THE EFFECT OF TECHNOLOGY, SECURITY AND COMPETITION ON THE USE OF CASHLESS PAYMENT SYSTEMS BY MERCHANTS IN NAIROBI COUNTY

BY

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DECLARATION

This research project is my original work and has not been presented for award of degree in any other University.

Signed ………………………………… Date……………………………….

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This project has been submitted for examination with my approval as the University supervisor

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DEDICATION

To

My dear loving mum Mary Muthoni Mugo

(Your love cheered me throughout)

and

My loving caring dad John Mugo

(Your encouragement sustained me)

ACKNOWLEDGEMENT

I would like to first and foremost thank the Almighty God for enabling me to come this far, for the gift of life, strength and endurance. Indeed it has been a very long journey.

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I will forever be indebted to my parents Mr and Mrs Mugo for the financial support, encouragement and prayers. I remain thankful to my brothers, sisters and friends for their encouragement and always being there for me and my fiancé Paul for his endless support and encouragement.

Lastly my sincere gratitude goes to all who took time to fill my questionnaires.

LIST OF ABBREVIATIONS

PDA-   Personal Digital Assistant

POS-   Point of Sale

PSV-   Public Service Vehicles

LDC-   Less Developed Countries

GDP-   Gross Domestic Product

ATM-   Automated Teller Machine

PSP-   Payment Service Providers

UN-   United Nations

UNEP -   United Nations Environment Programme

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ABSTRACT

This study sought to establish the effect of technology, security and competition to the use of cashless payment systems by merchants in Nairobi County. The study utilized descriptive research design. The population of this study was merchants in Nairobi County. A semi-structured questionnaire was administered to the persons heading different businesses. Cross tabulation, correlation analysis and multiple regression analysis were used to determine the relative significance of the factors. Analysis of the factors indicated that technology, security issues, and competition had a strong effect on adoption of the cashless payment system. Correlation analysis indicated that the three independent variables (competition, technology and security concerns) had strong correlations with cashless payment system. The study recommends that entrepreneurs all over Kenya understand that the provision of cashless payment system is a unique business opportunity that will build strategies that capture market share.

CHAPTER ONE

INTRODUCTION

1.1Background of the study

The payment and settlement systems are the core elements of financial structure in a nation as well as on the international level. The evolving technology on financial transactions has availed methods of payment that have improved efficiency and effectiveness in place of cash to facilitate trade. In early days there existed different forms of payment with the most ancient one being barter trade. The challenges that were involved in barter trade necessitated introduction of various forms of money. The emergency of potentially superior substitute for cash or monetary exchange that is cashless payment system is expected to aid effective operations in different sectors of the nation's economy if it is properly implemented.

Humphrey (2004) notes that since the end of 1980s, the use of cash for purchasing consumption goods in the US declined. Less Developed Countries (LDCs) are on the transition from a pure cash economy system to a cashless economy system for the purpose of development. Kenya is ranked second in Africa among countries that have significantly adopted cashless payments system, according to the results of a new global survey (Kariuki, 2013). The report released showed that 27% of Kenyans had fully adopted the cashless system for settling bills, buying goods and paying for various services with the number rising sharply due to reliable mobile phone cash transactions.

Use of cashless services was found to have tripled since 2011 when cash payments stood at Sh180.6trillion ($21 trillion), 34 per cent of total global consumer spend while cashless payments amounted to Sh361.2 trillion ($42 trillion). Belgium lead the pack with an estimated 93 per cent of transactions being cashless, France (92 per cent), and Canada at 90 per cent followed by Sweden, Australia and the Netherland.

The Government of Kenya has introduced a new measure which requires the Public Service Vehicles (PSVs) to implement and operate a cashless payment system for all fares. According to the cabinet secretary for transport and infrastructure, the new concept is informed by advanced technology in the country. The system will assist the PSV owners to track payments as well as deal with the escalating cases of PSV touts disappearing with money belonging to owners or passengers.

1.1.1 Technology, Security and Competition

Security is the state of being free from danger or threat. Cash has always been the primary target of criminals, and therefore the protection of cash should be given a high priority. There have been many cases where people handling/carrying cash have been killed or seriously injured at the hands of armed criminals. In this regard, cashless transactions are being preferred (Gal, 2003).

Technology is the use of science in areas such as industries, engineering and telecommunication to invent useful things or to solve problems. Advance in technology has availed a range of safer modes of payments. Transactions can now be completed

without physical exchange of cash using cards and mobiles phones. The cashless payment system is a convenient, safer and faster means of payment (Martin, 2011).

Competition in business is rivalry in which every seller tries to get what other sellers are seeking at the same time. Businessmen are now providing range of payment modes as a means to attracting a wider customer base. This is especially because of consumers seeking identical payment options at all points of purchase with availability of the same in online shopping and restaurants (Porter, 1998).

1.1.2 Cashless Payment System

In a cashless society, consumers can make retail transactions payments over the Internet, payment at 'unmanned' vending machine, 'manned' point of sale (POS) using mobile phone device, personal digital assistant (PDA), smart cards and other electronic payment systems, including debit and credit cards. Globally businesses are embracing the innovation that comes with it, and are transforming their business models in alignment with this reality. Locally, banks are investing in transformation into digital businesses. An example is the use of social banking in GT Bank which makes it very convenient for their customers to view their account balance, perform money transfers, and open accounts, all on Facebook.

The government of Kenya and the commercial entities provide strong encouragement and support for cashless transactions. Although there are benefits such as cost saving and efficient use of resources, social commentators and environmental activists have expressed concerns that it would increase overall consumption, increase personal debt

levels, reduce savings and that the resultant 'over-consumption' will have an adverse impact on the society and environment (MacDonald et al, 2006).

