

**THE EFFECTS OF TECHNOLOGICAL INNOVATIONS ON THE FINANCIAL  
PERFORMANCE OF THE COMMERCIAL BANKS IN KENYA**

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**DECLARATION**

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

Signed í í í í í í í í í í í í í í í                      Date í í í í í í í í í ..

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This research project has been submitted for examination with my approval as the University Supervisor.

Supervisor                      Signed í í í í í í í                      Date í í í í í í í í í í .

**Angela Kithinji**

## **DEDICATION**

My study is dedicated to the following: My loving family for support and patience during the entire period of my study. For their encouragement and continued prayers towards the successful completion of this course.

Finally I pay tribute and gratitude to my employer and colleagues for their understanding during the entire period of the study.

Thank you and God bless you.

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## **ABSTRACT**

A fundamental assumption of much recent research in operations improvement and operations learning has been that technological innovation has a direct bearing on performance improvements (Upton and Kim, 1999). This study therefore sought to investigate the effects of technological innovation on the performance of commercial banks in Kenya.

This study used a descriptive survey. The population of interest in this study comprised commercial banks in Kenya. The study conducted a census survey owing to the small number of commercial banks in Kenya. Primary data was collected using a questionnaire with close ended and open ended questions administered to the management staff of the commercial banks. The respondents were senior, middle and low management staff in the respective banks. Secondary data on financial data were obtained from annual reports of commercial banks which were obtained from the central bank and from individual commercial banks. Data for this study was both quantitative and qualitative hence both descriptive and content analysis techniques were employed. Content analysis was used to analyse the qualitative data collected while descriptive methods were used to analyse quantitative data. Tables were used to summarize responses for further analysis and facilitate comparison. This generated quantitative reports through tabulations, percentages, and measure of central tendency.

The study concludes that the banks had employed various technological innovations. These included ATM services, mobile phone transactions and internet based banking services. The study further concludes that technological innovations had lead to improved financial performance of commercial banks in Kenya. This was through increased bank sales, profits increment and return on equity. The study recommends that for banks to be highly competitive, they need to employ modern technological innovations such as internet based banking services.

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## **LIST OF ABBREVIATIONS**

ATM	Automated Teller Machine
CBK	Central Bank of Kenya
CEO	Chief Executive Officer
DCs	Developing Countries
R & D	Research and Development
SIN	Systems Integration and Networking
SME	Small and Medium Enterprises
SPSS	Statistical Package for Social Sciences

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

An organisation which is competing in fast changing markets with fast changing technology must make things happen, it must innovate. If it does not innovate it risks being overtaken by competitors. Sometimes a business underestimates the competitive challenges it faces. The risk of this happening is high when competitors react to potential challenges in much the same way (Abernathy and Utterback, 2005).

In today's global and dynamic competitive environment, product innovation is becoming more and more relevant, mainly as a result of three major trends: intense international competition, fragmented and demanding markets, and diverse and rapidly changing technologies (Wheelwright and Clark, 1992). Firms that offer products that are adapted to the needs and wants of target customers and that market them faster and more efficiently than their competitors are in a better position to create a sustainable competitive advantage (Calantone, 1995). Competitive advantage is increasingly derived from knowledge and technological skills and experience in the creation of new products (Teece, 2003; Tidd , 2001).

Banking institutions must play a catalytic function to develop technological innovation-driven economy. The experience of developed countries has evidently demonstrated that a shift of government's industrial policy-making towards a technological innovation-driven economic strategy is absolutely critical. Allegedly successful industrial policy performs an important function in fostering firms to inculcate a culture-based spirit of innovation and addresses firms' concerns in the realm of innovation pursuits (Goh, 2002).

Technological innovation is used to refer to the process through which technological advances are produced (Goh, 2002). The innovation process includes a set of activities that contribute to increase in the capacity to produce new goods and services (product innovations) or to implement new forms of production (process innovations). Therefore, the concept of technological innovation is associated with the idea of a flow of generation, application, dissemination of technologies.

The words 'technological innovations' are usually used interchangeably in innovation process, such as: technological change, technical progress, technological development or simply innovation. Traditionally, industrial economists break down the process of technological innovation into a sequence consisting of three phases: invention, innovation and diffusion. Furthermore, in a great deal of research, due to the availability of statistical data on research and development (R&D) spending, technological innovation is identified with research (pure and applied) and technological development (Roehm and Sternthal, 2001).

The same terms have been used in management literature, when dealing with the technological innovation process. Recently, however, a change in orientation has taken place and other concepts are beginning to be used such as: 'organizational learning' (Argyris and Schön, 1996), 'knowledge creation' (Nonaka and Takeuchi, 1995), 'routine creation' (Nelson and Winter, 1982), 'asset accumulation', 'core competency development' and 'dynamic capability development' (Teece *et al.*, 1997). All of these terms describe the flow of the generation of new knowledge within organizations, and therefore refer to phenomena that are analogous to the technological innovation process.

The concepts of learning and knowledge creation are often used to describe the innovation process: 'Companies innovate through a constant learning process through which they generate new technological knowledge' (Nonaka and Takeuchi, 1995). Furthermore, it has been recognized that the innovation process in companies basically consists of the development of new routines, since 'the conversion of an organization's activity into a routine constitutes the main form of storage of that organization's specific operational knowledge' (Nelson and Winter, 1982). The innovation process has also been associated with the creation of core competencies and with the development of dynamic capabilities.

Technological innovations have re-cultivated researcher interest towards the field of consumer innovation adoption (Danaher *et al.*, 2001). Robertson (1971) classifies innovations based on their impact on behavior and social structure into continuous, dynamically continuous, and discontinuous. Technological innovations are most likely to fall into the discontinuous innovation category (Moore, 1999) and can thus be regarded as knowledge intensive innovations. The knowledge needed for technological innovation comprehension is likely to be contingent upon the aspects of technology. According to Rogers (1995), technology consists both of a

software and a hardware component; the hardware aspect embodies the technology as a material or physical object (e.g. computers have hardware such as semiconductors and electric cables) and software is the information base used (e.g. coded commands and instructions and other information aspects). In many instances the software part of technology is less observable than the hardware part, but should nevertheless be taken into consideration when researching technology (Rogers, 1995). The hardware-software mixture present in technological innovations implies that consumers might need to combine their knowledge from several domains for complete innovation comprehension; i.e. according to Rogers' distinction both hardware and software knowledge would be needed.

Technological change has been described by technology push (Schumpeter, 1939) and demand pull or their interaction as triggers of innovation. More recently (1990s), the theoretical analysis has moved towards the theory of technological innovation as an interaction within a network of companies identified in the systems integration and networking (SIN) model (Rothwell, 1992b).

Commercial banks in Kenya have developed new technological innovations that have influenced their financial performance. This includes mobile banking technologies, electronic money transfer, internet banking transactions, ATM deposits and withdrawals, online account opening among others. All these technological innovations contribute heavily in building customer base, capital base as well as enhancing their profitability which results to influence on their financial performance.

