it easy to use, 35.3% considered its ease of use as average, 17.3% found the service difficult to use and lastly 15.0% found it very difficult. This showed that the ease of use assumed a normal distribution with a large portion of subscribers still unable to use the Lipa Na Mpesa with ease**.**

4.5.2 Pay Bill and Buy Goods & Services usage on Lipa Na Mpesa

The study sought to find out from the subscribers the most commonly used Lipa Na Mpesa functionality between 'Pay Bill' and 'Buy Goods and Services' options. The response from the respondents was as portrayed on Table 4.25.

Table 4.25 Paybill vs. Buy goods and Services Functionality

Paying Bills	Frequency	Percentage (%)
Pay Bill	117	39
Buy Goods and Services	111	37
None	72	24
Total	300	100

From the findings 39% of the respondents used the service regularly to pay utility bills e.g. water bill, electricity bill and others, while 37% used it to buy goods and services, whereas 24% never used it at all. It was noted that a large portion; 24% had still not tried out the available services on Lipa Na Mpesa.

4.5.3 Mobility of Lipa Na Mpesa

The study sought to find out whether the mobile payments are easily accepted in Embu town. Table 4.26 presented this.

Table 4.26 Response on adaptability of Lipa Na Mpesa

Question	Yes	Percentage (%)	No	Percentage (%)
Do you think that Lipa Na Mpesa payments are easily accepted in this town?	161	53.7	139	46.3

53.7% responded that they were acceptable whereas 46.3% responded that they were not.

A cross tabulation on Table 4.27 was conducted to test for association between response on adaptability of Lipa Na Mpesa within Embu town and the subscribers' preferred mode of making payment over the counter.

Table 4.27 Cross tabulation of Adaptability of Lipa Na Mpesa within Embu town * subscribers preferred mode of making payment for goods and services

			Subscribers preferred mode of making payment for goods and services				
			ATM/credit card(VISA)	Cash	LnM	other modes	Total
Adaptability of Lipa Na Mpesa within Embu town	no	Count	24	125	0	12	161
		Expected Count	25.2	70.3	59.0	6.4	161.0
	yes	Count	23	6	110	0	139
		Expected Count	21.8	60.7	51.0	5.6	139.0
Total		Count	47	131	110	12	300
		Expected Count	47.0	131.0	110.0	12.0	300.0

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Chi- Square test was done and results presented on Table 4.28.

Table 4.28 Chi-Square Tests on Response on mobility of Lipa Na Mpesa within Embu town * Subscribers preferred mode of making payment for goods and services

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	229.743[a]	3	.000
Likelihood Ratio	300.417	3	.000
Linear-by-Linear Association	48.605	1	.000
N of Valid Cases	300		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.56.

Table 4.28 indicates that Pearson Chi-Square χ^2 = 229.743, df=3, p = .0001 which is less than 0.05. This tells us that there is statistically significant association between adaptability of Lipa Na Mpesa and the subscribers' preferred mode of payment over the counter at 5% significant level.

4.5.4 Lipa Na Mpesa Adaptability to different business functions

As per the statements in Table 4.29, the modal rating on the likert scale was captured representing the merchants' opinions on various questions that were aimed at studying how well they understood versatility of Lipa Na Mpesa within their businesses

Table 4.29 Statement on Lipa Na Mpesa Adaptability to different business functions from merchant's questionnaire

Statement	1 Strongly Disagree	2 Disagree	3 Not sure	4 Agree	5 strongly Agree	Mode
Lipa na Mpesa increase customer base	0	0	1	30	69	5
Business adopting Lipa na Mpesa are likely to grow	0	0	21	41	38	4
Lipa na Mpesa is facilitating credit borrowing because of the transparency and credibility of the financial records	1	0	39	29	31	3
Customers should embrace Lipa na Mpesa because of convenience and efficacy	0	0	35	60	5	4
Lipa na Mpesa has contributed to employment	0	0	59	41	0	3

It was found out that 69% majority of the merchants strongly agreed that Lipa na Mpesa increases customer base, 41% majority agreed that businesses adopting Lipa na Mpesa were

likely to grow, 39 % majority were not sure whether Lipa na Mpesa is facilitating credit borrowing because of the transparency and credibility of the financial records. When asked whether customers should embrace Lipa na Mpesa because of convenience and efficacy, 60% majority were not sure. Lastly, the merchants were asked whether Lipa Na Mpesa has contributed to employment and majority 59% were in agreement. Higher contribution was noted from Lipa Na Mpesa increase customer base, Business adopting Lipa Na Mpesa are likely to grow and Customers should embrace Lipa na Mpesa because of convenience and efficacy. These indicated that majority of the merchants were aware of the versatile benefits of Lipa Na Mpesa.

4.6 Technological Features

The aim of this section was to evaluate how technological features influence subscriber adoption of mobile payments. In particular user-friendliness of LNM interface, security features and customer support on technical issues were studied.

4.6.1 User friendliness

Table 4.30 represents responses from the subscribers on technological features in mobile payment.

Table 4.30 User friendliness of Lipa Na Mpesa mobile platform

Technological features Questions	Yes	Percentage	No	Percentage
Do you experience any technological challenges while using Lipa Na MPESA?	155	51.7	145	48.3
Do you find the Lipa Na MPESA user interface effective?	245	81.7	55	18.3
Do you find the Lipa Na MPESA user interface friendly to use?	182	60.7	118	39.3

The study enquired on the whether respondents faced challenges while using Lipa Na Mpesa, 51.7% responded that they didn't face any challenges, while 48.3% claimed to face a challenge. The study went ahead to enquire more on whether the Lipa Na Mpesa user interfaces was effective and 81.7% said it was, while a larger percentage 18.3 said it wasn't effective. 60.7% of the subscribers responded that Lipa Na Mpesa interface was friendly to use whereas 39.3% responded that it was not.

