Adoption of E-commerce Payment Systems by Commercial Banks in Kenya

By

Jesse Ndubi Nakhumwa

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Declaration

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

Sign……………………….…………Date…….…..……….

Jesse Ndubi Nakhumwa

D61/63121/2011

This research project has been presented for examination with my approval as the university supervisor.

Sign……………………….…………Date…….…..……….

Dr. Kate Litondo

Lecturer, School of Business, Department of Management Sciences

University of Nairobi

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Dedication

I dedicate this project to my late Dad, the Late Daniel Otipi Namulanda. Your simple wise words inscribed in the question, "*Abasio basoma nawe kaba karie?*" (*Your fellow age mates have gone back to school, what about you?*), inspired me to this length though you never lived to see me graduate. Rest in peace.

Abstract

E-commerce, which is combination of traditional commerce and Internet, has brought dramatic changes of the way business transactions are conducted prompting banks, as the intermediary financial instruments, to adopt and adapt electronic payment systems (EPS). These e-payment systems which include debit and credit cards, electronic fund transfer, mobile payments platforms and internet banking are already in use in Kenya market. Importantly to note is the fact that electornic payment instruments are not used with equal intensity even in developed countries due to various reasons. The research thus is focused on identifying key drivers for adoption of EPS in Kenya market by banks.

The researcher identified major variables affecting adoption of EPS which included security status, perceived level of trust, infrastructure capability to handle the system, marginal cost reduction and perceived associated benefits. A descriptive census survey of all the 43 banks was then done through a structured questionnaire. With aid of technology acceptance model and DeLone & McLean Information System Success model, the data collected was empirically analysed and results presented.

However, with different intensity, the findings of the study revealed that many banks in Kenya are implementing EPS platforms. The driving forces for change are the factors identified in the conceptual framework of this study. Bank respondents successfully did the rating of these factors. Therefore, the study recommends for a concerted effort amongst EPS key players to streamline operations in their area of concern. They should establish policies and legal framework good for electronic transactions as well as building sound telecommunication infrastructure countrywide. Again, this study is just but a stepping-stone to a better analysis that will unlock the potential of e-payment systems. The researcher encourages both academicians and practitioners to critique the study findings.

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List of Abbreviations

ATM	Automated Teller Machines
B2C	Business-to-Consumer
C2C	Consumer-to-Consumer
CBK	Central Bank of Kenya
CDSC	Central Depository & Settlement Corporation
CRB	Credit Reference Bureau
DTM	Deposit Taking Microfinance
EC	Electronic Commerce
E-CRM	Electronic Customer Relationship Management
EDI	Electronic Data Interchange
EFT	Electronic Funds Transfer
EPS	Electronic Payment System
EUCS	End-User Computing Support
ICT	Information and Communication Technology
IS	Information Success/System
IT	Information Technology
KCB	Kenya Commercial Bank
KEPSS	Kenya Electronic Payment and Settlement System
KWFT	Kenya Women and Finance Trust
MTN	Mobile Telephone Networks
NACH	Nairobi Automated Clearing House
P2P	Peer-to-Peer
PIN	Personal Identification Number
PDA	Personal Digital Assistant
RTGS	Real Time Gross Settlement
SET	Secure Electronic Transaction
SPSS	Statistical Package for the Social Sciences
SSL	Secure Socket Layer
TAM	Technology Acceptance Model
TCP/IP	Transmission Control Protocol/ Internet Protocol
UNCTAD	United Nations Conference on Trade and Development
UIS	User Information Satisfaction

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Research

The birth of information and communication technology (ICT) as a result of merging of computer science and telecommunication engineering, brought dramatic changes of the way business is conducted to compete in the market place and spread throughout the globe (Schneider, 2011). The combination of traditional commerce and Internet, providing opportunities for business or organizations to develop new business models to take advantages of globalization is known as electronic commerce or e-commerce.

Chaffey, (2009) describes e-commerce as all electronically mediated information exchanges between an organisation and its external stakeholders. That means e-commerce includes other activities, "such as businesses trading with other businesses and internal processes that companies use to support their buying, selling, hiring, planning, and other activities" (Schneider, 2011; Zwass, 2003). In a university setup, a student applying for a course online is an example of a web self-service which is part of e-commerce (Chaffey & Wood, 2005). Therefore e-commerce involves digitally enabled commercial transactions between and among organizations and individuals with exchange of value across boundaries while e-business is the digital enablement of transactions and processes within a firm (Chaffey & Wood, 2005).

E-commerce is structured based on infrastructure, services, and products (Kalakota and Whinston 1997 cited by Chaffey & Wood 2005) into three categories, i.e., business-to-consumer (B2C) such as Amazon.com and travelocity.com offering online shop where products/ services are sold from company to end user; business-to-business (B2B) such as PerfectCommerce.com and Grainger.com where products and services are sold from one company/ organisations to another, and consumer-to-consumer (C2C) such as Half.com and eBay.com where products and

services are sold by consumers to fellow consumers through a third party who charges a flat rate. However, not all products and services can be sold on the internet a part from those that take advantage of the convenience of internet such as computer software, online books, travel and hotel bookings, among others.

Electronic business (e-business) is aimed at enhancing the competitiveness of an organization by deploying innovative information and communications technology throughout an organization and beyond, through links to partners and customers. It does not simply involve using technology to automate existing processes, but should also achieve process transformation by applying technology to help change these processes. To be successful in managing e-business, a breadth of knowledge is needed of different business processes and activities from across the value chain such as marketing and sales, through new product development, manufacturing and inbound and outbound logistics. Organizations also need to manage the change required by new processes and technology through what have traditionally been support activities such as human resources management (Chaffey, 2009).

ICT has made it possible to have electronic payment systems like debit cards, credit cards, electronic fund transfer, direct credits and internet banking. E-payment can refer to a payment system for buying and selling goods or services offered through the internet or any type of electronic fund transfer. Banks play a critical role in these e-payments as an intermediary. Traditional e-payment systems such as MoneyGram and Western Union are noted to have many limitations which inhibit consumers from adopting them. Earlier research suggests that some of these factors relate to lack of trust, security, usability, high transaction costs, lack of perceived advantage and perceived risk. These factors are deemed to be important to provide banks with the confidence to switch to an online payment system (Ozkan, 2010).

Importantly to note is the fact that electornic payment instruments are not used with equal intensity even in developed countries. The variations in intensity of adoption as revealed by previous research works are caused by issues to do with security, infrastructure, regulatory and legal issues and socio-cultural challenges (Ingenico, 2012). Efficient and safe payment systems matter for the smooth functioning of commerce, financial intermediation and ultimately economic growth. Markets for electronic payment services exhibit economies of scale and various types of externalities and thereby pose challenges to regulators. Four main motives drive regulation for these payments: efficiency, safety, innovation and access.

Any e-commerce payment system facilitates acceptance of electronic payment for online transactions or trading. The popularity of e-payment systems is enhanced with widespread use of internet based shopping and banking (Bizina, 2012). Nevertheless, electronic payments systems innovations are meant to fulfill two perspectives: - One is to replace existing funds transfer systems that are deemed risky because of their "informality" therefore freeing people from money lenders or other shady characters (a version of the empowerment). The second context, is that the designers of electronic payment systems are simply seeking a piece of the money transfer business (a version of the market share), where they seek to replace Western Union or MoneyGram (Boyd & Jacob, 2007).

Electronic funds transfer (EFT) was the earliest implementation of e-commerce. Popularly known as direct deposit, is a system of transfering money from one bank account directly to another without any paper money changing hands, such as depositing salaries into employees bank accounts. EFT has expanded to refer to any transfer of money initiated through an electronic terminal, including credit/ debit smart cards, automated teller machine (ATM),

electronic funds transfer at point of sale (EFTPOS), electronic data interchange (EDI) and internet banking (Deitel & Deitel, 2009).

Credit and smart cards are the most commonly used method of electronic payment (Chou, Lee and Chong, 2004) and are widely accepted by consumers and merchants throughout the world, especially in retail markets (Laudon & Traver, 2007). A credit card is a small plastic card issued to users as a method of payment for online or off-line purchases. The service provider or the commercial bank grants a line of credit to the card user, and the card user is required to pay at least a minimum amount for purchases made every month.

An ATM is a computerized telecommunications device that enables the clients of a financial institution to perform financial transactions without the need for a cashier, human clerk or bank teller. The ATM card uses expiration date and personal identification number (PIN) to authenticate the customer. Electronic data interchange (EDI) is another method of e-commerce payment that involve transfering structured data, by agreed message standards, from one computer system to another without human intervention via telecommunications or physically transported on electronic storage media. Examples of these standard trading documents are electronic cheques, invoices and credit notes (Schneider, 2011; Harris, Guru, & Avvari, 2011).

Mobile payment, also called electronic cash, allows a consumer to pay directly through his/ her mobile via text message. This is a payment where a mobile device (e.g. a phone or personal digital assistant (PDA)) is used at least for the initiation of the payment order and potentially also for the transfer of funds. Heightened activities of non banks in m-banking eventually ends at banks doors for top up or deposits. Financial institutions worldwide backed with other stakeholders like telecommunication companies are already warming up to these modern means

of payment for building trust with clients as they compete to control their market niche (Pattnaik, Ghosh, & Bharti, 2010).

E-commerce provides the opportunity to buy and sell products, information and services on the internet. Thus it requires an effective standardised online payment system. According to Đurić, Marić, & Gašević (2007), several online payment proposals both for coin-like and cheque-like systems have arisen with none achieving mass acceptance. This lack of a uniform platform for operation by banks leaves a strategic linger. All the e-payment service providers are expected to meet five central requirements of electronic payments to win trust from commercial sectors, i.e., security, cost, time, risk and capacity. Among the five factors, security is very crucial as it affects the trust and confidence of customers.

The other risks with e-payment lies in banks over reliance on IT; increased electronic access by customers and attacks by hackers through packet/ address spoofing, stealth diagnosis, sniffers, sweepers and backdoors; low public acceptability, lack of adequate infrastructure, staff resistance and legal challenges.

Laudon & Traver (2007) highlights the advantages of electronic payment systems over the traditional methods. They encourage privacy, integrity, compatibility, good transaction efficiency, acceptability, convenience, mobility, low financial risk and anonymity. The other advantages are reaching out to customers in remote zones, minimizing on costs associated with premises leasing and security and enhancing customer awareness and loyalty (Magutu, et al., 2011).

Many financial institutions support online payments since they provide new opportunities which also come with new operational and strategic risks. Several dimensions are considered before a

particular e-payment system may be adopted by both customers and the banking insitutions. Security is one such factor. However, stability of two e-commerce security models, i.e., secure electronic transaction (SET) and secure socket layer (SSL) has dramatically improved confidence among customers and organanisations. Both protocols are designed to secure data communication on the internet.

Cost implications in an e-payment system is critical. Costs such as maintainance, dispute settlement, salary of technical staff and security can hinder adoption of a payment system. Transaction time is another important aspect driving adoption of e-payment system. Modern e-payment system are instant with remarkable flexibility that attracts users. The e-payment capacity to serve a multitude of users is another dimension. Liquidity of economy depends on the level of acceptability of a payment system. Long queues of ATM users would discourage users. In Kenya, for example, M-pesa has more capacity than Yu cash, Airtel Money and Orange Money payment systems.

The other elements that keeps e-payment systems alive are its inert desirable characteristics of a good payment system which include support for anonymity, easier transferability, divisibility, acceptability and shortened transaction time. Other institutions adopt e-payment systems because it is part of their long term strategy. Akintoye and Araoye (2011) summarises the above drivers of effective electronic payment system into four main categories, i.e., technological developments, conducive economic environment, vibrant social environment and supportive regulatory policies.

1.2 Commercial Banks in Kenya and Electronic Payment Systems

As at 31st December 2012, the banking sector comprised of the Central Bank of Kenya, as the regulatory authority, 44 banking institutions (43 commercial banks and 1 mortgage finance

company), 4 representative offices of foreign banks, 6 Deposit-Taking Microfinance Institutions (DTMs), 118 Forex Bureaus and 2 Credit Reference Bureaus (CRBs). Out of the 44 banking institutions, 31 are locally owned banks, 3 with public shareholding and 28 privately owned while 13 are foreign owned (CBK, 2012). Most of these institutions have national wide branches with a considerable customer base. Equity bank, Kenya commercial bank, Barclays bank and Co-operative bank are the leading both in assets and customer base.

Kenya's electronic payment systems dates back to 2005 when Central Bank of Kenya commissioned a Kenya electronic payment and settlement system (KEPSS), a pioneer real time gross settlement (RTGS) system. RTGS supports continous concurrent processing and final settlement of funds transfer instructions from one bank to another, in the accounts of participants in the Central Bank of Kenya as long as they have sufficient covering balance or credit. The other electronic payment systems in use include Nairobi automated clearing house (NACH), ATMs using cards, securities payment and settlement systems (Central Depository & Settlement Corporation), cross border money transfers including Western Union and MoneyGram, and mobile payments such as M-pesa, Yu Cash, Orange Money and Airtel Money (CBK, 2012).

It should be noted that after safety, the efficiency of a nation's payment system is a primary concern of central banks (Bolt, Humphrey, & Uittenbogaarda, 2008). Banks have used economic value added (EVA) or risk-adjusted returns on capital (RAROC) models to weigh complex trade-offs between growth, return and risk (Kimball, 1998) as well as return on assets (ROA) and return on equity (ROE) as indicators of their performance (AL-Adwan, AL-Zyood, & Ishfaq, 2013). Since electronic payments are typically cheaper than paper-based or cash payments, pricing these transactions should speed up the shift to electronics (Bolt, Humphrey, & Uittenbogaarda, 2008). The key players in Kenya electronic payment systems in conjunction

with Central Bank of Kenya are banks, infrastructure providers, non-bank mobile service providers, and regulatory bodies including the government.

1.3 Problem Statement

E-commerce is growing substantially faster hence becoming increasingly important as a source of business in the world economy. Banks have realised immense efficiency and effectiveness in disbursement of funds either to other banks or to individual clients accounts using ICT. Unfortunately, traditional e-payment systems such as MoneyGram and Western Union are noted to have many limitations which inhibit consumers from adopting them. Some of these factors relate to lack of trust, security, usability, high transaction costs, lack of perceived advantage and potentially high perceived risk. These factors are deemed to be important to provide banks with the confidence to switch to an online payment system (Ozkan, 2010).

An empirical research by Mashhour and Zaatreh (2008) on contribution of information systems in the effectiveness of Jordanian banks operations, discovered that information systems are key to success of banking systems. They helped new banking innovative strategies to emerge including ATMs, e-banking and smart card system which reduced cost per transaction significantly. However, given the risk associated with these inventions, some quarters of the banking industry seems relatively slow to adapt to the changing circumstances. Accordingly, a comprehensive framework for identifying the marginal contribution of banking payment methods towards banks performance was recommended.

A study by Magutu *et al* (2011) established that Kenyan banks appreciate e-commerce though the concept is not very popular with customers and suggested that empirical analysis is neccerary to explain further, the low uptake of e-commerce by customers. Aduda and Kingoo (2012) agrees that online payment systems are reshaping the whole landscape of doing business. The new

landscape is scaled by high ICT costs and risks which threaten the profitability of financial institutions. Given that ICT is not a panacea to banking performance themselves, there is need to identify and understand the changes that ICT are causing on the banking sector and payment systems for future evolution (Aduda & Kingoo, 2012).

Citing the scholarly findings above, the researcher was keen on establishing the determinants for adoption of the various online payment systems by commercial banks in Kenya by addressing the following questions (a) what e-payment systems are commercial banks in Kenya using? (b) What are the success or failure factors of e-payment systems in commercial banks in Kenya? (c) What are the drivers for adoption of these systems?

1.4 Objectives of the Study

The general objective of this study was to evaluate the adoption of e-commerce payment systems by commercial banks in Kenya. Specific objectives of the research were: -

a) To establish extent to which e-commerce payment systems were adopted by commercial banks in Kenya.
b) To establish the benefits that accrued to banks from adoption of electronic payment systems.
c) To determine the drivers of e-payment systems adoption by commercial banks in Kenya.
d) To determine the challenges that surrounded adoption and use of these electronic payment systems by commercial banks in Kenya.

