

**THE IMPACT OF INFORMATION COMMUNICATION
TECHNOLOGY DEVELOPMENT ON FINANCIAL
PERFORMANCE OF COMMERCIAL BANKS IN KENYA.**

BY

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DECLARATION

This project is my original work and has not been presented in any other institution of learning for any academic award.

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Also to God for the strength and good health.

Thank you all.

DEDICATION

This project is sincerely dedicated to my loving parents for their moral and financial support. I also could not also have done it without constant encouragement from my colleagues and friends

God bless you all.

ABSTRACT

Despite the potential benefits of ICT an e-commerce, there is debate about whether and how their adoption improves bank performance. This study used some relative measures such as return on assets to uncover impact of ICT investment on banking performance. This study addresses this gap.

This study involved gathering data that described the events and then organized, tabulated, depicted and described the data collected. The research data was collected through use of questionnaires, only primary data was used. The respondents were employees of commercial banks in Kenya. Data was collected from all the 44 commercial banks in Kenya.

From the analysis of data collected, it can be seen that investment on ICT systems and infrastructure has been a key element in productivity and growth in the banking industry. This study indicates that ICT enables banks to offer a broad variety of services to customers.

LIST OF ABBREVIATIONS

ATM -Automatic Teller Machines

B2B-Bank to Bank

B2C-Bank to Customer

C2B-Customer to Bank

E-Commerce -Electronic Commerce

EDI –Electronic Data Interchange

EFT-Electronic Funds Transfer

ICT- Information Communication Technology

IDG- International Data Group

IT- Information Technology

MPIT- Management Productivity and Information Database

ROM- Return on Management Model

TA- Technology Assessment

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Information Communication Technologies have been a current issue for the past few years and hardly a day goes without a newspaper covering news referring to the ‘new economy’ or ‘information society’. ICT is also widely talked about in academia and governmental bodies. This is as a consequence of their influence in many aspects of our society from on-line shopping to virtual chatting.

This research concentrates on the effects of ICT in the performance of commercial banks. The aim is to identify and understand the changes that ICT is causing on the banking sector, in order to examine in detail how the recent (and foreseeable) advances in ICT are affecting the sector and its future evolution. As ICT is having a strong influence on the evolution of the financial sector as a whole, financial markets and banks, some characteristics of evolution of markets will fall within the scope of this research.

There exists various approaches to studying the impact of ICT on the banking sector. In this research we combine the technology assessment (TA) and economic approach. The aim of TA is to state objectively as much as possible the positive and negative impacts, the costs and benefits, the risks and advantages associated with (present or foreseeable) technical challenges. TA is an appropriate conceptual framework for analyzing the multiple aspects of the relationship between technology and banking and payment systems.

1.1.1 ICT Development

Information and Communication Technology (ICT) is a term that describes the combination of computer technology which is hardware and software with telecommunications technology such as data, image and voice networks. According to Lucas (1997) information technology refers to all forms of technology applied to processing, storing and transmitting information in electronic form. The physical equipment used for this purpose includes computers, communications equipment and networks. Effective service delivery is important and has a great influence on customer satisfaction, improving sales and market share (Joseph & Stone, 2003). Commercial banking is at a stage where customer perceptions and preferences have a very important impact on a bank's success. Customer satisfaction is a measure of how products and services supplied by a company meet or surpass customer expectation. The integration of world economies has opened an array of business opportunities as well as challenges for firms. Increased standardization activity reflects, among other factors, demand by consumers for safer and higher quality products, technological innovations, the expansion of global commerce and the increased concern by many governments to societal and welfare issues. Firms in service sectors such as banking are under constant pressure to perform better, cheaper and faster. The developments in information and communication technology (ICT) are radically changing the way business is done. Electronic commerce is now thought to hold the promise of a new commercial revolution by offering an inexpensive and direct way to exchange information and to sell or buy products and services. This revolution in the market place has set in motion a revolution in the banking sector for the provision of a

payment system that is compatible with the demands of the electronic marketplace (Abor, 2005).

1.1.2 Performance of Commercial Banks

The introduction of electronic banking has improved banking efficiency in rendering services to customer. Information and Communication Technology (ICT) is at the centre of electronic banking system in Kenya today. Banking industry in Kenya cannot ignore information systems because they play a critical impact in current banking system, they point out that the entire cash flow of most banks are linked to information system.

The application of information and communication technology concepts, techniques, policies and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a prerequisite for local and global competitiveness banking (Connel and Saleh,2004). The advancement in Technology has played an important role in improving service delivery standards in the Banking industry. In its simplest form, Automated Teller Machines (ATMs) and deposit machines now allow consumers carry out banking transactions beyond banking hours. With online banking, individuals can check their account balances and make payments without having to go to the bank hall. This is gradually creating a cashless society where consumers no longer have to pay for all their purchases with hard cash.

1.1.3 Expected Impact of ICT on Performance of Commercial Banks

The expected impact of ICT is that the new ICT based technologies and processes would lead to commercial banks improvement in their operating efficiencies and customer service levels. The most recent empirical evidence confirms the positive effect of ICT on firm performance not only in terms of productivity, profitability, market value, and market share, but also in intermediate performance measures, such as process efficiency, service quality, cost savings, organizational and process flexibility, and customer satisfaction.

Technology can save time and money and eliminate errors, thereby addressing certain issues associated with changing cultural and social trends, it can also minimize direct customer interaction and any associated service value to be gained (Bitner, 2001). With the Kenyan consumer becoming more informed, coupled with the advancement of information technology in doing business, consumers watchdogs being formed and awards being created for the best companies, it is reaching a point whereby either a company starts being responsible in all its core and non core activities or goes under. Brown (1998) acknowledged that Business had become the most powerful institution on the planet. He also stated that the dominant institution in any society needed to take responsibility for the whole but business had not had such a tradition.

1.1.4 Kenyan Banking Sector

The banking industry in Kenya has been in a process of significant transformation. The force behind this transformation of the banking industry is innovation in information technologies. Information and communication technology is at the centre of this global change curve of electronic banking system in Kenya today. It is against this background, that this study investigates the relationship between e-banking and performance of the Kenyan banking system. Specifically, the study establishes whether there is relationship between the dependent variable i.e., performance measured by return on assets and the independent variables: investments in e-banking, number of ATMS and number of debits cards issued to customers as proxy for e-banking.