Kenyans are now using mobile phone money transfer services to pay for utility bills, mainly electricity and water, purchase goods in supermarkets, and pay for bus tickets, insurance premiums and loans. According to the World Bank, penetration of the mobile phone in Africa has increased from 3 per cent in 2002 to more than 48 per cent today, and is expected to reach 72 per cent by the end of 2014 (World Payments Report, 2012).

There are different cashless payment methods for example, payment card which is accepted by a merchant to make a payment for a purchase or in payment of some other obligation. The use of a wide variety of cards available including credit, debit and the prepaid cards has given people the power to purchase items in stores, on the Internet, through mail-order catalogues and over the telephone. Cards are both beneficial to the merchants and their customers. They save merchant's time and money, enable them to attract and retain more customers, and help them grow their businesses.

Payment cards are more secure and convenient for the consumers. More than 1.2 billion credit cards are now in use around the world, accepted at more than 23 million locations (Gensler, 2013). The payments cards are now even more convenient with the wireless computer network which has allowed the POS to go mobile. Payment can now be done at the customers point this has increased customer satisfaction especially in the hotel industry where the technology has already been embraced.

1.1.3 Effect of Technology, Security and Competition on Use of Cashless Payment Systems.

Technology induced developments in payment and settlement systems have been significant in recent years and can be analyzed under two major categories. The first category relates to adapting the existing payment products for use on new channels brought about by technology. The card schemes with their ubiquitous acceptance network fit into the first category. The adaptation of card based payments over the internet has enabled the use of such products across the globe. The second category relates to new channels of delivery enabled by technology. Internet/mobile based products have become important means of payments (Gal, 2003).

Convenience is important. In theory, future mobile-phone users will not need to carry cash, payment cards, loyalty cards, paper receipts, paper coupons, and other artifacts of today's checkout-counter experience. Some security risks may abate: The rise of cashless wallets could prefigure the downfall of pickpockets, and with the rise of mobile payments, fraudulent cloning of magnetic-stripe cards may become decreasingly common (Martin, 2011).

Cashless payment tends to benefit businesses by extending customers base, boosting cash flow, reducing costs, enhancing customer service and improving competitive advantage. Cashless payment improves customer service by providing choices; it can offer a wide range of payment options which makes it convenient to perform transactions. The

varieties in payment options also bring about competition with competitor trying to offer full range of payment options (Gal, 2003).

1.1.4 Merchants in Nairobi County

Nairobi was founded by the British in 1899 as a simple rail depot on the railway linking Mombasa to Uganda, the town quickly grew to become the capital of British East Africa in 1907, and eventually the capital of the newly independent Kenyan republic in 1963 (Greenway & Monsma, 1989). Nairobi County was founded in 2013 on the same boundaries as Nairobi Province, after Kenya's 8 provinces were subdivided into 47 counties. Being the business and financial centre of Kenya and East Africa in general, Nairobi County is home to thousands of merchants operating in various sectors of the economy which include among others food processing, construction and real estate, tourism and hospitality, internet and computer services, trade, transport, energy and health.

Nairobi County is fairly urban and is divided into eight administrative divisions (sub counties) namely eight administrative divisions of Nairobi namely; Central, Dagoretti, Embakasi, Kasarani, Kibera, Makadara, Pumwani and Westlands. Nairobi is now one of the most prominent cities in Africa, both politically and financially. It is home to thousands of Kenyan businesses and over 100 major international companies and organizations. This includes the United Nations Environment Programme (UNEP) and the main coordinating and headquarters for the UN in Africa and Middle East, the United Nations Office in Nairobi (Greenway & Monsma, 1989). This study is therefore based in Nairobi as there will be coverage of the factors contributing to the adoption of the

cashless payment system than any other county. This is because it is the headquarters of most business, financial institutions among others as well as a hub of thousands of diverse businesses.

1.2 Research Problem

Money is often described as having three main functions i.e. a unit of account function, a medium-of-exchange function and a store-of-value function. In a cashless economy, the third is not operative and, probably, neither is the second. Cashless economy does not refer to an outright absence of cash transactions in the economic setting but one in which the amount of cash-based transactions are kept to the barest minimum. It is an economic system in which transactions are not done predominantly in exchange for actual cash (Daniel, Swartz and Fermar, 2004).

The cashless system is operated by several players among them the providers who provide the payment network for the system to function and the financial institutions that act as acquirers for merchants and issuers of cardholders and reach the card payment services to the ultimate users. For these two parties, the cashless payment system is an income generating initiative and they are motivated to run the system as they are able to generate adequate profits out of their operations. On the other side of the system are the users- both merchants and their customers. The benefits these two players derive from the system are manifold- the convenience of electronic transactions, the ease of credit availability, increased sales, increased purchasing power, secure transaction to list a few. Since they are the end users of the convenience the cashless payment system generates,

they are the ones who bear the cost of the system. Apart from these four players there is the regulator of the payment system, usually the central bank of the country.

The card based payment system cannot function in absence of any of its players. The global volume of non-cash transactions totaled 260 billion in 2009 after sustained average annual gains of 6.8% since 2001(World Payments Report, 2011). The outright volume of these payments only remains heavily concentrated in developed markets. Developing countries are just improving their payments infrastructures, enabling wider adoption and greater usage of non-cash means and channels .They also tend to be open to innovations that can broaden their still-nascent base of users (World Payments Report, 2011).

However, the global use of cash payment is still endemic, especially for low-value retail transactions. But while cash may be convenient, it makes taxation less transparent, and it is costly to distribute, manage, handle and process. It therefore follows that; cash as a mode of payment is an expensive proposition for any government (Gensler, 2013). As a result, many governments are seeking to reduce these costs and encourage the use of non-cash payment means. This study will therefore seek answers to the following question; do technology, security and competition affect the use of cashless payment systems in Nairobi County?