1.5 Value of the Study

Electronic payment systems worldwide provide a huge saving from financial payment inefficiencies by reducing leakages, cutting down transaction, administrative and overhead costs. The study contributes to better understanding of the adoption of one of the most important e-commerce models, i.e., electronic payment systems in Kenya with particular emphasis on online

business transactions. Kenya EPS providers as well as consumers can refer to the review of current literature about EPS to have an update about this model and its benefits in financial systems. Based on these facts, they might consider applying it to their own situations in Kenya. For future researchers, given the limited sources of literature about online businesses and supporting electronic transaction processes in Kenya, this research is expected to be a good source of reference.

1.6 Theoretical Framework

The research theory was built on two complementing theories of information systems, i.e., technology acceptance model (TAM) and DeLone & McLean Information System Success model. Technology acceptance model explored the level of motivation and user attitude that determined whether the user actually used or rejected the system (Kim, Mannino, & Nieschwietz, 2009). On the other hand, the use of DeLone & McLean Information Success model as a framework for measuring the success or effectiveness of information systems, was critical to understanding of the value and efficacy of information systems management actions and relevance of its investments (Delone & McLean, 2003). Combining the two provided a platform for understanding the drivers for why users adopt systems and whether the adopted systems had any business relevance.

The researcher used tested methodologies to measure the various dimensions of the success model. The operationalisation of the constructs is shown in appendix 4.

System quality – the main eight system quality factors observed were reliability, portability, user friendliness, understandability, effectiveness, maintainability, economy, and verifiability.

Information quality – is a key dimension of end-user satisfaction instruments. Therefore, it is not distinguished as a unique construct but was measured as a component of user satisfaction.

Service quality − a part from the use of SERVQUAL rater, other measures of service quality include the skill, experience, and capabilities and responsiveness of the support staff.

System use− empirical studies have adopted multiple measures of IS use, including intention to use, frequency of use, self-reported use, and actual use.

User satisfaction − The most widely used user satisfaction instruments are the Doll et al. (1994) End-User Computing Support (EUCS) instrument and the User Information Satisfaction (UIS) instrument (Petter, DeLone, & McLean, 2008).

Net benefits − There are an abundance of methods to measure net benefits at both the individual and organizational level of analysis. Perceived usefulness or job impact is the most common measure at the individual level. Different aspects of impact, i.e., task productivity, task innovation, customer satisfaction, and management control are the key dimensions measured at the individual level. At the organizational level, a variety of measures are employed; but profitability measurements seem to be preferred (Petter, DeLone, & McLean, 2008).

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The world is changing at an amazing rate and internet technology is considered to be the key driver for these changes. This chapter defines e-commerce, analyses the types of e-commerce and evolution of e-commerce payment systems. It also looks at the drivers for adoption of e-payment system by banks, the benefits of e-payment systems as well as the challenges that come with them. Lastly, a conceptual framework that guided the rest of the study is outlined.

2.2 E-Business

The term e-business was first used by IBM to refer to the transformation of key business processes through the use of internet technologies (Chaffey, 2009). That means that e-business is defined as all electronically mediated information exchanges, both within an organization and with external stakeholders supporting the range of business processes as shown in appendix 2. E-business therefore is aimed at enhancing the competitiveness of an organization by deploying innovative information and communications technology throughout an organization and beyond, through links to partners and customers.

Innovation in e-business is relentless, with the continuous introduction of new technologies, new business models and new communications approaches. For example, current opportunities which many businesses are reviewing the benefits, costs and risks of implementing include: - (a) the growth in popularity of social networks such as Bebo, Facebook and MySpace, virtual worlds such as Habbo Hotel and Second Life, and blogs created by many individuals and businesses; (b) rich media such as online video and interactive applications into web sites; (c) selection of mobile commerce services which exploit the usage of mobile phones and other portable wireless devices such as laptops around the world.

The potential of mobile commerce is evident from the fact that at the end of 2007, globally there were 3 billion subscriber connections (representing half the planet's population) with penetration rates in developing countries such as India (21%) and China (41%) showing the potential for future growth; (d) using location-based tracking of goods and inventory as they are manufactured and transported (Chaffey, 2009).

2.3 E-Commerce

The introduction of electronic commerce (EC), the exchange of products and services and payments via telecommunication systems were the witnesses of profound technological changes in the last few years. It is currently the fastest growing area for businesses worldwide. E-commerce by definition is about shopping on the world wide web, i.e., sale and purchase of goods and/ or services by electronic means over the internet (Schneider, 2011).

The term e-commerce has supplements like e-business, e-marketing, e-tail, e-CRM and e-procurement (Chaffey, 2009). Four perspectives of e-commerce are identified by Kalakota and Winston (1997) as cited by Chaffey (2009); a communications perspective – the delivery of information, products or services or payment by electronic means; a business process perspective – the application of technology towards the automation of business transactions and workflows; a service perspective – enabling cost cutting at the same time increasing the speed and quality of service delivery; and an online perspective – the buying and selling of products and information online. A range of digital technologies faciliate electronic communications in e-commerce. These technologies include Internet, websites and digital media such as wireless mobiles and digital televisions.

Buy-side e-commerce refers to transactions to procure resources needed by an organization from its suppliers. Sell-side e-commerce refers to transactions involved with selling products to an

organization's customers. So e-commerce transactions between organizations can be considered from two perspectives: sell-side from the perspective of the selling organization and buy-side from the perspective of the buying organization. Thus e-commerce can best be conceived of as a subset of e-business since e-commerce does not refer to many of the transactions within a business, such as processing a purchasing order, that are part of e-business. This is the perspective the research study shall adopt.

2.4 Types of E-commerce

Schneider (2011) states that e-commerce can be classified into five different types. They are (i) business to consumer (B2C) e-commerce, (ii) business to business (B2B) e-commerce, (iii) consumer to consumer (C2C) e-commerce, (iv) peer to peer (P2P) e-commerce and (v) M-commerce (Thanasankit, 2003). According to Rayport and Jaworski (2004), business to consumer (B2C) e-commerce is a market-driven perspective because firms are responsive to the change and need of market places. It includes online retailers, market creators, content providers and service providers.   It was started in 1995 first by Amazon. In 2010, B2C e-commerce made around $255 billion turnover.

According to U.S Census Bureau of the Department of Commerce edited by Thomas, Davie, and Weidenhamer (2013), total e-commerce sales for 2012 were estimated at $225.5 billion, an increase of 15.8 percent from 2011. Total retail sales in 2012 increased 5.0 percent from 2011. E-commerce sales in 2012 accounted for 5.2 percent of total sales. E-commerce sales in 2011 accounted for 4.7 percent of total sales. This trend of trading is shown in appendix 3.

In Nigeria as revealed by Ayo, Adewoye, & Oni (2011) by June 2010, the number of internet users stood at 43,982,200 that is, 29.5% of the country's population. Many online shopping sites are serving millions of Nigerians making transactions. Examples of such sites include

www.234world.com, Xtaples.net, www.booksng.com and www.orderbay.com. A site like 234world.com allows buyer to pay to a designated bank account after making online purchases. The items purchased are then shipped to the buyer at the speed of light. Considering all these, it is expected that the number of people engaging in e-commerce will increase.

B2B also has a huge market. It includes e-distributors and e-procurement companies for almost all kind of items ranging from advertising to almonds. In 2010 around $3.6 trillions of transactions were made in United States both online or offline. During the transaction, B2B e-commerce can reduce the cost of communicating with counterparts in other companies including the costs of travel, time spent on communication, physical space for meetings, processing paper documents or to confirm delivery (UNCTAD, 2005).

Schneider (2011) states that C2C deals with selling products and services between consumers. C2C e-commerce works when one consumer puts his or her product in the internet market on auction or sale for another consumer to buy and make profit through it. It has been identified that, in 2010, global C2C market was $ 80 billion. Peer-to-peer e-commerce is one in which users send files to web servers in e-commerce, through shared resources (Hai, 2010). P2P E-commerce helps in making money with the help of advertisements where internet users have shared their files (Laudon & Traver, 2007). For example, Bit torrent is widely used by P2P networks in order to download video and software by customers. It is estimated that U.S. retail mobile commerce sales will grow from US$13.63 billion in 2011 to $86.86 billion by 2016, increasing from 7 percent to 24 percent of all retail e-commerce (Pierzchala, 2013). M-commerce uses wireless network to connect to devices such as iphone, blackberry and laptop for executing business transactions. Once the devices are connected to the network, consumers can

make use of them to conduct price comparisons, banking, stock trades and much more (Schneider, 2011).

2.5 E-commerce Payment Systems

The exchange of goods conducted face-to-face between two parties dates back to before the beginning of recorded history. Eventually, as trade became more complicated and inconvenient, humans invented abstract representations of value progressing from barter through bank notes, payment orders, checks, credit cards, and now electronic payment systems. Electronic Payment is a financial exchange that takes place online between buyers and sellers. The content of this exchange is usually some form of digital financial instrument (such as encrypted credit card numbers, electronic cheques or digital cash) that is backed by a bank or an intermediary (Ingenico, 2012). Retail payments between customers and businesses are distinguished from wholesale payments between banks by their much higher transaction volume and much lower average value.

With demand for fast, convenient and safe payment alternatives to cash and cheque rapidly accelerating, commerce is increasingly driven by blips on a screen, numbers punched on a keyboard, cards swiped through electronic readers and chip-activated cell phones (UNCTAD, 2005). To sustain these transactions performed on Internet in an electronic form, we need a secure Internet payment system to handle the transactions.

The use of the Internet technology in banking industry now provides consumers with the ability to bank, invest, purchase, distribute, communicate, explore from home, work, cafes, or virtually anywhere an Internet connection can be made. Given the risk associated with these inventions, some quarters of the banking industry seems relatively slow to adapt to the changing circumstances. However, internet based companies are quickly seizing the new opportunities. It

is not a secret therefore, that the future of banking lies in "clicks and mortar" and not "bricks and mortar". Paperbased payment systems are slow, labor intensive and correspondingly expensive to maintain hence, the growth of electronic funds transfer systems (Kilonzo, 2007).

Through transmission constrol protocol/ internet protocol (TCP/IP), banks are taking steps to expand the use of networking technology in their business operations to create consistency across all channels; the Web site, mobile Web and applications, call centers, agent kiosks and automated teller machines. This is because payment and banking go hand in hand. Electronic banking is complementary to, and a manifestation of electronic commerce, for the simple reason that electronic commerce requires a payment system that is easily and readily processed (Kilonzo, 2007).

Also known as e-currency, digital cash or online cash, e-cash is a new concept in EPS because it combines computerized convenience with security and privacy that improve on paper cash (Sumanjeet, 2009). It is a method of payment that must be backed with some specified fund in the bank or with a line of credit granted to the users by the bank (Harris, Guru, & Avvari, 2011). Anonymity is one attribute of cash payment that has stood test of time. DigiCash Inc., a US company based in Dutch in 1990, used a number of cryptographic protocols developed by the founder David Chaum to make transactions anonymous. Unfortunately DigiCash was declared bankrupty in 1998, and subsequently sold its assets to Ecash, which was acquired by InfoSpace in 2002. Ecash is still an interesting model for electronic cash. Its model is shown below.

Figure 2.1: E-Cash Model
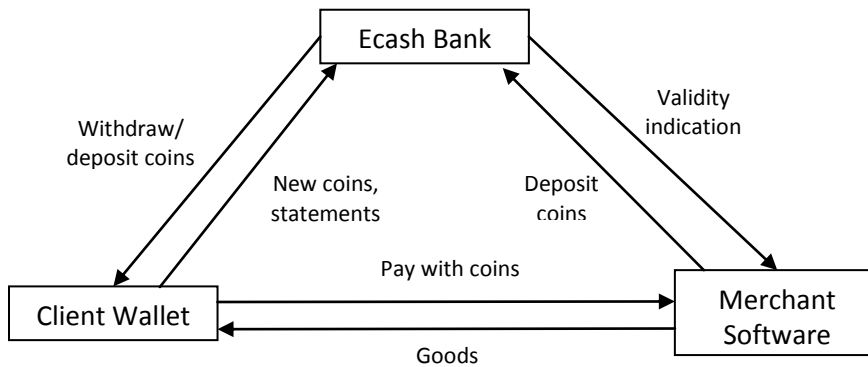
Source: Harris, Guru, and Avvari (2011)

Card present transactions EPS involves use of debit, credit or smart cards or any pre-paid devices; generally card based, relying on traditional magnetic stripe or chip technologies linked to a remote account. Each single purchase transaction will be debited to the customer's bank account and credited to the merchant's account. Examples are Equity Card and Barclays Card used for online payments in Kenya leading supermarkets. A typical authorisation and transaction process flow for card payments is captured in Figure 2.2 below.

Figure 2.2: Card Payment Cycle
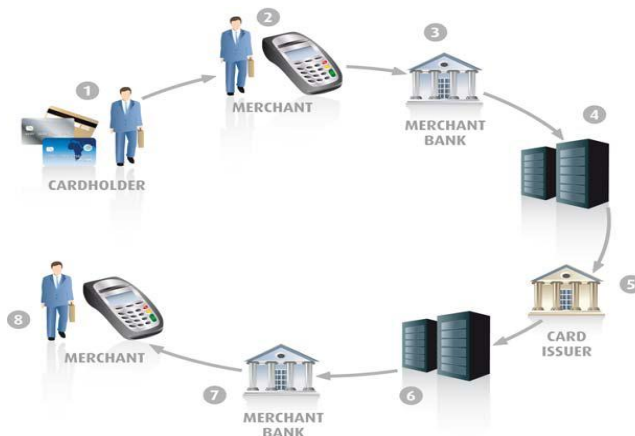
Source: Ingenico (2012)

A step-by-step authorisation and processes flow of a card transactions is outlined as follows: - cardholder presents a credit card to pay for purchases. For card-not-present transactions, the card holder provides the merchant with the account number, expiration date, billing address, and card

verification value. The merchant swipes the card, enters the amount, and transmits an authorization request to the merchant bank. For card-not-present transactions, the account number and other information may be digitally or key-entered. Merchant bank electronically sends the authorization request to the processing network. The processing network passes the request to the card issuer. Card issuer approves or declines the transaction. The processing network forwards the card issuer's authorization response to the merchant bank. Merchant bank forwards the responseto the merchant. Merchant receives the authorization response and completes the transaction accordingly.

According to Ingenico Corporate report (2012), credit card purchases are either charged to the card holder at fixed intervals in total (charge card) or in partial credit amounts. Until all payment sums of a certain period are debited from the card holder's account, credit card companies grant their customers credit. Smart cards contains an embedded microchip that has the capacity to store and secure information and make decisions as required by the card issuer's specific applications needs. Examples of smart cards in Kenya comprises of Safari Card used by Kenya Wildlife Services for electronic ticketing, Nakumatt smart card for shopping, MasterCard, VisaCard, Europay card among others.

Prepaid and private label cards are used for special events and campaigns like christmas gift vouchers redeemable at leading superstores (examples of Tuskys, Nakumatt or Uchumi). It is important to note however that user experience and adoption of these technologies can differ, with stored value cards being more heavily resisted than debit and credit cards, and with debit increasingly being preferred over credit despite the higher cost of such systems (Aduda & Kingoo, 2012). Thus easy and secure payment over the internet has become more important. E-

commerce growth projection in Europe showing double digit growth of 11% in the next five years after the year 2010 (Ingenico, 2012) as shown in Figure 2.3 below.