4.6.2 Security Features of Lipa Na Mpesa

Table 4.31 represented responses on security features of Lipa Na Mpesa.

Table 4.31 Security Features

Security features Questions	Yes	Percentage	No	Percentage
Do you have a point of sale terminal or cash register?	90	90	10	10
Is the Lipa Na Mpesa mode of payment compatible with your P.O.S?	70	70	30	30
Are the Lipa Na Mpesa security features adequate for your transactions?	87	87	13	13
Do you think Lipa na Mpesa has reduced theft in the business?	91	91	9	9
Have you experienced any form of Lipa Na Mpesa fraud related incidences?	3	3	97	97
Do you think Lipa na Mpesa is more secure than cash payments?	155	51.7	145	48.3

The study sought to find out whether the merchants had a point of sale terminal or cash register, 90% responded in the affirmative while 10% responded they don't have one. Most businesses had a point of sale that was compatible with Lipa Na Mpesa at 77.8%, the study also wanted to know whether the mobile payments had reduced theft in the business and 91% responded it had reduced theft since there wasn't money physically present in the business. The study sought to find out whether the respondent felt Lipa na Mpesa was secure than cash payments and 51.7% felt it was secure than cash payments. When asked whether they had fraud related incidences they responded that they didn't at 97% and therefore showing that Lipa Na Mpesa was a safe method to use.

Table 4.32 is a cross tabulation of responses on theft and fraud reduction in business against preferred mode of receiving payment.

Table 4.32 Cross tabulation of Response on theft and fraud reduction in business in Embu town * Merchants preferred mode of receiving payment

		Merchants preferred mode of receiving payment over the counter				Total
		Visa (debit/credit card	cash	LnM	other modes	
Response on theft and fraud reduction in business	no — Count	0	8	0	1	9
	Expected Count	1.9	3.4	3.1	.6	9.0
	yes — Count	21	30	34	6	91
	Expected Count	19.1	34.6	30.9	6.4	91.0
Total	Count	21	38	34	7	100
	Expected Count	21.0	38.0	34.0	7.0	100.0

A chi square test Table 4.33 was conducted to test for association between response on theft and fraud reduction in businesses within Embu town and the merchants' preferred mode of receiving payment over the counter.

Table 4.33 Chi-Square Tests on Response on theft and fraud reduction in businesses within Embu town * Merchants' preferred mode of receiving payment

Chi square test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.418[a]	3	.006
Likelihood Ratio	15.652	3	.001
Linear-by-Linear Association	.030	1	.864
N of Valid Cases	100		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .63.

Table 4.33 indicates that Pearson Chi-Square χ^2 = 12.418, df =3, p = .006 which is less than 0.05. This tells us that there is statistically significant association between response on theft and fraud reduction in businesses within Embu town and the merchants' preferred mode of receiving payment over the counter the at 5% significant level.

4.6.3 Technical Support on Lipa Na Mpesa

The study sought to find out where the business merchants get their technical support. Table 4.34 displays the responses.

Table 4.34 Technical Support

Technical support	Frequency	Percentage (%)
Web-self care	9	9
Regional support agents	31	31
Line 234 MPESA Customer care	48	48
Fellow Merchants	12	21
Total	100	100

The respondent mostly used customer care for support, at 48% it was the most popular, 31% from regional support agents and 12% got it from fellow merchants and 9% from web-self-care. This revealed that not all the merchants were fully utilizing the variety of dedicated support systems that have been put in place by Safaricom Ltd.

4.7 Subscriber Adoption of Mobile Payments

This section presented findings on different indicators that summed up as the dependent variable for the study. They included period of active LNM usage by respondents, preferred modes of making and receiving payments by the respondents and analysis of respondents' monthly of usage of LNM.

4.7.1 Period of active usage on Lipa Na MPESA by subscribers

The study sought to find out from the subscribers, the length of time their business had been registered by Lipa Na Mpesa.

Table 4.35 Period of active usage on Lipa Na Mpesa by subscriber

Period of Lipa Na Mpesa Active Usage	Frequency	Percentage
0 -1 year	89	29.7
1-2 years	47	15.7
2-3 years	85	28.3
3-4 years	79	26.3
Total	300	100

From the findings on table 4.35, it was found out that 29.7% of the subscribers had been using Lipa Na Mpesa for 0-1 year, 15.7% for 1-2 years, 28.3% for 2-3years and 26.3% for 3-4 years. Majority of the users were noted to have been active for less than one year indicating that most of the subscribers may have become aware of the service very recently or services improved within the last one year or customer perceptions with regards to the service are changing.

4.7.2 Period of Registration and Active usage on Lipa Na MPESA by merchants

The study sought to find out from the merchants, the length of time their business had been registered by Lipa Na Mpesa.

Table 4.36 Period of Registration and active usage on Lipa Na MPESA by merchant

Period of Lipa Na Mpesa Active Usage	Frequency	Percentage
0-1 year	47	47
1-2 years	31	31
2-3 years	15	15
3-4 years	7	7
Total	100	100

From Table 4.36, it was found out that 47% of the business had been registered for 0-1 year, 31% for 1-2 years, 7% for 2-3 years and 15% for 3-4 years. This revealed that awareness creation amongst the merchants by Safaricom ltd has not been very fruitful until very recently which is notable by the increase of Lipa Na Mpesa merchants in the last one year.

