

**FACTORS INFLUENCING ADOPTION OF ELECTRONIC
PAYMENTS BY COMMERCIAL BANKS IN KENYA**

BY

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DECLARATION

This research project report is my original work and has not been presented for examination in any other university.

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This research project report has been submitted for examination with my approval as the
Candidate's university supervisor

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Date.....

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First and foremost, I acknowledge the almighty God for giving me the strength to complete this proposal. I wish to also convey my sincere gratitude to my supervisor, Dr. Njihia for his skills in research and statistics I gained that helped me generate this report. In addition, I would also like to acknowledge my family and friends who for one way or another contributed to the completion of this research project.

DEDICATION

To my beloved Mother,
Thank you for inspiring me to think bigger.

ABSTRACT

Electronic payments is one of the technologies that has been significantly affected in the field of businesses. Electronic payments have greatly revolutionized the manner in which businesses conduct their operations and transactions by making payments of goods and services a convenient and flexible process. However, despite the potential benefits posed by electronic payments especially to financial institutions, several commercial banks in Kenya have been lagging behind in adopting this technology. It is against this backdrop that this research purposed to investigate factors influenceing the adoption of electronic payments by Kenyan commercial banks. In fulfilling this objective, this research was guided by three objectives; assessing the extent to which commercial banks in Kenya have adopted electronic payment systems, identifying the key factors influencing the uptake of the electronic payments by the commercial banks, and identifying the main challenges and benefits associated with the adoption of electronic payment systems by the commercial banks. In assessing these objectives, a descriptive research desing was adopted in which a census of 43 banks in Kenya were studied. Questionnaires were used to collect data from the head of payments for each of the banks. The collected data was then coded and inputted on SPSS for descriptive and inferential statistical analyses. The findings revealed that Kenyan commercial banks have adopted a range of electronic payment methods such as ATMs, electronic fund transfers, bulk cash deposit machines, and mobile banking applications. Of these technologies, electronic fund transfer payment methods were found to be the most widely adopted. Additionally, the study found that information security, infrastructure, technology, regulatory framework, and top management support positively influence the uptake of electronic payment technologies by Kenyan commercial banks. Moreover, the study found that adoption of these technologies face the following challenges; inadequate legal and regulatory frameworks, outdated technologies, poor infrastructure, connectivity issues, poor technologies, inefficient customer care services, time consuming technologies, and poor infrastructure associated with accessibility, connectivity, and usage. Therefore, in order to improve the uptake of electronic payment systems in Kenya, these challenges need to be addressed. As such it is recommended that the government should formulate and enforce regulations that provide conducive legal and regulatory frameworks for the commercial banks.

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LIST OF ABBREVIATION/ACRONYMS

ACH	Automated Clearing House
ATM	Automated Teller Machine
CBD	Central Business District
CBK	Central Bank of Kenya
EFT	Electronic Funds Transfer
FI	Financial Institutions
ICT	Information and Communication Technology
IT	Information Technology
MNO	Mobile Network Operator
P2P	Person to Person
SCF	Survey of Consumer Finances
SPSS	Statistical Packages for Social Sciences
SWIFT	Society for Worldwide Interbank Financial Telecommunications
TAM	Technology Acceptance Model
TRA	Theory Reasoned Action
UK	United Kingdom
USA	United States of America
UTAUT	Unified Theory of Acceptance and Use of technology

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Electronic payments are payments that are done electronically for purchase of various goods and services. Mobile payments or M-payments on the other hand can be defined as payments which are done over the Mobile Phone for purchase of various goods and services. Electronic payments assist customers, companies and banks make payments much more effectively and also improve the settlement process. With electronic payments customers can easily pay their bills without physically visiting the bank premises. Bank Customers can also access account information at anytime from the comfort of their homes or offices. There are several electronic payments options available to customers which include: Electronic Funds Transfer, Automated Teller Machines, debit cards, credit cards or smart cards, Electronic Wallets, Mobile Banking, Money Transfer, Person to Person Payments, Electronic Cash Systems, Electronic Cheque systems and Internet Payments (Wahab, 2012). Person to Person payments can be defined as online payments that allow individuals to transfer money from their individual bank accounts to another individual's bank account via the internet.

The current study will utilize two theories, which include Unified Theory of Acceptance and Innovation Diffusion Theory. Innovation Diffusion Theory defines how innovation is diffused via various channels over a given period of time among individuals of a society. The theory focuses on the factors which affect the likelihood that a new innovation will be adopted by members of a given social community. Unified Theory of Acceptance

explains intentions users have for using information systems and how their user behavior changes thereafter. The theory consists of four main key constructs which include; facilitating conditions, performance expectancy, social influence and effort expectancy. The theory highlights that experiences, gender, age, ease of use are factors which can minimize the effect of the four main constructs on behavior and intentions of usage and technological challenges.

Kenya is one of the leaders in mobile money with Safaricom's M-pesa product being used by majority of the Kenyan citizens for money transfer. M-pesa was launched in 2007 and less than five years later it had approximately 31 million users, transacting over 2 million transactions per day. The M-pesa agent's numbers in Kenya has grown to 130,000 agents since 2007 (Saruni, 2017). Safaricom M-PESA is continuously innovating to ensure that they remain competitive. Safaricom's electronic payments platform has made a major impact in the lives of many poor Kenyans, especially those who are unable to access banking systems.

1.1.1. Electronic Payment

Electronic payment infrastructure consists of a network of interrelated entities that accelerate data exchange between systems to initiate, sanction, and expedite cash transfer between two parties (Scholnick et al., 2008). In addition electronic payments are transactions made by several or individual clients. This covers business to business, individual to business and person-to-person payments. It involves a wide range of payment instruments, including point-of-sale payment instruments and those used for remote transactions. It also makes extensive use of private networks, such as automated clearing houses or credit card companies (BIS, 2003). According Rogers (1995),

electronic payment intensity is measured using the number of retail transactions to show volume of country level of retail payments business. The number of payment equipments include: ATMs (Automated Teller Machine), POS (Point of Sale), and level of usage of both internet and mobile banking determine the level of adoption.

1.1.2. Commercial Banks in Kenya

A commercial bank can be defined as an institution authorized to provide a variety of financial services, such as customer, business and mortgage loans, credit/debit cards issuance, checking account services and savings to customers and businesses. In Kenya, banking was started by the British during the 1890s, the first bank being The National Bank of Kenya followed by the Standard Bank now the Standard Chartered Bank in 1910 and Bank of South Africa (currently Barclays) in 1925. Their main goal was to finance trade but later the banks expanded their functions to cover deposits, this was followed by opening branches in Nairobi, Mombasa and other major towns in Kenya. The total number of commercial banks as per 2016 were forty three (CBK, 2016). Banks are important as they help to increase savings, investment and employment. Banks also assist customers to transfer money to each other and also provide loans to businesses and individuals. Banks in Kenya are grouped in three tiers by the Kenyan Central Bank (Wellington, 2017).

Kenya Commercial Banks are regulated and licensed by the Banking Act, Regulations and Prudential Guidelines. Commercial banks are also very key financial institutions in the financial industry and very close attention is given to them to ensure that they are compliant with the regulations and laws. This study will help in identifying factors,

benefits and challenges influencing adoption of Electronic payments by commercial banks in Kenya. Some of the benefits of using Electronic payments include convenience, safety, mobility, integrity and low financial risks. Electronic payments allow customers to pay for bills and other transactions by electronic means such as electronic wallets, cards, mobile phone, via the internet and using Electronic Fund Transfer (Wellington, 2017). In order for electronic payments to be successful the following factors should be considered for the payment methods which include reliability, cost, infrastructure, technology, customer information security and convenience of the payment method. Commercial banks that adopt Electronic payments should also consider the quality of service in this case the payment processing speed; customers should not have to wait for so long for a transaction to be processed. Financial institutions should also consider the transactions fees charged to the customer. The study will also address the challenges affecting the adoption of electronic payments in the commercial banks in Kenya.

1.2. Research Problem

Businesses keep changing every day as a result of the electronic influences. In the recent past, the growth in information technology has had massive of consequence on growth of more flexible modes of payment, banking services that are users' friendly and leading to more resourceful and successful banking systems. Although electronic payments make the transaction faster and more convenient, several commercial banks in Kenya have not adopted this new banking product. The banks that have adopted the product have been faced with various obstacles thus necessitating a need for a study to ascertain the challenges facing electronic payments and determine how they can be overcome and enhance a breakthrough in electronic payments (Howcroft *et al.* 2007). Magutu, (2011)

highlighted that the banks in Kenya have adopted e-commerce though it is not widely used by individuals and suggested that more research is required to find out the exact reasons for the low use of e-commerce services by customers. (Aduda & Kingoo, 2012) study found that online payments are reshaping the way of doing business. The area is affected by high ICT risks and costs which end up affecting the profitability of financial institutions. (Giglio, 2012).

Several studies have been carried out on adoption of electronic payments by commercial banks. Vutsengwa and Ngugi (2013) in their study on electronic payments found that regulation is one of the factors affecting growth of electronic payments in Kenya banking industry. Mattila, *et al.*, (2008) through their investigation found that legal risk arise from non-compliance with laws and regulations. Kumaga (2010) in his study established that electronic payments in most African countries are not very common. Most of the studies do not indicate the extent how various factors affect the adoption of electronic payment where creates a knowledge gap. Therefore that the current study aims to fill this gap by seeking to answer the question what are the factors influencing adoption of electronic payments by commercial banks in Kenya?

1.3. Objective of the Study

1.3.1 General Objective

The main objective of this study is to establish the factors influencing adoption of electronic payments by commercial banks in Kenya.