1.3 Objective of the study

The objective of this study is to establish the effects of technology, security and competition on the use of cashless payment system by merchants in Nairobi County.

1.4 Value of study

The aim of the study is to provide adequate information to the stake holders in different sectors of the economy to aid in smooth implementation and operation of cashless systems. This study will therefore uncover the challenges in implementation and operation of the cashless payment system.

The government will benefit from the findings of this study by learning the benefits and challenges it is likely to face during the implementation and operation of the cashless payment system. This is timely especially with the new regulations to operate a cashless public transport fare system. It will therefore take a proactive step to ensure efficient and effective evolution to a cashless economy.

The finding of this study will be invaluable to users, potential and current. It will enlighten them on the convenience and the cost efficient ways to operate cashless systems. Further they will benefit by learning the pitfalls to avoid while embracing cashless payments

The providers of cashless payment systems i.e. the Mobile subscribers, Banks and others will gain knowledge on how to package their products based on areas of improvement highlighted to encourage uptake. Issues especially related to fraud will be invaluable. The will also learn the attractiveness of the market in order to make a decision on the extent to which they can penetrate the market.

Academicians and scholars will find this research invaluable. The study will help them advance their knowledge on cashless payment systems. Further, they might be interested in recommendations for further research on this subject.

CHAPTER TWO

LITERATURE REVEIW

2.1 Introduction

This chapter reviews various studies and literature on cashless payment systems to try and establish the determinants of its use in different sectors of the economy. Analysis will be done from other studies which relate to different payment systems. Evolution of the payment systems and the factors that have necessitated different modes of payment will also be discussed.

2.2 Theoretical literature review

Money is the most important commodity in a market economy. A sum of money is at least one side of every market transaction. Therefore, anything that affects the value of money affects every market transaction. The value of money affects not only the transactions of the moment but also all transactions over periods of time. Below are innovations theories discussed to explain technology acceptance.

2.2.1 The Diffusion of Innovation (DOI) Theory

Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962, 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.

Adoption of a new idea, behavior, or product (i.e., "innovation") for example that of cashless payment system 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 will help or hinder adoption of the innovation (Rogers, 1995). The cashless payment system has gained acceptance in given industries. Factors that favor its acceptance in these industries will be analyzed to help overall acceptance.

2.2.2 Developer-Based (Determinist) Theory

The goal of developer-based theory is to increase diffusion by maximizing the efficiency, effectiveness and elegance of an innovation. Developers-based theories focus on the technical characteristics of an innovation in order to increase diffusion. The developer, or architect, of superior technology is seen as the primary force for change. The underlying assumption of developer-based theories is deterministic because they imply that technological products and systems will, by virtue of their superiority alone, replace

inferior products and systems. Developer-based theories of diffusion see change as following directly from a technological revolution or quantum leap.

Developer-based theories in instructional technology assume that the best way to bring about change is to create a system or product that is significantly, quantifiably superior to existing products or systems. Potential adopters are viewed as being predisposed to adopt innovations that are quantifiably superior. Top down school reform efforts such as the Goals 2000 initiative are excellent examples of developer-based IT diffusion theories (Mehlinger, 1995). These top down reform efforts seek to diffuse educational change by proposing educational systems that are superior to existing systems. By specifying goals, organizational structures, managerial philosophies, instructional products, and fiscal strategies that have been proven to be, or at are least theorized to be, superior to existing practice, top down school reformers are counting on technological superiority to bring about change. The payment system could easily be adopted if it's viewed to be superior to the cash system.

2.2.3 Unified theory of acceptance and use of technology (UTAUT)

This is a technology acceptance model formulated by Venkatesh and others in "User acceptance of information technology: Toward a unified view". The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. These theory would therefore help explain a number of factors that determines the adoption of the cashless payment system

The theory holds that four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions; the first three being direct determinants of usage intention and behavior, and the fourth a direct determinant of use behavior. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior (Venkatesh & Morris, 2003).

2.3 Determinants of use of the cashless payment system

Use of the cashless payment system is determined by several factors i.e. competition, government regulations, volume of transactions among others. This study concentrates on the three main factors contributing to the use of cashless payment system in Nairobi County. These factors are technology, security concerns and competition.

2.3.1 Technology

Cash is becoming increasingly redundant with the rise of contactless payment systems and digital wallets (Nichols, 2013). Technological innovation is truly revolutionizing the way we shop and coins may soon be consigned to the museum. Technological advancement has provided efficient and effective payment system devoid of 'cash and carry syndrome'. Specifically, cashless payment system has provided a medium through which economic exchanges take place without visiting brick and mortal banks or with no physical presence of the transacting parties.

With advance in technology, consumers can make payments over the Internet, payment at 'unmanned' vending machine, 'manned' point of sale using mobile phone device, personal digital assistant, smart cards and other electronic payment systems, including

debit and credit cards. Education to the stakeholders is important to increase acceptability of these cashless payment modes.

2.3.2 Competition

The ability to conduct cashless transactions at convenience stores, online websites, and quick service restaurants has contributed to consumers seeking identical payment options at all points of purchase. Diverse businesses therefore need to provide flexible and efficient new payment systems to ensure they remain competitive as well as increase their profitability.

2.3.3 Security concerns

Security is a major concern that has contributed to adoption of cashless payments system. High cash usage enables corruption, leakages and money laundering, amongst other cash-related fraudulent activities (Gal, 2003). The Kenyan government has introduced regulations to operate cashless system for the public fare. This is expected to reduce corruption and loss experienced by passengers when touts disappear with their money.

Fraud is common especially in Nairobi County where businessmen are robbed of the money collected after the banking hours either on their way home or even before closing their businesses. The businessmen therefore prefer transactions using debit and credit cards and mobile phone which are less risky. E- Payment systems are convenient and cheaper in addition to being secure and hence a preferred mode of transacting.