Rothwell, (1992b) argue that technology push is not enough because it can be constrained by the power of technological change in shaping the competitive dynamics of an industry. In other words, technology push is not stable because rapid technological changes create many alternatives from which firms choose their technology strategy. Nor does demand pull provide a complete explanation in circumstances where customers lack the necessary foresight of possibilities in a world with radically new products or systems. To say it the other way round, Hamel and Prahalad (1994) suggest that innovations come to be seen as a result of collaboration for integration of skills and capabilities when competing for the future market.

One important driver of organizational learning is experience with process technology. Organizational learning might be said to occur as an organization and its members build a

knowledge base of action-outcome relationships relevant to its tasks and technologies (Argote, 1999). These knowledge bases have been called technological knowledge (Bohn, 1994). As technological knowledge bases become more complete through learning, knowledge is said to be mature (Bohn, 1994). In developing his model of knowledge maturity (Bohn, 1994) focuses on what he calls technological knowledge.

Technological knowledge can develop from complete ignorance to mature knowledge (Bohn, 1994), as organization members experiment, encounter errors, draw inferences, and learn. When technological knowledge is immature, there will be many low cost occasions for learning that have significant returns. Organizations with immature technological knowledge learn rapidly and enjoy strong productivity gains as they "harvest the low-hanging fruit", while organizations with mature technological knowledge have to search more carefully for learning opportunities, work harder to exploit them and enjoy smaller returns to learning (Utterback, 1994).

The financial performance of banks and other financial institutions is usually measured using a combination of financial ratios analysis, benchmarking, measuring performance against budget or a mix of these methodologies (Barley, 2000). The common assumption, which underpins much of the financial performance research and discussion, is that increasing financial performance will lead to improved functions and activities of the organizations. The subject of financial performance and research into its measurement is well advanced within finance and management fields. It can be argued that there are three principal factors to improve financial performance for financial institutions; the institution size, its asset management, and the operational efficiency (Bijker, 2007).

Chien Ho, and Song Zhu (2004) showed in their study that most previous studies concerning company performance evaluation focus merely on operational efficiency and operational effectiveness which might directly influence the survival of a company. By using an innovative two-stage data envelopment analysis model in their study, the empirical result of this study is that a company with better efficiency does not always mean that it has better effectiveness. A paper in the title of efficiency, customer service and financing performance among Australian financial institutions (Elizabeth Duncan, and Elliott, 2004) showed that all financial performance measures as interest margin, return on assets, and capital adequacy are positively correlated with customer service quality scores.

Further, banks regarded the increase in environmental attitudes in society as a business opportunity. They subsequently created specialized credit products and mortgages as well as green or socially responsible funds, which invest in environmentally friendly or sustainable firms (Jolly, 1997). Technological innovations were introduced into the banks to enhance quality of services and products, efficiency and delivery. Technological innovations continue to take part in credit, risk prevention and control of funds in budgeting (Nystrom, 2009).

The Companies Act, the Banking Act, the Central Bank of Kenya Act and the various prudential guidelines issued by the Central Bank of Kenya (CBK), govern the Banking industry in Kenya. There are forty-six banks and non-bank financial institutions, fifteen micro finance institutions and forty-eight foreign exchange bureaus in Kenya. Six of the major banks are listed on the Nairobi Stock Exchange. The commercial banks and non-banking financial institutions offer corporate and retail banking services but a small number, mainly comprising the larger banks, offer other services including investment banking.

The Kenyan Banking sector has demonstrated a solid growth over the past few years. The industry continues to offer significant profit opportunities for the major participants. Profit after tax of the overall banking system increased by 38.61%, or Kshs 5.08 billion, from Kshs 13.15 billion in December 2005 to Kshs 18.22 billion in December 2006. This growth is a continuation of the strong growth in profit after taxes that the industry has achieved for the past several years. (The Kenyan Banking Sector Report ,2007).

Key issues affecting the banking industry in Kenya include; changes in the regulatory framework, where liberalization exists but the market still continues to be restrictive, declining interest margins due to customer pressure leading to mergers and reorganizations, increased demand for non-traditional services including the automation of a large number of services and a move towards emphasis on the customer rather than the product and introduction of non-traditional players, who now offer financial services products.

Among the key trends is what appears to be the strong emergence of technology driven banking services in Kenya .Banking is edging away from over reliance on traditional banking halls to other platforms supported by technology and in particular telecommunications .This is emerging

as threat to the banks because it has enabled non bank competitors like safaricom short circuit banks by offering cheap money transfer (The Kenyan Banking Sector Report ,2007).

There is also an emerging strategy of the banks trying to curve out underexploited but potentially viable niches like mortgage financing, Islamic banking and SME banking among others .The distinction between the traditionally big banks and small banks is somewhat fading as far as product offering is concerned .

## **1.2 Statement of the problem**

A fundamental assumption of much recent research in operations improvement and operations learning has been that technological innovation has a direct bearing on performance improvements (Upton and Kim, 1999). Strategic management in the banking sector demand that banks should have effective systems in place to counter unpredictable events that can sustain their operations and minimize the risks involved through technological innovations. Only those organisations that are able to adapt to the changing environment and adopt new ideas and ways of doing business that can be guaranteed hope of survival. Some of the forces of change that have greatly influenced the performance of commercial banks include mainly technological advancement.

According to Goh, (2002) there are numerous barriers to innovation in developing nations. The developing countries with low literacy rates and weak higher educational systems often face a great deal of difficulties assimilating new technologies for innovation development as they lack the essential human capital to leverage on technological developments, scientific knowledge and technical skills. There is also inadequate intellectual property rights protection often create a disincentive for banks to engage in innovation development through research and development (R&D), as the economic spin-offs associated with their innovation efforts are diminished very quickly once made available in the public domain. The innovation projects often involve high risks, long gestation periods and therefore require huge amounts of financial resources to share risks and costs, and hence restrictive ownership policies on direct investments often hamper private sector or foreign participation in technological innovation projects (Roehm and Sternthal, 2001).



Locally, Gitonga (2003) did a study on innovation processes and the perceived role of the CEO in the banking industry while Kihumba (2008), conducted a study on the determinants of financial innovation and its effects on banks performance in Kenya. Kihumba's study focused on financial innovation as a strategy and thus did not cover the effects of technological innovations on the financial performance of the commercial banks in Kenya. None of these studies have focused on the effect of technological innovation on the performance of Kenyan banking industry. This study therefore sought to fill this lacuna in knowledge by investigating the effects of technological innovation on the performance of commercial banks in Kenya.

### **1.3 Objectives of the Study**

The objectives of this study were:

- i. To identify the technological innovations adopted by commercial banks in Kenya.
- ii. To investigate the effects of technological innovations on the financial performance of commercial banks in Kenya.

### **1.4 Importance of the Study**

This study is expected to benefit the commercial banks in Kenya as they would be able to know what technological innovation to use in order to remain competitive and effective in the banking industry.