1.3.2 Specific Objectives

The following are the specific objectives of the study:

- i. To assess the adoption of electronic payments by commercial banks in Kenya.
- ii. To find out factors influencing adoption of electronic payments by commercial banks in Kenya.
- iii. To establish the challenges and benefits of adoption of electronic payments by commercial banks in Kenya.

1.4 Value of the Study

The study provides information to those interested in the banking industry activities and operations, especially concerning electronic payments. It will, therefore, provide insight into the challenges and potential benefits of adopting electronic payments. It will benefit all banks and financial institutions in undertaking electronic payments activities and procedures.

It will also assist in the formulation of policies, standards, guidance and procedures for electronic payments activities. The findings and recommendation will assist CBK and the individual banks come up with necessary regulations and guidelines that will foster electronic payments business. The findings will contribute to existing knowledge in electronic payments by assisting in understanding current challenges for implementing these electronic payments in Kenya in the commercial banks.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

The main goal of reviewing literature is to identify a theoretical framework and research on factors affecting electronic payments in the Kenya Commercial Banks.

2.1 Theoretical Review

This section reviews theories which are identified with the research. The study focuses on two theories namely innovation diffusion theory and unified theory of acceptance and use of technology.

2.1.1 Innovation Diffusion Theory

The innovation diffusion theory was developed by Rogers (1962). The theory defines how innovation is diffused via various channels over a given period of time among individuals of a society. The theory focuses on the factors which affect the likelihood that a new innovation will be adopted by members of a given social community. The theory also highlights that the adoption of a new idea does not happen immediately but involves a process and some individuals are more likely to adopt an innovation more than others.

Rogers (1995) highlights that diffusion of innovation takes place in four stages: The first stage is the invention where diffusion takes time and has consequences. At this stage information flows through various networks. Innovation diffusion theory mainly explains the components that influence and affect how individuals adopt a new information technology, such as the Internet. The theory further explains how leaders influence people's behavior while interacting with people, but additional mediators known as gate

keepers and change agents are also part of the process of diffusion. After the invention the innovation may go through five stages of adoption starting from innovators then early adopters, early majority, late majority and finally the laggards

2.1.2 Unified Theory of Acceptance and Use of technology

Unified Theory of Acceptance and Use of technology (UTAUT), theory forms the basis of this study. This theory explains intentions users have for using an information system and how their user behavior changes thereafter (Verkatash *et al.*, 2008). The theory consists of four main key constructs which include; facilitating conditions, social influence, performance expectancy, and effort expectancy. The theory highlights that experiences, gender, age, ease of use are factors which can minimize the impact of the four main constructs on usage intentions and behavior and challenges facing adoption of technology (Verkatash *et al.*, 2008). Unified Theory of Acceptance theory was preferred over the theory of reasoned action, technology acceptance model (TAM) which suggests that various components affect a user decision on how and when to use technology when they are presented with a new technology. Manuelli *et al.*, (2007) describes innovation as perceived ease of use and perceived usefulness as being greatly used within the adoption approach that builds on TAM.

Forman and Goldfarb (2009) described TAM to be a popular model used to study adoption and effect of information communication technology (ICT). The theory explains how individuals accept and decline the use of ICT in financial institutions or organizations. Manuelli *et al.*, (2007) however described TAM for being a less adaptable theory as compared to the diffusion theory that includes innovation characteristics and

time (Gibbs *et al.*, 2007). TAM was also criticized for not factoring behavior and factors such as external influence from competitors. Theory Reasoned Action (TRA) model mainly includes four general concepts namely; subjective norms, behavioral attitude, intention to use and actual use.

2.2 Adoption of Electronic Payment

Electronic Payments use has greatly improved over the years and some of the factors that have contributed to the improved use of E-Payments include; introduction of Internet, the improvement of ICT, and the quick expansion of wireless telecommunication (Gerald, 2011). E-payments have made the customers payment processes to be much easier and effective. Businesses and Banks also settlement process has been made easier and more affective due to the adoption of Electronic Payments. Most organizations and banks have adopted electronic payments so as to be continuously competitive and also succeed in the global economy.

According to Gerald (2011) human skill can be defined as skill used to perform various tasks. According to Gerald (2011) human skill can be defined as employees gaining more expertise and knowledge on existing skills. Trackers (2012) investigated the Uganda poor community so as to understand how they use electronic payments and exercise their rights, using survey method found that the poor and semi-literate Ugandans are capable and are increasingly using electronic payments and they are vulnerable to loss.

Collins (2010) conducted a similar study in Kenyan communities and found that financial knowledge did not automatically affect use of financial services among new mobile money users. Experience which can be defined as usage of financial products even before they are fully comprehended. These studies support the theory of Gerald (2011) that experience and training are very important for competencies.

2.3. Factors Influencing Adoption of Electronic Payments

The following are factors which influence electronic payments in the banking industry, the factors are; information security, infrastructure, technology, regulatory framework and top management support;

2.3.1 Information Security

According to Collins (2010), one of the main factors affecting electronic payments today is lack of adequate security. Research indicates that technical failures such as (hardware malfunctioning and other transaction errors) are not a major issue in electronic payments, but information security is a major factor affecting adoption of E-payments. Information security is mainly determined by the electronic payment channel and infrastructure used. Electronic payments are mainly carried out on the Web browsers which are integrated to various commercial banks. Electronic payments should be seamless so as to ensure the customer enjoys their payment journey.

Banks and organizations must consider various security measures before adopting electronic payments such as; access controls on customer information system such that only specific authorized personnel are authorized to access customer information. Controls should also be put in place that restricts physical access to locations containing

customer information. Customer information should also be encrypted at all times. There should also be procedures in place at the various banks and organizations that ensure that customer information updates are kept consistent with the information security programs and procedures. Also there should be segregation of duties so that not only one person is in charge of the customer information.

Banks should also ensure that employee background checks are done before hiring. Quality monitoring systems should be adopted that detect attacks, attempted attacks and intrusions into customer information systems. Once the attacks are detected response programs should also be in place that specifies actions to be taken including customer notification. Measures should also be put in place that safeguards financial institutions premises against destruction, customer information loss and damage of customer information. Banks agents should also have some security measures in place such as use of digital certificates. The agents should also have secure usernames, passwords and mouse-operated keypads for sensitive information. Their computers should have anti-virus software's installed, least 128-bit encryption and firewall implementation.

2.3.2 Infrastructure

According to Chiemeke (2009), successful use of technologies such as e-banking depends on how the technologies are used together with the other technologies. However in Africa the most critical barrier is limited information and communication infrastructure availability (Abor, 2009). Gerrard & Cunningham, (2008) found out that consumers shy away from using Internet banking due to poor infrastructure. Infrastructure barriers faced by the bank include cost expenses associated with purchasing equipment and networking, creation and maintenance of software and re-organization. Internet banking prospects are

affected by the technological capabilities of the company, the managerial skills effectiveness and the competitiveness.

Internet banking is faced by challenges such as poor infrastructure which in turn even affects the rate at which data is updated for the customers on the banking systems. Customers are therefore not able to view latest banking information which is a very major challenge. Poor infrastructure is mainly caused by the limited skills for building the E-payments systems. Another challenge is the lack of knowledge on the outdated electronic commerce, such as credit cards and telephone sales also there is a limited number of online consumers (Yuan *et al.*, 2010). Internet banking can be at times tedious as most of the applications take a long time to load. Connectivity issues are also another challenge that customers are faced when carrying out their internet banking transactions. Customer care assistance also takes sometime due to the congestion in the computer and telephones which can be very discouraging to the customers (Suh & Han, 2012).

Ozuru *et al.*, (2010), mentions that before any developing countries can adopt any new technology advanced infrastructure and human capacity building are required. A review of the migration plan of Society for Worldwide Interbank Financial Telecommunications (SWIFT) to the internet shows that complete adoption has not yet taken place in many countries due to the lack of working capital, technical expertise and proper infrastructure. Also several corporate organizations and individuals in the developing countries currently lack access to the required and necessary infrastructure to be able to process e-payments (Harris & Spence, 2012).

2.3.3 Technology

Technology use in the banking systems has really improved over the years. However, technology systems have been faced with various risks such as data and network security risks which have made adoption of electronic payments difficult. Clients have become uncertain due to technology risks regarding data security and information on applicable models of electronic payments (Owens, 2009). Technology applications require knowledge on mobile phones, barcode scanners, card readers, and at times computers that connect with the bank's server as well as software requirements, inter-operability and protocols accepted. Technology involves people using tools, knowledge and systems to make their lives more efficient and effective.

Technology risks which include failure of systems, errors during processing of transactions, defects on software, customer operating mistakes, network vulnerabilities, hardware failures shortcomings on security, incidents on hacking, and inadequate recovery capabilities (Chitura *et al.*, 2008). Operational, strategic and legal risks require great attention. Internet use has increased various investor risks through exposure to cyber attacks and direct marketing of unregulated financial services and frauds. Mberia (2009) explains technology as the technical means people use to improve their surroundings and carry out tasks efficiently. This means that technology is invented to make work easier and more effective. Any device invented and given the name technology means it makes work easier and more easily accomplished. Technology can be ancient technology or modern technology. An electronic payment is basically payments of goods and services via the Internet and by use of modern technology.

Technological factor in this study will be used to relate to mobile devices, software requires, inter-operability and protocols accepted and communications infrastructure (optimization and efficiency of bandwidth, communications interface, interference from other communications technologies).