2.4 Empirical literature review

More and more researches are being carried out on determinants of use of the cashless payment systems. Boeschoten (1998) carried out a research with the aim of finding out the factors that were considered in choosing and using payment instruments. He used a new and unique set of micro data that contained both transaction information and survey data on payment behavior of German individuals, the results indicated that cash usage was compatible with rational decision making. Consumers decide upon the adoption of payment cards and then use available payment means according to their transaction and personal characteristics, the relative costs of cash and card usage and preferences. He concluded that the transaction size is one of the most important explanatory variables in choosing a payment instrument. Transaction size is one of the factors that will be studied in this research.

Kaburia (2004) carried out a study of E-payment systems and alternatives for developing countries. The main purpose of this research project was to examine the e-payment alternatives that exist in Kenya and the world, and the extent of use of e-commerce and e-payment methods in Kenya. Three samples; one of individuals, another one comprising organizations and another sample of commercial banks and PSPs (payment Service Providers) were studied. The research found out that indeed the lack of suitable e-payment alternatives among other factors was a critical challenge to the growth of e-commerce in Kenya. Availability and ease of use of various cashless payment modes powered by advanced technology will be studied in this paper.

Magutu (2009) did the study titled Modeling the Effects of E-Commerce Adoption on Business Process Management. The general objective of this study was to model the effects of e-commerce adoption on business process management. This was a census study on modeling the effects of e- commerce adoption on business process management of commercial banks in Kenya. Out of the sixty (60) respondents to whom the questionnaires were administered, only forty- one (41) responded. This gave a response rate of 68.33% percent. It was found that the commercial banks in Kenya have formalized policy on E-Commerce and internal business process management. Also to a great extent the banks have focused their e-business activities on collaborating with business partners using ICT; provision of other on-line and e-services, including e-marketing and advertising; supply chain management using intranet; and on-line buying (internet). The major effects of e-commerce on banks business process management are it has improved the image of the bank; besides profit making the bank have been actively engaging themselves for the good of the effective business process management. This study brings out business image as one of the factors encouraging the adoption of the cashless pay system.

Newstead (2012) in his study he explored the relationship between e-payment system and economic growth as a means of reviewing current transition to cashless economy in Nigeria. Data was analyzed using Ordinary Least Square and Two Stage Least Square methods covering period of 7years (2005-2012). The result indicates a significant positive relationship between e-payment system and economic growth in terms of real

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Gross Domestic Product (GDP) per capita and trade per capita. Only Automated Teller Machines was found to positively contribute to economic growth while other e-payment channels contribute negatively. Hence, current cashless policy should be tailored towards effective e-payment system and other factors which bear much relevance on successful transition to cashless economy should be prioritized.

Similarly, World Payments Reports (2012) explored the state and evolution of global non-cash payments. The purpose of this study was to find out the reasons for adopting the cashless payment system among businesses in the developed economies. The study used purposeful sampling to pick different businesses in developed economies that had adopted the cashless payment system and found that non-cash payments made it easier and quicker for people and businesses to buy goods and services, pumping money into the system faster and contributing to GDP.

The result of the study was similar to Hasan, Renzis and Schmiedel (2012) who explored fundamental relationship between electronic retail payment and overall economic growth using data from across 27 European markets over the period 1995-2009 and found that migration to efficient electronic retail payment was related to overall economic growth, consumption and trade. Their study will be relevant in determining the factors in developed economies that have favored the implementation and operation of the cashless system.

2.5 Summary of Literature Review

Since 1943, a number of researchers from rural sociology and other disciplines have built on the Ryan and Gross' work to conduct studies and develop theories related to the diffusion of innovations. The researcher responsible for the most significant findings and compelling theories related to diffusion is Everett M. Rogers. Rogers' book Diffusion of Innovations, first published in 1960, and now in its fifth edition is the closest any researcher has come to presenting a comprehensive theory of diffusion.

The Innovation Decision Process theory by Rogers states that diffusion is a process that occurs over time and can be seen as having five distinct stages. The stages in the process are Knowledge, Persuasion, Decision, Implementation, and Confirmation. According to this theory, potential adopters of an innovation must learn about the innovation, be persuaded as to the merits of the innovation, decide to adopt, implement the innovation, and confirm (reaffirm or reject) the decision to adopt the innovation.

Sachs (1993) argues that after looking at the literature in our field, one might get the impression that the only important thing we need to know about how to encourage the adoption of innovations or how to be better change agents is that there are five stages to the innovation adoption process. Sachs correctly concludes that many other important theories of innovation diffusion are overlooked. The theories also do not explain the characteristics that lead to faster adoption in some sectors or by some people than others. In the literature review Boeschoten (1998) concluded that the transaction size is one of the most important explanatory variables in choosing a payment instrument. Kaburia

(2004) in is research found out that indeed the lack of suitable e-payment alternatives among other factors was a critical challenge to the growth of e-commerce in Kenya.

Magutu (2009) in the study titled Modeling the Effects of E-Commerce Adoption on Business Process Management found out the bank image was one of the main factor that encouraged adoption of technology besides profit making. Newstead (2012) in his study explored the relationship between e-payment system and economic growth, and demonstrated that the cashless payment system has contributed towards economic growth in different countries, reduced cash related crimes and attracted more foreign investors.

However, other than the challenges cited by different researchers, there are other factors such as security concerns brought about by lack of knowledge by users, technology and competition that contribute to adoption of the cashless payment system in different sectors of the Kenyan economy. This study will therefore provide rich information on technology, security concerns and competition among other factors affecting the adoption of cashless payment systems.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the description of the methods that were applied in carrying out the research. It covers research design, population of study, sampling design, data collection and data analysis. The research instruments that will be used for data collection is in Appendix 1.