The results of this study would also be invaluable to researchers and scholars, as it would form a basis for further research. The students and academics would use this study as a basis for discussions on the technological innovation strategies adopted by banking industry in Kenya and their effect on performance.

The Central Bank of Kenya would also find the results of this study very invaluable, as it would be able to ascertain the extent of competition in the industry and the innovation strategies that mitigate the effect of such competition to an individual firm and as so determine whether such strategies adopted in the industry conform to the guidelines provided for the industry by the government.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter reviews studies that have been done in the area of technological innovation and firm performance. The specific areas covered here are innovation, technological innovation, models of technological innovation, adoption of technological innovation, new approaches to technological innovation, technological innovation process, factors affecting the adoption of technological innovation (firm's external potential sourcing and networking, firm-specific characteristics and firm's environmental condition), and technological innovation and firm performance.

#### 2.2 Technological Innovation

Innovation is derived from the Latin word *novus*, meaning new. It is defined by dictionary as "introduction of something new or a new idea, method or device (Tornatzky and Fleischer, 1990). In this study, the word innovation refers to technological innovation as opposed to any other form of innovation. Among the variety of definition, technological innovation is considered as a process which is science, technology and system based. This process includes several factors affecting and affected by the firm's internal capabilities, its networking and its technological learning ability and influenced by its environmental factors. It would mobilise all existing potential resources to augment the firm's innovation capacities, ending with the introduction of a new or better product and/or production process.

Then, the core concentration in this research is not necessarily upon everything, which is new in the world or in time and place. Rather, the emphasis is placed on those minor or major changes in products and production processes that involve human activities and end to the new or better ones for the firm or its economy, regardless of their introduction before elsewhere. These changes include the adaptation, imitation and associated development efforts in technology evolution process.

Technological innovation and the appropriate implementation of new technologies are a fundamental part of development process of all nations. The literature evidence reveals that

successful technologies in each nation are those which rooted in their own indigenisation efforts. Indigenous technological innovation can originate just as much from a re-invention of historical techniques or an adaptation of local technology as from advanced industrialised countries.

Research on technological innovation, broadly defined, forms a huge body of research focused on problems of technology-based change in organizational and social settings (Rogers, 1995; Drazin and Schoonhoven, 1996). The popularity of the technological innovation approach in IS research testifies to its usefulness. Theories of innovation have been used to explain the adoption patterns of information technologies ranging from personal computers and spreadsheets to business computing and inter-organizational systems such as electronic data interchange (Iacovou *et al.*, 1995). A body of research devoted specifically to IS adoption and implementation has developed (Swanson, 1994), using this literature as a base. It is fair to say that research on technological innovation, particularly on the adoption and diffusion of innovations, has become the dominant approach to adoption, implementation, and use issues in IS research.

While undeniably popular and useful, this traditional approach to innovation adoption and diffusion has well-understood limitations that have been identified by innovation researchers themselves (Rogers, 1995; Wolfe, 1994; Drazin and Schoonhoven, 1996).

### **2.2.1 Models of Technological Innovation**

The early innovation models were the linear models of innovation. These simplistic models were replaced by the interactive model of technology push and market pull and later, by the value build up model by Jolly (1997). The models of innovation can be classified using, iteration in and adoption of the innovation, as the classifying variable. Iterative models look at the interactions of the people involved in the innovation process whereas adoptive models examine the feedback after the innovation has been adopted. Innovation is viewed as an outcome of numerous organizational iterations in the technology push-market pull model and the value build up model. Two kinds of adaptive models are discussed in literature: static and dynamic models, based on feedback after the innovation diffusion. In static models there is no feedback after the user has adopted the innovation, which is not the case with dynamic models of innovation. Chiesa *et al.* (1988) provides an excellent review of articles related to the technological

innovation ó more than 100 articles have been examined. Literature also indicates the demolition of the linear model of innovation (Freeman, 1996).

The interest in the technological innovation process still continues in response to capitalize the tremendous opportunities offered by new technologies. It is now also well acknowledged that the process of technological innovation is a complex process and many actors hold a role in it (Afuah, 1998). The presence of the various actors and champions is a necessary condition for innovative output but not sufficient enough. Questions of organizational integration, environment assessment and the development of technological capabilities are crucial to the process.

### **2.2.2 Approaches to Technological Innovation**

The social shaping of technology approach investigates how organizational, political, economic, and cultural issues shape the process of technological change (Williams and Edge, 1996). In this tradition, social groups with particular visions, interests, and interpretations of reality form complex networks of practice which create and sustain sociotechnical systems (Bijker and Law, 1992). This approach takes particular issue with the pro-innovation bias of traditional innovation studies, arguing that technological success has to be explained rather than assumed. It also considers technology to be flexible and open to reinvention during key periods.

The economics of technological innovation approach studies the role of technological change in economic growth and efficiency (Rosenberg, 1994). This literature is interested in challenging and expanding economic theory to include a better account of the technological change process. It is very much concerned with population-level dynamics and the economic consequences of innovation.

The technology and business strategy approach focuses on how technological change influences the structure of industries, and the success of businesses (Utterback, 1994). In this literature, technological change cycles between periods of radical and routine innovation, as companies struggle to position themselves relative to the dominant technological designs that emerge through a complex interaction of strategic intent, technological advance, and regulation.

Finally, the literature on technology and organizational structure studies how technological change influences the structural aspects of organizations, such as hierarchy and formalization

(Brown and Eisenhardt, 1997). This approach also contributes to an understanding of the consequences of innovation.

### **2.2.3 Technological Innovation Process**

The literature is developing arguments about the technological innovation process that challenge traditional adoption and diffusion theory. While it would be naive to suggest that one set of assumptions about innovation is right or wrong for all possible research projects, enough work has been done to suggest that the traditional approach to innovation research should not automatically be seen as the source of correct assumptions. Other claims about the technological innovation process are worth explicitly considering, particularly for information system research.

Technological innovation is fundamentally competitive and conflictual. Management researchers, sociologists, and economists all agree that, despite the need for cooperation in technology development and diffusion, technological innovation fundamentally takes place within a competitive and conflictual atmosphere. For the social shaping of technology theorists, different social groups are inevitably involved in technological innovation (Bijker, 1992), each with their own interpretation of what the technology is, and what problem it is trying to solve. For technological innovation to happen, networks of interest groups must be attracted into a new technological system, and their commitment to it preserved (Bijker and Law, 1992). For the economists of innovation, technological innovations compete for scarce resources and have uncertain returns (Rosenberg, 1994). Within the firm, each stage of the innovation process – expressing the idea, exploring the feasibility, building prototypes – can be seen as a separate hurdle where a number of ideas are in fierce competition with each other (Jolly, 1997). Between firms, the rapidity of technological innovation puts organizations under severe pressure to innovate effectively (Brown and Eisenhardt, 1997) and to maneuver strategically within their industries to establish commercially lucrative positions for themselves in the face of technological change (Utterback, 1994).