4.7.3 Preferred Mode for Making Payments over the Counter

The subscribers were asked their preferred mode of making payments over the counter. They responded as shown in Table 4.37.

Table 4.37 Preferred Modes for Making Payments over the Counter

Mode of payment	Frequency	Percentage (%)
ATM/Credit cards (VISA)	47	15.7
cash	131	43.7
Lipa na Mpesa	110	36.7
other modes	12	4.0
Total	300	100

Their response was as follows: 15.7% responded they prefer ATM/Credit cards (VISA), 43.7% preferred cash, 36.7% preferred Lipa Na Mpesa and the rest 4% preferred other means. This showed a high portion of subscribers is yet to adopt Lipa Na Mpesa as its payment mode of choice. Almost half of subscribers in Embu are still tied to cash based payments. However, the concept of cashless payment is also responsive as can be seen by the high number of subscribers using VISA and Lipa Na Mpesa summed up in contrast to the rest.

4.7.4 Preferred Mode for Receiving Payments over the Counter

The merchants were asked their preferred mode of receiving payments over the counter. They responded as shown in Table 4.38.

Table 4.38 Preferred Modes for Receiving Payments over the Counter

Mode of payment	Frequency	Percentage (%)
ATM/Credit cards (VISA)	21	21
Cash	38	38
Lipa Na MPESA	34	34
Other modes	7	7
Total	100	100

Their response was as follows: 38% respondents responded they prefer cash, 34% preferred Lipa Na Mpesa, 21% preferred to pay using ATM cards and the rest 7% preferred other means. The concept of cashless payment is also responsive amongst the merchants as can be seen by the high number of subscribers preferring VISA and Lipa Na Mpesa summed in contrast to the rest.

4.7.5 Subscriber's monthly usage of Lipa Na Mpesa

The study sought to find out from the subscribers how frequently they undertook Lipa Na Mpesa transactions on a monthly basis as can be seen on Table 4.39.

Table 4.39 Monthly usage of Lipa Na Mpesa per subscriber

Number of monthly Lipa Na Mpesa transactions per subscriber	Frequency	Percentage (%)
0	104	34.7
1	69	23.0
2	23	7.7
3	13	4.3
4	9	3.0
5	53	17.7
6	21	7.0
7	1	.3
8	3	1.0
9	2	.7
10	2	.7
Total	300	100.0

A one sample statistic was done and resulted to Table 4.40.

Table 4.40 One-Sample Statistics for subscriber's monthly usage of Lipa Na Mpesa

	N	Mean	Std. Deviation	Std. Error Mean
Monthly frequency of use	300	2.17	2.383	.138

Sample mean was found to be 2.17 transactions with standard deviation of 2.383 and standard error of mean of 0.138.

A one sample test for the subscriber's monthly usage was done and results were as presented on Table 4.41.

Table 4.41 One-Sample Test for subscriber's monthly usage of Lipa Na Mpesa

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Monthly frequency of use	15.749	299	.000	2.167	1.90	2.44

Table 4.41 demonstrates that population mean lies between 1.90 and 2.44 at the 95% confidence interval. This is a very low frequency of usage by the subscribers considering the number of businesses offering the Lipa Na Mpesa service within Embu town.

4.8 Regression Analysis

In this subsection; multiple regression analysis was used to determine whether the independent variables simultaneously impacted the dependent variable. Table 4.42 represents the model summary.

Table 4.42 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.762[a]	.581	.575	.293

a. Predictors: (Constant), demographic factors, technological features, cashless payment methods, versatility of service

Table 4.42 presents the coefficient of determination R^2= .581 and it indicates that the model statistically significantly predicts the dependent variable: subscriber adoption of mobile payments. The coefficient of determination indicated that 58.1% of the variation in the dependent variable can be explained by the independent variables i.e. demographic factors, technological features, types of cashless payments and versatility of service. The rest 41.9% is contributed by factors not studied in this research.

Analysis of variance was also conducted and presented on Table 4.43

Table 4.43 ANOVA[a] (Analysis of variance)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.130	4	8.783	102.206	.000[b]
	Residual	25.350	295	.086		
	Total	60.480	299			

a. Dependent Variable: Subscriber Adoption of Mobile Payments

b. Predictors: (Constant), demographic factors, technological features, cashless payment methods, versatility of service

The summary of ANOVA (analysis of variance) on Table 4.43 shows that the residual sum of squares (the sum of squared deviations from the least squares line) is 25.350, while the total sum of squares (the sum of squared deviations from the mean) is 60.480. Note that (60.480 - 25.350)/ 60.480 = .581 which is identical to the unadjusted R square in the model summary. The F statistic reveals the value of F (102.206) is significant at 0.0001 levels. The value F is

large enough to conclude that the set of independent variables as a whole was contributing the variance in factors influencing subscriber adoption of mobile payments.

The coefficients Table 4.44 presents the regression coefficients.