3.2 Research Design

The study employed descriptive survey design. This method is designed to describe the characteristic of a particular population in a systematic and accurate fashion and to focus on a number of subjects which have similar observable characteristics. This means that the sample measurements was be carried out at a single point in time. According to Orodho (2003), descriptive survey is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. The rationale for a descriptive research was description of the state of affairs as it existed. Kerlinger (1969) points out that descriptive studies are not only restricted to fact finding but may often result in the formulation of important principles of knowledge and solution to significant problems.

3.3 Population of Study

The population of interest in this study consisted all registered merchants in Nairobi. Of the registered businesses in Kenya an estimated 30,000 registered businesses are located in Nairobi (Nairobi City Council, 2013).

3.4 Sampling

The study adopted probability sampling. A sample of 379 merchants was used. This is line with Cooper & Schindler (2008) recommendation that 10%-20% of population size is sufficient sample size. Thus, using stratified random sampling, 48 firms will be drawn from each of the eight administrative divisions of Nairobi namely; Central, Dagoretti, Embakasi, Kasarani, Kibera, Makadara, Pumwani and Westlands.

The choice of the size of the sample was in accordance with the table for Determining Random Sample Size from a Given Population (with Confidence level 95%; Margin of error + or- 5%).The table is adapted from Educational and Psychological Measurement Handout number 16 Accreditation Study Course 2003 (Universal Accreditation Board,2003) of the united States of America. This sampling design greatly enhanced representativeness of the sample as data was be collected from a wide geographical area to ensure variability in characteristics of firms and the environment in which they operate. In addition, each firm was be given an equal chance to be selected .Hence the unbiased results was deemed suitable for generalization to the larger population.

3.5 Data collection

Primary data was collected using structured questionnaires .These questionnaires were directed to either a business manager or their representatives for each target entity. The questionnaires were administered through email and drop-and-pick method. The questionnaires were adequately prepared to provide for both open and closed ended questions in order to capture the objectives of the study.

The questionnaire was divided into two sections A and B. Section A captured the entities basic details while section B captured the extent to which technology, security and competition contributed to the adoption of cashless payment system in Nairobi County.

The researcher administered through the help of a research assistant three hundred and seventy nine (379) questionnaires to various merchants in Nairobi County. The researcher administered 150 questionnaires while the research assistant administered 229 questionnaires. The researcher concentrated with areas closest to the Central Business District while the assistant administered questionnaires in the rest of the areas. Two hundred and eight (208) responded within the two week duration they were given to respond. This translates to 54.88 % response rate.

The questionnaire was piloted before data collection. It was pretested in pilot survey using firms that were not considered for the main research. Pretesting questionnaires was directed towards ascertaining validity and reliability. The respondents were assured that the information obtained shall be treated for research purpose and no other purpose (Kombo, 2006).

3.6 Data Analysis

Since some of the issues in the study involved perception, descriptive statistics was the most appropriate method of data analysis. Descriptive techniques were chosen for this study because they offer more than just a collection of data. They involve measurement, classification, analysis, comparison and interpretation of data with the benefit of describing the state of affairs as it exists (Kombo, 2006).

Factor analysis was done to measure and establish the determinants of the use of cashless payment system in Nairobi. Data entry and management was undertaken using SPSS. Data was converted to numerical codes, and entered in a predesigned data entry spreadsheet in SPSS. Similar information was then categorized and grouped together to give a summary of results using descriptive statistics. The descriptive statistics to be used include measures of central tendency (mean), and measures of dispersion (standard deviation). These statistics will be used to determine the relative importance of the critical factors of both the dependent and independent variables. Pearson's correlation was conducted to determine the relationship between the different types of variables.

The correlation coefficient indicates both the magnitude and direction of the linear relationship of the variables. The correlation matrix was then be used as the standard form of reporting the correlation results. A multiple linear regression was used to develop a model that could predict research output using the independent variables technology, security and competition. The regression equation below will be used for development of the research model:

$$\hat{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_2 X_3 + \text{€ 1}$$

Where:

$\hat{Y}$ = Expected value of the dependent variable, in this case, use of cashless payment systems, α = Y-intercept (a constant term), β_1, β_2, β_3 β_k = Slope parameters; X_1, X_2, X_3 = independent variables, where X_1 - technology, X_2 – security ,X_3 – competition and € = Residual (error term).

The regression model assumes the following: the relationship between the dependent and independent variables is linear; the variance around the regression line is constant (i.e. homoscedastic); for each combination of the values of the independent variables, the values of the dependent variables are independent and normally distributed; and lastly, the Єs are independent and normally distributed with a mean of zero. The T- tests will be used to determine the statistical significance of the correlation coefficient; all tests will be two − tailed, and significance levels will be measured at 95% confidence level with significant differences recorded at an alpha level of 0.05 (p< 0.05); inferential statistics will be used to allow for prediction and extrapolation of population parameters from sample statistics.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents analysis and findings of the study on merchants in Nairobi and the effects of technology, security concerns and competition in the adoption of the cashless payment system. The questionnaires were directed to top management level because they are most likely to make final decisions about adoption of the payment systems. The objective of this study was to establish the effects of technology, security concerns and competition in adoption cashless payment system by merchants in Nairobi County.

The researcher administered through the help of research assistants three hundred and seventy nine (379) questionnaires to various merchants in Nairobi County. Two hundred and eight (208) responded within the two week duration they were given to respond. This translates to 54.88 % response rate.