Figure 2.3: Commerce Revenue in 2010
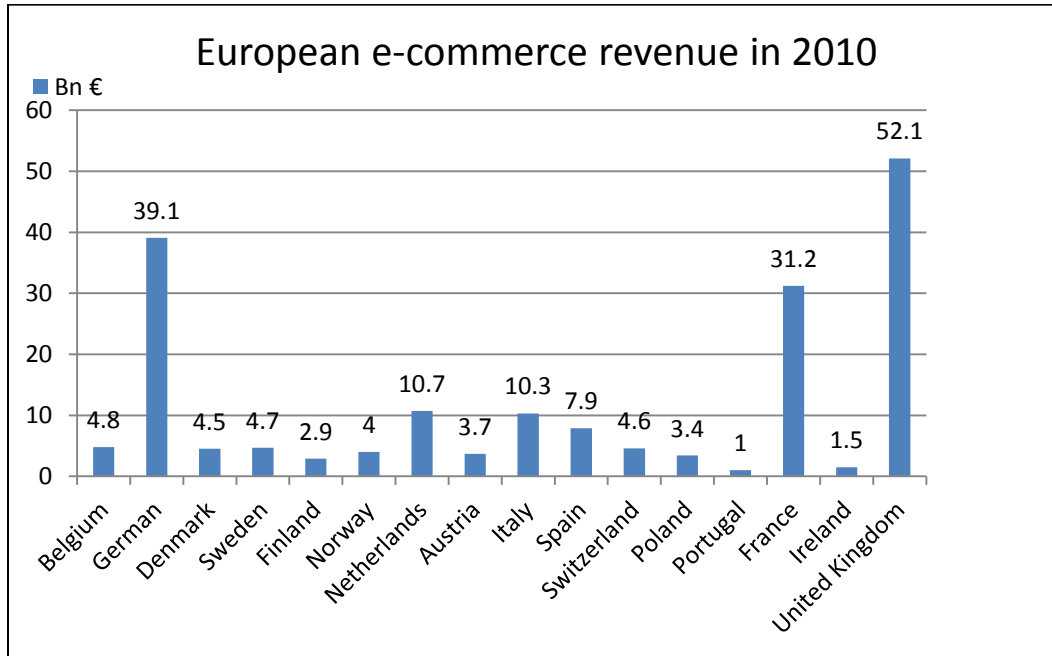
Source: Ingenico (2012)

A cell phone stands at the center of many innovative developments in the field of electronic payments. It is projected that by 2011, 141 million people worldwide were expected to pay via their mobile phones for digital goods, services, and bills (Dahlberg, Mallat, Ondrus, & Zmijewska, 2007). Kenya scenario of M-shwari, M-Benki and M-pesa provide branchless banking services to existing bank account or credit card accounts. Other examples are Wizzit and MTN Banking in South Africa and Obopay in the US. These platforms also support person-to-person (P2P) transfers where the user experience an instantaneous transfer of funds from one phone to another in exchange of goods and services while banks serve as an intermediary (Porteous 2006). Figure 2.4 below illustrates the major participants in M-payment systems.

Figure 2.4: Participants in Mobile Payment System
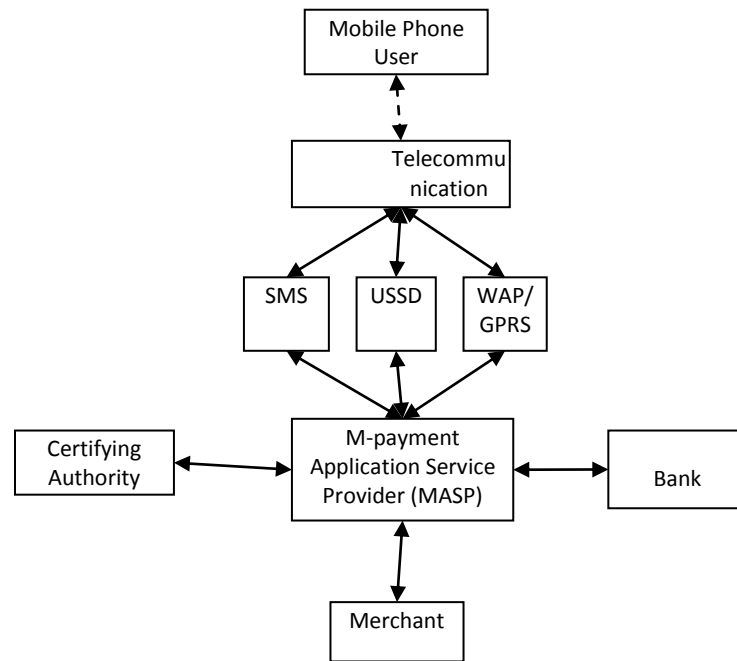
Source: Boping and Shiyu (2009)

According to Harris, Guru, and Avvari (2011), an e-cheque is a "de-materialized form of paper cheque". Its functions are similar to those of the traditional paper cheque except that it is sent and processed electronically. Like paper cheques, e-cheques also bear the digital equivalent of a signature, a computed number that authenticates that the cheque is from the owner of the account (Sumanjeet, 2009). Other security features in e-cheque are authentication, public key cryptography and encryption.

2.5.1 Determinants for Acceptance of Online Payment Methods

Akintoye and Araoye (2011) identify features of an effective electronic payment system from four dimensions: - technological, economic, social and regulatory. The technological dimension focuses on system's expandability, efficiency and security in handling each transaction, its compatibility with other payment systems, and its level of complexity for consumers to adapt to the system. However, security is an utmost technical importance.

Business and financial transactions require secure deposit and withdrawal of money to and from bank accounts, secure data, application programs and databases, secure transactions and payments, secure communication networks and secure network maintenance and management. Security must address authenticity, privacy, integrity and non-repudiation. The type of transaction whether online or offline should be known - the former may be associated with micro payments while the later supports large payments.

Economically an online payment system makes sense with respect to designing it, building it, running it, maintaining it, and upgrading it, besides its acceptance and widespread use by the consumers. All these are reflected in the cost of transaction, where costs incurred by seller and buyer in a transaction are kept at minimal. This includes both direct and indirect costs; atomic exchange - EPS must involve consumers paying money or something equivalent in value (tokens) in a transaction; user reach - which refers to the range of users to whom an EPS is accessible, whether countries or ages; value mobility - EPS token circulation is limited to the community authorised by the issuing company, the token may be valued by large number of parties at different places and passed along as gift or exchanged for currency in equal value; and financial risk - where concern is on level of security for online transactions, potential damages or loses that may be incurred. Thus the sharing of risks must be spelt out clearly in an EPS.

Social needs are also necessary for consumers to develop 'trust and acceptance' of the e-payment system. Anonymity is a social aspect meant to protect the privacy of consumers and to prevent companies or financial institutions from tracing users purchasing preferences or behavior. The EPS should also be user friendly, i.e., it should be simple and easy to use especially in micropayment. Mobility of the system is critical so that it can be shared and used anywhere and not tied up in a PC. Again, the operational features should be such that the customer and

merchant should not have a pre-existing business relationship before transacting. The system should support impulse buying (Akintoye & Araoye, 2011).

Ideally, the three above dimensions are together bound by the government regulations which govern online business transactions. Some of the concerns associated with such regulations include: - digital signatures recognition, digital funds transfers traceability and validity, electronic commerce contracts, online technical standards, customs and taxation, international agreements among others. This is because every country has its own set of policies that EPS must conform to. The issues raised above, thus, need a good attention for any form of on-line system to be quite effective.

2.5.2 Benefits of Online Payment Methods

The investment in EPS cannot be in vain (Chan, Lee, Dillon, & Chang, 2001). The financial institutions are able to realize global reach where they are no longer limited to clients who can reach them physically. This culminates into high revenue stream. Exchange of emails and other electronic messages to customers ensure better customer service since complaints and inquiries are quickly handled. The banks are also spared office space booking and hiring shop assistants hence low capital cost.

Mass customization is also possible through online transaction systems. Frequent bank-customer communication enables banks to mass customize products or services with reduced time to market reach. It is also easy to pick on a specific target group and direct marketing towards them. Thus it is possible to have add-on services to basic services, or add-on options to products that they are supporting (Dahlberg, Mallat, Ondrus, & Zmijewska, 2007).

Customers on the other hand enjoy convenience since they do not need to visit financial institutions, whether banks or virtual financial stores, physically. This saves a lot of time. Furthermore, the institutions would be available 24/7. The internet and World Wide Web are communication media containing a lot of financial related information. Some sites, like Amazon.com, carry product reviews and mode of payment that could help customers get a better picture of themselves and what they need.

Competitive pricing has benefited customers because many charges on online transactions were dropped. Some banks do not charge ATM transactions, like Barclays bank. Airtel money transfer does not attract charges on on-network money transfer. All these are to the benefits of customers. The various financial bouquet offered to customers can easily be customised to meet customers' individual needs as compared to physical products. There is also freedom of settling transactions from anywhere, anytime by banks.

2.5.3 Challenges of Online Payment Methods

E-commerce provides the opportunity to buy and sell products, information and services on the internet thus it requires an effective standardised online payment system. This lack of a uniform platform for operation by banks coupled with inadequate infrastructure leaves a strategic linger. The uncertainty of fully cashless society on liquidity issues slows the rate of adoption. Due to the interconnected nature of payment systems, such disturbances have the potential to transmit themselves to other financial institutions as well, leading to issues of financial instability.

Online fraud and other security issues are a menace to existence of EPS. The security challenge is on (1) Confidentiality: disclosure to unauthorized persons; (2) Operations access control: to prevent illegal access of data; (3) Integrity: keeping message information original; (4) Data origin authentication: proving the source of data; (5) Non-repudiation: non-denial of involvement

in transaction for legal purposes (Zhu, 2002). Electronic documents are difficult to discern the original from a copy hence posing a security concern. Online transaction security is addressed by two main protocols, i.e., secure electronic transaction (SET) and secure socket layer (SSL) protocols. The two protocols secure an end to end guaranteed communication medium between parties. The other risks with e-payment lies in banks over reliance on IT that has opened doors for attacks by hackers through packet/ address spoofing, stealth diagnosis, sniffers, sweepers and backdoors. Some customers get frustrated with these incidences which result in distrust of the payment method hence low public acceptability. Fear of layoffs, retraining on system use or the challenges of a new structure by staff could complicate successful implementation of the payment method.

National, regional or international set of laws, rules and other regulations are important requirements for the successful implementation of e-payment schemes. Some of the major elements include rules on money laundering, supervision of commercial banks and e-money institutions by supervisory authorities, payment system oversight by central banks, consumer and data protection, cooperation and competition issues. A legal and regulatory framework that builds trust and confidence supporting technical efforts is an important issue to be addressed in implementing e-payments.

2.6 Drivers of E-payment Systems

Various statistics and forecasts have all indicated that e-commerce has an extremely promising future. A few years ago, Forrester Research forecasted that e-commerce sales would account for 7% of the global economy by 2002 (Botha, Bothma, & Geldenhuys, 2008). Further down the years, e-commerce experienced exponential growth buffling the initial research estimates. Of course measuring the global value of e-commerce is a serious challenge. Botha, Bothma, and

Geldenhuys (2008) highlights the global value of e-commerce in billions of US dollars in the table below.

Table 2.1: Value of E-commerce in US Dollars

	2000	2001	2002	2003	2004	2005	2006
Forrester			2,293.5	3,878.8	6,201.10	9,240.60	12,837.30
IDC	354.90	615.30				4,600.00	

Source: Botha, Bothma, and Geldenhuys (2008)

A Comparison of these figures with annual global economic output, as measured by the Gross Domestic Product in US dollars from 2002 to 2004, a pattern value of e-commerce is seen increasing as a percentage of world economic output as shown in the table 2.2 below.

Table 2.2: Annual Global Output versus E-commerce Growth

	2002	2003	2004
Global value of e-commerce	2,294	3,879	6,201
Annual growth in e-commerce	-	69.0%	59.9%
Global economic output	32,067	35,125	36,813
Annual growth in economic output	3.4%	9.5%	4.8%
Global e-commerce as a % of global economic output	7.15%	11.04%	16.84%

Source: Botha, Bothma, and Geldenhuys (2008)

Indeed, the figure shows that e-commerce is growing substantially faster hence becoming increasingly important as a source of business in the world economy. Companies and countries that ignore e-commerce will unfortunately be marginalised in global economic activity, just as companies and countries that ignore international trade are marginalised in the increasing competitive global economy (Botha, Bothma, & Geldenhuys, 2008). The unprecedented growth of e-commerce from the figures above is a confirmation that there must be some drivers behind. As e-commerce is about going digital, the researcher uses the DIGITAL acronym phenomenom to unravel the mystery force behind:

Data networks, **I**ntense competition, **G**lobalisation, **I**nformation age, **T**echnologies, **A**utomation, **L**ow cost high quality products/services

Modern complex computer systems architecture/ data networks such as client-server and distributed systems are now a reality. This not only allows seamless flow of information but also opens many new opportunities including e-commerce payment systems where customer intimacy on location sensitive products is easily maintained, remote monitoring, tracking and diagnosis is possible (Zwass, 2003). Equally important to note is that in nearly all businesses, competition is becoming increasingly intense. In order to survive, companies are constantly looking for more effective ways to provide better customer services. E-commerce is one of the effective ways (Chaffey, 2009). The advantage that comes with e-commerce is e-payment methods that do not carry extra transaction costs.

Globlisation has helped many companies to move to the international market with one major obstacle, the geographical barrier. E-commerce provides an effective "vehicle" for companies to move to the international market because there is almost no geographical barrier in cyberspace. In other words, it is easier for a foreign company to compete with a local company under the cyber environment (Botha, Bothma, & Geldenhuys, 2008).

As we enter the information age, information becomes a valuable asset. Therefore, companies are looking for more effective ways to collect, update, and manipulate various types of information particularly for marketing purposes. E-commerce facilitates this (UNCTAD, 2011). According to Gharegozi, Faraji, & Heydari (2011), the opportunities for small enterprises to adopt E-commerce are growing due to improved access to the technical and communication infrastructure. With the advent of technologies, many business ideas can now berealized.

Automation on the other hand cuts down labor costs on routine work. This is particularly true in handling the myriad paper transactions once an order is taken. Internet and the web is a valuable means of communication that has turned into a primary information source offering the enticing possibility of interaction for e-commerce transactions (Gharegozi, Faraji, & Heydari, 2011). "Low cost high quality products/ services" has become one of themajor business philosophies in the 21stcentury because of competitionsand high customer expectations. Companies are looking forways to satisfy these requirements (Keller, Brady, Goodman, & Hansen, 2009). E-commerce is emerging as a new way of helping business enterprises to compete in the market andthus contributing to economic success.

2.7 Online Payment Systems in Kenya

Banks have come a long way since the Middle Ages, when merchant banks first formed in Italy to allow commodity traders to use their excess capital to invest in foreign trade. Today's banks offer a range of other services, including credit cards, money management, bill paying and retirement planning. As a financial institution, a bank acts as an intermediary between depositors and borrowers (Heffernan, 2005).

It is evident that banks and other financial institutions in developed and emerging markets are embracing e-banking. In Kenya, a recent survey indicates that there is steady increase in use of e-banking technologies such as automated teller machine (ATM), mobile and Internet banking, electronic funds transfer (EFT), direct bill payments and credit card (Gikandi & Bloor, 2010). According to CBK report, between 2002 and 2013, the number of ATMs and debit cards uses rose sharply as shown in the table 2.3 below.

Table 2.3: Electronic Banking Technologies in Kenya

Payment Cards								
Month, Year	ATMs	ATM Cards	Prepaid Cards	Charge Cards	Credit Cards	Debit Cards	POS Machines	Total Cards
Jan,2013	2,390	1,535,663	28,331	786	138,057	9,162,100	18,422	10,864,937
Jan,2012	2,224	1,367,822	19,969	1,319	122,650	7,909,474	16,705	9,421,234
Jan,2011	2,106	1,336,360	18,251	1,475	113,550	6,241,071	18,313	7,710,707
Jan,2010	1,840	1,073,052	16,870	1,579	107,682	3,659,965	17,092	4,859,148

Source: Central Bank of Kenya Report, 2013

However, ATMs adoption and usage has been surpassed by mobile banking (M-banking) in the last few years (CBK 2013). Currently there are over 21 million registered mobile payment users as compared to their nearest rival card based transactions which stand at 10 million only. The tremendous increase in number of people adopting M-banking has been attributed to ease of use and high number of mobile phone users. This is consistent with the theory of technology acceptance model and DeLone McLean model of information systems success as conceptualized in Kim, Mannino, & Nieschwietz (2009) and Delone & McLean (2003) in relation to online payment systems.