Technological innovation is underdetermined – there is no single best solution. To state that technological innovation is underdetermined is to say that technical principles are insufficient by themselves to determine design (Feenberg, 1995). The research traditions mentioned above subscribe to the view that the natural attributes of technology are not sufficient to explain

technological innovation, though they differ in the importance they attach to this belief. For the social shaping of technology theorists, the belief that technological innovation does not unfold according to some predetermined technical logic is critical (Williams and Edge, 1996). The particular path that technological innovation takes is something to be explained, rather than simply adjusted to. Studies of the management of innovation, and innovation adoption, acknowledge that the seemingly "best" technology does not always become the most widely accepted (Utterback, 1994). While the economists of innovation believe that technological "trajectories" make some innovation paths more likely than others (Dosi, 2005), the complex interplay between technological supply and market demand cannot be captured strictly with reference to the characteristics of technology. Even in the literature on technology and organization structure, which has argued for the strongest links between the nature of technology and organizational forms, there is a recognition that technological change serves as an occasion for restructuring (Barley, 1990), and the same technology can occasion quite different organizational outcomes.

Technological innovation cycles between periods of stability and change. A wide range of technological innovation research suggests that the innovation process fluctuates between periods of relative stability and periods of relative change. Research on innovation and business strategy in particular has argued that the nature of innovation changes over time. Periods of more incremental innovation, in which technology appears to develop along well understood paths, are then abruptly followed by periods of more radical innovation, in which the certainties of the past era are abandoned (Utterback, 1994; Tushman and Rosenkopf, 2002). Eventually, a radical innovation becomes more widely accepted, and settles back into relatively well understood incremental innovation. The economists of innovation refer to waves of change, in which the nature of technological innovation changes over the "lifecycle" of a technology (Freeman, 1990). The social shaping of technology theorists see the "firming up" of technology as the process of stabilizing interpretations and relationships around a technology as one of the key processes to be explained (Bijker *et al.*, 2007). While technology can become more "closed" over time for the social shaping theorists, the contingency of social life ultimately works to reopen previous controversies and pursue new opportunities. Each of these three claims offers an alternative starting point for the investigation of information systems as technological innovation.

## **2.3 Factors Affecting the Adoption of Technological Innovation**

The process of technological innovation at the firm level depends upon a number of inter-related factors which range across all sections of a firm and is strongly influenced by the interplay of many components in the firm's external environment. In this respect, the major focus of this study was to analyse the influence of various factors on cultivating technological innovative activities within manufacturing firms. Boland, (2007) model shows how technological innovation behaviour is influenced by three elements: the firm-specific characteristics, its external technology-based relationships and its environment including the impact of national and international factors.

### **2.3.1 Firm-specific Characteristics**

This refers to the most important determinants that explicitly influence the firm's technological innovation behaviour. These are a combination of factors including firm's contextual variables, managerial and employment structures, organisational structure, technological infrastructure and staff-skill development. The firm's contextual variables, here, refer to its ownership structure, size, production location, age, experience and its industrial sector (Mansfield, 2001; Andriessen, 2001).

### **2.3.2 Firm's External Potential Sourcing and Networking**

This refers to its networking configuration. This network consists of firm's technological relationships including technological collaborations, technology transfer relationships and technical feedback, with other firms, institutes, organisations, customers and agents (Kelly and Brooks, 2008; Mansfield, 2001).

### **2.3.3 Firm's Environmental Condition**

Firm's environmental condition points to the factors, which indirectly influence technological innovation process of the industrial sector. In this research, the effects of government policies and the role of financial systems as initiatives for cultivating innovative activities are explored (Adam and Farber, 2000; Nelson, 1995).

## 2.4 Financial Performance

Performance is the outcome of all of the organisation's operations and strategies (Wheelen and Hunger, 2002). Measuring financial performance accurately is critical for accounting purposes and remains a central concern for most organisations. Performance measurement systems provide the foundation to develop strategic plans, assess an organisation's completion of objectives, and remunerate managers (Ittner and Larcker, 1998). Although assessment of performance in the marketing literature is still very important, it is also complicated (Pont and Shaw, 2003). While consensual measurement of performance promotes scholarly investigations and can clarify managerial decisions, marketers have not been able to find clear, current and reliable measures of performance on which marketing merit could be judged. Two approaches have been adopted in the literature to measure financial performance. Longer term performance has been chosen for two reasons: firstly because that is what the customers of ðetailö products such as unit trusts might be expected to be looking at, particularly in view of the charging arrangements which make shorter term investment unwise. Secondly, one of the attractions of looking at ðrealö products rather than theoretical studies is the question of how administrative costs contribute to the results. In principle, such costs might appear in either front-end, or regular annual management charges. Using five-year offer-to-bid figures should capture such effects regardless of the choices of individual firms as to how to split costs between the two types of charges.

Financial performance is essential to the survival of firms in the competitive and uncertain environment. Management is eager to learn how the effort of service quality improvement is related to an organization's performance (Sousa and Voss, 2002). Financial performance ultimately reflects whether or not service quality is realized in a firm. Financial performance is conceptualized as the extent to which a firm increases sales, profits, and return on equity. These are indicators of financial performance and manifest the wellbeing of a firm collectively.

Traditionally, the financial performance of banks and other financial institutions has been measured using a combination of conventional accounting measures and risk and return measures. Further analysis of financial performance has used methodologies such as financial ratio analysis, benchmarking, measuring performance against budget or a combination of these



(Barnett and Salomon, 2006). Financial statements published in commonly include a variety of financial ratios designed to give an indication of the institution's performance.

As with any method of analysis designed to measure business performance, there are limitations and imperfections associated with the use of financial ratios, particularly the use of very few ratios in isolation (Goh, 2003). Hence this research endeavours to bring together several performance measures, financial ratios, and linear programming techniques and investigate the interplay between them rather than focusing on any individual measure in isolation.

Simply stated, much of the current bank performance literature describes the objective of financial institutions as that of earning acceptable returns and minimizing the risks taken to earn this return (Pont and Shaw, 2003). There is a generally accepted relationship between risk and return, that is, the higher the risk the higher the expected return. Therefore, traditional measures of bank performance have measured both risks and returns (Swanson, 1994).

## **2.5 Technological Innovation and Financial Performance**

Technology is one of the key elements that define a society or civilization. The critical role of technological innovation in the development of a company and its contribution on the economic growth of firms has been widely documented. Ayres (2008) identified technology as the wealth of companies. According to Abernathy and Utterback, (2005) the primary role of technological innovation is to assure the survival of the entity, as well as the business ecosystem, which in turn is based on achieving sustainable financial performance.

Gerstenfield and Wortzel (2007) analyzed the relationship between the usage of Internet-based innovation technologies, different types of innovation, and financial performance at the firm level. Data for the empirical investigation originated from a sample of 7,302 European enterprises. The empirical results show that Internet-based innovation technologies were an important enabler of innovation in the year 2003. It was found that all studied types of innovation, including Internet-enabled and non-Internet-enabled product or technological innovations, are positively associated with turnover and employment growth. Finally, it was found that innovative activity is most of the time associated with higher profitability.