1.2 Statement of the Problem

The banking sector in Kenya dating back to 1689 provides financial services to the low-income households and micro and small enterprises thus contribute to poverty alleviation. This puts emphasis on the sound development of banking institutions as vital ingredients for investment, employment and economic growth. But now the much-vaunted sector is looking tarnished. Precisely the attribute of the system that previously appeared to be a virtue, the willingness of banks to go on lending to firms in distress, now turns out to have led to serious problems. Borrowers who should have been cut off were not, with the result that further billions were lost. The public has had to pay twice. They pay once, in the form of slowed economic growth as the result of the prolonged overhang of bad loans (and aspects of the burst bubble), and then again as taxpayers when the government ends up footing the bill. The vast majority of the recent literature on electronic money and

banking suffers from a narrow focus. It generally ignores electronic banking entirely and equates electronic money with the substitution of currency through electronic gadget such as smart cards and virtual currency. For example, Freedman, (2000) proposes that electronic banking and electronic money consist of three devices; access devices, stored value cards, and network money. Electronic banking is simply the use of new access devices and is therefore ignored. Electronic money then is the sum of stored value (smart) cards and network money (value stored on computer hard drives). What is most fascinating and revealing about this apparently popular view is that electronic banking and electronic money are no longer functions or processes, but devices.

Kenya banking sector has witnessed many changes since the beginning e-banking. Today, customers of banks have efficient, fast and convenient banking services. In line with rendering qualities and acceptable services, most banks in Kenya are investing large sum of money in information and communication Technology. While the rapid development of information technology has made some banking tasks more efficient and cheaper, technological investments are taking a larger share of bank's resources. Currently, apart from personnel costs, technology is usually the biggest item in the budget of a bank, and the fastest growing one. Another problem associated with this financial innovation plastic card fraud, particularly on lost and stolen cards and counterfeit card fraud. Banks need to manage costs and risks associated with electronic banking. This study is important in Kenya now.

Despite the potential benefits of ICT and e-commerce, there is debate about whether and how their adoption improves bank performance. Several attempts have been made to investigate the impact of electronic banking on bank performance. Studies by Kariuki (2005) showed the positive impacts of ICT on their banking performance using bank turnover and profits as measure of performance. He established that banks those with high profit growth are more likely to be using greater numbers of advanced ICTs. He concluded that e-banking leads to higher profits though in long-term but not in short-term due to high ICT investment cost. All this studies used profit and turnover as measures of bank performance. While Davenport (2003) and Oshikoya (2007) and Jean-Azam (2006) suggest that use of and investment in ICT requires complementary investments in skills, organization and innovation and investment and change entails risks and costs which might reduce bank profits in. Hence there is need to use some of relative measure such as return on assets to uncover the impact of ICT investment on banking performance. This gap is being addressed in this study. The study will answer and investigate the following research question; what is the general impact of information and communication technology on financial performance of commercial banks?

1.3 Objectives of the Study

This research project will examine the general impact of Information and Communication Technology (ICT) on the financial performance of commercial banks in Kenya.

1.4 Significance of the Study

The increasing competitive pressures on banks in Kenya, many of which operate in a global economy, have been a strong driver for ICT adoption. Commercial banks are constantly searching for opportunities to cut costs and ICT holds great promise in this respect as it increases efficiency of banks' business processes, both internally and between trading partners in the value chain. This study is of great importance considering the fact that entry barriers to the banking industry have been greatly lowered by leveraging on ICT. This study highlights various opportunities that can be harnessed in order to compete favorably in this increasingly competitive and unpredictable business environment. In theory this study is justified in the sense that it highlights the imperative of ICT and its inherent dynamism.

Electronic communication using digital information and communication technology is already the standard means of inter-organizational and inter-country communication in most of the developed world and also increasingly in third world countries. They are helping individuals, companies and countries to store and transmit information held anywhere in the world, and to communicate them across the globe irrespective of time and space. This means that whoever does not have the technical infrastructure to participate in this new mode of communication would not be able to trade or relate to other individuals, companies or countries in the near future. Therefore in practice this study is significant because Kenyan commercial banks cannot afford to let this opportunity of embracing ICT pass it by.

In general, existing studies have concluded two positive effects regarding the relation between IT and banks' performance. First, IT can reduce banks' operational costs (the cost advantage). For example, internet helps banks to conduct standardized, low value-added transactions (e.g. bill payments, balance inquiries, account transfer) through the online channel, while focusing their resources into specialized, high-value added transactions (e.g. small business lending, personal trust services, investment banking) through branches. Second, IT can facilitate transactions among customers within the same network (the network effect).

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter introduces the various literatures that have been studied in that show the impact of ICT on performance of commercial banks. It will focus on the theories and models that are used to assess the impact of ICT on commercial banks performance.

2.2 Review of Theories

The academic study of e-operations was inevitably embryonic, and as such there was a dearth of reported research studies examining the impact of e-commerce on internal business processes (Van et al., 2003). A lot of what had been written about e-commerce to date had either been predictive, that is, the ‘how to succeed’ type of publication. According to Daniel, (1999) much of the literature appeared to emanate from those with direct commercial interests, as consultants selling advice, computer hardware or software sales agents.

2.2.1 Contemporary Banking Theory

Bhattacharya and Thakor (1993) contemporary banking theory suggest that banks, together with other financial intermediaries, are essential in the allocation of capital in the economy. A very powerful tool to explain how banks work is provided by the literature on financial intermediation. This literature is centered on information asymmetries, an assumption that “different economic agents possess different pieces of information on relevant economic variables, and that agents will use this information for their own profit” (Freixas and Rochet, 1998).

2.2.2 Innovation Diffusion Theory

This theory explains individuals' intention to adopt a technology as a modality to perform a traditional activity. The theory is developed by Roger's (1983). The critical factors that determine the adoption of an innovation at the general level are the following: relative advantage, compatibility and complexity.

2.2.3 The Decomposed Theory of Planned Behavior

This theory was developed by Taylor and Todd (1995). The theory postulates that the intention to use a certain technology is influenced by attitude, subjective norm and perceived behavioral control.

2.3 Measures of a Bank's Performance

The role of technology in the banking sector may be exaggerated or underestimated. According to Oscamp and Spacapan (1990), technology is probably the most dominant influence on life in the modern world. According to Kirkup and Keller (1992), technology touches every aspect of our lives; coping with all needs in a practical way. The utilization of present day technology is the distinguishing factor between human species in today's contemporary society. Of all the technologies of our time, information technology has the greatest influence at the international arena. According to Hanna, Boyson and Gunaratne (1996), 'as some economic historians would assert the pervasiveness of information technology on society amounts to a second industrial revolution'. It is an enabling technology for quality enhancement. Various models have been propounded on how to measure the impact of information technology on economic

sectors. A synthesis of the works of Chief Information Officer (1992) and Strassman (1990) show that the impact of IT on the banking sector in Kenya could be assessed through the following models:

Balanced Score Card Model; under this method, four inter related operational and financial measures are used. These measures center on customer's view of organizational performance, line manager's view of internal processes, strategic manager's view of innovation effects and the shareholders view of financial rewards.