There is also a growing partnership in financial institution and non-financial service providers where consumers through use of e-banking and other e-commerce services such as M-Kesho, M-Shwari, credit cards among others can transact and clear utility bills through shared banks' platforms. This is evidenced with partnership of, for example, Kenya Women and Finance Trust (KWFT) and Samsung geared at bridging the digital divide and facilitating mobile banking solutions for millions of unbanked women in Kenya. The KWFT mobile service has several innovative features such as funds transfers, M-pesa, ATM services and utility bill payments. Kenya Commercial Bank entered a business agreement with Safaricom to authorise M-pesa agents to access cash instantly once a cash deposit is made at the bank (KCB, 2013).

Standard Chartered Bank has online banking service called Straight2Bank. The service provides a one site for transactions, hedging, securities services and real-time foreign exchange rates tailored to customer needs. Equity bank uses SSL in combination of passwords to run Eazzy 24/7 online eBanking service while Co-opNet enables Co-operative Bank customers to do full end-to-end banking through a web-based channel. The service is available through PCs, laptops and other internet-enabled devices.

2.8 Conceptual Framework

The study thus will concentrate on establishing the factors that drive emergence and acceptability of e-commerce payment system. These drivers are captured in the conceptual framework indicated in the diagram below.

Figure 2.5: Research Conceptual Framework

Independent Variables   Dependent Variables

Determinants of e-payment
- System Security
- Perceived Bank Trust
- Enhanced Infrastructure Capacity
- Cost Reduction
- Perceived Benefits

Adoption of e-payment
- ATMs
- Debit cards
- Credit cards
- Mobile banking
- Internet banking

E-payment moderating factors
- Number of bank branches
- Bank business ownership
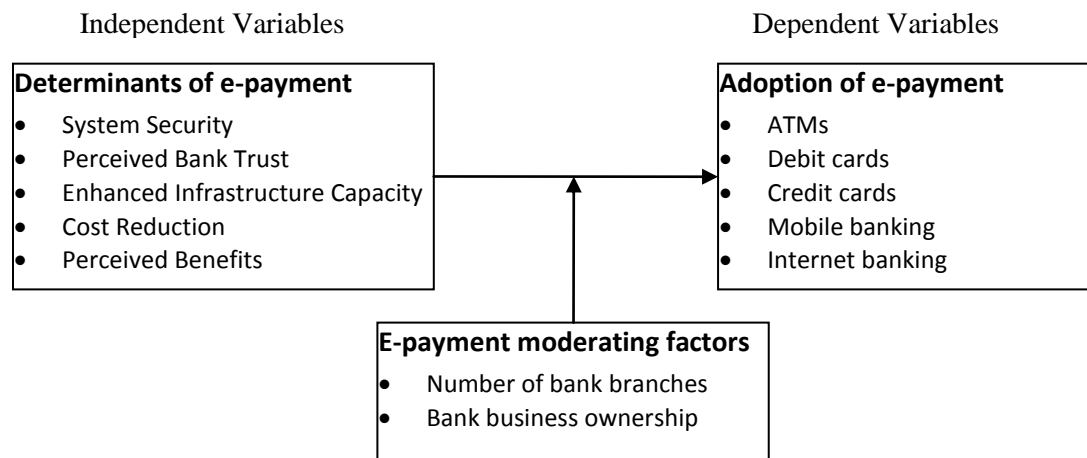
Source: Researcher (2013)

Adoption of electronic payment systems in the above diagram is determined by the inert attributes of the e-payment system in relation to security, perceived bank trust, infrastructure capacity, cost reduction and benefits that are likely to accrue from it adoption. However, other moderating factors such as the size of the bank by number of branches and ownership structure may determine the speed at which the e-payment systems is adopted or extent of implementation.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The quality of any research is as a result of the vigour that is put into the activities. The chapter highlights the framework under which the study will be conducted starting with research design and research methodology adopted to realise the most accurate results. The chapter will end by explaining data collection and analysis techniques used.

3.2 Research Design

Research design provides the glue that holds the research project together. A design is used to structure the research, to show how all of the major parts of the research project - the samples or groups, measures, treatments or programs, and methods of assignment - work together to try to address the central research questions (Walliman, 2011). This is the most significant element of the research process where the whole research is designed, options considered, decisions made and details of the research laid down for execution.

A descriptive cross-sectional survey research design was adopted to offer a substantial body of knowledge about extent of online payment systems and drivers for adoption of this methods of payament by banks in Kenya. Variables associations or disassociation were measured at a single point in time (Howitt & Cramer, 2011). The descriptive approach was concerned with who, what, where, when or how much of the interest variables being studied were adopted by banks. This approach was prime for investigating the forces behind the success or failure of electronic payment systems.

A survey strategy was adopted since it allows collection of a large amount of data from a sizeable population in a highly economical way. In addition, the survey strategy is perceived as authoritative by people in general and is both comparatively easy to explain and to understand.

Quantitative data collected with survey are easy to analyse quantitatively using descriptive and inferential statistics. The results thus can be used to suggest possible reasons for particular relationships between variables and to produce models of these relationships. For the case of this research, an establishment of relationship between the extent of EPS used by banks against the drivers for adoption of EPS was very important. Survey strategy also gave the researcher more control over the research process with possibility of generating findings that represented the whole population of banks (Saunders, Lewis, & Thornhill, 2009).

3.3 Population

Kenya as a country will be the geographical area of study. The focus of the study, however, is on e-payment systems adoption by commercial banks in Kenya. As at 31st December 2012, the banking sector comprised of the Central Bank of Kenya, as the regulatory authority, with other 43 commercial banking institutions (CBK, 2012). Out of the 43 banking institutions, 30 are locally owned banks while 13 are foreign owned. Since there are only 43 banking institutions, the study covered the whole sample frame (population). Therefore, this was a census study. A census is defined as the procedure of systematically acquiring and recording information about the members of a given population (banks). Census data are very important for business research. With census, generalisation of results is made simpler and accurate (Saunders, Lewis, & Thornhill, 2009).

Although the study coverered all the banks in Kenya as census, the subjects of interest were two staff members from each bank, that is, one from finance and another from information and communication technology. That means a purposive non-probability sampling approach was used. Under purposive sampling technique, the researchers purposely choose who, in their opinion are thought to be relevant to the research topic (Howitt & Cramer, 2011). In this case,

the judgment of the researcher was more important than obtaining a probability sample. The process of sampling in this case involved purposive identification of the respondents. The people chosen for the study bore characteristics of interest to the theoretical concerns of the researcher, hence forming a research sample set. Based on the facts stated in the preceding paragraphs, the respondents in this study were arrived at as follows:

N (Total number of banks in Kenya (CBK, 2012)) = 43

n = Nx2 - > 43 x 2 respondents from each bank = 86

Therefore n = 86

3.4 Data Collection Instruments

Primary data was collected using structured questionnaires. The questionnaire had four sections. Section A dwelt on the cadre of the correspondence while section B identified the benefits of deploying e-payment systems. Section C of the questionnaire revealed some of the challenges that come with e-payment system and lastly section D pointed out the key drivers that were behind adoption of e-payment systems irrespective of the challenges that were faced by banks.

The questionnaire was validated through a rigourous process. With the aid of lead supervisor, several revisions and improvements were done on the questionnaire before it was ready for deployement to respondents. That ensured that the structured questionnaire remained focused, accurate and consistent with the study objectives. To determine questionnaires reliability, it was first administered to two groups of respondents. The first group constituted of 10 employees working in the banking sector. The second group of 10 people was from the general public with little knowledge about banking. The intention of picking the first group was to determine the accuracy of questions on eliciting the right and consistent information that the research sought. Corrections were then made based on the opinion of the first group, that is, redefining the questions that could invoke the answers desired by the researcher. The role of the second group

was to test the level of questionnaire complexity and the time frame that each questionnaire would take to be filled completely. The views of both groups were vital on shaping the structure of the final questionnaire, approved by the supervisor.

3.5 Data Analysis

The analyses of data always depend on the research questions and objectives (Saunders, Lewis, & Thornhill, 2009). Prior to analyses, responses were grouped and each question coded accordingly bearing in mind the data types of each code. These different levels of numerical measurement dictate the range of techniques available for the presentation, summary and analysis of collected data.

The coding entailed use of dummy names similar to the semantics of the questions in the questionnaire. These coded names were in turn assigned numeric values (nominal, ordinal and scales) that could be computed by Statistical Package for Social Scientist (SPSS) software. Data cleaning was done whereby the questionnaires were checked for accuracy and completeness before data entry. This was followed by data entry according to the assigned codes. The keyed in data was subjected to SPSS processor, which computed the data and results. The output results were used to draw conclusions in relation to the research questions. The following Linear Probability Model (LPM) was used to establish the drivers of e-commerce payment systems.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Whereby
Y = e-payment methods (ATM, debit/credit cards, mobile, and Internet)
$\beta_{0..}\beta_2$ = Constant/ co-efficient
$X1$ = Determinants of e-payment (security, trust/risk, capacity, cost, benefits)
$X2$ = Characteristics of the bank (number of branches and ownership)
ε = Random error term

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

Analysis of data looks for patterns or trends across the results, to track progressions or to seek out repetition of certain results to build up a strong case. More so, quantitative analysis deals with data in the form of numbers and uses mathematical operations to investigate their properties (Walliman, 2011). The chapter thus analyses bio-data of respondents, who provide insight information of the benefits that accrue to banks by adoption of electronic payment systems. The analysis also reveals the challenges that implementers of electronic payment systems face while touching off with possible drivers for adoption of electronic payment systems. The data was analysed descriptively by use of Statistical Package for Social Scientist software (SPSS) and the data tabulated using tables, frequencies and percentages.

4.2 Response Rate

Out of the 86 questionnaires given out to respondents, 70 were successfully returned with 16 failing to be honoured. This represents 81% response rate. According to Saunders, Lewis, and Thornhill (2009), a questionnaire response rate of between 50-70% is adequate for research study.

4.3 Background Data

To be sure that what was found in the questionnaires actually represented what was measured, a section of the questionnaire was designed to capture background data on respondents as well the banks they represented. Background data therefore took care of the validity and reliability of the questionnaires used as data collection tools.

4.3.1 Respondents

Individual respondents data included the age of the respondents, their position in the bank, their age and work experience. A combination of gender and the position they held in the bank yielded the following results.

Table 4.1: Gender versus Employee Position

		Position in Bank							
		Senior Management		Middle Management		Junior Management		4	
		Mean	N %	Mean	N %	Mean	N %	Mean	N %
	Male	4	54%	4	60%	5	37%	3	67%
Gender:	Female	3	46%	3	40%	3	63%	5	33%
	Total	3	100%	4	100%	4	100%	4	100%

Depicting total of respondents in each level of management is reflects in Figure 4.1 below.

Figure 4.1: Respondents Positions in Banks
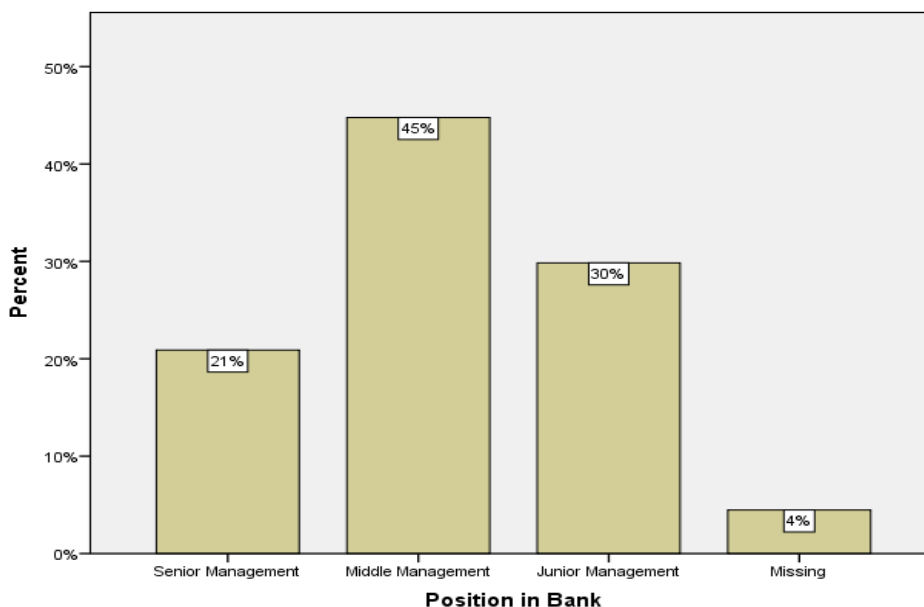
This confirms the fact that the respondents in the study were people who had enough work experience and that their opinions were highly regarded by the banks management. However, a certain pattern is also observable from the table above. More men (53.8%) were skewed on senior management position with female taking the largest share in junior management (63.2%). That could be a pointer to effects of the new constitution concerning gender balance at the work place.

A comparison of respondents' academic level against their work experience yielded the table below. Majority of the respondents with least number of years of working experience exhibited high education level as compared to those with over 15 years of work experience.

Table 4.2: Academic Level against Work Experience

			Work experience					
			0-4	5-9	10-14	15-19	20>	Total
academic level	High School	Count	3	6	0	1	0	10
		%	30%	60%	0%	10%	0%	100%
	Diploma	Count	0	7	3	0	2	12
		%	0%	58%	25%	0%	17%	100%
	Undergraduate	Count	3	14	4	0	0	21
		%	14%	67%	19%	0%	0%	100%
	Post Graduate	Count	5	10	11	1	0	27
		%	18%	37%	41%	4%	0%	100%
Total		Count	11	37	18	2	2	70
		%	15%	53%	26%	3%	3%	100%

Most respondents with post graduate education fell in the working experience category of 10-14 years. To get a better perception of gender balance, work experience, academic levels and fairness on promotion, the table 4.3 below was generated. The results revealed that the highest work experience category fell in the respondents' age category of 41-45.

Table 4.3: Respondent Age against Work experience

			Work experience					
			0-4	5-9	10-14	15-19	20>	Total
Respondent Age	<25	Count	3	6	0	1	0	10
		%	30%	60%	0%	10%	0%	100%
	25-30	Count	6	5	0	0	0	11
		%	55%	45%	0%	0%	0%	100%
	31-35	Count	2	16	4	0	0	22
		%	9%	73%	18%	0%	0%	100%
	36-40	Count	0	10	8	0	0	18
		%	0%	56%	44%	0%	0%	100%
	41-45	Count	0	0	3	1	0	4
		%	0%	0%	75%	25%	0%	100%
	46-50	Count	0	0	3	0	2	5
		%	0%	0%	60%	0%	40%	100%
Total		Count	11	37	18	2	2	70
		%	16%	52%	26%	3%	3%	100%

It is therefore prudence for the researcher to affirm that the respondents were people within the desired job designation, having adequate academic credentials and work experience which culminated into better perception of the various technologies that commercial banks in Kenya would implement either to ease pressure on the books of account or to capture a larger market share.

4.3.2 Extend of EPS Use by Kenya Banks

Banks and other financial institutions in Kenya are one of the largest investors in the fields of information systems (IS), and there are many indications that these trend will continue in the future. When the correspondents were asked whether their respective banks use electronic payment systems, 91% percent admitted having installed ATMs, 64% gave consent of using debit cards, credit cards attracted 73%, mobile payment methods got 88% with internet supported transactions taking 73%. All the five methods of electronic payments under study scored above 50% which is an indicator of their intensity of use by commercial banks in Kenya. Table 4.4 below indicates the extent of adoption of electronic payment systems by commercial banks in Kenya.

Table 4.4: Extent of EPS Adoption by Banks in Kenya

	No		Yes		Total	
	Count	Row N %	Count	Row N %	Count	Table N %
Bank e-system ATM	6	9%	64	91%	70	100%
Bank e-system debit Cards	24	36%	42	64%	66	100%
Bank e-system Credit Cards	17	27%	47	73%	64	100%
Bank e-system Mobile Payment	8	13%	56	88%	64	100%
Bank e-system Internet Payment	17	27%	46	73%	63	100%

The above information was captured in a bar chart below to give more visibility of correspondents' opinion on the various electronic payment systems. The most preferred method

of electronic payment by banks is ATM (91%) followed by mobile payment methods (80%). Debit card payment method was the least accepted by correspondents with a rating of (60% each). The bar chart allows direct comparison of the methods of payment against the opinions of the respondents.