2.3.4 Regulatory Framework

Policy makers and regulators have been facing issues to adopt safe development of electronic payments and operation with increased levels of financial access (For broad electronic payments experiences). Central Bank of Kenya and Kenya Bankers Association are the regulators of Electronic payments. Central Bank issued the first Electronic payments prudential guidelines (under section 33(4) of the Central Bank Act, (CBK, 2010). CBK needed to evaluate the development of the Electronic payments model, the legal and regulatory framework, the model of electronic payments and the branching regulations in the guidelines. In addition to vetting of the Agents by Central bank, a contract agreement is signed between the Commercial banks and Agency on responsibilities of each party. The guideline is issued under section 33(4) of the Banking Act which empowers CBK to issue guidelines to financial institutions.

Policymakers tend to promote the adoption of electronic payments among the poor under-banked and unbanked. They also execute frameworks that allow the spread of electronic payments while at the same time protect individuals against fraudulent attacks. An electronic payment system is solely authorized to be used by licensed banks or their agents. Additionally, all financial institutions customers carrying out electronic payments activities must be authorized institutions. Therefore account details for customers must exist with Financial Institutions and every transaction must be processed to the actual

customer account. Financial Institutions and their agents must comply with the Anti-Money Laundering Act (2008) as well as the international standards set by the Financial Action Task Force (World Bank, 2010).

Vutsengwa and Ngugi (2013) found that regulation is one of the factors affecting growth of electronic payments in Kenya banking industry. Mattila, *et al.*, (2008) through their investigation found that legal risk arise from non-compliance with rules, laws and regulations. Some customers who have inadequate information about their rights and obligations usually don't take precautions when using online banking services. This eventually leads to unwanted law suits against the bank and disputed transactions (Akoh, 2011). According to McKinney *et al.*, (2012) in some cases Internet banking rights and obligations are uncertain and applicability of laws and rules are ambiguous, thus bringing about legal risks. To enhance customers' services, banks may access other sites which may cause legal risks and may give an opportunity for hackers to linked sites to defraud a bank customer.

2.3.5. Top Management Support

The level of top management support one of the factors that affect the adoption of electronic payments in the commercial banks. Wong (2005) highlighted that lack of top management support leads to failure of information technology projects. Therefore top management plays a key role in the successful adoption of electronic payments in the banks. Paradi (2013) highlights that top management support plays a role in success of Information technology projects because management have influence on the corporate culture. In order for electronic payments to be successfully adopted in the bank management should ensure that they fully approve and support the implementation of

electronic payments. Once management approves electronic payments, other employees who were biased on the adoption of electronic payments even change their minds and start embracing electronic payments. According to McKinney *et al.*, (2012) management of the commercial banks should also support the adoption of the electronic payments financially and also allocate resources to ensure successful adoption of electronic payments. Management should also own the adoption of electronic payments projects so as to ensure full cooperation of all bank stakeholders, which will in turn lead to the successful adoption of electronic payments.

2.4 Challenges and Benefits of Electronic Payments

Electronic payments types are continuously being innovated and developed. Some of the E-payments types include; electronic wallets, ATM, electronic funds transfer at various points of sales, electronic cheque and credit cards (debit cards, smart cards.) Adoption of electronic payments in the banking industry has improved over the years. However, the growth of E-payments has not been so rapid and this is due to several challenges that have faced electronic payments adoption in the banking industry. Challenges such as legal, infrastructure, security, regulatory and socio-cultural challenges are facing E-payments. Additionally in Africa challenges such as undeveloped infrastructure, inadequate legal and regulating framework, un-readiness by banks and low level of credit card access are hindering the progress of e-payments (Wondwosson *et al.*, 2009).

Kumaga (2010) study shows that use of electronic payments in most African countries are not common. Taddesse and Kidan, (2009) highlights that legal and regulatory framework are some of the missing key components for electronic payments. Also infrastructure for electronic payments such as mobile network and internet are also not

available in Africa. Kumaga (2010) highlights that banks are not adequately automated to allow electronic payments. According to Bassey (2008) infrastructure, regulatory, cultural-human dimensions are the three categories challenges facing the adoption of e-payment systems in Africa. In Kumaga's view the infrastructural challenge is the main challenge which relate to networks, ICT accessibility, affordability, connectivity and usage.

Additional issues include; network failure, interconnectivity, connectivity high cost, low bandwidth and regular power outage. From the above challenges it is evident that the future of E-payments is dependent on the infrastructure. According to Gerald (2011) the African governments, business entities and financial institutions will have to invest greatly in IT infrastructure in order for E-payments adoption to be a success. Despite the several challenges facing the adoption of electronic payments in the banking industry there are several benefits that banks and business entities which have adopted electronic payments have faced. Some of the benefits include faster turnaround time for payments. Since customers don't have to physically have to walk to the banks customers can transact from their homes and therefore the increased turnaround time (Wondwosson *et al.*, 2009). Another benefit is quick accessibility to bank services, as customers can access their bank information from the comfort of their homes. Settlement process is also faster as cashiers don't have to physically count money which at time gets misplaced.

2.5 Summary of Literature Review

It is clear that limited research has been done on information security challenges, infrastructural challenges, technological challenges, regulatory framework challenges and top management support challenges associated with electronic payments. Most of the

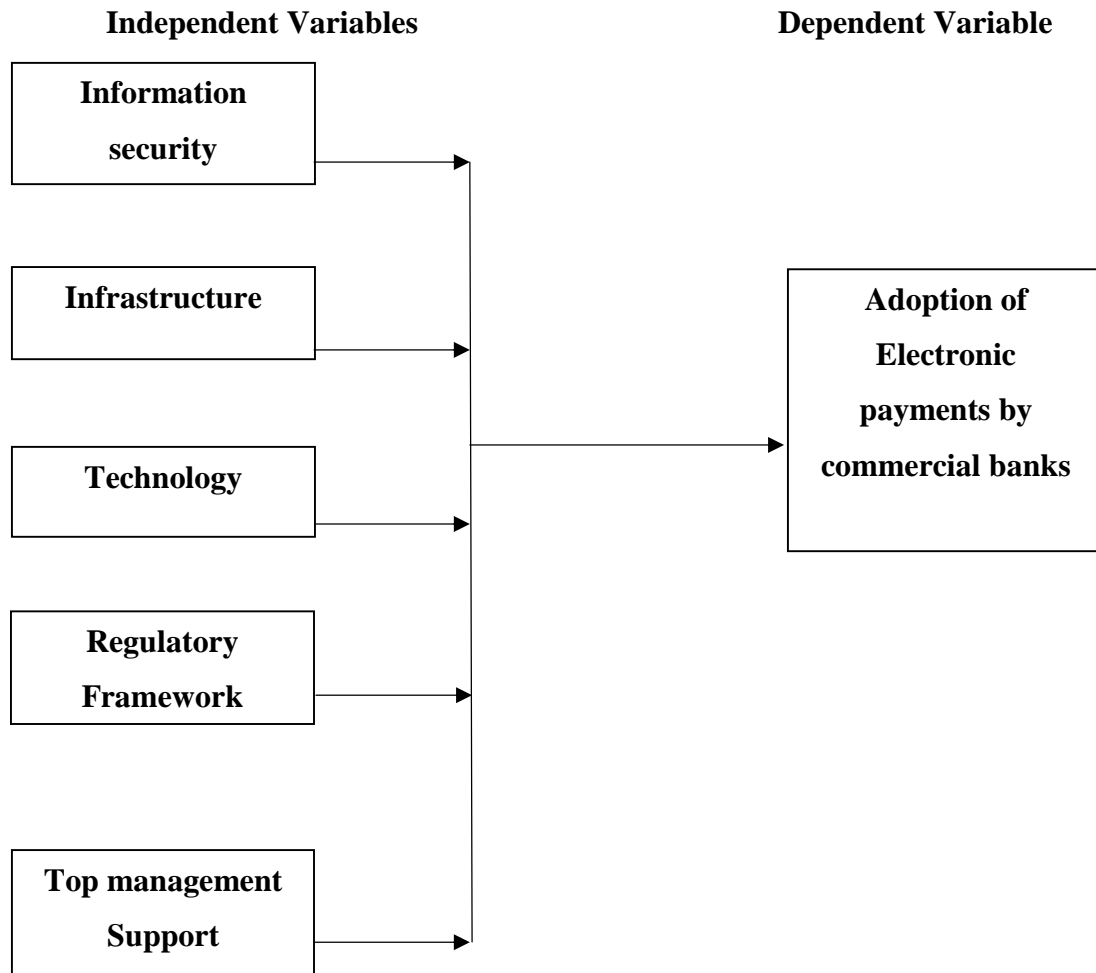
studies focus on the challenges facing electronic banking during adoption. It explains out that legal and regulatory differences, lack of trust and redress systems also hinder electronic payments adoption by commercial banks. Electronic payments adoption however, works differently depending on the culture of the organization, the type of the organization and above all the training and people development needed in the organization.

It concluded that the high customer security challenges involved, the lack of proper infrastructure to ensure a good flow of electronic payments, concerns regarding the reliability of technology and lack of stable regulatory frameworks are barriers to the success of electronic payments. From the above review it is evident that the factors affecting electronic payments are customer information security, infrastructure, technology, regulatory framework and top management support. The factors have not been thoroughly researched and thus the need for this study.

2.6 Conceptual Framework

The conceptual framework in Figure 2.1 demonstrates the relationships that exist between the dependent and independent variables under investigation. The dependent variable is adoption of electronic payments by commercial banks in Kenya. The independent variables that will be investigated to establish their level of influence on the dependent variable are: information security, infrastructure, technology, regulatory framework and top management support how they influence the adoption of electronic payments by commercial banks in Kenya.