Once the data was collected, it was checked for completeness and consistency. The data was analyzed by use of descriptive statistics and inferential statistics. This included a list of tables and percentages to represent the response rate and information on the variables that the study considered .Cross tabulation was used to determine the relationship between various variables and the use of cashless payment system. The findings of the study are presented in three parts. The first part presents the cross tabulation based on different variables under consideration .The analysis was as per the questionnaires that

were used to collect data. Data was categorized in terms of factors affecting use of cashless payment system. The second part presents findings using correlation analysis while the third presents data based on regression analysis.

4.2 General Information

Table 4.1: General Information

No.	Question	Parameters	Frequency	%
3	Do you have a cashless system of payments?	Yes	79	37.80%
		No	129	62.20%
4	Gender	Male	121	58%
		Female	87	42%
5	Respondent's age bracket	Under 35 years	123	59%
		Over 35 years	85	41%
6	Number of your staff workers	Below 5 Workers	73	35%
		5 – 10 Workers	60	28.70%
		10 – 15 Workers	42	20.11%
		Above 15workers	34	16.19%
7	Duration of business existence	Under 1 Year	51	24.32%
		1 – 2 years	58	28%
		2-5 years	38	18.45%
		5-9 years	31	15%
		Over 10 years	30	14.23%
8	Total revenue base per year (Ksh.)	Less than 1,000,000	49	23.51%
		1,000,000-5,000,000	58	28.11%
		5,000,000 - 15,000,000	46	21.98%
		10, 0000 – 15,000,000	39	18.87%
		Over 15,000,000	16	7.53%
9	What does the business deal in?	Goods	109	52.59%
		Services	99	47.41%
10	Highest level of education	Primary education	55	26.37%
		Secondary education	82	39.49%
		College education	39	18.20%

		University education	32	15.24%
11	Whose cashless transactions are more?	Male Customers	45	56.73%
		Female Customers	34	43.27%
12	Volume of cashless transactions per day	0-50	26	33.43%
		50-100	29	36.91%
		100-150	15	19.22%
		Over 150	9	10.44%
13	Average value of a single cashless transaction in Ksh.	1-100	20	25.53%
		100-500	24	29.79%
		500-1000	17	21.19%
		1000-2500	8	10.29%
		2500-5000	7	8.99%
		Over 5000	3	4.21%

Source: Research data (2014)

From the analysis in Table 4.1 the study revealed that 37.8 % of merchants were using cashless payment system. 58% of the respondents were male while 59% were below the age of 35 years.35% of the merchants had less than five workers, 28.7% had 5-10workers, 20.11% had 10-15 workers while 16.19% had more than 15 workers. The results of the study revealed 24.32% of the businesses were under one year old, 28% were between 1-2 years old , 18.5% were 2-5 years old,15% were 5-9 years old while 14.23% were over 10 years old.

Further, the results of the study revealed that 23.51% of the merchants' annual revenue base was less than Ksh. I million, 28.11% between 1-5 million , 21.98% between 5-15 million , 18.87% between 10-15 million and 7.53% over Ksh.15 Million .52.59% of the merchants were dealing with goods while the rest 47.41% were dealing in services. It is evident from the results of the study that 26.37% of the merchants had primary education,

39.49 % had secondary education, 18.90% had college education while 15.24% had university education.

The results of the study indicated that 56.73% of female customers outnumbered the 43.27% of male customers who preferred using cashless payment systems. Further, the results indicated that 33.43% of merchants had 0-50 cashless transactions per day, 36.91% had 50-100 transactions per day,19.22% had 100-150 transactions per day while 10.44 had over 150 transactions per day. Regarding the value of transactions, the results of the study revealed that 25.53% of the value of a single cashless transaction in Kshs were between 1-100, 29.79% were between 100-500, 21.19% were between 500-1000, 10.29% were between 1000-2500 , 8.99% were between 2500-5000 while 4.21 % were over 5000.

4.3 Factors affecting adoption of cashless payment system

These factors were grouped into three categories according to how they relate to variables i.e. security, technology and competition. This part presents the cross tabulated data for each variable based on the rating.

1=   Not at all   2=   A little bit   3= moderately

4 = Great extent   5 = Very great extent

Table 4.2: Security issues affecting the adoption of cashless payment systems

No.	Factor	Mean	Standard Deviation
1.	Security concerns	4.54	1.38
2.	Size of transactions	4.35	1.38
3.	Conspiracy between staff and customers to steal	2.97	0.72
4.	Nature of goods and services	2.58	0.57
5.	Government regulations	1.95	0.44

Source: Research data (2014)

From the analysis of security issues affecting the adoption of cashless payment systems in Table 4.2, there are five factors that affect the use of cashless payment systems. Security concerns affected the use of cashless payment system to a great extent with a mean>=4.5 and a significant standard deviation. Government regulation did not have significant effect to the use of cashless payment system with a mean >=1.9.

Table 4.3: Technology issues affecting the adoption of cashless payment systems

No.	Factor	Mean	Standard Deviation
1.	Technological advancement	4.67	1.47
2.	Global acceptance	4.62	1.40
3.	Volume of transactions	4.31	1.35
4.	Ease of record keeping and tracking	3.98	1.27
5.	Challenges regarding coins availability	3.57	1.02
6.	Ease of use	3.00	0.77
7.	General economic growth	2.66	0.61
8.	Online trading	2.5	0.59

Source: Research data (2014)

From the analysis of technology issues affecting the adoption of cashless payment systems in Table 4.3, there are eight factors that affect the use of cashless payment systems. Technological advancement affected the use of cashless payment system to a great extent with a mean>=4.5 and a significant standard deviation. Online trading did not have significant effect to the use of cashless payment system with a mean >=2.5.