Figure 4.2: Electronic Payment Methods Level of Adoption
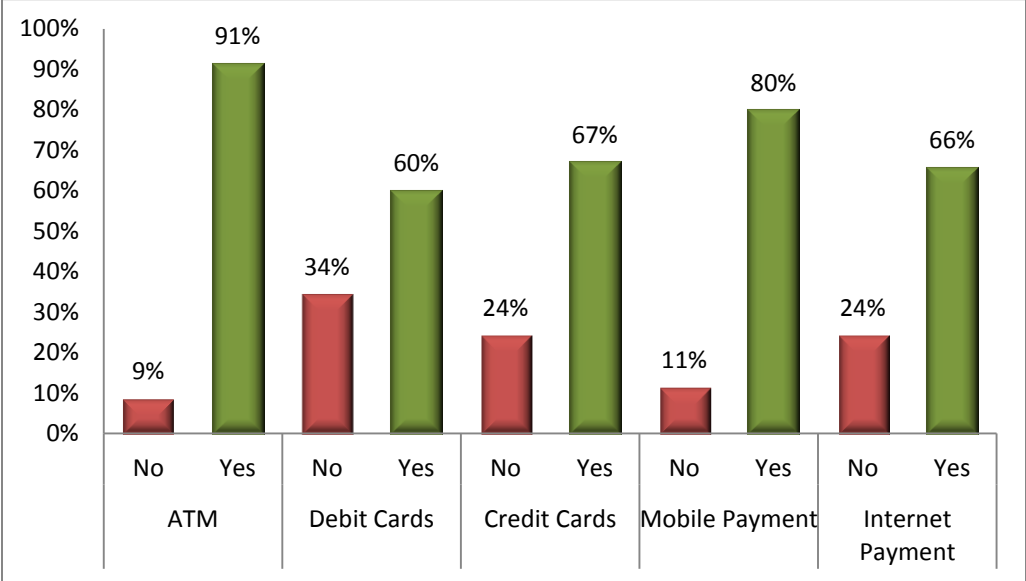
Do you use the following e-payment methods? (Yes/No)

Kenya as a developing country still has a long way to go before the banks can accept implementing electronic payment systems as a mainstream method of financial transaction. The variations in intensity of adoption as revealed by previous researches are security, infrastructure, regulatory and legal issues and socio-cultural challenges (Ingenico, 2012).

4.4 Benefits of Electronic Payment Systems

The benefits of electronic payment systems were sought from the respondents and their response is shown in appendix 7. ATM methods of payment had a strong approval of 15% probability for increasing global reach of bank payments while 29% agreed that the ATM service would grant their clients a 24/7 hours service without the attention of teller clerk. Internet payment method

also attracted a probability of 31% for improving the customer access through low capital costs as well as providing a 24/7 hours service to the customers. However, 20% of respondents did not agree that internet payment adds value to global reach. This could be explained by the different legal policies adopted by different countries concerning electronic payment systems. On average, quite a number of respondents did not have an opinion, that is, they were neutral on whether there are any benefits that come with electronic payment systems.

4.5 Challenges Facing Implementation of Electronic Payment Systems

The challenges facing electronic payment systems in Kenya were recorded as follows in table 4.5 below. There is strong evidence that the challenges actually exist and affect the adoption of electronic payment systems. Online fraud (strongly agree - 16%) is one of the most challenging factors in adoption of electronic payment systems. The other equally worrying challenges are different software platforms (12%) and lack of cross border EPS support (14%). Where different implementation platforms are involved, banks find it difficult to interface with each other hence hampering smooth interbank transactions. Where banks have overseas branches, the challenge of inter-border transaction is also difficult if the host country does not ratify electronic payment as one of the official modes of transaction.

Table 4.5: Electronic Payment Challenges Facing Banks

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total	
	Count	N %	Count	N %	Count	N %	Count	N %	Count	N %	Count	Total N %
different e-payment platform	4	6%	2	3%	33	48%	22	32%	8	12%	69	100%
Low uptake cashless society	4	6%	13	19%	17	25%	29	42%	6	9%	69	100%
Increased online fraud	4	6%	5	7%	23	33%	26	38%	11	16%	69	100%
Over reliance on IT	2	3%	9	13%	22	32%	32	46%	4	6%	69	100%
fear for layoffs	8	12%	12	17%	19	28%	26	38%	4	6%	69	100%
cross border e-payment system	2	3%	13	19%	22	32%	22	32%	10	14%	69	100%

The least challenge came from fear for layoffs (12% strongly disagree). Where change management is professionally carried out, staffs have no intrinsic fear of future consequences.

The findings of the major challenges were presented in a bar chart for clarity of the opinion as shown in Figure 4.3 below. Online fraud bar charts indicate a larger portion of respondents with certain levels of agreement.

Figure 4.3: Increased Online Fraud Effects on Approval of E-Payment Systems
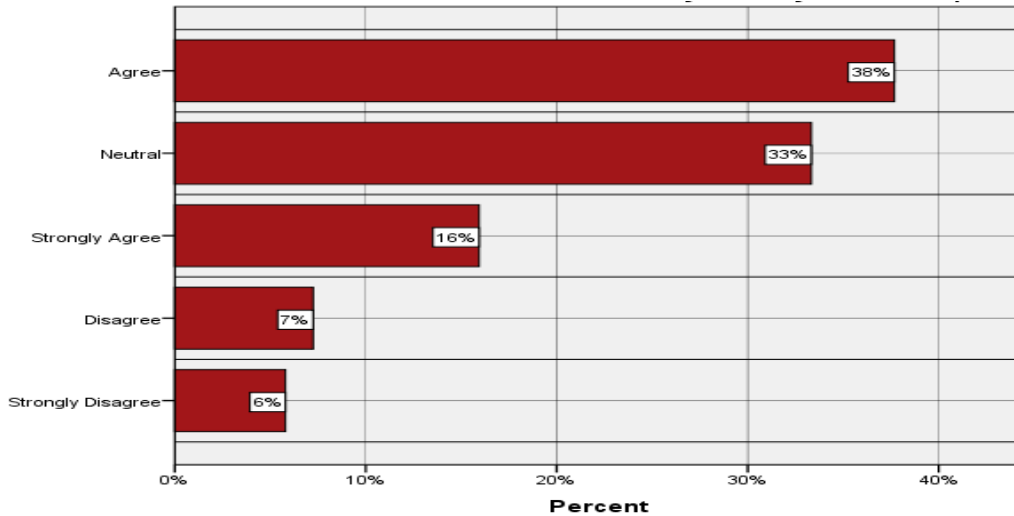
Banks' use of different electronic payment software and platform also has a strong indication for being a stumbling block to success of electronic payment systems deployment by banks. The longest bar charts range from neutral to strongly agree leaving a small portion of respondents who felt that it was not a hindrance.

Figure 4.4: Different E-payment Platforms Adopted by Banks
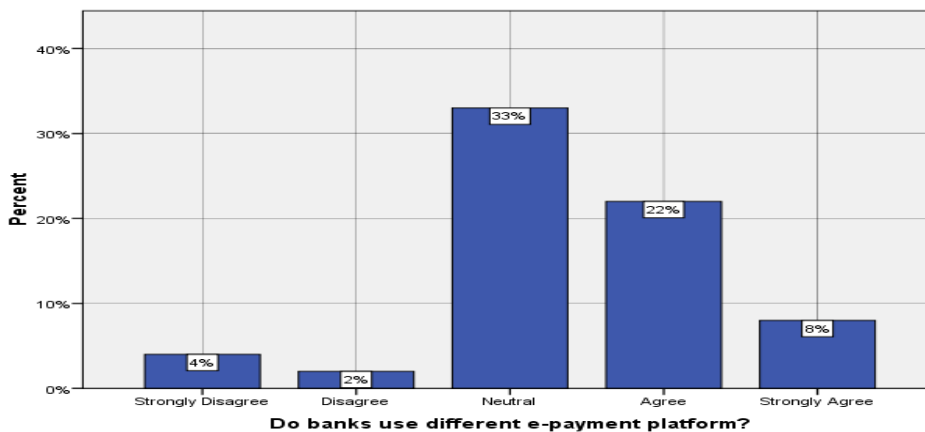
Lack of cross-border e-payment system legal and technical support proves to be a huge challenge too. In the absence of an ex ante agreed upon resolution and burden-sharing mechanism and deteriorating health of the bank, incentive conflicts escalate and supervisory cooperation breaks down. Those who were neutral tied up at 22% with agreed respondents. Perhaps any slightest cross border transactions inconvenience would see them join the 'agree' group.

Figure 4.5: Lack of Cross-Border E-payment Systems
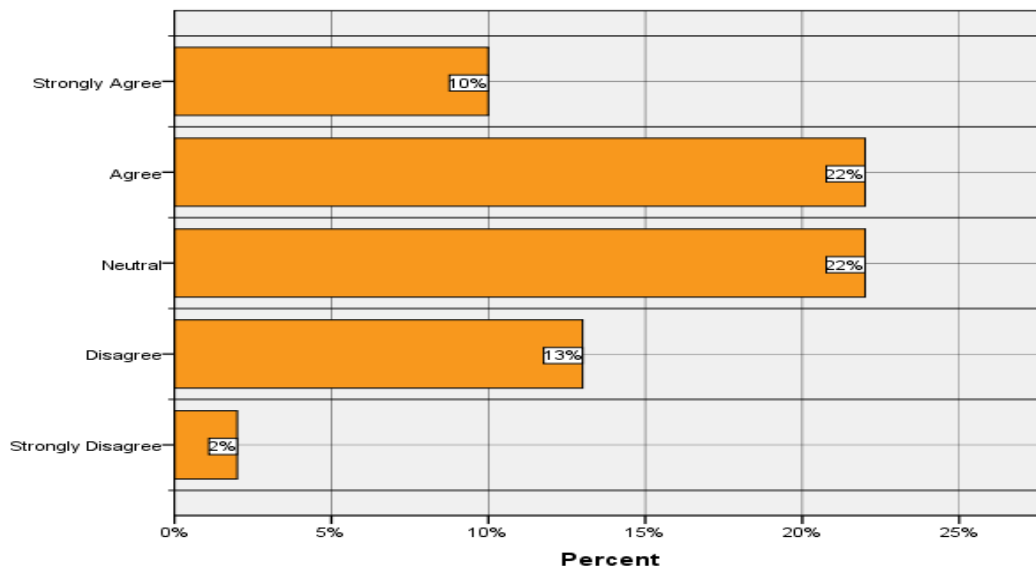
4.6 Key Drivers of Electronic Payment Systems

The research data obtained through questionnaires from banks respondents touching on key drivers for adoption of electronic payment systems are illustrated in the table 4.6 below. The answers are divided into two main categories of Yes and No for each payment method against the rows which constitute the key drivers for adoption. Majority of the respondents approved the role of drivers in adoption of electronic payment systems. Mobile phone payment system led the pack with 85% suggesting that they may take shorter time to transact. Improved system security providing trust and confidence to banks deployment of ATMs scored the highest probability of 79%. Perceived usefulness of ATMs probability stood at 81% while banks capacity to deploy

and manage credit cards electronic systems probability was 81%. In contrast to the above supportive indicators, 47% mobile and internet method of payments was considered to have higher transaction risks. The opinion could be shaped by the fact that once the password is known to a third party, fraud can take place undetectably.

Table 4.6: The Main Drivers of Electronic Payment Systems

	Yes					No				
	ATM	Debit Card	Credit Card	Mobile Payment	Internet Payment	ATM	Debit Card	Credit Card	Mobile Payment	Internet Payment
Improved e-system security	79%	54%	59%	75%	59%	21%	46%	41%	25%	41%
User anonymity	66%	66%	65%	62%	68%	34%	34%	35%	38%	32%
E-payment long term strategy	71%	65%	69%	78%	77%	29%	35%	31%	22%	23%
Low costs of implementation	62%	62%	54%	70%	65%	38%	38%	46%	30%	35%
Perceived usefulness	82%	68%	73%	75%	65%	18%	32%	27%	25%	35%
Low transaction risk	67%	65%	55%	53%	53%	33%	35%	45%	47%	47%
System capacity	77%	76%	81%	66%	77%	23%	24%	19%	34%	23%
Short transaction time	70%	84%	75%	85%	67%	30%	16%	25%	15%	33%
System opportunities	74%	62%	69%	75%	80%	26%	38%	31%	25%	20%
Changes in lifestyle	72%	69%	73%	82%	83%	28%	31%	27%	18%	17%

There is generally high score in changes of lifestyle having effect on adoption of EPS. Internet method (80%) provides the highest chances of creating more opportunities than all the other EPS.

4.7 Correlation and Regression of Determinants of E-Payment Systems

The technique of correlation is used to test the statistical significance of the association. On the other hand, regression analysis is used to describe the relationship precisely by means of an equation that has predictive value. The two analyses techniques are important because of their different roles.

4.7.1 Correlation of Determinants of EPS

Pearson correlation is used to evaluate the relationship between variables and its matrix is an important indicator that tests the linear relationship, between the variables. The matrix also helps to determine the strength of the variables in the model, that is, which variable best explains the relationship between determinants of e-payment systems and the current method of electronic payment systems used by commercial banks in Kenya. This is important since it helps in deciding which variable(s) to drop from the equation. Appendix 6(a) presents the correlation matrix in levels. The first table - appendix 6(a) shows that there is no statistical relationship between key EPS determinants with the use of ATM as an electronic payment method. However, improved systems security, perceived usefulness, low transaction risk, capacity of banks system and the presence of bank branches had a positive relationship with use of ATM method.

The number of bank's branches indicates a strong positive relationship with use of credit cards Appendix 6(c). The same relationship is also exhibited in appendix 6(e) where internet payment method has a positive relationship with presence of bank branches.

4.7.2 Determinants of E-payment Systems Regression

The five factors of research framework are improved systems security, perceived bank trust/ low risk, enhanced infrastructure capacity, cost reduction and perceived benefits. To test for statistical significance, these factors were regressed against the identified methods of electronic payments by commercial banks in Kenya. Regression was used since it is the best technique used to measure the effects of two or more independent variables on a single dependent variable measured on interval or ratio scales (Walliman, 2011).

A regression of ATM as an EPS is shown in table 4.7 below. Only 12.6% of variables in the use of ATM payment method can be explained by all the independent variables.

Table 4.7: ATM Payment Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.355[a]	.126	.042	.301

a. Predictors: (Constant), ATM: Perceived usefulness, ATM: low costs
of implementation, ATM: Improved e-system security, ATM: system
capacity, ATM: low transaction risk

The table above indicates that 12.6% of total ATM usage variance is explained by all the
independent variables. The remaining 87.4% is explained by other factors unknown to the
researcher.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.679	5	.136	1.503	.205[b]
	Residual	4.700	52	.090		
	Total	5.379	57			

a. Dependent Variable: Bank e-system ATM

b. Predictors: (Constant), ATM: Perceived usefulness, ATM: low costs of implementation, ATM:
 Improved e-system security, ATM: system capacity, ATM: low transaction risk

Significance of 0.205 implies that there are some differences between variables explaining usage
of ATM payment method. Therefore, the hypothesis that drivers of e-payment systems have no
effect on the usage of ATM services is rejected since p-value of the F statistics is <1.

Co-efficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.661	.186		3.555	.001
	ATM: Improved e-system security	.055	.111	.071	.493	.624
	ATM: low transaction risk	.147	.093	.223	1.572	.122
	ATM: system capacity	.137	.099	.193	1.386	.172
	ATM: low costs of implementation	.100	.084	.161	1.191	.239
	ATM: Perceived usefulness	-.088	.109	-.109	-.805	.425

a. Dependent Variable: Bank e-system ATM

However, it is important to note that 'low transaction risk' variable increase the usage of ATM payment method by 22% (t=1.572). Low transaction risk t-value is the only one amongst the rest which is closer to the critical value of 95% confidence interval (Z-score = 1.96). Perhaps the withdrawal put on ATMs could explain why banks were more confident hence strong relationship.