According to Adam and Farber, (2000), in the organizational context, technological innovation may be linked to performance and growth through improvements in efficiency, productivity, quality, competitive positioning and market share, among others. They also found that technological innovation is positively related with performance. During the last few decades, developing countries (DCs) have striven to be successful in the process of technology development. For technological development purposes, it is necessary to develop the four inter-related components of technology named human ware, orgaware, inforware and technoware at the same time and in parallel. However, most of researches on technology development process in DCs have focused on sequential analysis as acquisition, absorption and diffusion of technology. This sequential approach assumes that all technology innovations occur in the same way in all companies and does not distinguish between the kinds of technologies as products and processes, each of which may follow a different path (Abernathy and Utterback, 2005). Further, technology development process in relation to the in-firm characteristics as well as extra-firm's situation is much more complex and dynamic. Historical evidence shows that DCs were pioneer in innovation. United Nations (1991) reckons that there have been three distinct epochs in the technological innovation of DCs.

Regarding the importance of technological innovation, there are a huge body of knowledge like, technological innovation is a means of survival and growth of industrial sectors or technological innovation is recognized as a major contributor of economic growth and a dominant factor of business success not only in developed countries but also in DCs (Pack and Westphal, 2006; Wilkinson, 2003). Gerstenfield and Wortzel (2007) suggested that one of the requirements for economic and industrial development of DCs is their ability to innovate successfully. According to Tefler (2002), a company must innovate or die, the process of innovation is fundamental to a healthy and viable organization. Those who do not innovate ultimately fail.

Hill and Utterback (2009) identified technological innovation as a major agent of development and change in societies which has been linked to rising productivity, employment growth and a strong position in export markets, trade and improved quality of life. However, the inherent complexity of the process of technological innovation and its involvement in interaction with different environmental as well as industry-specific factors, made studies of the characteristics of technological innovation seem difficult to carry out. However, Lall (1980) stressed that a

significant amount of technological innovation is taking place in the modern sectors of DCs, particularly in those with relatively long experience of manufacturing and with broad -based capital good sectors. To Lall, these innovations include changes in broad sense. They encompass increase in productivity and efficiency from simple learning by doing, advances in the designing, constructing and managing complex and advanced industrial processes and a manifestation of the ability to innovate technologies in the areas of medium to high.

## **2.6 Empirical Studies**

Rycroft and Kash (1999) claim that innovation requires a process of co-evolution between technology and cultural perspectives. Technology exerts a significant influence on the ability to innovate and is viewed both as a major source of competitive advantage and of new product innovation (Gunasekaran et al., 1996). Often, banks experience problems in this area, which are caused by lack of capital expenditure on technology and insufficient expertise to use the technology to its maximum effectiveness (Alstrup, 2000).

Hammer (1990) stresses that organisations should "obliterate rather than automate" believing that technology is often introduced for technology's sake without contributing to the overall effectiveness of the operation. However, banks traditional lack of resources usually results in a compromise situation (Vossen, 1999). It is important to link technology to innovation in sustaining competitiveness. Organisations that can combine customer value innovation (Kim and Mauborgne, 1999) with technology innovation have an increased chance of enjoying sustainable growth and profit.

There are numerous definitions of innovation in the literature; however, most definitions share common themes relating to knowledge, which may be turned into new products, processes and services to improve competitive advantage and meet customers' changing needs (Nystrom, 2000). Carnegie and Butlin (2003) define innovation as "something that is new or improvement done by an enterprise to create significantly added value either directly for the enterprise or directly for its customer." Livingstone et al. (1998) refer to innovation as "new products or processes that increase value, including anything from patents and newly developed products to creative uses of information and effective human resource management systems".

Literature continually advocates that evaluation is a necessary process to establish whether innovation has been effective in meeting individual and organizational priorities. This enables judgments to be made, about cost effectiveness and to aid organizational learning and improvement. Despite innovation absorbing real and substantial costs, and considering Culkin and Smith (2000) conclusion that the clarity of organizational objectives in terms of innovation has led to an increased emphasis on the evaluation of return on investment, Ekvall, (1999) observes that systematic evaluation rarely occurs within organisations. Making causal connections between investment in innovation, and future management performance and organisation success is externally difficult. Francis (2000) highlights the difficulty in establishing a statistical link between the incidence of innovation and company performance. Similarly, Tidd, Bessant and Pavitt (2001), found that the literature tends to focus heavily on training and education, and is primarily concerned with measuring the inputs, process and immediate outcomes rather than the longer-term impact of innovation.

Han, (2001) indicates that some innovations are built on existing products, services, or procedures, and are incremental in nature. Others involve greater degrees of difference and are more radical than incremental. Some innovators aim to be first, others aim for second place. He adds that a different dimension of innovations is the degree to which they imitate something already familiar.

The middle portion of the framework, creativity and ideas management, selection and portfolio management and implementation management, comprises the processes necessary for carrying out or developing an innovation. The process used in carrying out an innovation task requires an understanding of how firms manage the process of developing new products and services. Development includes the process of generating, selecting, and transforming ideas into commercially viable products and services. Several studies suggest that firms with high performance in innovation usually have a formal process for developing new products and services.

This formal process includes creativity and ideas management, selection and portfolio management and implementation management. Creativity and ideas management is the stimulation of ideas addressing customer requirements. The scope of ideas should be wide and all employees should be involved and ideas from customers cultivated. Selection and portfolio

management provides an efficient means to select from the many ideas generated and choose the best ideas for implementation. Implementation is the fundamental capability to turn new ideas. The Human resource management element of the framework deals mainly with people and organization climate issues: the underlying impetus of innovation management is the need to create an environment where employees are motivated to contribute to innovation. An effective human resource policy that supports innovation and encourages the development of an innovative organization is needed. Von Stamm, (2003) suggest that firms should focus on norms that support creativity and implementation in order to build an innovative culture. Rewarding employees for their innovation effort is one way to build an innovative culture. Studies have confirmed that the type of reward mechanisms that best practice firms offer to their employees have been based on financial and non-financial rewards.

The adoption and diffusion approach to technological innovation has many attractive features for IS research. Adoption is conceived as a social change process, in which an innovation is communicated over time among members of a social system (Rogers, 1995). While accounting for the nature of social systems and social relationships, this theory focuses on perceived attributes of a technology, such as relative advantage, compatibility, and complexity (Moore and Benbasat, 1992). This approach has created a cumulative research tradition that allows us to place IS research in the context of other technology-based social changes.

The adoption and diffusion approach to technological innovation has well-understood limitations, however, that have been identified by innovation researchers themselves. Some of these limitations are methodological, and have to do with defining technology characteristics that allow cross-study comparisons (Wolfe, 1994), the difficulties of recalling past adoption decisions accurately (e.g. Rogers, 1995), and the related inconsistency of previous research findings (Wolfe, 1994).