Information Economics Model; relative weights are assigned to tangible and intangible corporate objectives. IT systems are scored based on their impacts on each of the objectives. The final step is a peer review process to evaluate the scoring for errors and oversights.

Impact Focus Strategy Model; this approach relies on the listing of benefits anticipated by an organization at onset of system's implementation. It also involves the creation of benchmarks, which the system must meet to have an impact.

The Value Framework Model; this method uses a grid to define multiple impacts of an information system based on two dimensions namely impact and value. The value dimension includes additional service/product quality cost by technology. The impact dimension included time compression of processes, overcoming geographic restrictions and restructuring business relationships.

Alternative Payoff Scenarios Model; the value of information technology investment is calculated by determining how the value of generated information leads to a payoff. This payoff is compared with the payoff without information technology by quantifying impacts in non monetary terms; quantifying monetary benefits from associated improvements. These net profit effects are compared with expected net profits from changed decisions and processes without information technology.

The Return on Management Model (ROM); information technology here is regarded as a tool primarily to improve managerial performance. Management outputs and inputs are compared at a ratio to arrive at management value added; the lower the ratio, the lower the ROM and vice versa.

Embedded Network Productivity Measurement Model; this approach predefines measurement parameters, which are built into network management software, and real time indices of compliance with performance targets are generated.

The framework adopted for this study is the impact focus strategy model .This model relies on the listing of benefits anticipated by an organization at onset of systems implementation. Benchmarks, which the system must meet in order to have an impact, are also created.

The benefit anticipated in this instance is improved productivity of the banking sector. Hence as this study proposes to determine the extent to which the use of information communication technology have impacted on the performance of commercial banks in

Kenya, the impact focus strategy model is deemed best suited above other models for such a kind of study.

2.4 Review of Empirical Studies

Various empirical studies on information technology and its impact on the banking sector in various countries have been conducted over the years. Various scholars such as Wilson (1993), Freund, Konig and Roth (1997), Radeck, Wenninger and Orlow (1997), O'Sullivan (2000) and others have been engaged in unending discourse on the positive payoffs emanating from the utilization of information technology in banks and other financial institutions. Such academic debates have resulted in the origin of the term 'information technology productivity paradox' which is concerned with appraising the impact of information technology on operational efficiency and the productivity of organizations. A cursory look at the industry level studies of the nineties such as the works of Wilson (1993), Jordan, John and Katz(1999), Furst, Lang and Nolle (1998) portray that in many instances a positive correlation is posited between increased investment in information technology and productivity. On the contrary, other works such as those of Strassman (1990), Morrison and Berndt (1990), Dos-Santos and others (1993) show that an additional investment in information technology does not necessarily contribute positively to productivity. Such works argue that the estimated marginal benefits are less than the estimated marginal costs; that for each additional dollar spent in information technology equipment, the marginal increase in measured output was only eighty cents. Brynjolfsson and Hitt (1996) noted that most of such results from researches account for what he referred to as the 'economic theory of equilibrium'. This means that

increased profitability is not necessarily a by-product of increased spending in information technology.

Ojung'a (2005) investigated e-commerce services in commercial Banks in Kenya. His study gave various outputs and some of them included the extend to bank to bank e-commerce service utilization, extend to bank to customer electronic payment methods and extend of usage of electronic payment methods. Magutu et al.,(2009) modeled the effects of E-Commerce adoption on Business Process Management: Case Study of Commercial Banks in Kenya.

Some other researchers such as Loveman (1994), Lichtenberg (1995) and others have worked on ICT impact on a bank's performance. Loveman in his work compiled data from the Management Productivity and Information database (MPIT). He discovered that the utilization of information technology made no significant impact on the performance of commercial banks. Lichtenberg in his work obtained data from yearly surveys conducted from the eighties to the nineties by Computer world magazines. Using the Cobb Douglas production function as his theoretical framework, he estimated a positive correlation between increased investment in information technology and the productivity of firms. In addition, the International data Group (IDG) usually compiles on an annual basis, details of expenditures made by firms on information technology while the Standard and Poor's Compustat II database provides various measures of output and non information communication technology expenses. These two sets of data were analyzed by Brynjolfsson and Hitt (1996). His findings revealed that information communication

technology staff were twice more productive than their non information communication technology counterparts. In addition, computer capital contributes over eighty percent marginal increase in output whereas the contribution of non information communication technology capital is as low as six percent.

According to Ochieng, (1998) and Otieno, (2006) the new information technology is becoming an important factor in the future development of Kenya financial services industry, and especially Kenyan banking industry. Banks are faced with a number of important questions, for examples how to take full advantage of new technology opportunities, how e-developments change the ways customers interact with the financial services provider. Kenya has achieved significant success in the implementation of electronic banking; it is on the top of the emerging markets in this area and even outpaces the achievements of some developed countries. This progress is not coincidence; it has external and also subjective reasons.

It is upon this premise that this study is designed to fill this gap in the body of knowledge.

2.5 Conclusions from Literature Review

Existing studies has looked the ICT and financial system holistically specifically looking on E-banking. The vast majority of the recent literature on electronic money and banking suffers from a general focus. It generally ignores electronic banking entirely and equates electronic money with the substitution of currency through electronic gadget such as smart cards and virtual currency. For example, Freedman (2000) proposes that electronic

banking and electronic money consist of three devices; access devices, stored value cards, and network money.

Electronic banking is simply the use of new access devices and is therefore ignored. This has prompted a fresh look on this subject.

ICT has produced changes in the structure of bank income. As a result of increased competition that has lowered margins in lending operations (the banks' traditional business) banks have diversified their sources of income and rely increasingly on income from fees services rather than interest rate spreads. Fees charged for services include typical banking activities like payment transactions, safe custody and account administration (Hallam-Baker,(1996).These activities are, in general, less volatile than fees and commissions charged on activities which are affected by economic and cyclical developments (e.g. underwriting activities, brokerage services, treasury management, transactions on derivatives, private banking, credit card business). This change is also reflected in the increasing size of off-balance sheet items in the banks' financial accounts.

Despite the potential benefits of ICT and e-commerce, there is debate about whether and how their adoption improves bank performance. Use of and investment in ICT requires complementary investments in skills, organization and innovation and investment and change entails risks and costs as well as bringing potential benefits. The impact of ICTs and e-business strategies on bank performance are positive overall, but that ICTs are not a panacea in themselves.