Table 4.44 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.237	.089		13.884	.000
	Versatility of service	.076	.016	.196	4.664	.000
	Technological features	.102	.037	.111	2.771	.006
	Cashless payment methods	.103	.019	.232	5.350	.000
	Demographic factors	-.194	.016	-.501	-11.988	.000

a. Dependent Variable: Subscriber Adoption of Mobile Payments

This demonstrated a linear relationship between subscriber adoption of mobile payment (dependent variable) and the independent variables (demographic factors, technological features, cashless payment methods, versatility of service). The regression equation was:

$y = 1.237 + 0.076 B_1 + 0.102 B_2 + 0.103 B_3 - 0.194 B_4$, where;

B_0 = constant 1.237 i.e. the y intercept

B_1 = unit change of versatility of service

B_2 = unit change of technological features

B_3 = unit change of cashless payment methods

B_4 = unit change of demographic factors

The linear regression equation assumes that the dependent variable has a linear relationship with each predictor. The regression equation above has established that taking all factors into account and changing the factors by 1 unit, subscriber adoption will be 1.324. If all other independent variables are at 0, a unit increase in demographic factors (age) would lead to a 1.043 change in subscriber adoption. A unit change in technological features would lead to a 1.339 change in subscriber adoption. A unit change in types of cashless payments would lead to a 1.34 change in subscriber adoption. Lastly a unit change in versatility of service would

lead to a 1.313 change in subscriber adoption. The regression model therefore demonstrates that demographic factors, technological features, types of cashless payment methods and versatility of service are statistically significant in explaining the variations in subscriber adoption of mobile payments.

CHAPTER 5

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

From the analysis and data collected, the following discussions, conclusions and recommendations were made. The responses were based on the objectives of the study. The study found that all the independent variables and the constant had a significant relationship with the dependent variable (subscriber adoption of mobile payments).

5.2 Summary of Findings

These are the findings of each objective given by the respondents as well as findings on the dependent variable.

For the first objective which was to determine how demographic factors influence subscriber adoption of mobile payments, the findings were as highlighted. More male than female were involved in the study indicated by 50.5% male and 49.5% female. Amongst the subscribers who preferred Lipa Na Mpesa as their preferred mode of payment 20% were male whereas 80% were female. As for the merchants 38.2% were male and 61.8% were female. Majority of the respondents were between the age brackets of 41-50 years of age at 33%. Least was 11% between 31-40 years of age. Amongst the subscribers who preferred Lipa Na Mpesa as their preferred mode of payment 7.3% were of age 18-30 years, 5.5% were of age 31-40 years, 45.5% between 41-50 and 41.7% were above 50 years. For the merchants 0 were for of age 18-30 years, 11.8% were of age 31-40, 38.2% were of 41-50 and 50% were above 50 years of age. 25.25% of the respondents had primary education, 39.75% were at secondary level and 35% were at tertiary level. Amongst the subscribers who preferred Lipa Na Mpesa as their preferred mode of payment 5.5% were at primary level, 60% at secondary level and 34.5% at tertiary level. As for the merchants 14.7% were at primary level, none at secondary and 85.3% were at tertiary level. 50% respondents were self-employed, 43% were employed while 7% were unemployed. Amongst the respondents who preferred Lipa Na Mpesa as their preferred mode of payment 13.6% were employed, 74.5% were self-employed and 11.9% were unemployed. 46% of merchants engaged in service, 37% engaged in selling goods and lastly 17% dealt with both goods and service. Majority 39% of businesses had been in operation for 4-7 years. 30.3% of the subscribers earned 0-40,000, 35.7% earned 40,000-70, 0000, 20% earned 70,000-100,000, and 14% earned above 100, 0000. Those earning 0-40,

0000 KES and preferred Lipa Na Mpesa were at 13.6%, 40,000-70,000 KES were at 7.3%, 70,000-100,000 KES were at 52.7% and above 100,000% were at 26.4%.

The second objective was to establish the influence of cashless payment methods on subscriber adoption of mobile payments and findings were as explained. 79% of the subscriber respondents use cashless payment methods and 21% did not. 70% owned a credit or ATM card and 30% did not. 85% knew of Lipa Na Mpesa service whereas 15% did not know the service. When asked whether they make payment over the internet 7.3% responded in the affirmative and 92.7% responded that they did not use the internet to pay for goods or services. 14.3% of the subscriber rated Lipa Na Mpesa very inferior, 29.7% found the service to be inferior, 40.7% found the service to be on average, 10.3% gave superior rating and 5% considered it very superior to the other cashless payment modes. There was a weak positive correlation of 0.152 between Lipa Na Mpesa rating and Period of active Lipa Na Mpesa usage by subscriber. 83.3% subscribers would recommend Lipa Na Mpesa to others while 16.7% would not. 48% preferred the use of visa cards, 36% preferred the use of Lipa Na Mpesa, 12% preferred electronic funds transfer and lastly 4% preferred other modes.; 63% felt traditional methods of payment are affecting the Lipa by Mpesa and 37% felt that they did not affect.

The third objective was to establish the relationship between versatility of service and subscriber adoption of mobile payments and findings were as summarized. 8.7% of the subscribers found the service to be very easy to use, 23.7% considered LNM easy to use, 35.3% considered its ease of use as average, 17.3% found the service difficult to use and 15.0% found it very difficult. 39% of the subscribers used the service regularly to pay utility bills while 37% used it to buy goods and services, whereas 24% never used it at all. 75% were of the opinion that businesses in Embu town were conversant with LNM whereas 25% responded that they were not. There was statistically significant association between adaptability of Lipa Na Mpesa and the subscribers' preferred mode of payment over the counter at 5% significant level as confirmed by Pearson Chi-Square $\chi(1) = 229.743$, df=3, $p = .0001$. It was also found that majority of the merchants were aware of the versatile benefits of Lipa Na Mpesa.