Figure 2.1. Conceptual Framework



Source: Researcher (2017)

CHAPTER THREE

RESEARCH METHODOLOGY

3.0. Introduction

This chapter highlights the methods that were used in collecting and analysing the data which enabled the study reach its pre-set research objectives. The chapter is outlined into research design, population and sampling techniques, data collection procedure and data analysis technique.

3.1 Research Design

Descriptive survey was the research study adopted. Descriptive research design describes data and characteristics about the population or phenomena being studied hence it is ideal for this study since it was easier to analyse the factors influencing adoption of electronic payments by commercial banks in Kenya. Descriptive survey approach according to Kothari (2009) is concerned with finding out where, what and how of a phenomena. As per this study, descriptive design is deemed good because the main purpose of the study is to establish the factors influencing adoption of electronic payments by commercial banks. Descriptive survey research design is good in enabling the researcher generalize to a larger population, thus the research deemed the method best for the study.

3.2 Population and Sampling

The study's target population was all the Kenya commercial banks in which are 43 banks according to Kenya Bankers Association (2017). Since the study population is small a census sampling was applied.

3.3 Data Collection

Questionnaire was used to collect primary data and was given to the head of payments in each of the 43 commercial banks. Each item in the questionnaire was developed to address a specific objective, beginning with the respondents/banks demographic information. The data was collected through drop and pick later method (Kombo & Tromp, 2007). The advantage of this method is that the responses gathered were standard. The questionnaire comprised of 7 sections. Section A comprised of the background information of the respondents. Section B comprised questions on factors influencing adoption of electronic payments in commercial banks in Kenya. Section C comprised of questions on adoption of electronic payments in commercial banks. Section D comprised of questions on benefits and challenges affecting adoption of electronic payments in commercial banks.

3.4 Data Analysis

Data analysis was done through descriptive and inferential statistics. The particular descriptive statistics were mean scores and frequencies. The descriptive statistics was used for the first objective of the study, which is to establish the adoption of electronic payments, by commercial banks in Kenya. For the second objective of the study which is to find out factors affecting adoption of electronic payments by commercial banks in Kenya regression analysis were used for analysis. For the third objective of the study, which is to establish the challenges and benefits of adopting electronic payments by commercial banks in Kenya, descriptive statistics was used for analysis.

Descriptive statistics included measuring central tendency, spread and measures of variability. Measures of variability included analysis on standard deviation, skewness, variance, minimum and maximum variables. Measures of central tendency included analysis on mode, median and mean. Regression analysis involved estimating the relationship between dependent variable and independent variable. This study applied a multiple regression model. Multiple regression analysis was used because there are several independent variables. The model took the following format:

$$Y = a_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + \epsilon$$

Where: Y= Adoption of Electronic Payment

a_0 = Constant

X_1 = Information Security

X_2 = Infrastructure

X_3 = Technology

X_4 = Regulatory Framework

X_5 = Top Management Support

ϵ = Error term

B_1, B_2, B_3, B_4 and B_5 are coefficients

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND INTERPRETATIONS

4.0 Introduction

This chapter highlights the analysis of primary data collected through questionnaire. The analysis helps the study to describe the various factors influencing adoption of electronic payments in Kenya commercial banks. Data analyzed was presented in tables and figures.

4.1 Response Rate

The research study targeted a sample size of 43 from which 40 responded and returned the questionnaires making a response rate of 93.02%. This response rate was satisfactory enough to come up with conclusions for the study. Mugenda and Mugenda (1999) highlights a response rate of 50% is satisfactory for analysis and reporting; a rate of 60% is strong and a response rate of 70% and over is outstanding. Based on the assertion, the response rate was outstanding.

Table 4.1: Response Rate

	Questionnaires Administered	Questionnaires filled & Returned	Percentage
Respondents	43	40	93.02

4.2 Demographic information

The research study goal was to analyze the following demographic information: gender, age range, level of education as well as years of service.

4.2.1 Gender

The results on gender distribution were as shown below.

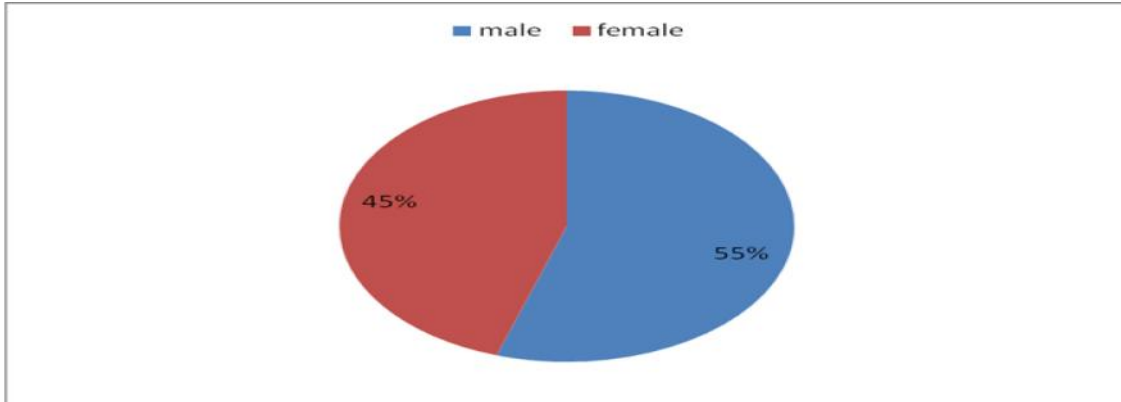


Figure 4.2: Gender

Based on the findings 55% of the respondents were male while 45% were female. The gender was moderately distributed.

4.2.2 Highest Level of Education

The findings on education level of the respondents were as shown on the figure below

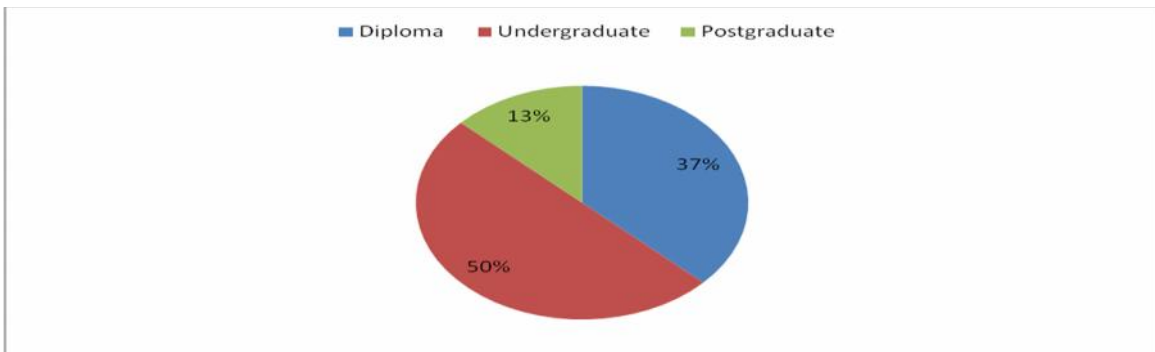


Figure 4.3: Highest Level of Education

50% of the respondents were degree holders, 37% were postgraduates while 13% were diploma holders. Respondents were also fairly distributed in terms of education level

4.2.3 Age distribution

The findings on distribution age of the respondents were as shown on the figure below

The age distribution of the respondents is as shown in Figure 4.4 below. As it can be seen, 45% of the respondent's age was between 34 and 41 years, 25% were aged between 42 and 49 years, 12% between 26 and 33 years, 10% between 18 and 25 years, and only 8% were aged above 50 years.

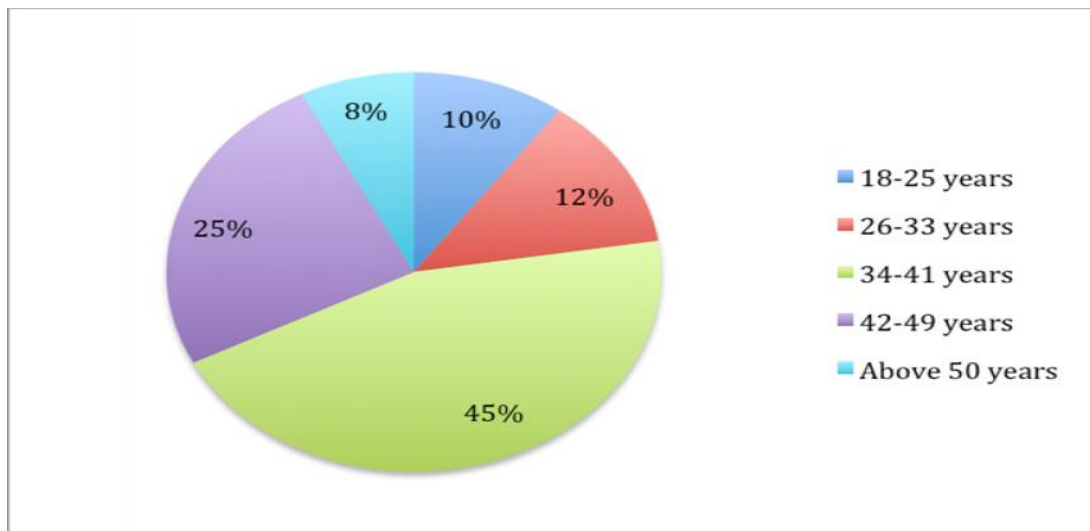


Figure 4.4. Age Distribution of the Respondents

4.2.4 Years of Service in the Bank

The findings on Age distribution of the respondents were as shown on the figure below