This study shows the positive impacts of ICT on commercial banks turnover and profitability and to a lesser extent on employment, most notably when e-commerce is part of larger business strategies of bank. Further (Kariuki, 2005) provides evidence that the use of e-banking can contribute to improved bank performance, in terms of increased market share, expanded product range, customized products and better response to client demand.

It is against this background, that this study investigates how different electronic channels enhance the delivery of consumers and retails products, and also how banks choose to support their electronic banking component/services internally, such as internet services provider, internet banking software, core banking vendor, managed security service provider, bill payment provider, credit business and credit scoring company, which e-Banking systems rely on. This research concentrates on the effects of ICT on the commercial banking sector.

The aim is to identify and understand the changes that ICT is causing on the banking sector, in order to examine in detail how the recent (and foreseeable) advances in ICT are affecting the sector and can affect its future evolution. As ICT is having a strong influence on the evolution of the banking, the study investigates the influence ICT has on the banking sector and the payments system. Therefore, the purpose of this study was to investigate the relationship between ICT and bank performance, specifically among the commercial banks in Kenya.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology of the study. It describes the research design, sampling design, target population, data collection procedures and analysis management and the ethical considerations in the study.

3.2 Research Design

This study will use a descriptive design according to the Likert model of data analysis. This design refers to a set of methods and procedures that describe variables. It involves gathering data that describe events and then organizes, tabulates, depicts and describes the data. Descriptive studies portray the variables by answering who, what, and how questions (Babbie, 2002). This design will be used because it will facilitate the smooth sailing of the various research operations, thereby making research as efficient as possible hence yielding maximum information with minimal expenditure of effort, time and money.

3.3 Population

A population is a group of individual persons, objects or items from which samples are taken for measurements, it is the group the investigator wishes to make inferences from (Babbie, 2005). The target population will be all 44 commercial banks in Kenya (see appendix II). In addition, this study will be carried in Nairobi since all the selected commercial banks have their headquarters in Nairobi and this will

facilitate collection of adequate information for the research subject area .A census will be done on all the 44 commercial banks.

3.4 Data Collection

The research instrument in this study will be questionnaires. Both open and closed ended questions will be applied to collect primary data. (See appendix 1). Primary data will be used.

Creswell (1994) noted that, data collection methods for primary data include: structured and semi-structure questionnaires, mailed questionnaires, structured and semi-structured interviews (personal and telephone interviews), observation and focus group discussions. Questionnaires are the most commonly used methods when respondents can be reached and are willing to co-operate. These methods can reach a large number of subjects who are able to read and write independently. The questionnaire will consist of sections geared to obtain the respondent's opinion in strategic control. Respondents to be interviewed will be permanent employees of the respective commercial banks and will be actively involved in the financial innovation processes. The respondents will be expected to give an insight into the financial innovation in the respective commercial banks.

The Likert model of analysis was used in the study design and every response was analyzed separately. The responses from the banks are treated as individual data and this is referred to as ordinal data because the responses levels as by the questionnaire did express a specific position. It is therefore difficult to express the differences between adjacent levels to be equal to one another. In this study the respondents from the different

banks were to select the following options according to their judgment using a five point measurement scale as follows.

1= not applicable at all,

2= least applicable,

3=moderately applicable,

4= largely applicable,

5= applied to a great extent.

3.5 Data Analysis

The data will be analyzed by use of descriptive statistics such as median scores, mode, and , range and interquartile percentages. The variability between the data can be expressed by either the Mann- Whitney U test or by Chi Square. Statistical Package for Social Sciences (SPSSv17) will be used to aid in qualitative analysis in this study. The researcher will examine the completed questionnaire. The information for each item on the questionnaire will be processed and reported through a descriptive narrative. This will be accomplished by use of graphs and tables and Qualitative analysis techniques will therefore be applied.

3.6 The Mann- Whitney Rank Sum Test

The Mann-Whitney Rank Sum test is used in this analysis because the questionnaire adopted a single Likert Scale questions. It has also been referred to as the Mann-Whitney-Wilcoxon, or Wilcoxon rank sum test. Other groups refer to it as a Wilcoxon-

Mann- Whitney test and it is used in the statistical analysis of ordinal data from questionnaires where the data are expressed as opinions from the respondents.

This is therefore a non-parametric test and it is suited to the Likert scale data and as we cannot be able to confine the stated population to fit the normal distribution and therefore cannot be analyzed by the parametric descriptive statistics of mean, Standard deviation, Regression Analysis and other Parametric data analysis designs.

Our test data are being statistically independent and that the results from one respondent do not affect the data from the other respondent from the same sample as this observation is ordinal. In fact, the test hypothesis for this statistic is that there is an equal probability of unequal observations from the samples. This is because not all the respondents were able to respond to all the questions that were addressed and more strongly, they came from the same population.

With regard to this data, it will be analysed by Chi Square as it will be illustrated above.

3.7 Chi Square test

Since the data we have here is a non-parametric data, it therefore indicates that it does not conform to the normal distribution and hence it cannot be handled using the parametric statistics. In order to conduct the analysis, the data was grouped into two categories on the score allocated. A score of 5 and 4 was considered to be great while a scale of 3,2 and 1 was considered as small(less) indicating they had less influence on the stated questions.

The other reason is that Likert scale data at a 5-point scale is usually not easy to compute and considering the data collected was ordinal. In order for this data be inferred by the inferential statistics, it has to be converted to the nominal data and thus the great and the

small(less) depending on the score. The data was grouped and classified on the basis of the questions as the number of occurrences. The assumption for the application of this statistics is that the number of the respondents was constant (30). The data to be computed was already in the frequency form of the number of the people that responded to the different questions for every level of the Questions and all the observations were to be used in order to provide the best inferences form the data. This data as well had to be converted from the ordinal data to the nominal data form and thus the grouping into those that greatly supported and the small extend of support to express the variability of the test and the inferences to be made.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the findings. The data collected from the questionnaires, observation and interviews were presented in tabular percentage forms and graphs were also used to analyze the data. Quantitative and qualitative analysis were carried out thus all of the discussion in this chapter reflects the ideas given by the respondents. For the purpose of this study, classifications were made based on gender, marital status, age group, job group and length of service and other variables.

4.2 Data Analysis and Findings

Data was collected from the administered fifty (50) questionnaires to randomly selected respondents who included top management, middle management and staff of the 44 commercial banks in Kenya. Of the 50 respondents, 30 responded, a response rate of 60 percent

4.3 Adoption of E-Commerce

There are a number of e-commerce products and services that banks can offer. They can take various forms, either B2B, B2C, C2B etc.

The respondents were asked to indicate the extent to which they have utilized the bank to bank e-commerce service. From the 5 point scale used, the table below gives the result.