The last objective was to evaluate how technological features influence subscriber adoption of mobile payments. On this it was found out that 51.7% of subscribers respondents faced challenges while using LNM, 48.3% did not. 81.7% indicated that LNM user interface was effective, while 18.3% indicated it wasn't effective. 60.7% of the subscribers responded that

LNM interface was friendly to use whereas 39.3% indicated that it was not. 90% had a point of sale terminal or cash register, 10% didn't have one. Most businesses had a point of sale that was compatible with Lipa Na Mpesa at 77.8%, 91% responded LNM had reduced theft. The study sought to find out whether the respondent felt Lipa na Mpesa was secure than cash payments and 51.7% felt it was secure than cash payments. 97% didn't have fraud related incidences. There was statistically significant association between response on theft and fraud reduction in businesses within Embu town and the merchants' preferred mode of receiving payment over the counter at the 5% significant level as indicated by Pearson Chi-Square $\chi(1)$ = 12.418, df=3, p = .006. 48% used customer care for technical support, 31% from regional support agents, 12% indicated that they got it from fellow merchants and 9% from web-self-care.

Lastly, Subscriber adoption of mobile payments was also assessed and findings were as follows. 29.7% of the businesses indicated that they had been registered for 0-1 year, 15.7% for 1-2 years, 28.3% for 2-3years and 26.3% for 3-4 years. 47% of the business had been registered and used LNM for 0-1 year, 31% for 1-2 years, 7% for 2-3 years and 15% for 3-4 years.15.7% of subscribers indicated they prefer ATM/Credit cards (VISA), 43.7% preferred cash, 36.7% preferred Lipa Na Mpesa and the rest 4% preferred other means for making payments over the counter. 38% of the merchants indicated they prefer cash, 34% preferred Lipa Na Mpesa, 21% preferred to pay using ATM cards and the rest 7% preferred other means of receiving payments over the counter. Sample mean of subscriber Lipa Na Mpesa transactions per month was 2.17 transactions with standard deviation of 2.383 and standard error of mean 0.138 with population mean lying between 1.90 and 2.44 at the 95% confidence interval.

5.3 Discussion of Findings

The aim of this study was to investigate the factors influencing subscriber adoption of mobile payments. The study revealed several findings about subscriber adoption of mobile payments in Embu town.

5.3.1 Demographic Factors and Adoption of Mobile Payments

The study found that amongst the subscribers who preferred Lipa Na Mpesa as their preferred mode of payment 20% were male whereas 80% were female. This finding contradicts Pousttchi *et al*. (2010) who in Brazilian study discovered that mobile banking users were predominantly males. Joshua and Koshy (2011) through gathering 553 respondents in India

observed that men might use mobile payment services more than women would. The study found majority of those who preferred Lipa Na Mpesa for making payments (86.97%) were above the age of 40 years. This finding asserts Laforet and Li (2005) study who randomly reported that mobile payments main users were not necessarily young and highly educated. However it contradicted Cruz (2010) who claimed that older people perceived mobile payments as more difficult to use than younger people did. The respondents cited that they liked the service more since it was more secure than carrying cash and that it enabled them purchase products and services conveniently. The study also found that majority (60%) of the people who preferred Lipa Na Mpesa had attained tertiary level of education. The least group of people that had adopted the service were those with primary level qualifications. Findings from the study indicated that 74.5% of those who preferred Lipa Na Mpesa service were self-employed as opposed to 13.6% who were employed. This indicated that the service was picking conveniently in the informal sector compared to the formal sector. Most of the businesses that had had adopted the Lipa Na Mpesa dealt with offering service to customers.

5.3.2 Cashless Payment Methods and Adoption of Mobile payment

From the findings when asked whether they use cashless payment for goods and services 79% responded they used cashless payment. According to Better than cash (2014) It is estimated that 95% of all financial transactions in Kenya are still cash-based. Of those that are not cash-based, it is estimated that 70% of these are handled by Safaricom's M-Pesa mobile money service. This shows that our study findings were similar to the better than cash (2014) findings. Better than cash (2014) continue to say it is also estimated that about 80% of Kenyans have used mobile money. Safaricom's M-Pesa has about 99% of the mobile money market, and therefore essentially defines (for now) what the market looks like. Highly trusted and popular brand in Kenya with about 80% of the cellular phone market at the time only helped to support its rapid growth. The study sought to find out whether the subscribers know of Lipa Na Mpesa service and 85% responded in the affirmative and 15% responded they did not use the service. This again is somewhat similar to the Better than cash findings. When asked whether they make payment over the internet 7.3% responded in the affirmative and 92.7% responded they did not use the internet to pay for goods or services. This shows that internet payment is not rampant in Kenya as it is in other countries and that most individual use the Lipa Na Mpesa and VISA to pay for goods. According to Nyaga (2012) findings 65% of respondents were using mobile money services to purchase business supplies out of which 58% rated this service as either very important or important to the business. This contradicted

the study's finding that indicated majority 40% of the subscribers rated the service as average. Mbiti (2008) found that most people used the mobile money service to send or receive money as opposed to savings or other services. High volumes in mobile money transfers have also been well demonstrated by the FTC (2009) report which noted that high volumes of mobile money payments account for over 90% of the Kenya economy compared to other forms of money transfers. Arunga and Kahora (2009) also found that mobile money services were mostly used for sending and receiving money. This contradicted the study findings on most preferred mode of cashless payment, where majority of the subscribers indicated opting for ATM/Credit card (VISA) payments. The cashless payments experienced in Embu town was proximity payments where the subscribers´ and merchants´ equipment are generally in the same location and communicate directly with each other using contactless technologies for data transfer exchanged over the air. The study concluded that availability of banks within the town which offered other cashless payments like ATM and credit cards via VISA offered stiff competition to the Lipa Na Mpesa service.