The more important limitations for IS research, though, are the conceptual assumptions imposed by the theories themselves. One extremely important assumption of this kind is the pro-innovation bias of adoption and diffusion research (Rogers, 1995). The adoption and diffusion approach has a strong bias towards assuming that a technological innovation is positive, and will be adopted by a target population over time. This bias tends to lay the blame of poor adoption on adopting individuals and organizations, rather than on systems or situations, and does little to

help IS research understand the crucial problem of trying to learn which innovations will be beneficial, and which will not. Another fundamental limitation is the lack of attention to community- and population-level dynamics (Drazin and Schoonhoven, 1996). The adoption and diffusion approach is poorly equipped to understand how different groups interact in the production and provision of innovation, including the influence of consumers on producers. Other limitations have been identified with respect to the relative lack of attention to the adaptation and reinvention of innovations by users, and to the relative neglect of the consequences of adoption and diffusion, again stemming from the original conceptualization of fixed, unchanging innovations being diffused from producers to adopters. These limitations are potentially worrying for IS research, which must cope with a technology that has blind alleys as well as glittering successes, where the industry dynamics are extremely complex, where the technology is flexible and reconfigurable, and where the consequences of adoption are both important and uncertain.

Gitonga (2003) did a study on innovation processes and the perceived role of the CEO in the banking industry. His study suggests that banks should focus on norms that support creativity and implementation in order to build an innovative processes. Kihumba (2008) conducted a study on the determinants of financial innovation and its effects on banks performance in Kenya. This study concluded that technological innovations influence the structural aspects of banks in Kenya particularly on financial innovation as a strategy. Use of various aspects of technological innovations is thus expected to have great effects on the financial performance of an organization.

## **2.7 Conclusion of Literature Review**

The available literature shows that there exist a strong relationship between technological innovations and financial performance of financial institutions such as banks. As noted by Ayres (2008) technology affects the wealth of companies. There is, however, need to investigate the specific effects of these technological innovations with a specific reference on commercial banks. This is due to the research gap that exists as no study has been done to investigate the effects of technological innovations on financial performance of commercial banks despite their strategic positioning to adopt technological innovations. The available literature provided insights on how different technological innovations are adopted in different contexts. Due to

contextual, sector, and managerial differences among the organizations issues of technological effects on financial performance gained from these studies may not be assumed to explain effects of technological innovations on financial performance of the commercial banks in Kenya. It is in this light that the researcher carries out a study on the effects of technological innovations on financial performance of the commercial banks in Kenya.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter sets out various stages and phases that were followed in completing the study. It involves a blueprint for the collection, measurement and analysis of data. This section was an overall scheme, plan or structure conceived to aid the researcher in answering the raised research question. In this stage, most decisions about how research was executed and how respondents were approached, as well as when, where and how the research were completed. Therefore in this section the research identified the procedures and techniques that were used in the collection, processing and analysis of data. The following subsections were included; research design, target population, data collection instruments, data collection procedures and data analysis.

#### **3.2 Research Design**

This study used a descriptive survey. A descriptive study attempts to describe or define a subject, often by creating a profile of a group of problems, people, or events, through the collection of data and tabulation of the frequencies on research variables or their interaction as indicated by Cooper and Schindler (2003). Descriptive research is more rigid than an exploratory research and seeks to describe uses of a product, determine the proportion of the population that uses a product, or predict future demand for a product. Orodho (2004) notes that the choice of the descriptive survey research design was made based on the fact that in the study, the research was interested on the state of affairs already existing in the field and no variable would be manipulated.

#### **3.3 Population of Study**

The population of interest in this study comprised commercial banks in Kenya. There were 43 commercial banks in Kenya as of December 2009 (CBK Report, 2009). The study conducted a census survey owing to the small number of commercial banks in Kenya.



### **3.4 Data Collection**

Primary data was collected using a questionnaire with close ended and open ended questions administered to the management staff of the commercial banks. The questionnaire was divided into two parts. The first part was mainly on the background information. This was to enable the researcher get an indication of the nature of the company, while the second part was on technological innovations and their effects on performance of the commercial banks in Kenya.

The targeted respondents were senior, middle and low management staff in the respective banks. The population under study was appropriate because it represented several categories in the financial market and in different sizes and situated in different areas of the country thus more representative.

The questionnaires were self administered. The researcher sent them through hand delivery to the respondents and asked them to complete the questionnaires. The researcher followed up on the respondents to closely monitor the administration of the questionnaires.

Secondary data on financial data were obtained from annual reports of commercial banks which were obtained from the central bank and from individual commercial banks.

### **3.5 Data Analysis**

Before processing the responses, the completed questionnaires were edited for completeness and consistency. The data were then coded to enable the responses to be grouped into various categories. Data for this study was both quantitative and qualitative hence both descriptive and content analysis techniques were employed. Content analysis was used to analyse the qualitative data collected while descriptive methods were used to analyse quantitative data.

The descriptive analysis technique was employed. The descriptive statistical tools helped the researcher to describe the data and determine the extent to be used. The findings were presented using tables and charts. The Likert scale was used to analyze the mean score and standard deviation, which helped in determining the impact of technological innovation on performance in the Kenyan banking industry. Data analysis used SPSS version 16. Tables were used to summarize responses for further analysis and facilitate comparison. This generated quantitative reports through tabulations, percentages, and measure of central tendency. In addition, to

quantify the strength of the relationship between the variables, the researcher used Karl Pearson's coefficient of correlation. This was used to measure technological innovations that affect the financial performance of the commercial banks in Kenya.

### **3.6 Data Validity and Reliability**

The researcher carried out a pilot study to pretest the validity and reliability of data collected using the questionnaire. According to Berg and Gall (1989) validity is the degree by which the sample of test items represents the content the test is designed to measure. Content validity which was employed by this study is a measure of the degree to which data collected using a particular instrument represents a specific domain or content of a particular concept. Mugenda and Mugenda (1999) contend that the usual procedure in assessing the content validity of a measure is to use a professional or expert in a particular field.

According to Shanghverzy (2003) reliability refers to the consistency of measurement and is frequently assessed using the test-retest reliability method. Reliability is increased by including many similar items on a measure, by testing a diverse sample of individuals and by using uniform testing procedures (ibid).

The researcher selected a pilot group of 5 individuals from the target population of the staff working in the commercial banks in Nairobi to test the reliability of the research instrument. The pilot data was included in the actual study. The pilot study allows for pre-testing of the research instrument. The clarity of the instrument items to the respondents necessary so as to enhance the instrument's validity and reliability. The aim was to correct inconsistencies arising from the instruments, which ensured that they measure what was intended.

## CHAPTER FOUR

### DATA ANALYSIS AND INTERPRETATION OF THE RESULTS

#### 4.1 Introduction

The aim of this chapter is to analyze the data from the respondents. The results are presented in figures and tables. Out of the 43 respondents that the researcher aimed to achieve, 36 were able to correctly fill and return the questionnaires hence achieving a 78 percent response rate. This is considered reasonable to form a basis of the conclusions of the study.

#### 4.1 Technological Innovations And Financial Performance

In this section, the study aimed at identifying the extent to which the bank made use of various technological innovations in its operations. A Likert scale of 1 to 5 where 1 is to a very great extent, 2 is to great extent, 3 is to moderate extent, 4 is to low extent and 5 is to no extent was used.