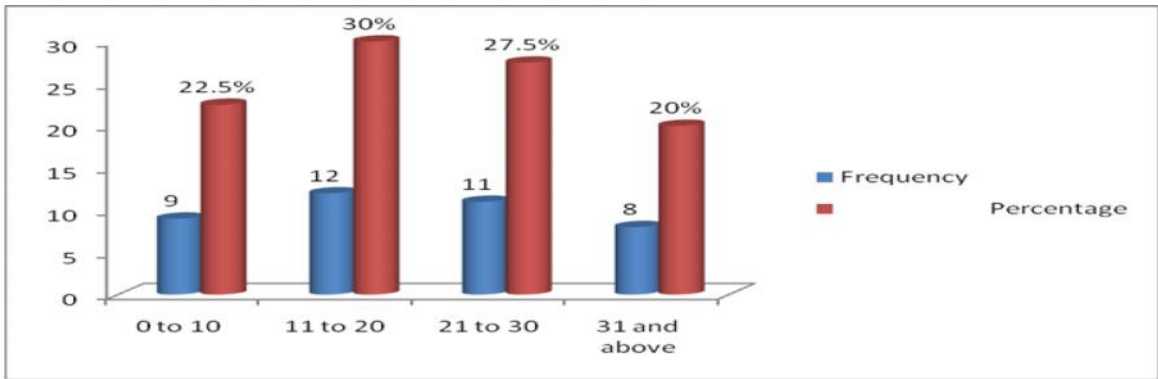


Figure 4.4: Years of Service in the Bank

From the findings, majority (30%) had worked in the banking sector for 11 to 20 years 27.5% had worked for 21 to 30 years, 22.5% had worked for less than 10 years while only 20% had worked for more than 30 years in the banking industry.

4.3 Factors Influencing Adoption of Electronic Payments

The study's main aim was to investigate the extent to which information security, infrastructure, technology, regulatory framework and top management support affected adoption of Electronic payments by commercial banks.

4.3.1 Information Security

The respondent was requested to indicate the extent to which they agreed with the following statements in regards to Information Security. The scale in use was 1-5. Where: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Table 4.2: Information Security

Information Security	Mean	Std deviation
The quality of anti-virus software installed helps detect attacks and intrusions much faster.	4.10	0.15
Information security is mainly determined by the electronic payment channel and infrastructure used	4.02	0.26
Customer information updates are kept consistent with the information security programs and procedures	4.02	0.21
The bank ensures that customer information is encrypted at all times	4.00	0.16
The monitoring tool in place in the bank effectively detects fraud, attempted attacks and intrusions on customer information effectively	3.98	0.29
The bank ensures segregation of duties so that not only one person is in charge of the customer information	3.96	0.13
The access controls in our bank only allow specific authorized personnel to access customer information	3.92	0.24
Information security is a major factor affecting adoption of E-payments	3.90	0.23

From the findings respondents agreed to a small extent that: The quality of anti-virus software installed helps detect attacks and intrusions much faster(mean = 4.10, SD=0.15), Information security is mainly determined by the electronic payment channel and infrastructure used (mean = 4.02, SD=0.26), Customer information updates are kept consistent with the information security programs and procedures (mean = 4.02, SD=0.21), The bank ensures that customer information is encrypted at all times (mean = 4.00, SD=0.16), The monitoring tool in place in the bank effectively detects fraud, attempted attacks and intrusions on customer information effectively (mean = 3.98, SD=0.29), The bank ensures segregation of duties so that not only one person is in charge of the customer information (mean = 3.96, SD=0.13), The access controls in our bank only allow specific authorized personnel to access customer information (mean = 3.92, SD=0.24), and that information security is a major factor affecting adoption of E-

payments (mean = 3.90, SD=0.23). The findings concur with Collins (2010) that one of the main factors affecting electronic payments today is lack of adequate security. Research indicates that technical failures such as (hardware malfunctioning and other transaction errors) are not a major issue in electronic payments, but information security is a major factor affecting adoption of E-payments.

4.3.2 Infrastructure

The respondent was also requested to indicate the extent to which they agreed with the following statements in regards to infrastructure and Adoption of Electronic Payments. The scale in use was 1-5. Where: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Table 4.3: Infrastructure

Infrastructure	Mean	Std deviation
There is limited information and communication infrastructure availability	4.14	0.17
Poor infrastructure affects the rate at which data is updated for the customers on the banking systems	4.08	0.26
The infrastructure in place supports technology	4.05	0.21
The infrastructure team is very effective in monitoring the uptime of the infrastructure.	4.01	0.18
The physical infrastructure in the bank is adequate	4.00	0.25
The bank has acquired advanced infrastructure and enhances human capacity building	4.00	0.20
The monitoring tools in place are very effective and notify the monitoring team immediately when there is an issue	3.98	0.19
The equipment's available are able to meet the needs of electronic payments customers	3.85	0.25

Based on the findings it was noted that there is limited information and communication infrastructure availability (mean = 4.14, SD=0.17), Poor infrastructure affects the rate at which data is updated for the customers on the banking systems (mean = 4.08, SD=0.26), The infrastructure in place supports technology (mean = 4.05, 0.21), The infrastructure team is very effective in monitoring the uptime of the infrastructure (mean = 4.01, SD=0.18),The physical infrastructure in the bank is adequate (mean =4.00, SD=0.25), The bank has acquired advanced infrastructure and enhances human capacity building (mean = 4.05, SD=0.20).The monitoring tools in place are very effective and notify the monitoring team immediately when there is an issue (mean = 3.98, SD=0.19) and the equipment's available are able to meet the needs of electronic payments customers (mean = 3.85, SD=0.25),

The study supported the findings that in Africa the most critical barrier are limited information and communication infrastructure availability (Abor, 2009). Gerrard & Cunningham, (2008) found out that consumers shy away from using Internet banking due to poor infrastructure. Infrastructure barriers faced by the bank include cost expenses associated with purchasing equipment and networking, creation and maintenance of software and re-organization. Internet banking prospects are affected by the technological capabilities of the company, the managerial skills effectiveness and the competitiveness.

4.3.3 Technology

The respondent was requested to indicate the extent to which they agreed with the following statements in regards to Technology and Adoption of Electronic Payments. The scale in use was 1-5. Where: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Table 4.4: Technology

Technology	Mean	Std deviation
Technology involves people using tools, knowledge and systems to make their lives more efficient and effective	4.02	0.19
Internet use has increased investor risks through exposure to cyber-attacks and direct marketing of unregulated financial services and frauds	4.01	0.24
The bank has put in place adequate mitigation measures against technology risks	4.00	0.22
The cloud services being used in the bank are effective.	3.96	0.23
There are risks associated with using technology systems which include data and network security risks	3.95	0.19
The use of the technology has ensured quick and effective services to the clients	3.88	0.22
The disaster recovery and back-up system comes in handy when the primary bank system experience a downtime	3.73	0.18

Technology involves people using tools, knowledge and systems to make their lives more efficient and effective (mean = 4.02, SD=0.19), Internet use has increased investor risks through exposure to cyber-attacks and direct marketing of unregulated financial services and frauds (mean= 4.01, SD=0.24), The bank has put in place adequate mitigation measures against technology risks (mean= 4.00, SD=0.22), The cloud services being used in the bank are effective (mean = 3.96, SD=0.23), There are risks associated with using technology systems which include data and network security risks (mean = 3.95, SD=0.19), The use of the technology has ensured fast and efficient services to the customers(mean = 3.88, SD=0.22) and the disaster recovery and back-up system comes in handy when the primary bank system experiences a downtime (mean = 3.73, SD=0.18).

The findings are in line with Wahab (2012) that technology systems have been faced with various risks such as data and network security risks that have made adoption of electronic payments difficult and low.

4.3.4 Regulatory Framework

The respondent was requested to indicate the extent to which they agreed with the following statements in regards to Regulatory Framework and Adoption of Electronic Payments. The scale in use was 1-5. Where: 1=Very small extent, 2=Small extent, 3=Moderate extent, 4= Great extent, and 5=Very great extent.

Table 4.5: Regulatory Framework

Regulatory Framework	Mean	Std deviation
Kenya had placed banking ombudsmen as an alternative means of redress.	4.12	0.20
Regulations protect consumers of financial services and reduce financial crime	4.01	0.19
Regulations purpose is to efficiently maintain confidence in the financial system	4.00	0.18
Regulations promote public understanding of the financial system	4.00	0.20
Regulations set by Kenyan government held banks liable for the conduct of their agents	3.99	0.23
Regulations protect consumers of financial services and reduce financial crime	3.89	0.18

According to the respondents Kenya had placed banking ombudsmen as an alternative means of redress (mean = 4.12, SD=0.20), Regulations protect consumers of financial services and reduce financial crime (mean = 4.01, SD=0.19), Regulations purpose is to efficiently maintain confidence in the financial system (mean = 4.00, SD=0.18), Regulations promote public understanding of the financial system (mean = 4.00, SD=0.20), Regulations set by Kenyan government held banks liable for the conduct of

their agents(mean = 3.99, SD=0.23) and regulations protect consumers of financial services and reduce financial crime (mean = 3.89, SD=0.18) In line with the current findings Vutsengwa and Ngugi (2013) found that regulation is affecting growth of electronic payments in Kenya banking industry. Mattila, *et al.*, (2008) through their investigation found that legal risk arise from non-compliance with rules, laws and regulations.