Table 4.4: Competition issues affecting the adoption of cashless payment systems

No.	Factor	Mean	Standard Deviation
1.	Cash handling expenses	4.19	1.31
2.	Suppliers requirements	3.64	1.25
3.	Influence from service providers	3.49	0.94
4.	Customer demands	3.33	0.91
5.	Competitors	3.12	0.83
6.	Strategy to expand market	2.81	0.68
7.	Image of the business	2.19	0.50

Source: Research data (2014)

From the analysis of competition issues affecting the adoption of cashless payment systems in Table 4.4, there are seven factors that affect the use of cashless payment systems. Cash handling expenses affected the use of cashless payment system to a great extent with a mean>=4.0 and a significant standard deviation. Image of the business did not have significant effect to the use of cashless payment system with a mean >=2.0.

4.4 Correlation analysis on the factors affecting the use of cashless payment system

An analysis was done on how the variables under study were related to the use of cashless payment system and to each other. Findings are presented in the table 4.5 and are represented by the following; Use of cashless payment system- CS, Technology- T, Security- S and Competition- C.

Table 4.5: Correlation Matrix of variables affecting use of cashless payment system

	CS	T	S	C
CS	1.000			
T	.753	1.000		
S	.601	.450	1.000	
C	.512	.576	.124	1.000

Source: Research data (2014)

4.5 Regression analysis on the factors affecting the use of cashless payment system

The coefficient of determination (R^2) equals 0.6706. This shows that security, competition and technology explain 67.06 percent of the variations in the use of cashless payment system leaving only 32.94 percent unexplained. The P-value of 0.000 implies that use of cashless payment system is significant at 5percent level of significance.

Table 4.6: Regression Model Summary

R	R Square	Adjusted R Square	Std Error of the Estimate	Change statistics				
				R Square Change	F Change	df1	df2	Sig.F Change
.8189	.6706	.6545	.90331	.761	10.759	3	85	.000

Predictors: (constant), technology, security and competition

Source: Research data (2014)

Results in table 4.6 indicate that about 67.06 of the variation in the use of cashless payment system can be explained by the three independent variables. This indicates that the model is adequate in predicting the response of the dependent variable.

Table 4.7: ANOVA

	Sum of squares	Df	Mean square	F	Sig
Regression	61.453	3	10.2422	30.5555	.000(a)
Residual	30.191	85	.3352		
Total	91.644	91			

Predictor Variables: (Constant), Technology, security and Competition; Response variable: operational productivity

Source: Research data (2014)

The F value of 30.5555 indicates that the overall regression model is significant hence it has some explanatory value (P-value P=0.00<0.05).This indicates that the predictor variables have a significant effect on the output variable. This indicates that there is a significant relationship between the predictor variables (Technology, security and Competition) and response variable (use of cashless payment system).

Multiple regression analysis was conducted from the summarized data and the following regression model was fitted;

Y=-0.534+0.762X1+0.620X2+0.562X3…..

Table 4.8 Regression coefficients

		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std.Error	Beta		
(Constant)		-.534	0.607		-.8803	.385
Technology	X1	.762	0.114	.511	6.684	.000
Security	X2	.620	0.200	.472	3.099	.014
Competition	X3	.562	0.161	.494	3.491	.001

Dependent variable: Use of cashless payment system

Source: Research data (2014)

From Table 4.8 above, the constant =-0.534, shows that if Technology, Security and Competition were all rated as zero, the use of cashless payment system be -0.534. X1= 0.762, shows that one unit change in technology results in the use of cashless payment system increase by 0.762, X2= 0.620, shows that one unit change in security results in the use of cashless payment system increase by 0.620 and X3= 0.562, shows that one unit change in competition results in the use of cashless payment system increase by 0.562.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings .The chapter also presents the conclusion and recommendations made based on the findings from the study.

5.2 Summary of the findings

In a nut shell, the study revealed that 37.8 % of merchants were using cashless payment system. 58% of the respondents were male while 59% were below the age of 35 years.35% of the merchants had less than five workers, 28.7% had 5-10workers, 20.11% had 10-15 workers while 16.19% had more than 15 workers. The results of the study revealed 24.32% of the businesses were under one year old, 28% were between 1-2 years old, 18.5% were 2-5 years old, 15% were 5-9 years old while 14.23% were over 10 years old. This indicates that the use of cashless payment systems is most popular with the youths and new businesses.

The results of the study revealed that 23.51% of the merchants' annual revenue base was less than Ksh. I million, 28.11% between 1-5 million , 21.98% between 5-15 million , 18.87% between 10-15 million and 7.53% over Ksh.15 Million .52.59% of the merchants were dealing with goods while the rest 47.41% were dealing in services. It is evident from the results of the study that 26.37% of the merchants had primary education, 39.49 % had secondary education, and 18.90% had college education while 15.24% had

university education. Level of education, nature of products and the revenue base could not be out rightly linked to the use of cashless payment systems.

The results of the study further indicated that 56.73% of female customers outnumbered the 43.27% of male customers who preferred using cashless payment systems. Further, the results indicated that 33.43% of merchants had 0-50 cashless transactions per day, 36.91% had 50-100 transactions per day, 19.22% had 100-150 transactions per day while 10.44 had over 150 transactions per day. Regarding the value of transactions, the results of the study revealed that 25.53% of the value of a single cashless transaction in Kshs were between 1-100, 29.79% were between 100-500, 21.19% were between 500-1000, 10.29% were between 1000-2500 , 8.99% were between 2500-5000 while 4.21 % were over 5000. Low value transactions were the majority with most users being male.

From the analysis it can be concluded that cashless payment system is gradually gaining popularity with security, technology and competition being major drivers. There are numerous challenges facing use of cashless payment systems however, fraud being the biggest. Of all the cashless payment systems, mobile payments lead the way.

An analysis on how the variables under study were related to the use of cashless payment system and to each other revealed that the use of cashless payment system was highly related to technology followed by security and competition respectively.

The coefficient of determination (R^2) equals 0.6706 shows that security, competition and technology explain 67.06 percent of the variations in the use of cashless payment system leaving only 32.94 percent unexplained.