Table 4.1 Bank to Bank E-Commerce Services

B2B e-Commerce Services	Mode	Median
EFT electronic payment bank to bank	5	5
EFT via EDI	5	4
Automated clearing through EFT	5	5
Settlement of payment on a gross basis in real time	5	5
Truncation and cheque imaging Transmission	5	5
Settlement of Government Securities Electronically	4	3

Since a score of one represents a low level of usage of the services while a score of five represented the highest level of usage, to a great extent B2B e-Commerce services key to banks are: EFT electronic payment from bank to bank, EFT via EDI, automated clearing through EFT and the settlement of payment on a gross basis in real time. Truncation and cheque imaging transmission and Settlement of Government Securities electronically have really gained prominence with banks as they had the most occurring value of 5 indicating they were used in most banks to a very great extent. This is because of the developing nature of the economy and little investment in e-government.

The respondents were further asked to indicate the extent to which they have utilized the bank to customer e-commerce service. From the 5point scale used, the table below gives the result.

From the results in table 4.3 below, internet banking, Branch Banking, Internet Banking, telebanking and home banking are now very applicable to a very great extent with a score of 5. EFT is very largely applicable since the most occurring value had a value of 4 and the median of 4. Mobile and office banking are the most moderately applicable in the banking industry and perhaps due to the new technology that not many people are very friendly with even with most of the people being able to operate the mobile phones use B2C e-commerce services by customers with a mode of 3. This is illustrated in the table below.

Table 4.2 Bank to Customer E-Commerce

B2C e-commerce Services	Mode	Median
Internet banking- direct access to your account	5	5
EFT	4	4
Office banking	3	3
Mobile Banking	3	3
Branch banking	5	5
Tele-banking	5	5
Home banking	5	5

4.4 Reasons for Adoption of E-Commerce

Banks have various reasons for adoption of e-Commerce .The table 4.4 below gives details. The main reason for the adoption of e-commerce by banks was to improve customer service, to cut down on operational costs, to keep up with industry trends and lastly to respond to customers' demands. Other reasons include expanding bank market share, to increase bank profitability, to create customer awareness of e-Commerce services, to increase geographical reach, profitability and as a response to customer

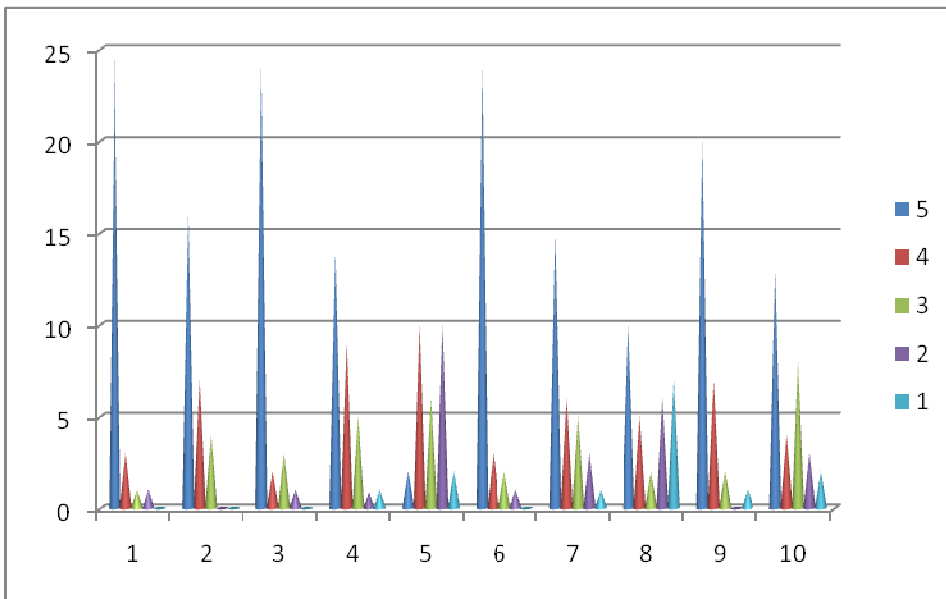
awareness on e-commerce services, to increase customer awareness on bank Products and to extend bank geographical reach. The most insignificant reason for their adoption was compliance with regulations.

All the banks had a score that was to a great extent had all the reasons to improve their services which was more to a customer centered service. It is therefore shown that most of the banks with a score of 5 as their modal class indicate that it was applicable to a very great extent in order to meet the customers' needs. It was however moderate for the score of 4 when it comes to keeping up with the trend of the industry and therefore competition was not a factor contributing to their adoption of the e-Commerce.

Table 4.3 Reasons for Adoption of E-Commerce

FACTORS	5	4	3	2	1	Mode	Median
Improve customer service	25	3	1	1	–	5	5
Cut down on operational costs	16	7	4	–	–	5	5
Increase customer awareness on bank products	24	2	3	1	–	5	5
Extend bank geographical reach	14	9	5	1	1	5	4
Expand bank market share	2	10	6	10	2	5	3
Increase banks' profitability	24	3	2	1	–	5	5
Keep up with industry trend	15	6	5	3	1	4	4.5
Compliance with regulations	10	5	2	6	7	5	4
Response to customers' demands	20	7	2	–	1	5	5
Response to customers' awareness of e-commerce services	13	4	8	3	2	5	5

Figure 4.1 Reasons for the adoption of E-Commerce.



- | No | Key |
|----|--|
| 1 | Improve customer service |
| 2 | Cut down on operational costs |
| 3 | Increase customer awareness on bank products |
| 4 | Extend bank geographical reach |
| 5 | Expand bank market share |
| 6 | Increase banks' profitability |
| 7 | Keep up with industry trend |
| 8 | Compliance with regulations |
| 9 | Response to customers' demands |
| 10 | Customer's awareness of E-commerce |

4.5 Benefits Derived from E-Commerce

There are various benefits that have been derived by banks in Kenya from the adoption of E-commerce. indicate the extent to which their banks have benefited from the adoption of e-commerce services and pr in table 4.4. below.