4.3.5 Top management Support

The respondent was requested to indicate the extent to which they agreed with the following statements in regards to Top management Support and Adoption of Electronic Payments. The scale in use was 1-5. Where: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Table 4.6: Top management Support

Top management Support	Mean	Std deviation
Bank management support the adoption of the electronic payments financially	4.10	0.20
Management owns the adoption of electronic payments projects so as to ensure full cooperation of all bank stakeholders	4.07	0.18
The bank's management ensures that they fully approve and support the implementation of electronic payments	4.05	0.19
The bank management have influence on the corporate culture which is necessary in the adoption of electronic payments	4.00	0.23
The bank's management allocates resources to ensure successful adoption of electronic payments	3.79	0.24
Top management plays a major role in the successful adoption of electronic payments in the bank	3.69	0.23

Bank management support the adoption of the electronic payments financially (mean= 4.10, SD=0.20), Management owns the adoption of electronic payments projects so as to ensure full cooperation of all bank stakeholders (mean= 4.07, SD=0.18), The bank's management ensures that they fully approve and support the implementation of electronic payments (mean= 4.05, SD=0.19), The bank management have influence on the corporate culture which is necessary in the adoption of electronic payments (mean= 4.00, SD=0.23), The bank's management allocates resources to ensure successful adoption of electronic payments (mean= 3.79, SD=0.24) and top management plays a major role in the successful adoption of electronic payments in the bank (mean= 3.69, SD=0.23).

As noted earlier by Paradi (2013) the level of top management supports one of the factors that affect the adoption of electronic payments in the commercial banks. Wong (2005) highlighted that lack of top management support leads to failure of information technology projects. Therefore top management plays a key role in the successful adoption of electronic payments in the banks. Paradi (2013) highlights that top management support plays a role in success of Information technology projects because management have influence on the corporate culture.

4.4 Adoption of Electronic Payments by Commercial Banks in Kenya

Please state to what extent you agree with the following statements in regards to Adoption of Electronic Payments? Use scale 1-5: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Table 4.7: Adoption of Electronic Payments

Adoption of Electronic Payments	Mean	Std deviation
The bank has adopted an electronic fund transfer system	3.91	0.24
The bank has adopted an mobile banking application that customers to carry out money transfers	3.11	0.17
The bank has adopted electronic payments in retail banking operations	3.01	0.19
The bank has adopted ATMs	3.00	0.19
The bank has adopted electronic payments in corporate banking operations	2.94	0.23
The bank has adopted electronic payments in retail banking operations	2.78	0.22
The bank has adopted electronic payments in loan repayments	2.67	0.20
The bank has adopted bulk cash deposit machines	2.65	0.23

From the findings majority of the banks in Kenya had adopted electronic payments. Respondents to a moderate extent agreed that: the bank has adopted an electronic fund transfer system (mean= 3.91, SD=0.24), the bank has adopted an mobile banking application that customers to carry out money transfers (mean= 3.11, SD=0.17), the bank has adopted electronic payments in retail banking operations (mean= 3.01, SD=0.19), the bank has adopted ATMs (mean=3.00, SD=0.19), the bank has adopted electronic payments in corporate banking operations (mean= 2.94, SD=0.23), the bank has adopted electronic payments in retail banking operations (mean= 2.78, SD=0.22), the bank has adopted electronic payments in loan repayments (mean= 2.67, 0.20) and the bank has adopted bulk cash deposit machines (mean=2.65, SD=0.23). This implies that banks had adopted electronic payments although at a moderate rate.

4.5 Challenges and Benefits of Adopting Electronic Payments in Commercial Banks

Please state to what extent you agree with the following statements in regards to Challenges and Benefits of Adopting Electronic Payments? Use scale 1-5: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Table 4.7: Challenges of Adopting Electronic Payments

Challenges of Adopting Electronic Payments	Mean	Std deviation
Inadequate legal and regulatory framework is a challenge facing electronic payments	1.99	0.35
The banks face lack of knowledge on the outdated electronic commerce, such as credit cards and telephone sales	1.96	0.32
Poor infrastructure is one of the challenges facing electronic payments	1.94	0.34
Connectivity issues are also another challenge that customers are faced when carrying out their internet banking transactions	1.92	0.31
Customer care assistance also takes sometime due to the congestion in the computer and telephones which can be very discouraging to the customers	1.84	0.30
Poor technology is one of the challenges facing electronic payments	1.81	0.39
Internet banking can be at times tedious as most of the applications take a long time to load	1.78	0.36
Infrastructural challenges relate to ICT accessibility, affordability, networks, connectivity and usage.	1.60	0.37

From the findings respondents agreed to a great extent that: inadequate legal and regulatory framework is a challenge facing electronic payments (mean=1.99, SD=0.35), the banks face lack of knowledge on the outdated electronic commerce, such as credit cards and telephone sales (mean=1.96, SD=0.32), poor infrastructure is one of the challenges facing electronic payments (mean=1.94, SD=0.34), connectivity issues are also another challenge that customers are faced when carrying out their internet banking transactions (mean= 1.92, SD=0.31), customer care assistance also takes sometime due to

the congestion in the computer and telephones which can be very discouraging to the customers (mean=1.84, SD=0.30), poor technology is one of the challenges facing electronic payments (mean= 1.81, SD=0.39), Internet banking can be at times tedious as most of the applications take a long time to load (mean=1.78, SD=0.36) and infrastructural challenges relate to ICT accessibility, affordability, networks, connectivity and usage (mean=1.60, SD=0.37).

As revealed by Wondwosson *et al.*, in (2009), the growth of E-payments has not been so rapid and this is due to several challenges that have faced electronic payments adoption in the banking industry. Challenges such as legal, infrastructure, security, regulatory and socio-cultural challenges are facing E-payments. Additionally in Africa challenges such as undeveloped infrastructure, inadequate legal and regulating framework, un-readiness by banks and low capital are hindering the progress of e-payments (Wondwosson *et al.*, 2009).

4.6 Benefits of Adopting Electronic Payments

The respondent was requested to indicate the extent to which they agreed with the following statements in regards to Factors Influencing Adoption of Electronic Payments. The scale in use was 1-5. Where: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Table 4.8: Benefits of Adopting Electronic Payments

Benefits of Adopting Electronic Payments	Mean	Std. deviation
Electronic payments allow customers to pay for bills and other transactions by electronic means such as electronic wallets, cards, mobile phone	1.95	0.37
Fast turnaround time for payments is one of the benefits for adopting electronic payments	1.91	0.31
Quick accessibility to bank services, as customers can access their bank information from the comfort of their homes	1.85	0.33
Electronic payments assist customers, companies and banks make payments much more effectively	1.80	0.30
Other benefits include safety, mobility, integrity and low financial risks	1.65	0.32
Bank Customers can also access account information at any time from the comfort of their homes or offices.	1.63	0.34
Improved settlement process is one of the benefits of adopting electronic payments	1.56	0.30

To a great extent respondents agreed that: electronic payments allow customers to pay for bills and other transactions by electronic means such as electronic wallets, cards, mobile phone (mean=1.95, SD=0.37), fast turnaround time for payments is one of the benefits for adopting electronic payments (mean = 1.91, SD=0.31), quick accessibility to bank services, as customers can access their bank information from the comfort of their homes (mean = 1.85, SD=0.33), electronic payments assist customers, companies and banks make payments much more effectively (mean = 1.80, SD=0.30), other benefits include safety, mobility, integrity and low financial risks (mean = 1.65, SD=0.32),bank customers can also access account information at any time from the comfort of their homes or offices (mean = 1.63, SD=0.34) and improved settlement process is one of the benefits of adopting electronic payments (mean = 1.56, SD=0.30),

The findings are in line with Kumaga (2010) who found that e- payments help in improved settlement process, reduced risk of loss and theft, mobility, integrity and transactions can be done at any time from any destination, as long as the customer has access to Internet.

4.7 Regression analysis

Model Analysis

Multiple regression analysis was conducted to analyze the influence among the various variables. Statistical package for social sciences (SPSS V 21.0) was used for data analysis.

Model Summary

The model summary is presented in the table below

Table 4.9: Summary of Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.777	.604	.545	.08823

Source : Research Data, 2017

The fitness of the model was ascertained by the use of coefficient of determination. The average adjusted coefficient of determination (R^2) from the model was 54.5% of the variations in adoption of Electronic payments by commercial banks are explained by the factors (information security, infrastructure, technology, regulatory framework and top management support). Hence, a fairly good model it was since $R^2 > 50\%$.

Analysis of Variance

ANOVA technique was used to review the significance of the model. The findings are tabulated in table below. The f results are presented below.

Table 4.10: Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	215.329	5	43.07	2.484	.0031 ^b
	Residual	589.501	34	17.34		
	Total	804.83	39			

Source : Research Data, 2017

Critical value = 2.011

As shown above the, the ANOVA test results revealed that $F(5, 34) = 2.484$, $p < 0.05$. This implies that the relationship between the dependent variables and the independent variable of the model fitted in the data collected is statistically significant. This outcome is also supplemented by the F- critical value associated with the degrees of freedom. In other words, with a larger calculated value than the critical value ($2.484 > 2.011$) it indicates that that the information security, infrastructure, technology, regulatory framework and top management support have significant effect on adoption of Electronic payments by commercial banks.

Coefficients

Coefficient table was used to determine the study model. The findings are presented in the table below. Multiple regression analysis was used to analyze the influence amongst

the parameters. Statistical Package for Social Sciences (SPSS V 21) was used for data analysis.