The F value of 30.5555 indicates that the overall regression model is significant hence it has some explanatory value (P-value P=0.00<0.05).This indicates that the predictor variables have a significant effect on the output variable. This indicates that there is a significant relationship between the predictor variables (Technology, security and Competition) and response variable (use of cashless payment system).

5.3 Recommendations

The study reveals that the use of cashless payment systems is most popular with the youths and new businesses. It is recommended that service providers develop cashless payment systems that encourage wider acceptance.

Government regulations were cited as the least driver of the adoption of cashless payment system. It is therefore recommended that the government puts up policies and enforcement mechanisms in place that promote the use of cashless payment systems for example the cashless fare system.

Low value transactions were the majority with most users being male. Since fraud concerns were cited as the deterrents of high value cashless transactions, the government should invest in laws to curb cyber crime in tandem with global trends.

Of all the cashless payment systems, mobile payments lead the way owing to its convenience. It is recommended that cashless payment systems service providers invest in improving convenience in other modes of cashless payment to promote their acceptance and usage.

It is recommended that entrepreneurs all over Kenya understand that the provision of cashless payment services is a unique business challenge and opportunity. They should therefore build strategies that capture market share and embrace globalization.

5.4 Limitation of the Study

Time being a limiting factor, the study focused on a sample of merchants in Nairobi County to gain an understanding of the effect of technology, security concerns and competition on the use of the cashless system by merchants in Nairobi County. Further, finances were a limiting factor which influenced the use of a sample.

There was unwillingness by some of the merchants to complete the questionnaires as they were suspicious of the intentions of the study. As a matter of fact, most did not want to indicate the names of their enterprises. The researcher explained that the data was meant for research purposes only so that the respondents could fill most if not all the questions.

Identifying only the targeted enterprises, those employing the cashless payment system was a major limitation. The researcher keeping this in mind seriously engaged the research assistant to capture details for the targeted enterprises. Another limitation of this study was that some data, for example data on revenue base per year, was not readily

available. This reduced the probability of reaching a more conclusive study. However, conclusions were made with the available data.

The size of the sample could have limited confidence in the results and this might limit generalizations to other situations. The study was also limited to three factors that affect the use of cashless payment system. There are many other factors that affect the use of cashless payment system for example government regulations.

5.5 Suggestions for Further Research

The factors affecting the use of cashless payment systems are wide-ranging. Thus it is impossible to exhaustively study the subject in a single report. The scope of this study only covers the three factors. Given enough time and resources it is possible to attempt to study more factors in all counties in Kenya. Various studies using different statistical methods would yield better results.

Further studies can assess whether there is a connection between the use of cashless payment systems in an economy to the level of economic growth. If so, a breakdown to the extent of connection in various sectors of the economy should be determined to allow informed policies.

In addition studies could be carried out to assess how the use of cashless payment system affects the efficiency of different departments of the government. The study focuses on technology security and competition as the only factors affecting the use of cashless

payment systems. A study could be carried out to find out what other factors affect the use of cashless payment systems and to what extent they affect.

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APPENDICES

Appendix I: Research Questionnaire

PART A: GENERAL INFORMATION

1. Name of entity

2. What is your designation at the organization?

3. Do you have a cashless system of payments?

       Yes ( )   No ( )

4. Gender: Male ( )   Female ( )

5. What is your age bracket? (Tick as applicable)

       a) Under 35 years ( )

       b) Over 35 years ( )

6. What is the number of your staff workers?

       a) Less than 5 Workers

       b) 5 – 10 Workers

       c) 10 – 15 Workers

       d) More than 15workers

7. For how long has your organization been in existence?

       a) Under 1 Year ( )

b) 1 – 2 years ( )

c) 2-5 years ( )

d) 5-9 years

e) Over 10 years ( )

8. What is your total revenue base per year?

a) Less than 1,000,000 ( )

b) Between 1,000, 000 – 5,000,000 ( )

c) Between 5,000,000 and 15,000,000 ( )

d) Between 10, 0000 – 15,000,000 ( )

e) Over 15,000,000 ( )

9. What does the business deal in?

a) Goods ( )   b) Services ( )

10. What is your highest level of education? Kindly tick your choice

Primary education   □

Secondary education   □

College education   □

University education   □

11. Whose cashless transactions are more?

Male Customers □   Female Customers □

12. What is the volume of cashless transactions per day?

0-50 □

50-100 □

100-150 □

Over 150 □

13. What is the average value of a single cashless transaction in Ksh?

1-100 □

100-500 □

500-1000 □

1000-2500 □

2500-5000 □

Over 5000 □

SECTION B

To what extent would you say each of the following factors have influenced your adoption of cashless payments? Where;

1= Not at all   2=   A little bit   3= moderately

4 = Great extent   5 = Very great extent

No.	Factor	1	2	3	4	5
1.	Competitors					
2.	Security concerns					
3.	Government regulations					
4.	Cash handling expenses					
5.	Online trading					
6.	Customer demands					
7.	Suppliers requirements					
8.	Conspiracy between staff and customers to steal					
9	Strategy to expand market					
10.	Challenges regarding coins availability					
11.	Influence from service providers					
12	Ease of record keeping and tracking					
13.	Volume of transactions					
14.	Ease of use					
15.	General economic growth					
16.	Image of the business					
17.	Size of transactions					
18.	Nature of goods/services					
19.	Global acceptance					
20.	Technological advancement					

Appendix II: Table for Determining Sample Size from a Given Population

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size

"S" is sample size.

Source: Adapted from Educational and Psychological Measurement David A Payne; Robert F McMorris 1967 English Book x, 419 p. illus. 23 cm. Waltham, Mass., Blaisdell Pub. Co.