Table 4.8: ATM Regression with Moderating Factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.560[a]	.314	.207	.238

a. Predictors: (Constant), ATM: system capacity, bank branches , Bank Ownership, ATM: Perceived usefulness, ATM: low costs of implementation, ATM: Improved e-system security, ATM: low transaction risk

Introduction of moderating factors, that is, bank ownership and bank branches raises the explanation of variables in the usage of ATM payment methods to 31.4%.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.159	7	.166	2.936	.013[b]
	Residual	2.539	45	.056		
	Total	3.698	52			

a. Dependent Variable: Bank e-system ATM

b. Predictors: (Constant), bank branches , Bank Ownership, ATM: low costs of implementation, ATM: Perceived usefulness, ATM: system capacity, ATM: Improved e-system security, ATM: low transaction risk

The significance value of 0.013 ($p < 0.05$) confirms that indeed there is a statistical significance between the determinants for adoption of EPS and the use of ATM systems by commercial banks in Kenya.

Co-efficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.758	.172		4.393	.000	.410	1.105
	ATM: Improved e-system security	-.086	.097	-.123	-.891	.378	-.282	.109
	ATM: low costs of implementation	.179	.071	.336	2.525	.015	.036	.322
	ATM: Perceived usefulness	-.075	.088	-.111	-.853	.398	-.251	.102
	ATM: low transaction risk	.084	.087	.143	.962	.341	-.092	.259
	ATM: system capacity	.157	.082	.255	1.908	.063	-.009	.322
	Bank Ownership	-.138	.069	-.259	-2.003	.051	-.276	.001
	bank branches	.111	.080	.186	1.391	.171	-.050	.272

a. Dependent Variable: Bank e-system ATM

With moderating factors, low costs of systems implementation and banks system capacity to handle voluminous transactions increase probability of ATM usage by 34% (t=2.5250 and 25% (t=1.908) respectively. The low cost element can be explained by the fact that banks with branches tend to have a regional centralised office for resolving any technical issues arising from usage of ATM. Thus the cost of system down time is greatly reduced. With several management units, for example, at County level enhances banks' perception of having robust redundant communication medium capable of meeting customer demands.

Table 4.9: Credit Card Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.678[a]	.460	.404	.342

a. Predictors: (Constant), Credit Card: Banks capacity, Credit Card: low costs of implementation, Credit Card: improved E-payment security, Credit Card: low transaction risk, Credit Card: Perceived usefulness

With credit card payment method, 46% of Credit card usage is explained by all independent variables in the study. This falls short of the 50% mark by only 4%.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.771	5	.954	8.179	.000^b
	Residual	5.600	48	.117		
	Total	10.370	53			

a. Dependent Variable: Bank e-system Credit Cards

b. Predictors: (Constant), Credit Card: Banks capacity, Credit Card: low costs of implementation,
Credit Card: improved E-payment security, Credit Card: low transaction risk, Credit Card:
Perceived usefulness

Since the p-value of factor statistics is <1, there is strong statistical significance between usage of

credit card payment method and the drivers of EPS under study. The f-value is 8.179 which is a

strong indicator of variables roles in credit card usage.

Co-efficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.683	.123		5.575	.000
	Credit Card: improved E-payment security	.414	.105	.469	3.944	.000
	Credit Card: low costs of implementation	.317	.101	.362	3.137	.003
	Credit Card: Perceived usefulness	-.231	.131	-.231	-1.771	.083
	Credit Card: low transaction risk	-.367	.099	-.414	-3.720	.001
	Credit Card: Banks capacity	.055	.134	.049	.412	.682

a. Dependent Variable: Bank e-system Credit Cards

The t-test shows three research factors have a strong probability relation with usage of credit

cards. These are improved security with probability of 47% (t=3.944), low costs of

implementation with 36% (t=3.137) and low transaction risk with 41% (t=3.720). Since ATM

cards at times are used as credit cards, it is possible that the security of maximum transaction cap

with presence of regional offices helping out customers could explain the positive relation.

However, low transaction risk reverses the strong positivity of the first two factors. The banks

uneasiness with credit card risk level could be because many vendors participating in online

transactions tend to store customers data and that would jeopardise privacy of data policy.

Table 4.10: Credit Card with Moderating Factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.802[a]	.643	.584	.270

a. Predictors: (Constant), bank branches , Bank Ownership, Credit
Card: low costs of implementation, Credit Card: improved E-payment
security, Credit Card: Banks capacity, Credit Card: low transaction risk,
Credit Card: Perceived usefulness

Credit cards adoption chances are 64% when moderating factors are considered. Only 36% of credit usage is explained by other factors outside the study.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.517	7	.788	10.807	.000[b]
	Residual	3.063	42	.073		
	Total	8.580	49			

a. Dependent Variable: Bank e-system Credit Cards

b. Predictors: (Constant), bank branches , Bank Ownership, Credit Card: low costs of implementation, Credit
Card: improved E-payment security, Credit Card: Banks capacity, Credit Card: low transaction risk, Credit Card:
Perceived usefulness

The hypothesis that drivers of e-payment systems have effect on the usage of credit card service

is not rejected since the p-value of F is less than 1 with f-test value of 10.807.

Co-efficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.579	.149		3.880	.000	.278	.880
	Credit Card: improved E-payment security	.274	.090	.329	3.052	.004	.093	.456
	Credit Card: low costs of implementation	.238	.086	.285	2.770	.008	.064	.411
	Credit Card: Perceived usefulness	-.289	.111	-.306	-2.609	.013	-.512	-.065
	Credit Card: low transaction risk	-.256	.090	-.305	-2.830	.007	-.438	-.073
	Credit Card: Banks capacity	.022	.114	.020	.191	.850	-.208	.251
	Bank Ownership	-.124	.086	-.149	-1.447	.155	-.298	.049
	bank branches	.435	.101	.472	4.323	.000	.232	.638

a. Dependent Variable: Bank e-system Credit Cards

Low costs of credit card implementation and presence of bank branches have probability significance in the adoption of credit card payment systems by 28% and 47% respectively. One of the characteristics of banks, that is, extensive bank branches strengthens possibility of credit card usage by 47% (t=4.323).

The remaining research variables under study, that is, debit cards, mobile payment and internet banking regression was somehow weak. The f-test in all of them showed slight statistical significance. For the t-tests, banks infrastructure capacity to handle transactions electronically remained positive and strong amongst all the studied variables. The usage of the variables were explained by 28% (t=1.615), 29% (t=2.009) and 33% (t=2.247) respectively. More details can be found in appendix 8, 9 and 10.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter wraps the whole research study in three sections, summary, conclusion and recommendations. The summary section highlights all the various concepts and thoughts on electronic payment systems described in the study. The conclusion derives a believed perception from the summary of the study while recommendation section offers direction of future research on the same topic.

5.2 Summary of the Research

The theme of the research focused around understanding various factors that drive banks to adopt electronic payment systems. After a careful examination of previous revered literature on the topic, several factors were identified as being key forces determining the rate at which commercial banks in Kenya adopted electronic payment systems. These factors were status of system security, the level of trust associated with the system from the banks point of view, the nature and volume of system infrastructure supported by the banks, possibility of cost cutting by banks upon adoption and other perceived benefits that could accrue from the adopted system.

A descriptive research design was crafted which used a questionnaire to capture primary data from all commercial banks in Kenya regarding the extent of EPS adoption in Kenya, the benefits that accrue to banks on adoption, the challenges that implementing banks encounter and lastly the determinants of EPS adoption. The design of the questionnaire was aligned to the objectives that guided the study which touched on these four key areas outlined above.

A regression of the collected data revealed that indeed there was a correlation between the five variables of the study and the level and rate of EPS adoption by commercial banks in Kenya. To

answer the first objective of the study on extent of EPS adoption, on average over 73% of correspondents confirmed to be using EPS. The second objective which sought to identity any benefits of EPS, got strong approval on role of EPS in aiding banks to realize global reach, granting 24/7 hours service and low capital investments where the banks have partnered with other players in financial and telecommunication sectors. The third objective was determining main drivers of EPS in the market which the study identified as need to reduce speed of transaction, building confidence and trust in the systems, banks capacity to bankroll and manage systems and lastly changes in society's lifestyle. The fourth and final objective intention was to establish the main challenges in usage of EPS. Online fraud, use of different software platforms and lack of cross-border EPS support were identified as the key stumbling blocks to effective take off of EPS in Kenya.

5.3 Conclusion

Banking industry in Kenya is undergoing technological evolution that is shaping business landscape extensively. From the study, banks are not sure on the most appropriate direction to take, that is, maintain status quo or shift their operations to the demands of digital generation lifestyle. Nevertheless, it is notable that ICT has made it possible to have electronic payment systems like debit cards, credit cards, electronic fund transfer, direct credits and internet banking a reality in banking sector. These new methods of transactions have made it easier for banks operations to cut on capital costs, reach many clients irrespective of distance, improve security while transacting large amounts of sums, easier financial packages mass customization with the end result being high revenue stream for the banks.

Of course where benefits are involved, a few challenges will always pop up. The obstacles that banks should address in order to continue benefiting from e-payment systems relate to factors

like lack of e-payment systems trust by majority of bankers, incidences of online fraud, difficulty in usability of some technologies hence need for highly trained technical staff, high transaction costs due to double taxations and fear for high risk investments. If these factors can be overcome by banks, cash transaction will automatically come down with high uptake of EPS.

5.4 Limitations of Study

The researcher experienced some challenges while carrying out the study, notably with bank management. Banks consider every bit of their data to be confidential thus making it very difficult to have questionnaires filled. The researcher therefore spent a lot of time convincing concerned offices within the banks to authorize filling of the questionnaire.

The data that was captured in the questionnaire constituted mostly nominal and ordinal data which is not very accurate in predicting variables. The researcher would have wished to collect scale data that could reveal more accurate patterns in the study.

The study was based on electronic payment systems used by banks in Kenya, a concept which is wide covering several methods. A regression of each of these methods gave varying patterns that could be merged into one regression. Where attempt to merge is tried, then other variables would not be interpreted correctly. This is because factors affecting them differ. However, it is also not possible to study one EPS method like ATM usage and generalize the findings to other EPS systems like mobile payment or internet banking.

The researcher doubled up as a full time employee as well as a student. Thus time to study, collect data and or even do analysis of collected data was always short. This translated into reading up to late hours and resulting into fatigue of the researcher. That means, creativity and understanding of certain concepts was not optimized.

5.5 Recommendations

E-payment systems are a congruent of many subsystems ranging from software, hardware and human resources. The success of such a system may not take a 'one-size-fits-all' approach. However, where appropriate steps are taken involving all stakeholders, a lot can be realized by banks from such a system. The stakeholders in mind include the banks, government, and telecommunication operators.

Commercial banks in Kenya should increase accuracy and update of their product description. This helps to decrease the doubts of consumers in e-transaction and proves the seriousness of e-electronic payment systems. More and improved guidelines/ functions for websites will help them convince and attract more online buyers. Banks diversification of payment, decreasing cash and increasing non-cash payment would stimulate electronic payment transactions. Equipping bank staff with right information and communication technology (ICT) skills would motivate the staff who will eventually support online transaction projects initiated by the management.

The government of Kenya should continue to promulgate necessary regulations to make e-commerce legal framework complete and encourage the development of electronic payment systems platforms. The legal framework would provide the desired transaction features like non-repudiation, security, anonymity, divisibility among others which will encourage banks to launch online-based products with hope of good response from the market. Certain official electronic payment benchmarks should be established to have official and sufficient statistics of this business at government level. Efforts, through proper government programming, must be put in to educate and create awareness to the public of online transactions and the benefits accruing from electronic payment systems. Regular and supportive policies emphasizing use of electronic payment should also be into place.

This is the era of information and communication technology. The leading concern of electronic revolution in this 21st century is to establish and ensure a better, easy and comfortable way of management, communication and development with the use of information technology. Thus e-commerce has become a buzzword of present information technology (Laisuzzaman, Imran, Nahid, Amin, & Alim, 2010). ICT has reshaped e-commerce beyond online shopping, online stock, bond transactions, buying and downloading software without ever going to a store. These activities involve electronic payment systems which are a backbone activity of banks and other financial institutions.

Since telecommunication network is a major player in implementation of e-payment systems, high speed, competitive international broadband access coupled with high density of local telecommunication facilities is essential for growth of e-commerce transactions backed by banks in Kenya.

5.6 Further Research Suggestions

Citing scholarly publications and recommendations regarding effectiveness and efficiency brought about by electronic payment systems, it will be prudent for upcoming researchers to concentrate on a particular e-payment system, for example, ATM and do further prodding that will provide insight on how to make it cost effective hence likely to attract mass adoption on the market.

Further research is also suggested to find out why many electronic payment systems fail at infancy stage. Take the case of DigiCash, irrespective of its unique innovations, the technology could not sustain itself on the market.

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Appendix 1: **Questionnaire**

Instructions

I am a University of Nairobi, MBA student doing a research on *"drivers for adoption of e-payment systems by banks"*. You have been chosen purposely to provide information on decisions for adoption of e-payment systems. I would like to seek your cooperation in answering the questions in the questionnaire. Your information, views and opinion will be kept **confidential**. The questionnaire constitutes of four sections A, B, C, & D.
Please put a tick mark [∨] in the appropriate box wherever required

Section A: Personal Information

(1)   Individual Data

(a) Name of the organization

(b) Age of the organization?

   0-8 ☐   9-16 ☐   17-24 ☐   25-32 ☐   40> ☐

(c) Your position in the organization?

   Senior Management ☐   Middle Management ☐   Junior Management ☐

(d) Gender: - Male ☐   Female ☐

(e) Which of the following age groups best describe your age? (*tick one bracket*): -

   <25 ☐   25-30 ☐   31-35 ☐   36-40 ☐   41-45 ☐   46-50 ☐   >50 ☐

(f) Which bracket best describe your work experience (in years) in the current job position: -

   0-4 ☐   5-9 ☐   10-14 ☐   15-19 ☐   20> ☐

(g) Please tick your highest academic qualification:-

   A. High School   ☐

   B. Diploma   ☐

   C. Undergraduate   ☐

   D. Post Graduate   ☐

(2) Bank Information

(a) Do you use the following e-commerce payment systems? (*You can tick more than one*)

   1. ATM   Yes ☐   No ☐

   2. Credit Cards   Yes ☐   No ☐

   3. Debit Cards   Yes ☐   No ☐

4. Mobile Payments Yes ☐   No ☐

5. Internet Payment Yes ☐   No ☐

6. Others

(b) What is the bank's ownership structure?

Local ☐   Foreign ☐

(c) (i) Does the bank have branches across the country?   Yes ☐   No ☐

(ii) If your answer in I(i) above is Yes, please state the number of branches:

(d) Do you have any partnerships in implementation of e-payment systems? Yes ☐   No ☐

Section B: Benefits of e-payment systems

(3) The following are the benefits that accrue to banks from adoption of the electronic payment system. You are required to rank each means of payment on the right against the perceived benefit on the left of the table using the scale below. [1, 2, 3, 4, or 5]

   1 -- **Strongly disagree**   **2 - Disagree 3 - Neutral   4 - Agree   5 - Strongly Agree**

For example:

Banks are fond of using this means of payment:

ATM [4]   Debit [3]   Credit [5]   Mobile [5]   Internet [2]

	ATM	Debit Card	Credit Card	Mobile Payment	Internet Banking
For example: The adoption of means depend on bank size	*2*	*3*	*3*	*1*	*4*
(i) The means of payment allows financial institution to realise global reach.					
(ii) Banks enjoy high revenue upon adoption.					
(iii) Low capital cost on banks since neither office space nor shop assistants needed.					
(iv) The means of payment has important privacy features for banks					
(v) Banks are able to carry out mass customization of financial package offers.					
(vi) The means of payment makes banking payment services available 24/7 anywhere.					