Table 4.11: Regression Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T/Z	Sig.(p)
		B	Std. Error	Beta		
1	Constant	0.416	0.495		0.840	0.006
	Information Security	0.457	0.16	0.4812	2.856	0.03
	Infrastructure	0.408	0.152	0.408	2.685	0.041
	Technology	0.483	0.13	0.4804	3.715	0.023
	Regulatory Framework	0.415	0.15	0.4156	2.767	0.042
	Top Management Support	0.4125	0.16	0.4215	2.578	0.0312

Source : Research Data, (2017)

The output as presented in table above, the equation ($Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$) becomes:

$$Y = 0.416 + 0.457X_1 + 0.408X_2 + 0.483X_3 + 0.415X_4 + 0.4125X_5$$

The regression model above gives that, a change in unit of Information Security with other influencers being constant leads to an increase in adoption of Electronic payments by commercial banks by a factor of 0.457, a unit change Infrastructure while holding the other factors constant results to an increase in adoption of Electronic payments by commercial banks by a value of 0.408 and a unit rise in Technology while holding the other factors constant would lead to an increase in adoption of Electronic payments by commercial banks by a value of 0.483. a unit change Regulatory Framework while holding the other factors constant results to an increase in adoption of Electronic payments by commercial banks by a value of 0.415 and a unit rise in Top Management

Support while holding the other factors constant would lead to an increase in adoption of Electronic payments by commercial banks by a value of 0.4125. Significance of predictor variables is displayed by a probability of less than α , a vice versa of which displays the opposite. The predictor variables in this model were as indicated by p values which are 0.03, 0.041, 0.001, 0.023, 0.042 and 0.0312 for X1, X2, X3, X4 and X5 were less all than $\alpha = 0.05$. Using normal distribution, at $\alpha = 0.05$, critical Z value= 1.96. All the Z values are higher than this (i.e. 2.856, 2.684, 2.039, 3.7154, 2.7667 and 2.5781), this supports conclusion using p value that all the independent variables were of significance.

4.8 Discussion of the Findings

The overarching objective of this research was to identify a set of key factors that influencing the adoption of electronic payments by commercial banks in Kenya. In fulfilling this objective, three specific objectives were identified that guided this research project. In particular, these research objectives included; assessing the extent to which Kenyan commercial banks have adopted electronic payments methods, determining the critical factors affecting the adoption of electronic payment technologies by Kenyan commercial banks, and identifying the main challenges and benefits of adopting electronic payments by the commercial banks in Kenya. Through a series of statistical analyses, a number of key findings were identified that helped to address this study's objectives.

Firstly, it was noted that commercial banks in Kenya use a several types of electronic payment systems. The various electronic payment systems identified include; electronic fund transfer systems, bulk deposit machines, mobile banking applications, and ATMS. Of all these systems, electronic fund transfer systems were found to be the most widely

adopted closely followed by mobile banking applications. This finding is in line with the findings presented by Abor (2009) who found mobile banking systems are among the most widely adopted electronic payment systems by financial institutions.

Secondly, it was found that the process of electronic payments adoption by Kenyan commercial banks is influenced by the following main factors; information security, infrastructural frameworks by the institutions, regulatory frameworks, technology, and level of managerial support. In regard to these findings, it was found that there is a positive correlation between these factors and the level of electronic payment adoption by commercial banks in Kenya. In other words, a unit improvement of these factors result to a corresponding increase in the uptake level of electronic payment technologies by Kenyan commercial banks. In relation to past literature, the findings for this research objective are in congruent with previous findings by; Collins (2010) who identified inadequate security of information, Chiemeke (2009), Abor (2009), and Gerrard & Cunningham (2008) who identified infrastructure as an influencing factor for electronic payments' uptake, Mberia (2009) who concluded technology affects the adoption of electronic payment, Paradi (2013) who found top management support plays a critical role in the uptake of electronic payments by institutions, and Vutsengwa and Ngugi (2013) who established regulatory frameworks to be an influencing factor in adoption of electronic payments.

In regards to the third objective, this study found a number of challenges that face the uptake of electronic payments by commercial banks in Kenya. These challenges included; inadequate legal and regulatory frameworks, outdated technologies, poor infrastructure, connectivity issues, poor technologies, inefficient customer care services,

time consuming technologies, and poor infrastructure associated with accessibility, connectivity, and usage. These findings are similar to the conclusive evidence presented by past studies by Wondwosson et al. (2009) and Kumaga (2010). In regards to the benefits associated with adopting electronic payment systems this study found that the key advantages include; time saving, improved efficiency, minimized theft risk, improved flexibility, and enhanced accessibility to bank services.

In summary the model used was ascertained by the use of coefficient of determination. The average adjusted coefficient of determination (R^2) from the model was 54.5% of the variations in adoption of Electronic payments by commercial banks are explained by the factors (information security, infrastructure, technology, regulatory framework and top management support).The regression model also highlighted, a change in unit of any factor with other influencers being constant leads to an increase in adoption of Electronic payments by commercial banks.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter summarizes the research study in three main sections which are summary, conclusion and recommendations. The summary section highlights all the aspects of electronic payment systems in regards to the various commercial banks. The conclusion derives a believed perception from the summary of the study while recommendation section highlights direction of future research on the same topic.

5.2 Summary

The research main aim was to analyze the various factors that influence adoption of electronic payments in commercial banks. This theme was grounded on the recent technological developments experienced in financial institutions that have revolutionized the manner in which payments are made. Although these developments have been widely adopted by financial institutions in most parts of the world, Kenyan commercial banks have been lagging behind in embracing electronic payments. Given this background, this study formulated three prerequisite goals namely; to assess the extent to which Kenyan commercial banks have adopted electronic payments, to determine the key factors affecting the uptake of electronic payments by Kenyan commercial banks, and to identify the main challenges and benefits facing the adoption of electronic payments by the commercial banks. These objectives were investigated through conducting successive statistical analyses including descriptive statistics and regression analysis.

The findings of the study showed that commercial banks have adopted various electronic payment technologies including; ATMs, electronic fund transfer systems, mobile banking applications, and bulk cash deposit machines. In regard to the degree the commercial banks have adopted these form of payments, it was found that the electronic fund transfer systems have been adopted to a very large extent compared to the rest. Additionally, the analytical results revealed that the process of embracing electronic payments by commercial banks is affected by various elements including; information security, infrastructural frameworks by the institutions, regulatory frameworks, technology, and level of managerial support. Based this finding, it is clear that embracing new technologies regardless of their anticipated benefits, may be marked by hindered by a multiplicity of factors before becoming widely adopted. Therefore, this finding is justified by the Innovation Diffusion theory that focuses on rate of diffusion of an innovation.

Moreover, the results revealed that multiple issues affect the adoption of the electronic payment technologies; inadequate legal and regulatory frameworks, outdated technologies, poor infrastructure, connectivity issues, poor technologies, inefficient customer care services, time consuming technologies, and poor infrastructure associated with accessibility, connectivity, and usage. From the regression analysis, it was found that adoption of electronic payment technologies and the factors identified are positively correlated, that is, a unit increase in one of the factors results in a corresponding increasing in the uptake of the electronic payment methods. Given the nature of these factors, they can be broadly grouped into facilitating conditions and performance expectations. As such this finding is justified by the Unified Theory of Acceptance,

which postulates that the decision to uptake a new innovation by a user is influenced by four constructs; performance expectation, facilitating conditions, social influence, and effort expectancy.

5.3 Conclusion

This study purposed to investigate the uptake of electronic payment technologies by commercial banks in Kenya by focusing on three objectives; Assess the adoption of electronic payments by commercial banks in Kenya, identifying the critical factors affecting adoption of electronic payments and determining the main challenges and benefits facing the adoption of the technologies. Kenya's banking industry is experiencing various technological changes that are positively shaping the business industry. From the study, it is clear that banks are not certain on the right direction, which is maintain their image or move all their operations to electronic payments. However, it is evident that ICT has made it possible for various commercial banks to adapt electronic payment systems. The various electronic payment systems include: electronic fund transfer, credit cards, debit cards, internet banks, bulk deposits and ATMs. The adoption of electronic payments has made operations and work easier at the various banks. Banks have even been able to cut on costs, increase client outreach, improved security and simpler and effective financial systems.

From the study there were also some challenges that were identified. The various challenges that the banks need to address include trust issues in regards to the e-payment systems, online fraud incidence, systems that are not user friendly that end up requiring highly trained technical staff for support, high transaction costs and fear for high risk

investments. If banks can overcome these challenges, there will a reduction of cash transactions.

5.4 Recommendations

The recommendations are based on the findings on the objectives of the study.

Kenya Commercial banks should keep on investing in innovative solutions as they are able to maintain costs much effectively as compared to investing in physical branches. More transactions can be processed on electronic and mobile channels as compared to the manual processes. This also helps to lower costs and hence increased revenue for the banks.

Kenya commercial banks should always keep on updating their product description. This will eventually assist in increasing the customers trust for the various electronic products. An increase in website guidelines/ functions will assist convince and attract more online customers. Commercial banks in Kenya should also keep on diversifying on electronic payment solutions, reducing cash payments and increasing electronic payment transactions.

The bank staff should also be well knowledgeable with ICT skills and also electronic payments, this will ensure that they are able to support the various electronic payment systems effectively. The government of Kenya should continue developing regulations that enhance the legal the development of electronic payment solutions. The regulations would provide the required transaction features like security non-repudiation, anonymity, divisibility among others, which will encourage banks to develop electronic payment solutions with the hope that they will be embraced by the market.

Electronic payment benchmarks should be setup that will be used to evaluate various commercial banks. Proper awareness and marketing should be done to the public to educate them on electronic payment systems benefits. Policies surrounding electronic payments should also be put in place in the various commercial banks.

The main issue of electronic revolution in this 21st century is to find more effective ways of adapting ICT in the various institutions and businesses. Therefore electronic payments have become very important in this era. ICT has remodeled electronic commerce beyond online stock, online shopping, bond transactions, buying and downloading software without physically visiting a store.