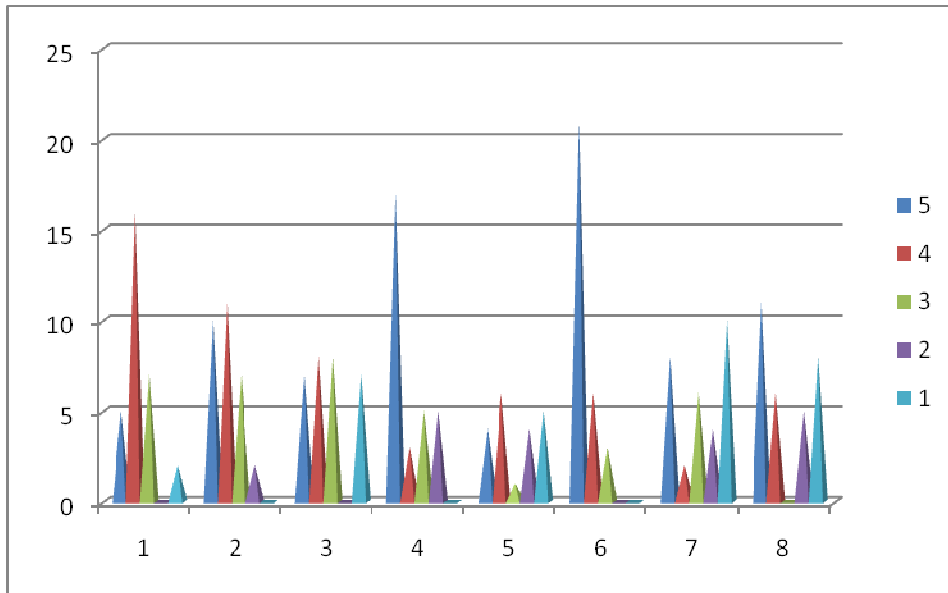
Table 4.4 E-Commerce Benefits (Descriptive Statistics)

e-Commerce Benefits	Mode	Median
Expanded geographical reach	4	4
Expanded Customer base	4	4
Increased visibility of the Ban through the Search Engine Marketing	4	3.5
Provided customers with valuable information	5	5
Increased customer loyalty	4	3.5
Reduced marketing and advertising Costs	5	5
Validity of a contract concluded by electronic means	1	3
Enabled you to reach a narrow market (niche)	5	4

This table illustrates that there was expanded geographical reach, customer base, increased visibility of the banks and the increased customer loyalty to a great extent. But to a very great extent, there were able to provide the customers with the most valuable information that was required from the banks as indicated by the modal class of 4 and 5 respectively. The median of the data was also corresponding to the same kind of information as reported in the table above.

The same data that was collected can also be seen in the graph illustrated below as well.

Figure 4.2 Benefits of the e-Commerce



No. Factors

1. Expanded geographical reach
2. Expanded customer base
3. Increased visibility of your bank through search engine marketing.
4. Provided customers with valuable information about your business
5. Increased customer loyalty
6. Reduced marketing and advertising costs
7. Validity of a contract concluded by electronic means
8. Enabled you to reach a narrow market (niche)

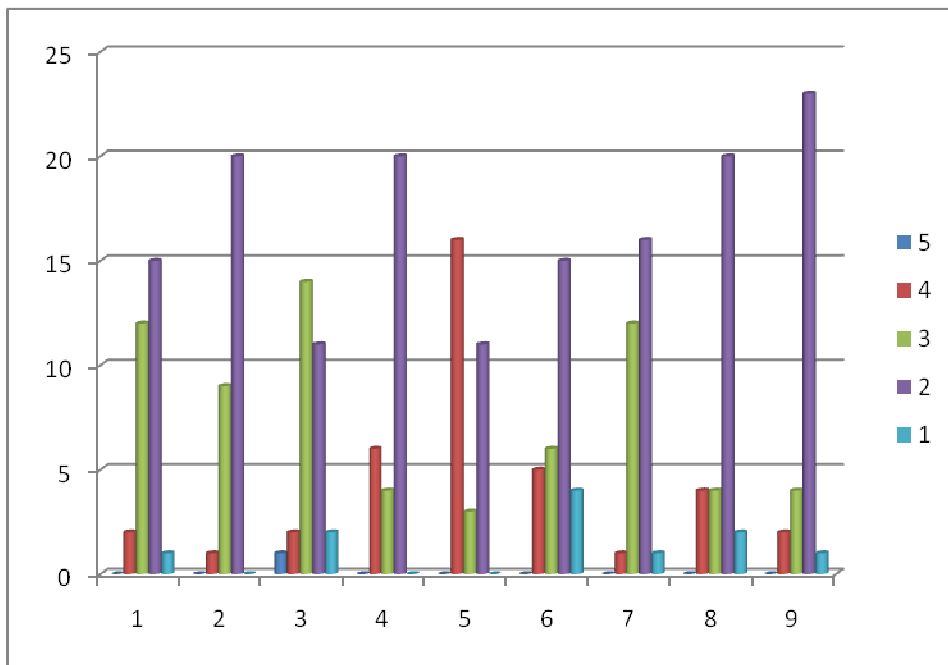
4.6 Challenges Faced in Adoption E-Commerce

The implementation of e-commerce could not come without challenges. The table below gives an explanation of the challenges that have been faced.

Table 4.5 Challenges Faced in Adoption E-Commerce (Descriptive Statistics)

CHALLENGE	5	4	3	2	1
Electronic signatures	–	2	12	15	1
E invoice	–	1	9	20	–
Taxation/customs	1	2	14	11	2
Security of payment	–	6	4	20	–
Data protection	–	16	3	11	–
Data retention	–	5	6	15	4
The validity of a contract concluded by Electronic means	–	1	12	16	1
Privacy of personal data	–	4	4	20	2
Online marketing	–	2	4	23	1

Figure 4.3 Challenges facing the Adoption of E- Commerce.



No Factor

1. Electronic signatures
2. E-Invoice
3. Taxation/ customs
4. Security of payments
5. Data protection
6. Data retention
7. Validity of a contract concluded by electronic means
8. Privacy of personal data
9. Online marketing

From the research data, the greatest challenge was data protection which has the highest modal class of 4 indicating it as a challenge to a great extent. The use of electronic signatures, E-invoice, security payments, data retention, the validity of the contract that had been concluded by the electronic means, privacy of the personal data and online marketing were not significantly a challenge to most of the banks at all. The electronic signatures, taxations and validity of the contracts concluded by the electronic means had an effect a small extend and was therefore not a challenge. This is because it has a use of signatures in electronic documents. Other major challenges of E-commerce in bank operations include: slow internet speed, security of payments, e-invoicing, privacy of personal data, internet connection failure. Several challenges were ranked least based on their magnitude: taxation, data retention, customer difficulty in using and finding the websites and lack of user support.

Inferential statistics (Chi Square)

Table 4.6 Chi square analysis on the applications of E-commerce

Factors	Great	Small
Settlement of the payment on gross basis in real time	23	11
Settlement of government securities electronically	19	11
EFT electronic payment bank to bank	29	1
Automated clearing through EFT	25	5
Truncation and cheque imaging transmission	21	9
Electronic Funds Transfer via Electronic Data	17	13

This data was analyzed by ChiSquare and the following results were observed.