5.3.3 Versatility of Service and Adoption of Mobile Payments.

The study found that 32.4% of the subscribers find Lipa Na Mpesa easy and very easy to use whereas the rest had found it average and difficult. This indicated that majority of the subscribers 67.6% were still unable to use the system with ease.

It was alarming to find out that 24% of the subscribers had never tried out either Paybill or the Buy goods and services functionality. This is contrary to Safaricom's objective of deepening financial inclusion where, the company is targeting to have 100% inclusivity in its mobile money services (Safaricom Ltd, 2014).

A test of association between adaptability of Lipa Na Mpesa and the subscribers' preferred mode of payment over the counter was conducted and it proved that there was association between adaptability of LNM and subscribers' preferred mode of payment.

The fact that merchants were aware of the versatility benefits of LNM contributed to the adoption of mobile payments .The major versatility factors that influenced adoption of mobile payments among the mobile merchants were; business growth , increased customer base and convenience & efficacy.

5.3.4 Technological Features and Adoption of Mobile Payments

Technological features that had contributed to adoption of the mobile payments included' friendly user interface (60.7%), effectiveness of interface (81.7%), compatibility with POS (70%) adequate Lipa Na Mpesa security feature transactions (87%), reduced theft (91%) and

minimal electronic fraud (97%). According to Andreev et al (2012), most m-banking/m-payments systems in the developing world enable users to do three things: (a) Store value (currency) in an account accessible via the handset. If the user already has a bank account, this is generally a question of linking to a bank account. If the user does not have an account, then the process creates a bank account for her or creates a pseudo bank account, held by a third party or the users' mobile operator. (b) Convert cash in and out of the stored value account. If the account is linked to a bank account, then users can visit banks to cash-in and cash-out. In many cases, users can also visit the GSM providers' retail stores for assistance on these processes. The study found that majority 48% of the business merchants get technical support to facilitate these processes from customer care agents on phone contrary to Andreev et al (2012) findings that asserted the technical support is received from the providers' regional agents. As such, technological features found in Lipa Na Mpesa were found to contribute to its adoption.

5.3.5 Subscriber Adoption of Mobile Payment

87% of the subscribers indicated that they had been active for less than 1 year implying that most of them have become aware of the service very recently or services improved within the last one year or even customer perception with regards to LNM is changing. As for the merchants 47% of them also responded to have been registered and having actively used Lipa Na Mpesa within the last one year. This is an indicator that from the merchant end, awareness on Lipa Na Mpesa by Safaricom has not been very successful until very recently.

It is evident from the study findings that 43.7% of the subscribers are still tied to cash based payments. Almost half of the subscribers are yet to adopt. However, cashless payments are picking up as can be seen by high number of subscribers using VISA and LNM summed up i.e. 52.4%. Merchants on the other end are noted to be gradually embracing cashless payment; 55% summing up both VISA and LNM. However, 38% prefer cash than other modes. The fact that 43.7% of subscribers and 38% of the merchants used cash as opposed to 36.7% of subscribers and 34% of merchants who used Lipa Na Mpesa is in line with Soman (2001) who suggests that payments by cash and cheques are both memorable and painful and that electronic transfers are less. He concludes that, the use of cash renders the experience of parting with money vividly and thus highly salient and thus more 'painful'.

Embu town subscribers' average monthly usage of Lipa Na Mpesa is very low at 2.17 transactions per month considering we have respondents in the population who are hitting 10

transactions per month. This is a mere 21.7% of the company target of at least 10 transactions per month per subscriber (Safaricom Ltd, 2014).

5.4 Conclusion

It was concluded from the study that demographic factors are significant in explaining variations in subscriber adoption of mobile payments. Lipa Na Mpesa has made a positive contribution to the subscribers and merchant lives men and women of different ages, educational backgrounds, occupational status and incomes. Notably, majority of those who chose Lipa Na Mpesa as their preferred mode of payment were above the age of 40 years. However, this same group did not engage very much with Lipa Na Mpesa on a monthly basis. Their monthly usage of Lipa Na Mpesa was lower compared to those below 40 years. This was an indicator that perhaps they used Lipa Na Mpesa only for their utility bills and rarely used the service for making other over the counter payments within Embu town. There was disparity noted between those who preferred Lipa Na Mpesa as their preferred mode of payments and various demographic categories e.g. gender, age, income levels and business types.

It was concluded from the study that type of cashless payments is significant in explaining variations in subscriber adoption of mobile payments. Majority of the traders rely on it as opposed to the forms of payment for their day to day transactions. It is evident that the respondents in this study have an average understanding of the basic functions of Lipa Na Mpesa. Despite the existence of other forms of cashless payment, Lipa Na Mpesa is one of the cashless payments of choice by a worthy section of Safaricom MPESA subscribers in Embu town despite very stiff competition from mostly preferred VISA payments which are backed up by majority of the banks within the region.

It was concluded from the study that versatility of service is significant in explaining variations in subscriber adoption of mobile payments. Versatility benefits of Lipa Na Mpesa service especially ease of use, adaptability to different functions, diversity of usage application through pay bill and buy goods functionality have all contributed to the adoption of the service in Embu town. However, it is worth noting that majority of the respondents have reservations on the ease of use as a result of problems associated with the functionality of the service. Majority of the subscribers are notably not able to use the service with ease. Lack of conversance with Lipa Na Mpesa by merchant has also led to a number of subscribers from fully engaging Lipa Na Mpesa on business transactions.