5.5 Limitations of the study

Although this research was able to generate crucial findings, a number of limitations were encountered. Firstly, there might be other relevant factors that significantly affect the adoption of electronic payment technologies by Kenya commercial banks and were not covered in this research. As such the scope of this research may have restricted an extended discussion of all the factors. Additionally, self-reporting through the use of questionnaires may have hampered the nature of data collected. Self-reported responses may be marked by over-exaggeration that may interfere with the validity of the conclusions produced. In addition, the questionnaire designed for this study did not make use of open-ended questions. As such, the instrument failed to capture supplementary data from respondents who had additional useful opinion or knowledge that would have ultimately benefited this study.

5.6 Suggestions for Further Research

This study determined the factors influencing the adoption of electronic payments by commercial banks in Kenya. Other studies should be carried out to determine factors that influence adoption of agency banking among Kenya Commercial Banks. More research should be carried out on the effects of electronic payments on the Kenya Commercial Banks market share. Also studies should be carried out of the effect of legislation on adoption of electronic banking among commercial banks in Kenya.

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APPENDIX I

QUESTIONNAIRE

INSTRUCTIONS:

Kindly respond to the following questions by ticking on the appropriate box () or filling the answers in the blank spaces

SECTION A: BACKGROUND INFORMATION

1. Name of the Bank?

.....

2. What is your Gender?

Male []

Female []

3. Kindly indicate your highest Level of education?

Certificate []

Diploma []

Undergraduate []

Postgraduate []

4. What is your Age?

18-25 Years []

26-33 Years []

34-41 Years []

42-49 Years []

Above 50 Years []

5. How long have you served in this bank?

Below 10 years [] 11-20 years []

21-29 years [] 30 years and above []

SECTION B: Factors Influencing Adoption of Electronic Payments

6. Please state to what extent you agree with the following statements in regards to Factors Influencing Adoption of Electronic Payments? Use scale 1-5: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Information Security	Very small	Small extent	Moderate extent	Great extent	Very great
Information security is a major factor affecting adoption of E-payments	(1)	(2)	(3)	(4)	(5)
Information security is mainly determined by the electronic payment channel and infrastructure used	(1)	(2)	(3)	(4)	(5)
The monitoring tool in place in the bank effectively detects fraud, attempted attacks and intrusions on customer information effectively	(1)	(2)	(3)	(4)	(5)
The quality of anti-virus software installed helps detect attacks and intrusions much faster.	(1)	(2)	(3)	(4)	(5)
The bank ensures segregation of duties so that not only one person is in charge of the customer information	(1)	(2)	(3)	(4)	(5)

Customer information updates are kept consistent with the information security programs and procedures	(1)	(2)	(3)	(4)	(5)
The access controls in our bank only allow specific authorized personnel to access customer information	(1)	(2)	(3)	(4)	(5)
The bank ensures that customer information is encrypted at all times	(1)	(2)	(3)	(4)	(5)

Infrastructure	Very small	Small extent	Moderate	Great extent	Very great
The infrastructure team is very effective in monitoring the uptime of the infrastructure.	(1)	(2)	(3)	(4)	(5)
The monitoring tools in place are very effective and notify the monitoring team immediately when there is an issue	(1)	(2)	(3)	(4)	(5)
There is limited information and communication infrastructure availability	(1)	(2)	(3)	(4)	(5)
The physical infrastructure in the bank is adequate	(1)	(2)	(3)	(4)	(5)
The equipment's available are able to meet the needs of electronic payments customers	(1)	(2)	(3)	(4)	(5)

The infrastructure in place supports technology	(1)	(2)	(3)	(4)	(5)
Poor infrastructure affects the rate at which data is updated for the customers on the banking systems	(1)	(2)	(3)	(4)	(5)
The bank has acquired advanced infrastructure and enhances human capacity building	(1)	(2)	(3)	(4)	(5)

Technology	Very small	Small extent	Moderate	Great extent	Very great
The bank has put in place adequate mitigation measures against technology risks	(1)	(2)	(3)	(4)	(5)
The cloud services being used in the bank are effective.	(1)	(2)	(3)	(4)	(5)
There are risks associated with using technology systems which include data and network security risks	(1)	(2)	(3)	(4)	(5)
The use of the technology has ensured quick and effective services to the clients	(1)	(2)	(3)	(4)	(5)
Technology involves people using tools, knowledge and systems to make their lives	(1)	(2)	(3)	(4)	(5)

more efficient and effective					
Internet use has increased investor risks through exposure to cyber-attacks and direct marketing of unregulated financial services and frauds	(1)	(2)	(3)	(4)	(5)
The disaster recovery and back-up system comes in handy when the primary bank system experience a downtime	(1)	(2)	(3)	(4)	(5)
The cloud services being used in the bank are effective	(1)	(2)	(3)	(4)	(5)

Regulatory Framework	Very small	Small extent	Moderate	Great extent	Very great
Regulations purpose is to efficiently maintain confidence in the financial system	(1)	(2)	(3)	(4)	(5)
Regulations promote public understanding of the financial system	(1)	(2)	(3)	(4)	(5)
Regulations protect consumers of financial services and reduce financial crime	(1)	(2)	(3)	(4)	(5)
Kenya had placed banking ombudsmen as an alternative means of redress.	(1)	(2)	(3)	(4)	(5)

Regulations set by Kenyan government held banks liable for the conduct of their agents	(1)	(2)	(3)	(4)	(5)
Regulations purpose is to efficiently maintain confidence in the financial system	(1)	(2)	(3)	(4)	(5)
Regulations protect consumers of financial services and reduce financial crime	(1)	(2)	(3)	(4)	(5)

Top management Support	Very small	Small extent	Moderate	Great extent	Very great
Top management plays a major role in the successful adoption of electronic payments in the bank	(1)	(2)	(3)	(4)	(5)
The bank's management ensures that they fully approve and support the implementation of electronic payments	(1)	(2)	(3)	(4)	(5)
The bank's management allocates resources to ensure successful adoption of electronic payments	(1)	(2)	(3)	(4)	(5)
Management owns the adoption of electronic payments projects so as to ensure full cooperation of all bank stakeholders	(1)	(2)	(3)	(4)	(5)
Bank management support the adoption of the electronic payments financially	(1)	(2)	(3)	(4)	(5)

The bank management have influence on the corporate culture which is necessary in the adoption of electronic payments	(1)	(2)	(3)	(4)	(5)
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SECTION C: Adoption of Electronic Payments by Commercial Banks in Kenya

7. Please state to what extent you agree with the following statements in regards to **Adoption of Electronic Payments?** Use scale 1-5: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Adoption of Electronic Payments	Very small	Small extent	Moderate extent	Great extent	Very great
The bank has adopted electronic payments in retail banking operations	(1)	(2)	(3)	(4)	(5)
The bank has adopted electronic payments in corporate banking operations	(1)	(2)	(3)	(4)	(5)
The bank has adopted an mobile banking application that customers to carry out money transfers	(1)	(2)	(3)	(4)	(5)
The bank has adopted electronic payments in loan repayments	(1)	(2)	(3)	(4)	(5)
The bank has adopted an electronic fund transfer system	(1)	(2)	(3)	(4)	(5)

The bank has adopted ATMs	(1)	(2)	(3)	(4)	(5)
The bank has adopted bulk cash deposit machines	(1)	(2)	(3)	(4)	(5)
The bank has adopted electronic payments in retail banking operations	(1)	(2)	(3)	(4)	(5)

SECTION D: Challenges and Benefits of Adopting Electronic Payments in Commercial Banks

8. Please state to what extent you agree with the following statements in regards to **Challenges and Benefits of Adopting Electronic Payments?** Use scale 1-5: 1 Very small extent, 2 Small extent, 3 Moderate extent, 4 Great extent, 5 Very great extent.

Challenges of Adopting Electronic Payments	Very small extent	Small extent	Moderate extent	Great extent	Very great extent
Poor infrastructure is one of the challenges facing electronic payments	(1)	(2)	(3)	(4)	(5)
Poor technology is one of the challenges facing electronic payments	(1)	(2)	(3)	(4)	(5)
Inadequate legal and regulatory framework is a challenge facing electronic payments	(1)	(2)	(3)	(4)	(5)
Infrastructural challenges relate to ICT accessibility, affordability, networks,	(1)	(2)	(3)	(4)	(5)

connectivity and usage.					
The banks face lack of knowledge on the outdated electronic commerce, such as credit cards and telephone sales	(1)	(2)	(3)	(4)	(5)
Internet banking can be at times tedious as most of the applications take a long time to load	(1)	(2)	(3)	(4)	(5)
Connectivity issues are also another challenge that customers are faced when carrying out their internet banking transactions	(1)	(2)	(3)	(4)	(5)
Customer care assistance also takes sometime due to the congestion in the computer and telephones which can be very discouraging to the customers	(1)	(2)	(3)	(4)	(5)

Benefits of Adopting Electronic Payments	Very small	Small extent	Moderate	Great extent	Very great
Fast turnaround time for payments is one of the benefits for adopting electronic payments	(1)	(2)	(3)	(4)	(5)
Improved settlement process is one of the benefits of adopting electronic payments	(1)	(2)	(3)	(4)	(5)
Quick accessibility to bank services, as customers can access their bank information	(1)	(2)	(3)	(4)	(5)

from the comfort of their homes					
Other benefits include safety, mobility, integrity and low financial risks	(1)	(2)	(3)	(4)	(5)
Electronic payments allow customers to pay for bills and other transactions by electronic means such as electronic wallets, cards, mobile phone	(1)	(2)	(3)	(4)	(5)
Electronic payments assist customers, companies and banks make payments much more effectively	(1)	(2)	(3)	(4)	(5)
Bank Customers can also access account information at any time from the comfort of their homes or offices.	(1)	(2)	(3)	(4)	(5)

THANK YOU FOR YOUR PARTICIPATION