Table 4.7 Test Statistics

	GREAT	LESS
Chi-Square(a,b)	.000	.667
Df	5	4
Asymp. Sig.	1.000	.955

a) 6 cells (100.0%) have expected frequencies less than 5. The minimum expected cell frequency is 1.0.

b) 5 cells (100.0%) have expected frequencies less than 5. The minimum expected cell frequency is 1.2.

With a Chi Square value of 0 for greater scores and a value of 0.667 at a significance of 0.01 and 0.05, it implies that the data collected did not agree and hence, they cannot be relied on since the statistics differed more significantly from the expected results

The same analysis was also applied on the Reasons for adoption of the E commerce.

The following was calculated as below.

Table 4.8 Analysis on the reasons for adoption of E-commerce

Factors	Great	Small
Improve customer service	28	2
Cut down on operational costs	23	4
Increase customer awareness on bank products	26	4
Extend bank geographical reach	23	7
Expand bank market share	12	18
Increase banks' profitability	27	3
Keep up with industry trend	21	9
Compliance with regulations	15	15
Response to customers' demands	27	3
Response to customers' awareness of e- commerce services	17	13

This was done for a total of 30 respondents as illustrated above and grouped as great for those that showed it influenced greatly and those that expressed it had influence to a small, very small and that they did not know grouped as Less.

Table 4.9 Test Statistics

	Great	Less
Chi-Square(a)	1.200	1.200
Df	7	7
Asymp. Sig.	.991	.991

a) 8 cells (100.0%) have expected frequencies less than 5. The minimum expected cell frequency is 1.3.

The Chi Square value illustrated above at a significance of 0.991 had the same value for both the great and the small and thus they were all significant at the same point of confidence level.

On the benefits derived from E commerce.

It was grouped as follows:

Table 4.10 Benefits derived from E-commerce

Factors	Great	Small
Expanded geographical Reach	21	9
Expanded Customer Base	21	9
Increased Visibility of your bank through Search Engine Marketing	15	15
Provided Customers with valuable information about your business	20	10
Increased Customer Loyalty	10	10
Reduced marketing and advertising Costs	27	3
Validity of a contract concluded by electronic means	10	20
Enabled you to reach a narrow market (niche)	17	13

Table 4.11 Test Statistics

	Great	Less
Chi-Square(a)	1.000	1.000
df	5	5
Asymp. Sig.	.963	.963

a) 6 cells (100.0%) have expected frequencies less than 5. The minimum expected cell frequency is 1.3.

The test was significant for both the great and small as they had the same value of the Chi Square test. With a Value of one, it indicates that they had a better benefit one commerce all at the same level and this was a at a degree of freedom of 5 and at a significance of 0.963.

This as well illustrates that there is significantly higher benefits of ICT in the financial development of the banks and they have all the reasons to use ICT in their operations.

The changes faced by the banks in adoption E-commerce.

Table 4.12 Changes faced by the banks in adoption E-commerce.

Factors	Great	Small
Electronic signatures	28	2
E invoice	1	29
Taxation/customs	3	27
Security of payment	6	24
Data protection	16	14
Data retention	5	25
Validity of a contract concluded by electronic means	1	29
Privacy of personal data	4	26
Online marketing	2	28

Chi Square analysis had the following statistics.

Table 4.13 Test Statistics

	Great	Less
Chi-Square(a)	1.111	1.111
df	6	6
Asymp. Sig.	.981	.981

a 7 cells (100.0%) have expected frequencies less than 5. The minimum expected cell frequency is 1.3.

This shows that the data had a Chi Square value of 1.11 and they at a significance of 0.98 and a degree of freedom of 6. A value of 1.11 indicates that there was a very high discrepancy in the observed and the expected values and thus there was a very great benefit of E-commerce to the banks such that there were less challenges faced by the banks in terms of the services they were providing to the people.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In line with the general objective of the study, this chapter summarizes the conclusion and recommendations which were arrived at after analysis of the data. It also gives the limitations of the research and gives suggestions for further research.

5.2 Summary

The results of the research indicate that investment on ICT system and infrastructures has become a key element in productivity and growth in the banking industry. Increased investment in ICT-Capital has accelerated growth in industry. The study indicate that ICT also enables banks offer a broad variety of services to customers, coordinate branch activities, meet up with changes in government regulations and policies as well as adjust to market demands and competition.

Electronic banking also has a strong positive relationship on the overall banking performance by making workers performance more effective and efficiency; The adoption of electronic banking has enhanced the fortune of the Kenyan commercial banks. Electronic banking has improved the bank customer relationship by rendering effective services throughout the day and night in every week. Customers can now have access to their account outside working hours to make withdrawal to attend to their needs. Electronic banking has made banking transaction to be easier by bringing services closer to its customers hence improving banking industry performance.

This study shows that ICT investment has had a strong influence on the structure and the activities of the banking sector; this allows transactions to be conducted more efficiently, technology allows banks to market their products more effectively. For example, banks build up sophisticated databases containing information about their consumers, and through data mining they are then able to target their commercial efforts more precisely, knowing which range of products individual consumers might be interested in buying. Technology also affects the very products that banks sell. This has led to increased bank income.

5.3 Conclusions

Based on the results from data analysis, findings and discussions above, one can safely conclude the following:

First, commercial banks appreciate the e-commerce as evidenced by its wide adoption.

Although most commercial banks have introduced e-commerce services and products it is not yet very popular with most of their customers. This could be because the majority of the customers who the banks serve, lack enough access to information technology infrastructure, knowledge and skills. The banks should popularize the use of e-commerce by educating their customers about their use and the advantages that come with it.

Secondly, most banks implement the e-commerce facilities for the sole purpose of meeting the organization's interests like profitability and cost reduction. They should instead put into consideration other external factors like reducing environmental pollution

by not using paper. There are no legal requirements that commercial banks use e-commerce. The government can introduce such regulation in order to improve the efficiency of the banking industry as well as to reduce the banking costs incurred by the people.

Thirdly, although the benefits of implementation of e-commerce are recommendable, the distribution of such benefits should be put into consideration. This is, for example, people who cannot access internet services can be reached out by improving on easily accessible and affordable facilities like mobile banking.

Lastly, although most of the challenges we came across are inherent, most of them can be reduced. E-commerce in banks is mainly hampered by illegal access and use of restricted information. Commercial banks indicate that internet hackers and computer viruses are the main threats and also highlight that they spend significant proportion of funds on these factors.

5.4 Limitations

There was time and financial constraint in carrying out the research. The managers and some of the staff were actually too busy and reluctant to participate in the research and had to be really convinced to answer. Some respondents were biased since they feared disclosing the weaknesses of their banks.