It was concluded from the study that technological features are significant in explaining variations in subscriber adoption of mobile payments. User friendliness of the service, security features embedded in the system, provision of technical support by Safaricom ltd through various support systems have contributed majorly to the adoption of Lipa Na Mpesa. However, not all subscribers and merchants are fully aware of the security benefits of Lipa Na Mpesa as well as the various means of getting support on technical issues at times of need. Despite Safaricom's recent launch of the web-self-care system in mid-2014, a number of subscribers are yet to know of its existence and support functionalities.

5.5 Recommendations

The study recommends prioritization of a consistent awareness campaign on the services and benefits offered by the mobile money services with bias towards the use of Lipa Na Mpesa to pay for goods and services. There is high disparity within various categorizations of users for example age, gender, income levels, type of business, education levels and occupation status.

Safaricom Ltd should also prioritize making the mobile phone user interface more user-friendly. Of greater importance would be increasing user-friendly support services that target both subscribers and merchants and would go a long way to improving the credibility and transparency of Lipa Na Mpesa. For example, increased support services have resulted in use of cashless payment systems on some transport services.

Further to this, Safaricom Ltd should aim towards ensuring that there is a balance between the usages of their Paybill service in contrast to the Buy Goods & Services functionalities while at the same time aiming to pursue those who do not use either of the two functionalities in their day to day transactions.

To minimize the current risks, it is recommended that Safaricom Limited identifies platforms capable of minimal delays and fast responses to increase Lipa Na Mpesa adoption rates in Embu town. The organization should develop more robust systems that minimize the risk of losing money, such as providing a method to confirm the business identity one has registered on their systems, bridging the gap between the various companies and Safaricom especially for the Paybill systems where other remote stakeholders/companies are involved and a faster method of cancelling a faulty transaction when it arises.

Lastly, networks can be developed to boost Safaricom's network connectivity within poor coverage zones even though the cost benefits of such interventions need to be further evaluated.

5.6 Suggestions for Further Research

Based on the study findings the following is recommended:

1. A similar study may be carried out in rural areas where factors like bank accessibility have minimal influence with regard to other forms of cashless payments.

2. A study of the challenges of adoption of Lipa Na Mpesa should be carried out as there may be other factors not studied that may contribute to the variations.

3. There is need to establish factors that have led to low usage of internet payments among mobile subscribers in Embu Town.

4. Lastly, it was revealed that 48% of the merchants opted to use VISA cards as opposed to 36% who opted for Lipa Na Mpesa service as preferred mode of cashless payment. This finding is intriguing considering the fact than 34% of the merchants asserted that they prefer Lipa Na Mpesa compared to 21% who prefer VISA as preferred mode of payment over the counter. This indicated that when cash is an option then VISA payments reduce by almost half. The study therefore recommends a further inquisitive on the effects of VISA card payments on the Mobile payment adoption.

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APPENDIX 1

INTRODUCTORY LETTER

FELIX KAILEMIA BAARIU,

P.O BOX 54373-00200,

NAIROBI.

CELLPHONE: 0722617842

DATE……………………

TO WHOM IT MAY CONCERN

RE: DATA COLLECTION REQUEST

I am currently undertaking a master's degree of Arts in Project Planning and Management at the University of Nairobi- Embu campus. As a requirement for award of the degree for graduation, I am undertaking a research to determine factors influencing subscriber adoption of mobile payments. A case of Safaricom's Lipa Na MPESA service in Embu town, Kenya.

In this regard, I am kindly requesting you for your support in terms of time and by responding to the attached questionnaire. Kindly fill it accurately and honestly. Kindly note that the information received will be treated with utmost confidence. You don't need to write your name. Rest assured that the research is purely for academic purposes.

Thank you in advance.

Yours sincerely,

Felix Kailemia Baariu

L50/65988/2013

MPESA SUBSCRIBER'S QUESTIONNAIRE

SECTION I: Demographic factors

1. What is your gender?

Male [   ]   Female [   ]

2. What is your age-group?

18-30 years [   ]   31- 40 years [   ]   41- 50 years [   ]   above years 50 years [   ]

3. What is your highest level of education?

Tertiary [   ]   Secondary [   ]   Primary [   ]

4. What is your occupation status?

Employed [   ]   Self Employed [   ]   Other [   ] (specify)

5. What is your monthly income level?

0-40,000 [   ]   40,000-70, 0000 [   ]   7 0,000-100,000 [   ]   above 100, 0000 [   ]

SECTION II: Types of cashless payment methods

6. Do you use cashless payment for goods and services?

Yes [   ]   No [   ]

7. Do you do mobile banking using your mobile phone?

Yes [   ]   No [   ]

8. Do you own credit card or ATM cards?

Yes [   ]   No [   ]

9. Do you know the Lipa Na M-PESA service?

Yes [   ]   No [   ]

10. If yes, have you ever used it?   Yes [   ]   No [   ]

11. Do you make payments of goods or services over the internet?

Yes [   ]   No [   ]

12. If yes, which payment system do you use?

Visa [   ]   Master card [   ]   PayPal [   ]   Lipa Na MPESA [   ]   other [   ] specify

13. How would you rate Lipa Na MPESA service with respect to the other cashless modes of payment?

Very Inferior [   ]   Inferior [   ]   Average [   ]   Superior [   ]   Very Superior [   ]