**Table 4.1 Extent banks uses various technological innovations**

<b>Technological innovation</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean</b>	<b>Standard deviation</b>
Mobile banking technologies	42	38	19			1.8787	.99898
Electronic money transfer	76	14	10			1.1322	.88868
Internet banking transactions	52	33	14			1.5446	.43556
ATM deposits and withdrawals	98	4				1.0003	.23343
Online account opening	12	8	22	58		2.2110	.65455

**Source: Research Data, 2010**

Results from the table above shows that a majority of the banks (98 percent) used to a very great extent ATM deposits and withdrawals and electronic money transfers (76 percent). In addition, 52 percent agreed to very great extent that they used internet banking transactions. 22 percent however agreed to moderate extent that they used online account openings as a technological innovation.

Technological innovation is considered as a process which is science, technology and system based. The study further inquired the level of agreement on how various factors of technological innovations form the bank's technological system. A likert scale of 1 to 5 where 1 is to a very great extent, 2 is to great extent, 3 is to moderate extent, 4 is to low extent and 5 is to no extent was used. Data was presented using mean and standard deviation.

**Table 4.2 Level of agreement on how various factors of technological innovations form the bank's technological system**

<b>Extent</b>	<b>Mean</b>	<b>Standard deviation</b>
Internal capabilities	1.1006	1.4050
Networking	1.1176	1.4373
Technological learning ability	2.1373	1.2809
Environmental factors	2.9877	1.0098

**Source: Research Data, 2010**

Results depicted in the table 4.2 above shows that a majority of the respondents cited that internal capabilities and networking were the major factors of technological innovations that formed the bank's technological system as was cited by a low mean of 1.10 and 1.11. The least cited factor was environment factors as was shown by a mean of 2.98.

The study went further to establish the level of agreement on various statements about technological innovations and the process of its implementation in the bank. A likert scale of 1 to 5 where 1 is to a very great extent, 2 is to great extent, 3 is to moderate extent, 4 is to low extent and 5 is to no extent was used.

**Table 4.3 Level of agreement on various statements about technological innovations and the process of its implementation in the bank**

<b>Technological innovations and the process of its implementation</b>	<b>Mean</b>	<b>Std dev</b>
Different social groups are inevitably involved in technological innovation	2.45554	.44755
Networks of interest groups must be attracted into a new technological system	2.3322	.98797
Technological innovations compete for scarce resources	1.9009	.97897
The rapidity of technological innovation puts organizations under severe pressure to innovate effectively	1.2112	.97897

**Source: Research Data, 2010**

The table above shows that most respondents were in agreement that the rapidity of technological innovation puts organizations under severe pressure to innovate effectively as was shown by a low mean of 1.21 closely followed by the fact that technological innovations compete for scarce resources as was shown by a mean of 1.90. The least cited statement was that different social groups were inevitably involved in technological innovation as was shown by a mean score of 2.45.

The study further inquired the extent to which various factors affected adoption of various technological innovations in the bank. A likert scale of 1 to 5 where 1 is to a very great extent, 2 is to great extent, 3 is to moderate extent, 4 is to low extent and 5 is to no extent was used.

**Table 4.4 Extent to which various factors affected adoption of various technological innovations in the bank**

<b>Factor</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean</b>	<b>Std deviation</b>
Firm-specific characteristics such as organisational structure, technological infrastructure	30	55	5	5	5	2.001	.97767
Firm's external potential sourcing and networking such as technology transfer relationships and technical feedback with other organisations, customers and agents	22	20	20	28	10	3.213	.87876
Firm's environmental condition for instance effects of government policies and role of financial systems as initiatives for cultivating innovative activities	28	35	30	8	0	2.899	.43885

**Source: Research Data, 2010**

Results from the table above shows that most respondents agreed to a very great extent that firm-specific characteristics such as organisational structure, technological infrastructure adoption of various technological innovations in the bank shown by 30 percent , closely followed by firm's environmental condition for instance effects of government policies and role of financial systems as initiatives for cultivating innovative activities shown by 28 percent. 10 percent agreed to a no extent that a firm's external potential sourcing and networking such as technology transfer relationships and technical feedback with other organisations, customers and agents.

The study further inquired on the extent to which various technological innovations affected the financial performance of this bank. A likert scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent was used. Data was analyzed using mean and standard deviation.

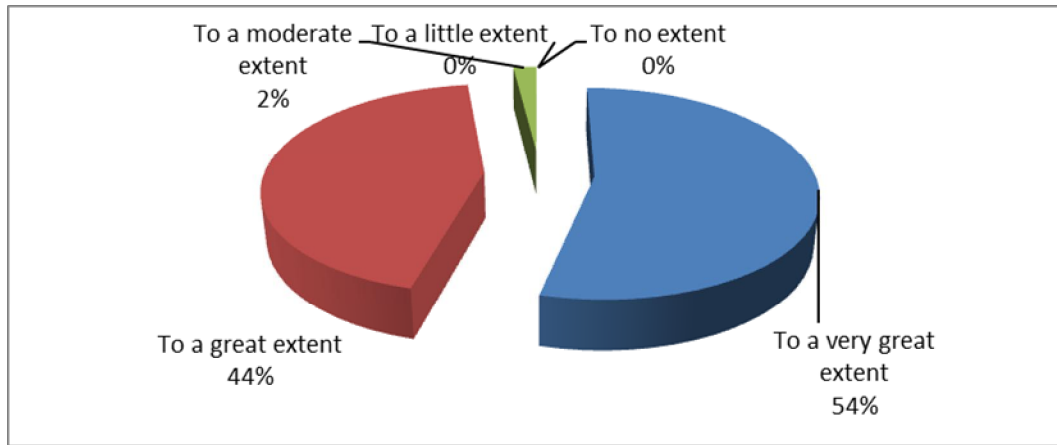
**Table 4.5 Extent to which various technological innovations affected the financial performance of the bank**

<b>Technological innovation</b>	<b>Mean</b>	<b>Std dev</b>
Mobile banking technologies	1.0122	1.4050
Electronic money transfer	1.9009	1.4373
Internet banking transactions	2.5443	1.2809
ATM deposits and withdrawals	1.0054	1.3558
Online account opening	2.9898	1.3324

**Source: Research Data, 2010**

The table 4.5 above shows that a majority of the respondent cited that ATM deposits and withdrawals, mobile banking technologies and electronic money transfers affected to a very great extent the financial performance of the banks as was shown by low means of 1.00, 1.01 and 1.90. The least cited technological innovations affected the financial performance of the banks were online account openings and internet banking transactions shown by high means of 2.9 1 and 2.5 respectively.

**Figure 4.1 Extent competitive positioning affects the financial performance of the bank**



**Source: Research Data, 2010**

As figure 4.1 above shows, majority of the respondents indicated that to a very great extent competitive positioning affects the financial performance of the banks comprising 54 percent while 44 percent cited that competitive positioning affects the financial performance of the bank to a great extent. Only 2 percent agreed to a moderate extent that competitive positioning affects the financial performance of the bank.