(vii) Other benefits

Section C: E-payment Challenges

These are some of the challenges that banks implement e-payment systems face. Tick one option for each challenge.

(4) Each implementing bank uses different e-payment platform and software

Strongly disagree ☐   *Disagree* ☐   *Neutral* ☐   *Agree* ☐   *Strongly Agree* ☐

(5) The rate of approval for an e-payment system is slowed down by uncertainty of liquidity performance effects of a cashless society.

Strongly disagree ☐   *Disagree* ☐   *Neutral* ☐   *Agree* ☐   *Strongly Agree* ☐

(6) Increased online fraud resulting from unauthorised access to private data poses a menace to adoption of e-payment system

Strongly disagree ☐   *Disagree* ☐   *Neutral* ☐   *Agree* ☐   *Strongly Agree* ☐

(7) There is a general fear by banks for relying too much on IT thus risking banks performance in case of failure.

Strongly disagree ☐   *Disagree* ☐   *Neutral* ☐   *Agree* ☐   *Strongly Agree* ☐

(8) Banks management may feel that adoption of e-payment systems can trigger fear for layoffs amongst staff members. This might cause fraud among other vices.

Strongly disagree ☐   *Disagree* ☐   *Neutral* ☐   *Agree* ☐   *Strongly Agree* ☐

(9) Banks would wish to target for e-payment system that goes beyond country borders but monetary laws and rules in foreign countries may hamper its regional reach.

Strongly disagree ☐   *Disagree* ☐   *Neutral* ☐   *Agree* ☐   *Strongly Agree* ☐

Section D: Determinants of E-payments

(10) Some possible key drivers for adoption of e-payment systems by banks are highlighted on the left of the table. You are required to tick *Yes* or *No* against each of the e-commerce payment system on the right in the table to best describe the asserted driver.

	ATM		Debit Card		Credit Card		Mobile Payment		Internet Banking	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Example: It is easier to use this means of payment	X			X		X	X			X
E-payment security has greatly improved										
Non-disclosure of user, (anonymity) of use, easier transferability and level of acceptability has resulted to banks trust of the system										
The e-payment system is core to long term strategy of banks										
Costs of implementation and maintenance are somehow low										
Perceived usefulness										
Risk of transaction is no longer a big issue										
Banks capacity to handle the system is greater due to technological development										
Transaction time is flexible, instantaneous and drastically reduced										
The adopted payment system provide new opportunities for exploitation										
Change in lifestyle and other social dimensions play key role in adoption.										

Appendix 2: Diagram of E-business and E-commerce

E-business

Buy-side e-commerce

Sell-side e-commerce

Internet and extranet

Internet

Internet and extranet

Key

Suppliers

Suppliers' supplier

Organisational processes & functional units

Intermediaries

Customers

Customers' customer
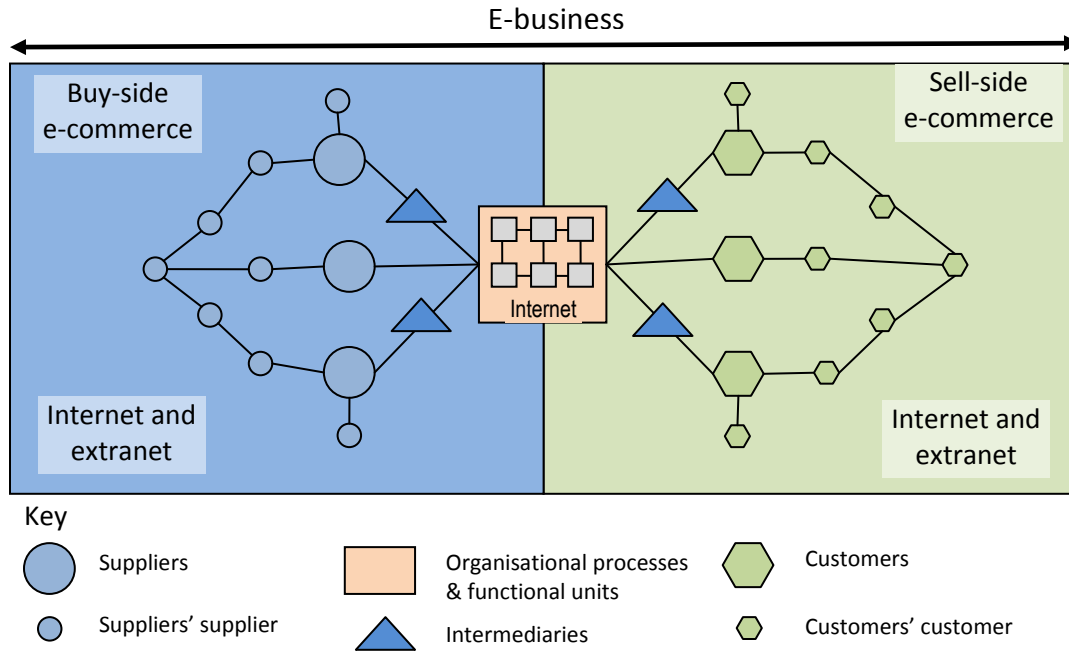
Source: Chaffey (2009)

Appendix 3: Graph showing E-commerce Trend in U.S.

Not Adjusted   Adjusted
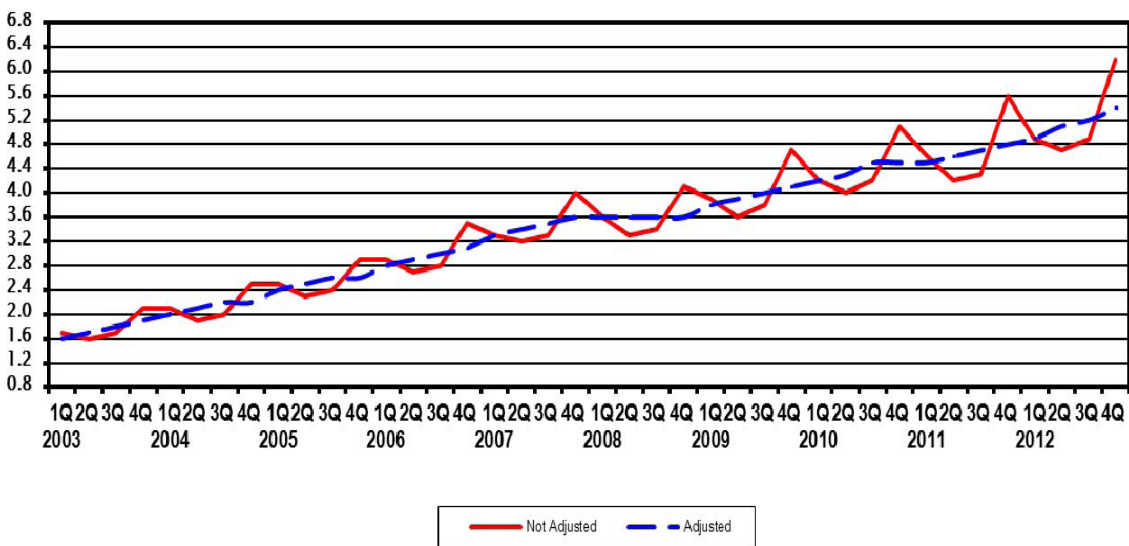
Source: US Census Bureau, 2013

Appendix 4: Theoretical Framework of Study
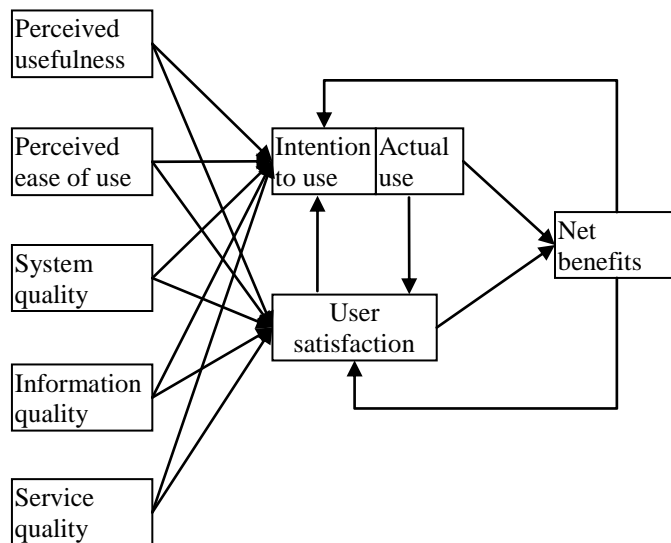
Source: Researcher, 2013
Adopted from Delone & McLean (2003)

Appendix 5: List of Banks in Kenya by Central Bank of Kenya as at July 2013

1   African Banking Corporation ltd
2   Bank of Africa k Ltd
3   Bank of Baroda Kenya
4   Bank of India Ltd
5   Barclays Bank of K Ltd
6   Chase Bank Kenya Ltd
7   Citibank N.A.
8   CFC Stanbic Bank Ltd
9   CharterHouse Bank Ltd
10   Commercial Bank of Africa ltd
11   Consolidated bank
12   Co-operative Bank of Kenya
13   Credit Bank Ltd
14   Credit Finance C Bank Ltd
15   Development Bank of K
16   Diamond Trust Bank
17   Dubai Bank Ltd
18   Ecobank Kenya Ltd
19   Equatorial Commercial Bank ltd
20   Equity Bank
21   Family Finance Bank
22   Fidelity Commercial Bank Ltd
23   FINA Bank ltd
24   First Community Bank Ltd
25   Giro Commercial Bank
26   Guardian Bank Ltd

27	Gulf African Bank Ltd
28	Habib Bank A.G Zurich
29	Habib Bank Ltd
30	Imperial Bank ltd
31	Jamii Bora Bank Ltd
32	KCB Ltd
33	K-Rep Bank ltd
34	Middle East Bank
35	National Bank of Kenya
36	National Industrial Credit Bank ltd
37	Oriental Commercial Bank Ltd
38	Paramount Universal Bank Ltd
39	Prime Bank ltd
40	Standard Chartered Bank of Kenya
41	Trans-National Bank
42	Victoria Commercial Bank Ltd
43	UBA Kenya Bank Ltd

Appendix 6: EPS correlation Table

(a) Pearson Correlation: ATM Payment Method

Correlations

		e-system: ATM	Improved security	low costs of implementation	Perceived usefulness	low transaction risk	system capacity	Bank Ownership	bank branches
e-system: ATM	Pearson Correlation	1	.089	.194	-.144	.229	.076	-.252	.265*
	Sig. (2-tailed)		.465	.125	.241	.071	.530	.043	.032
	N	70	70	64	68	63	70	65	66
Improved security	Pearson Correlation	.089	1	.010	-.060	.222	-.284*	.046	.214
	Sig. (2-tailed)	.465		.937	.626	.081	.017	.715	.084
	N	70	70	64	68	63	70	65	66
low costs of implementation	Pearson Correlation	.194	.010	1	-.078	.193	-.224	.064	.105
	Sig. (2-tailed)	.125	.937		.545	.146	.076	.632	.415
	N	64	64	64	62	58	64	59	62
Perceived usefulness	Pearson Correlation	-.144	-.060	-.078	1	-.257*	.107	.023	.038
	Sig. (2-tailed)	.241	.626	.545		.042	.385	.857	.764
	N	68	68	62	68	63	68	63	64
low transaction risk	Pearson Correlation	.229	.222	.193	-.257*	1	-.216	-.098	-.220
	Sig. (2-tailed)	.071	.081	.146	.042		.089	.466	.094
	N	63	63	58	63	63	63	58	59
Banks system capacity	Pearson Correlation	.076	-.284*	-.224	.107	-.216	1	-.101	-.105
	Sig. (2-tailed)	.530	.017	.076	.385	.089		.423	.400
	N	70	70	64	68	63	70	65	66
Bank Ownership	Pearson Correlation	-.252*	.046	.064	.023	-.098	-.101	1	-.009
	Sig. (2-tailed)	.043	.715	.632	.857	.466	.423		.943
	N	65	65	59	63	58	65	65	63
Bank branches	Pearson Correlation	.265*	.214	.105	.038	-.220	-.105	-.009	1
	Sig. (2-tailed)	.032	.084	.415	.764	.094	.400	.943	
	N	66	66	62	64	59	66	63	66

*. Correlation is significant at the 0.05 level (2-tailed).

(b) Pearson Correlation: Debit Card Payment Method

Correlations

		e-system debit Cards	improved security	low costs of implementation	Perceived usefulness	low risk of transaction	system capacity	Bank Ownership	bank branches
e-system Debit Cards	Pearson Correlation	1	.092	-.014	.113	.084	.155	-.001	.095
	Sig. (2-tailed)		.461	.915	.386	.512	.218	.993	.463
	N	66	66	60	61	63	65	61	62
improved security	Pearson Correlation	.092	1	.002	.352**	.048	.323**	-.015	.212
	Sig. (2-tailed)	.461		.986	.005	.705	.008	.906	.093
	N	66	68	60	63	65	67	63	64
low costs of implementation	Pearson Correlation	-.014	.002	1	-.049	-.125	.044	-.028	.301*
	Sig. (2-tailed)	.915	.986		.715	.349	.739	.840	.024
	N	60	60	60	57	58	59	55	56
Perceived usefulness	Pearson Correlation	.113	.352**	-.049	1	.049	.227	.022	.370**
	Sig. (2-tailed)	.386	.005	.715		.711	.076	.868	.004
	N	61	63	57	63	60	62	60	59
low risk of transaction	Pearson Correlation	.084	.048	-.125	.049	1	.333**	-.118	-.338**
	Sig. (2-tailed)	.512	.705	.349	.711		.007	.369	.008
	N	63	65	58	60	65	64	60	61
system capacity	Pearson Correlation	.155	.323**	.044	.227	.333**	1	-.121	-.198
	Sig. (2-tailed)	.218	.008	.739	.076	.007		.346	.117
	N	65	67	59	62	64	67	63	64
Bank Ownership	Pearson Correlation	-.001	-.015	-.028	.022	-.118	-.121	1	-.009
	Sig. (2-tailed)	.993	.906	.840	.868	.369	.346		.943
	N	61	63	55	60	60	63	65	63
bank branches	Pearson Correlation	.095	.212	.301*	.370**	-.338**	-.198	-.009	1
	Sig. (2-tailed)	.463	.093	.024	.004	.008	.117	.943	
	N	62	64	56	59	61	64	63	66

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

*. Correlation is significant at the 0.05 level (2-tailed).

(c) Pearson Correlation: Credit Card Payment Method

Correlations

		e-system Credit Cards	improved security	low costs of implement ation	Perceived usefulness	low transaction risk	Banks capacity	Bank Ownershi p	bank branches
e-system Credit Cards	Pearson Correlation	1	.295*	.311*	.017	-.295*	.097	-.127	.615**
	Sig. (2-tailed)		.018	.019	.900	.020	.449	.336	.000
	N	64	64	57	59	62	63	59	60
improved security	Pearson Correlation	.295*	1	.070	.392**	-.044	.120	-.174	.298*
	Sig. (2-tailed)	.018		.596	.001	.733	.334	.172	.017
	N	64	68	59	63	64	67	63	64
low costs of implementation	Pearson Correlation	.311*	.070	1	.317*	.028	.161	-.100	.120
	Sig. (2-tailed)	.019	.596		.015	.836	.226	.462	.384
	N	57	59	59	58	56	58	56	55
Perceived usefulness	Pearson Correlation	.017	.392**	.317*	1	.264*	.240	-.019	.316*
	Sig. (2-tailed)	.900	.001	.015		.043	.061	.884	.015
	N	59	63	58	63	59	62	60	59
low transaction risk	Pearson Correlation	-.295*	-.044	.028	.264*	1	.223	-.249	-.112
	Sig. (2-tailed)	.020	.733	.836	.043		.078	.057	.396
	N	62	64	56	59	64	63	59	60
Banks capacity	Pearson Correlation	.097	.120	.161	.240	.223	1	-.250*	-.137
	Sig. (2-tailed)	.449	.334	.226	.061	.078		.048	.281
	N	63	67	58	62	63	67	63	64
Bank Ownership	Pearson Correlation	-.127	-.174	-.100	-.019	-.249	-.250*	1	-.009
	Sig. (2-tailed)	.336	.172	.462	.884	.057	.048		.943
	N	59	63	56	60	59	63	65	63
bank branches	Pearson Correlation	.615**	.298*	.120	.316*	-.112	-.137	-.009	1
	Sig. (2-tailed)	.000	.017	.384	.015	.396	.281	.943	
	N	60	64	55	59	60	64	63	66

*. Correlation is significant at the 0.05 level (2-tailed).