14. Kindly state the reason for your answer above

I…………………………………………………………………………

II…………………………………………………………………………

III…………………………………………………………………………

15. Would you recommend the use of Lipa Na MPESA to others?

Yes [   ]   No [   ]

16. Kindly state reasons for your answer above

I…………………………………………………………………………

II…………………………………………………………………………

III…………………………………………………………………………

IV…………………………………………………………………………

SECTION III: Versatility of service

17. Which transaction on Lipa Na MPESA are you a regular user of. Please tick one.

Pay Bill [   ]   Buy Goods & Services [   ]   None [   ]

18. Do you think that Lipa Na Mpesa payments are easily accepted in this town?

Yes [   ]   No [   ]

19. How can you term the usage of Lipa Na MPESA service?

Very easy [   ]   Easy [   ]   Average [   ]   Difficult [   ]   Very Difficult [   ]

SECTION IV: Technological features

20. Do you think mobile payments are more secure than cash payments?

Yes [   ] No [   ]

21. Kindly give reason, for your answer

I……………………………………………………………………

II……………………………………………………………………

III……………………………………………………………………

22. Do you find the Lipa Na MPESA user interface friendly to use?

Yes [   ] No [   ]

23. Do you find the Lipa Na MPESA user interface effective?

Yes [   ] No [   ]

24. Does your mobile have access to internet?

Yes [   ] No [   ]

25. Kindly give reason, for your answer

I……………………………………………………………………

II……………………………………………………………………

III……………………………………………………………………

IV……………………………………………………………………

26. Do you think mobile payments have positively contributed to reduced money theft?

Yes [   ] No [   ]

27. Do you experience any technological challenges while using Lipa Na MPESA?

Yes [   ] No [   ]

28. If yes, where do you get assistance?

Line 234 customer care [   ]   Regional support agents [   ]   Merchants [   ]

Colleagues [   ]

SECTION V: Subscriber adoption of Lipa Na Mpesa

29. How long have you actively used Lipa Na MPESA?

0-1 year [   ]   1-2 years [   ]   2-3 years [   ]   3-4 years [   ]

30. What is your preferred mode for making payments over the counter?

Cash [   ]   VISA (debit card/credit card) [   ]   Lipa Na MPESA [   ]   other (specify) [   ]

31. On average how many times per month do you interact with Lipa Na Mpesa? Kindly indicate 0, 1, 2...10 times etc.

…………………………………………………………………………

APPENDIX 3
MERCHANT'S QUESTIONNAIRE

SECTION I: Demographic factors

1. What is your gender?

Male [   ]   Female [   ]

2. What is your age-group?

25-30 years [   ]   31- 40 years [   ]   41- 50 years [   ]   above 50 years [   ]

3. What is your highest academic qualification?

 Tertiary [   ]   Secondary [   ]   Primary [   ]

4. What type of business do you deal in?

Goods [   ]   Services [   ]   Both [   ]

5. How long have you operated in the business?

0-3 years [   ]   4-7 years [   ]   8-10 years [   ]   above 10 years [   ]

SECTION II: Types of cashless payment methods

6. Please indicate your most preferred mode of cashless payments that you accept.

Lipa Na Mpesa [   ]   ATM cards [   ] Credit cards [   ]   Electronic Funds Transfer [   ]

other mode [   ]   (specify)

7. Do you find the Lipa Na MPESA service credible?

Yes [   ]   No [   ]

8. Do you think traditional modes of payment are affecting its adoption?

Yes [   ]   No [   ]

9. State two reasons for you answer above

I……………………………………………………………………

II……………………………………………………………………………..

10. Do mobile payments increase the purchasing power of customers?

Yes [ ]   No [ ]

SECTION III: Versatility of service

11. Kindly put tick [✓] in the box in relation to your opinion

STATEMENT	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Lipa na Mpesa is increasing the customer base for businesses					
Businesses adopting Lipa na Mpesa are likely to grow					
Lipa na Mpesa is facilitating credit borrowing because of the transparency and credibility of the financial records					
Lipa na Mpesa has contributed to employment					
Customers should embrace Lipa na Mpesa because of convenience and efficacy					

SECTION IV: Technological features

12. Do you have a point of sale terminal or cash register?

Yes [ ]   No [ ]

13. Is the Lipa Na MPESA mode of payment compatible with your Point of sale system?

Yes [   ]   No [   ]

14. Are the Lipa Na MPESA security features adequate for your transactions?

Yes [   ]   No [   ]

15. Do you think mobile payments have reduced theft in the business?

Yes [   ]   No [   ]

16. Give reasons for your answer above?

I…………………………………………………………………………

II…………………………………………………………………………..

III…………………………………………………………………………

IV…………………………………………………………………………..

17. Have you experienced any form of Lipa Na MPESA fraud related incidences?

Yes [   ]   No [   ]

18. Where do you receive technical support on Lipa Na MPESA?

 Web self-care [   ]   Line 234 MPESA customer care [   ]   Regional support agents [   ]

Fellow Merchants [   ]

SECTION V: Subscriber adoption of Lipa Na Mpesa

19. How long has your business been registered and actively used Lipa Na MPESA?

0-1 year [   ]   1-2 years [   ]   2-3 years [   ]   3-4 years [   ]

20. What is your preferred mode for receiving payments over the counter?

VISA (debit card/credit card) [   ]   Cash [   ]   Lipa Na MPESA [   ]   other [   ]

(specify)

APPENDIX 4

KREJCIE AND MORGAN TABLE

Required Sample Size[†]

Population Size	Confidence = 95% Margin of Error				Confidence = 99% Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586