5.5 Suggestion for Further Research

This study focused on the e-commerce products and services adopted by commercial banks and the benefits and challenges they face in adopting these services. Further studies can be focused on the perceptions of customers towards the e-commerce services offered by the banks. It will also determine the benefits derived and challenges faced by customers who use such services.

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APPENDIX I: QUESTIONNAIRE

PART A: ORGANISATIONAL DATA

1. Name (optional) _____
2. Level of education _____
3. Designation _____
4. Name of the bank _____
5. Year of incorporation _____
6. Please tick the category that best describes your bank
 - a) Foreign owned and not locally incorporated []
 - b) Foreign owned but locally incorporated []
 - c) With government participation []
 - d) Wholly locally owned []

PART B: APPLICATIONS OF E-COMMERCE

7. For each of the following bank –to- bank ecommerce services, indicate the extent to which it is applicable to your bank. Use a five point measurement scale as follows.

1= not applicable at all, 2= least applicable, 3=moderately applicable, 4= largely applicable,

5= applied to a great extent.

- a) Settlement of payment on a gross basis in real-time. [1] [2] [3] [4] [5]
- b) Settlement of government securities electronically [1] [2] [3] [4] [5]
- c) EFT electronic payment bank to bank [1] [2] [3] [4] [5]

- d) Automated clearing through EFT [1] [2] [3] [4] [5]
- e) Truncation and cheque imaging transmission [1] [2] [3] [4] [5]
- f) Electronic Funds Transfer via Electronic Data Interchange [1] [2] [3] [4] [5]

8. What other bank to bank e-services does your bank offer?

.....

9. For each of the following bank- to- customer ecommerce services, indicate the extent to which it is applicable to your bank. (Tick where appropriate)

Use a five point measurement scale as follows.

5= applied to a great extent, 4= largely applicable, 3=moderately applicable, 2= least applicable 1= not applicable at all.

FACTORS	5	4	3	2	1
Internet banking – direct access to account					
Office banking					
Home banking					
Tele banking					
Branch banking					
Mobile banking					
Electronic funds transfer (EFT)					

10. What other bank to customer e-commerce services does your bank offer?

.....

.....

PART C: REASONS FOR ADOPTION OF E-COMMERCE

11. To what extent did the following factors influence adoption of e-commerce services in your bank? (Tick where appropriate)

Where, 5 = Very great extent; 4 = Great extent; 3 = Small extent; 2 = Very small extent and 1 = Do not know

FACTORS	5	4	3	2	1
Improve customer service					
Cut down on operational costs					
Increase customer awareness on bank products					
Extend bank geographical reach					
Expand bank market share					
Increase banks' profitability					
Keep up with industry trend					
Compliance with regulations					
Response to customers' demands					
Response to customers' awareness of e-commerce services					

Are there any other reasons? Please specify.

.....

.....

PART D: BENEFITS DERIVED FROM E- COMMERCE.

12. To what extent has your organization derived the following benefits from the implementation?

of e-commerce facilities? (tick where appropriate)

Where 5 = Very great extent; 4 = Great extent; 3 = Small extent; 2 = Very small extent and

1=Do not know

BENEFIT	5	4	3	2	1
Expanded geographical Reach					
Expanded Customer Base					
Increased Visibility of your bank through Search Engine Marketing					
Provided Customers with valuable information about your business					
Increased Customer Loyalty					
Reduced marketing and advertising Costs					
Validity of a contract concluded by electronic means					
Enabled you to reach a narrow market (niche)					

13. What are the other benefits your organization may have derived from implementing e-commerce facilities?

.....

.....

PART E: CHALLENGES FACED IN ADOPTION OF E COMMERCE

14. To what extent have the following challenges affected your organization since the implementation of e-commerce facilities? (Tick where appropriate)

Where 5 = Very great extent; 4 = Great extent; 3 = Small extent; 2 = Very small extent and 1 = Do not know

CHALLENGE	5	4	3	2	1
Electronic signatures					
E invoice					
Taxation/customs					
Security of payment					
Data protection					
Data retention					
Validity of a contract concluded by electronic means					
Privacy of personal data					
Online marketing					

15. What are the challenges faced by your organization in implementing e commerce facilities?.....

.....

**THANKS FOR TAKING YOUR TIME TO FILL THIS
QUESTIONNAIRE**

APPENDIX II: COMMERCIAL BANKS IN KENYA

The following are the commercial banks which have been operating in Kenya lately.

Most of them have their head offices in Nairobi.

Foreign Banks

- 1) Bank of Africa, Nairobi
- 2) Bank of India, Nairobi
- 3) Citi bank, Nairobi
- 4) Habib Bank, Nairobi
- 5) Habib Bank A.G Zurich, Nairobi

Foreign Owned but Locally Incorporated Banks

- 1) Barclays Bank of Kenya, Nairobi
- 2) Stanbic Bank, Nairobi
- 3) Standard Chartered Bank , Nairobi
- 4) Diamond Trust Bank, Nairobi
- 5) Bank of Baroda, Nairobi

Banks with Government Participation

1. Stanbic Bank, Nairobi
2. Development Bank, Nairobi
3. Consolidated Bank Of Kenya Ltd4
4. Industrial Development Bank, Nairobi
5. Kenya Commercial Bank, Nairobi
6. National Bank of Kenya, Nairobi

Banks Locally Owned

- 1) African Banking Corporation, Nairobi
- 2) African Development Bank, Nairobi
- 3) Akiba Bank, Nairobi
- 4) Bankers Trust, Nairobi
- 5) Biashara Bank of Kenya, Nairobi
- 6) Victoria Commercial Bank, Nairobi
- 7) CFC Bank, Nairobi
- 8) Transnational Bank Ltd
- 9) Credit Bank Ltd
- 10) Guardian bank Ltd
- 11) Investment & Mortgages Bank Ltd
- 12) Middle East Bank (K) Ltd
- 13) Akiba Bank Ltd
- 14) Fina Bank Ltd
- 15) Imperial Commercial Bank
- 16) Victoria Commercial Bank
- 17) Prime Bank Ltd
- 18) Equatorial Commercial Bank
- 19) Giro Commercial Bank
- 20) Biashara Bank Ltd
- 21) Africa Banking Corporation Ltd
- 22) Chase Bank Ltd

- 23) City Finance Bank, Nairobi
- 24) Commercial Bank of Africa, Nairobi
- 25) Continental Bank of Kenya, Nairobi
- 26) Cooperative Bank of Kenya, Nairobi
- 27) East African Development Bank, Nairobi
- 28) Equity bank