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

(d) Pearson Correlation: Mobile Payment Method

Correlations

		Bank e-system Mobile Payment	improved E-payment	low costs of implemen tation	Perceived usefulness	low risk of transaction	Banks capacity	Bank Ownershi p	bank branch es
e-system Mobile Payment	Pearson Correlation	1	-.098	-.214	-.231	-.072	.278*	-.116	.019
	Sig. (2-tailed)		.443	.109	.078	.584	.032	.372	.883
	N	64	64	57	59	60	60	61	62
improved E-payment	Pearson Correlation	-.098	1	.131	.127	-.086	-.137	.028	.074
	Sig. (2-tailed)	.443		.313	.322	.507	.279	.825	.562
	N	64	68	61	63	62	64	63	64
low costs of implementation	Pearson Correlation	-.214	.131	1	.370**	.102	.026	.027	.066
	Sig. (2-tailed)	.109	.313		.004	.456	.850	.841	.619
	N	57	61	61	58	56	57	56	59
Perceived usefulness	Pearson Correlation	-.231	.127	.370**	1	.205	.264*	-.060	-.028
	Sig. (2-tailed)	.078	.322	.004		.120	.043	.646	.835

Correlations

		Bank e-system Mobile Payment	improved E-payment	low costs of implementation	Perceived usefulness	low risk of transaction	Banks capacity	Bank Ownership	bank branches
	N	59	63	58	63	59	59	60	59
low risk of transaction	Pearson Correlation	-.072	-.086	.102	.205	1	.197	.088	-.200
	Sig. (2-tailed)	.584	.507	.456	.120		.139	.510	.133
	N	60	62	56	59	62	58	59	58
Banks capacity	Pearson Correlation	.278*	-.137	.026	.264*	.197	1	.010	-.289*
	Sig. (2-tailed)	.032	.279	.850	.043	.139		.937	.025
	N	60	64	57	59	58	64	60	60
Bank Ownership	Pearson Correlation	-.116	.028	.027	-.060	.088	.010	1	-.009
	Sig. (2-tailed)	.372	.825	.841	.646	.510	.937		.943
	N	61	63	56	60	59	60	65	63
Bank branches	Pearson Correlation	.019	.074	.066	-.028	-.200	-.289*	-.009	1
	Sig. (2-tailed)	.883	.562	.619	.835	.133	.025	.943	
	N	62	64	59	59	58	60	63	66

*. Correlation is significant at the 0.05 level (2-tailed).

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

(e) Pearson Correlation: Internet Payment Method

Correlations

		e-system Internet Payment	improved security	low costs of implementation	Perceived usefulness	low transaction risk	Banks capacity	Bank Ownership	bank branches
e-system Internet Payment	Pearson Correlation	1	-.055	-.060	.007	-.143	.138	.181	.377**
	Sig. (2-tailed)		.671	.650	.957	.275	.280	.163	.003
	N	63	63	59	58	60	63	61	61
improved security	Pearson Correlation	-.055	1	-.005	.371**	.359**	-.043	-.173	.035
	Sig. (2-tailed)	.671		.967	.002	.003	.721	.168	.779
	N	63	70	63	65	66	70	65	66
low costs of implementation	Pearson Correlation	-.060	-.005	1	.269*	.024	.329**	-.062	.051
	Sig. (2-tailed)	.650	.967		.038	.858	.008	.644	.700
	N	59	63	63	60	60	63	58	59
Perceived usefulness	Pearson Correlation	.007	.371**	.269*	1	.149	.160	-.251*	.088
	Sig. (2-tailed)	.957	.002	.038		.252	.203	.049	.499
	N	58	65	60	65	61	65	62	61
low transaction risk	Pearson Correlation	-.143	.359**	.024	.149	1	.106	-.213	-.132
	Sig. (2-tailed)	.275	.003	.858	.252		.398	.099	.305
	N	60	66	60	61	66	66	61	62
Banks capacity	Pearson Correlation	.138	-.043	.329**	.160	.106	1	-.134	-.125
	Sig. (2-tailed)	.280	.721	.008	.203	.398		.287	.316

Correlations

		e-system Internet Payment	improved security	low costs of implementation	Perceived usefulness	low transaction risk	Banks capacity	Bank Ownership	bank branches
Bank Ownership	N	63	70	63	65	66	70	65	66
	Pearson Correlation	.181	-.173	-.062	-.251*	-.213	-.134	1	-.009
	Sig. (2-tailed)	.163	.168	.644	.049	.099	.287		.943
	N	61	65	58	62	61	65	65	63
bank branches	Pearson Correlation	.377**	.035	.051	.088	-.132	-.125	-.009	1
	Sig. (2-tailed)	.003	.779	.700	.499	.305	.316	.943	
	N	61	66	59	61	62	66	63	66

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

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 7: Benefits of Electronic Payment Systems

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree			
	Count	N %	Count	N %	Count	N %	Count	N %	Count	N %	Count	Table N %
ATM: global reach.	2	3%	9	14%	18	27%	27	41%	10	15%	66	100.0%
ATM: high revenue	6	9%	9	13%	17	25%	31	46%	5	7%	68	100.0%
ATM: low cost	3	4%	5	7%	35	51%	18	26%	7	10%	68	100.0%
ATM privacy features	4	6%	9	13%	13	19%	37	54%	5	7%	68	100.0%
ATM: mass customization	5	7%	10	15%	18	26%	26	38%	9	13%	68	100.0%
ATM: 24/7 services	6	9%	3	4%	14	21%	25	37%	20	29%	68	100.0%
Debit Card: global reach	3	4%	9	13%	28	41%	19	28%	9	13%	68	100.0%
Debit Card: high revenue	2	3%	10	15%	30	44%	20	29%	6	9%	68	100.0%
Debit Card: Low cost	3	4%	9	13%	28	41%	23	34%	5	7%	68	100.0%
Debit Card: privacy features	4	6%	2	3%	26	38%	32	47%	4	6%	68	100.0%
Debit Card: mass customization	6	9%	11	16%	25	37%	23	34%	3	4%	68	100.0%
Debit Card: 24/7 services	0	0%	12	18%	23	34%	26	38%	7	10%	68	100.0%
Credit Card: global reach	1	1%	13	19%	27	40%	17	25%	10	15%	68	100.0%
Credit Card: high revenue	7	10%	4	6%	25	37%	26	38%	6	9%	68	100.0%
Credit Card: Low cost	9	13%	1	1%	34	50%	21	31%	3	4%	68	100.0%
Credit Card: privacy features	1	1%	6	9%	27	40%	31	46%	3	4%	68	100.0%
Credit Card: mass customization	11	16%	4	6%	24	35%	26	38%	3	4%	68	100.0%
Credit Card: 24/7 services	3	4%	2	3%	20	29%	29	43%	14	21%	68	100.0%
Mobile Payment: global reach	4	6%	13	19%	19	28%	26	38%	6	9%	68	100.0%
Mobile Payment: high revenue	7	10%	9	13%	7	10%	32	47%	13	19%	68	100.0%
Mobile Payment: capital cost	3	4%	8	12%	10	15%	35	51%	12	18%	68	100.0%
Mobile Payment: privacy features	3	4%	8	12%	21	31%	26	38%	10	15%	68	100.0%

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree			
	Count	N %	Count	N %	Count	N %	Count	N %	Count	N %	Count	Table N %
Mobile Payment: mass customization	4	6%	10	15%	18	26%	30	44%	6	9%	68	100.0%
Mobile Payment: 24/7 services	3	4%	6	9%	13	19%	28	41%	18	26%	68	100.0%
Internet Banking: global reach	14	21%	6	9%	1	1%	29	43%	18	26%	68	100.0%
Internet Banking: high revenue	4	6%	10	15%	20	29%	24	35%	10	15%	68	100.0%
Internet Banking: capital cost	9	13%	6	9%	10	15%	22	32%	21	31%	68	100.0%
Internet Banking: privacy features	10	15%	11	16%	11	16%	25	37%	11	16%	68	100.0%
Internet Banking: mass customization	5	7%	12	18%	16	24%	21	31%	14	21%	68	100.0%
Internet Banking: 24/7 services	4	6%	6	9%	10	15%	27	40%	21	31%	68	100.0%

Appendix 8: Debit Card Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.329[a]	.108	.016	.492

a. Predictors: (Constant), Debit Card: system capacity, Debit Card: low costs of implementation, Debit Card: Perceived usefulness, Debit Card: low risk of transaction, Debit Card: improved E-payment security

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.414	5	.283	1.168	.339[b]
	Residual	11.623	48	.242		
	Total	13.037	53			

a. Dependent Variable: Bank e-system debit Cards
b. Predictors: (Constant), Debit Card: system capacity, Debit Card: low costs of implementation, Debit Card: Perceived usefulness, Debit Card: low risk of transaction, Debit Card: improved E-payment security

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.415	.181		2.290	.026
	Debit Card: improved E-payment security	.077	.159	.078	.485	.630
	Debit Card: low costs of implementation	-.160	.140	-.159	-1.141	.259
	Debit Card: Perceived usefulness	-.043	.163	-.041	-.264	.793
	Debit Card: low risk of transaction	.015	.155	.015	.098	.923
	Debit Card: system capacity	.325	.201	.275	1.615	.113

a. Dependent Variable: Bank e-system debit Cards

Debit Card with moderating factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.405[a]	.164	.025	.484

a. Predictors: (Constant), bank branches , Bank Ownership, Debit Card: low costs of implementation, Debit Card: system capacity, Debit Card: Perceived usefulness, Debit Card: improved E-payment security, Debit Card: low risk of transaction

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.932	7	.276	1.177	.336[b]
	Residual	9.848	42	.234		
	Total	11.780	49			

a. Dependent Variable: Bank e-system debit Cards

b. Predictors: (Constant), bank branches , Bank Ownership, Debit Card: low costs of

implementation, Debit Card: system capacity, Debit Card: Perceived usefulness, Debit Card:

improved E-payment security, Debit Card: low risk of transaction

Co-efficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.293	.263		1.111	.273
	Debit Card: improved E-payment security	.141	.172	.145	.819	.418
	Debit Card: low costs of implementation	-.143	.148	-.143	-.970	.338
	Debit Card: Perceived usefulness	-.306	.190	-.283	-1.605	.116
	Debit Card: low risk of transaction	.159	.181	.157	.879	.384
	Debit Card: system capacity	.350	.210	.299	1.670	.102
	Bank Ownership	.082	.151	.083	.543	.590
	bank branches	.204	.201	.184	1.014	.316

a. Dependent Variable: Bank e-system debit Cards

Appendix 9: Mobile Payment Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.411[a]	.169	.072	.295

a. Predictors: (Constant), Mobile Payment: Banks capacity, Mobile Payment: improved E-payment, Mobile Payment: low costs of implementation, Mobile Payment: low risk of transaction, Mobile Payment: Perceived usefulness

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.758	5	.152	1.746	.145^b
	Residual	3.732	43	.087		
	Total	4.490	48			

a. Dependent Variable: Bank e-system Mobile Payment
b. Predictors: (Constant), Mobile Payment: Banks capacity, Mobile Payment: improved E-payment, Mobile Payment: low costs of implementation, Mobile Payment: low risk of transaction, Mobile Payment: Perceived usefulness

Co-efficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.948	.126		7.535	.000
	Mobile Payment: improved E-payment	.051	.109	.068	.468	.642
	Mobile Payment: low costs of implementation	-.102	.102	-.157	-.995	.325
	Mobile Payment: Perceived usefulness	-.124	.119	-.181	-1.041	.304
	Mobile Payment: low risk of transaction	-.116	.088	-.192	-1.325	.192
	Mobile Payment: Banks capacity	.190	.095	.295	2.009	.051

a. Dependent Variable: Bank e-system Mobile Payment

Mobile Payment Regression with Moderating Factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.442^a	.195	.058	.297

a. Predictors: (Constant), Mobile Payment: Banks capacity, Mobile Payment: improved E-payment, Mobile Payment: low costs of implementation, Bank Ownership, Mobile Payment: low risk of transaction, bank branches , Mobile Payment: Perceived usefulness

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.876	7	.125	1.420	.224^b
	Residual	3.614	41	.088		
	Total	4.490	48			

a. Dependent Variable: Bank e-system Mobile Payment
b. Predictors: (Constant), Mobile Payment: Banks capacity, Mobile Payment: improved E-payment, Mobile Payment: low costs of implementation, Bank Ownership, Mobile Payment: low risk of transaction, bank branches , Mobile Payment: Perceived usefulness

Co-efficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.857	.158		5.426	.000

Co-efficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Bank Ownership	-.041	.093	-.067	-.438	.664
bank branches	.109	.100	.163	1.089	.283
Mobile Payment: improved E-payment	.075	.114	.100	.659	.514
Mobile Payment: low risk of transaction	-.091	.093	-.151	-.977	.334
Mobile Payment: low costs of implementation	-.113	.106	-.175	-1.060	.295
Mobile Payment: Perceived usefulness	-.134	.125	-.196	-1.075	.289
Mobile Payment: Banks capacity	.212	.098	.329	2.165	.036

a. Dependent Variable: Bank e-system Mobile Payment

Appendix 10: Internet Payment Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.341^a	.116	.022	.450

a. Predictors: (Constant), Internet Banking: Banks capacity, Internet Banking: improved E-payment security, Internet Banking: low costs of implementation, Internet Banking: low transaction risk, Internet Banking: Perceived usefulness

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.250	5	.250	1.237	.307^b
	Residual	9.504	47	.202		
	Total	10.755	52			

a. Dependent Variable: Bank e-system Internet Payment
b. Predictors: (Constant), Internet Banking: Banks capacity, Internet Banking: improved E-payment security, Internet Banking: low costs of implementation, Internet Banking: low transaction risk, Internet Banking: Perceived usefulness

Co-efficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.622	.158		3.927	.000
Internet Banking: improved E-payment security	-.015	.138	-.016	-.106	.916
Internet Banking: low costs of implementation	-.078	.140	-.082	-.559	.579
Internet Banking: Perceived usefulness	-.065	.145	-.069	-.446	.658
Internet Banking: low transaction risk	-.165	.133	-.183	-1.240	.221
Internet Banking: Banks capacity	.358	.159	.333	2.247	.029

a. Dependent Variable: Bank e-system Internet Payment

Internet Payment Regression with Moderating Factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.467[a]	.218	.091	.439

a. Predictors: (Constant), Internet Banking: Banks capacity, bank branches , Internet Banking: improved E-payment security, Bank Ownership, Internet Banking: low costs of implementation, Internet Banking: low transaction risk, Internet Banking: Perceived usefulness

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.312	7	.330	1.716	.131[b]
	Residual	8.277	43	.192		
	Total	10.588	50			

a. Dependent Variable: Bank e-system Internet Payment
b. Predictors: (Constant), Internet Banking: Banks capacity, bank branches , Internet Banking: improved E-payment security, Bank Ownership, Internet Banking: low costs of implementation, Internet Banking: low transaction risk, Internet Banking: Perceived usefulness

Co-efficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.245	.215		1.137	.262
	Bank Ownership	.202	.130	.221	1.547	.129
	bank branches	.278	.143	.273	1.943	.059
	Internet Banking: improved E-payment security	-.025	.135	-.027	-.186	.853
	Internet Banking: low costs of implementation	-.130	.141	-.136	-.924	.360
	Internet Banking: Perceived usefulness	.000	.152	.000	.002	.999
	Internet Banking: low transaction risk	-.063	.137	-.069	-.461	.647
	Internet Banking: Banks capacity	.385	.159	.359	2.419	.020

a. Dependent Variable: Bank e-system Internet Payment