Further, the study established the level of agreement on the extent various technological innovations affect the market performance of this bank.

**Table 4.6 Level of agreement on the extent to which various technological innovations affect the market performance of the bank.**

Technological innovation	Mean	Std dev
Mobile banking technologies	1.0772	1.4050
Electronic money transfer	1.9342	1.4373
Internet banking transactions	2.3443	1.2809
ATM deposits and withdrawals	1.0884	1.3558
Online account opening	2.7498	1.3324

**Source: Research Data, 2010**

Results depicted in the table 4.6 above shows that a majority of the respondents agreed to a very

great extent that mobile banking technologies, ATM deposits and withdrawals and electronic money transfers technological innovations affected the market performance of the bank as was shown by low means of 1.07,1.09 and 1.93. The least cited technological innovation that affected market performance was online account opening.

The study further evaluated the extent to which various factors affected financial performance of the bank. A likert scale of 1 to 5 where 1 is to a very great extent, 2 is to great extent,3 is to moderate extent, 4 is to low extent and 5 is to no extent was used.

**Table 4.7 Extent to which various factors affected financial performance of the bank**

<b>Factor</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean</b>	<b>Std deviation</b>
Competitive environment	30	55	5	5	5	2.0012	.76554
Uncertain environment	22	20	20	27	10	3.2332	.24545
Service quality improvement	2	8	35	30	25	3.7677	.6566

**Source: Research Data, 2010**

Table 4.7 above shows that majority of the respondents agreed to a very great extent that a competitive environment and an uncertainties were the major environment factors that affected financial performance of the bank as is shown by 30 percent and 22 percent respectively. 35 percent cited service quality improvement affected financial performance of the bank to a moderate extent.

The study went further to determine the extent to which financial performance of the bank influence various factors

**Table 4.8 Extent to which financial performance of the bank influence various factors**

<b>Factor</b>	<b>Mean</b>	<b>Standard deviation</b>
Increases sales	1.005	.59875
Profits increment	1.1223	.87575
Return on equity	1.5450	.48785

**Source: Research Data, 2010**

Results shown above reveal that majority of the respondents cited that financial performance of a



bank increased sales as was shown by a low mean of 1.00, closely followed by profits increment and return on equity shown by means of 1.12 and 1.54 respectively.

The study further evaluated the extent to which technological innovations affected the performance of the bank in the various aspects. Data was analyzed using a likert scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

**Table 4.9 Extent to which technological innovations affect various aspects of the bank**

<b>Technological innovation and Financial performance</b>	<b>Mean</b>	<b>Standard deviation</b>
Contributes on the economic growth of banks	1.1006	1.4050
Competitive Positioning	1.1056	1.4050
Assures the survival of the bank	1.1176	1.4373
Service quality	2.1127	1.0098
Achievement of sustainable financial performance	2.1373	1.2809
Higher profitability	2.3725	1.3558
Efficiency	2.5878	1.25545

**Source: Research Data, 2010**

The results revealed that most respondents agreed to a very great extent that technological innovations contributed to economic growth of banks, competitive positioning and assured the survival of the bank as was shown by low means of 1.100, 1.105 and 1.117 respectively. However, the least cited results of technological innovations were efficiency and higher profitability shown by means of 2.58 and 2.37 respectively.

The study further inquired on the hindrances to technological innovations that influenced financial performance in the banks. The respondents cited inadequate finances, lack of specific technological innovations and a high generation of e products. On the issue of the possible solutions to the challenges hindering technological innovations in the banks, the study cited good management, allocation of funds to electronic technology and collaboration with technological organizations.

## 4.2 Correlations

Inferential statistics namely Pearson's product moment correlation analysis was employed for the study variables. Pearson's product moment correlation tests were chosen in order to assess whether there is a relationship between the study variables

**Table 4.10 Correlations**

		<b>Electronic money transfer</b>	<b>Internet banking transactions</b>	<b>ATM deposits and withdrawal</b>	<b>Online account opening</b>
	Pearson Correlation	1	.402	.689	.277
	Sig. (2-tailed)	.	.000	.978	.007
	N	66	66	66	66
Internet banking transactions	Pearson Correlation	.402	1	.027	.560
	Sig. (2-tailed)	.000	.	.799	.000
	N	66	66	66	66
ATM deposits and withdrawals	Pearson Correlation	.689	.027	1	.762
	Sig. (2-tailed)	.978	.799	.	.560
	N	66	66	66	66
Online account opening	Pearson Correlation	.277	.560	.762	1
	Sig. (2-tailed)	.007	.000	.560	.
	N	66	66	66	66

**Source: Research Data, 2010**

In order to establish the relationship between technological innovations and the objectives, Pearson's Product Moment Coefficient analysis (PPMC) was used. The researcher used the Pearson moment correlation and the findings were as in the table above. From the findings, it

was clear that there was a positive correlation between ATM deposits and withdrawal, Internet banking transactions and Internet banking transactions as the correlation figure was 0.402.

## CHAPTER FIVE

### SUMMARY OF FINDINGS, CONCLUSION AND RECCOMENDATIONS

#### 5.1 Summary of the Findings

The study found that a majority of the banks (98 percent) used ATM deposits and withdrawals and electronic money transfers (76 percent) while 52 percent used internet banking transactions.

On the issue of how various factors of technological innovations form the bank's technological system, the study established that majority of the respondents cited that internal capabilities and networking were the major factors of technological innovations that formed the bank's technological system as was cited by a low mean of 1.10 and 1.11. In addition, the study found out that most respondents agreed to a very great extent that firm-specific characteristics such as organisational structure, technological infrastructure adoption of various technological innovations in the bank shown by 30 percent, closely followed by firm's environmental condition for instance effects of government policies and role of financial systems as initiatives for cultivating innovative activities shown by 28 percent.

The study further revealed that majority of the respondents cited that ATM deposits and withdrawals, mobile banking technologies and electronic money transfers affected the financial performance of the banks as was shown by low means of 1.00, 1.01 and 1.90.

On the issue of the extent competitive positioning affects the financial performance of the bank, majority of the respondents agreed to a very great extent that competitive positioning affects the financial performance of the banks comprising 54 percent while 44 percent cited that competitive positioning affects the financial performance of the bank to a great extent

On how various technological innovations affect the market performance of the bank, majority of the respondents agreed to a very great extent that mobile banking technologies, ATM deposits and withdrawals and electronic money transfers technological innovations affected the market performance of the bank as was shown by low means of 1.07, 1.09 and 1.93.

On the area of the extent into which various factors affected financial performance of banks, majority of the respondents agreed to a very great extent that a competitive environment and an uncertain were the major environment factors that affected financial performance of the bank as was shown by 30 percent and 22 percent respectively.

The study further revealed that majority of the respondents cited that financial performance of a bank increased sales as was shown by a low mean of 1.00, closely followed by profits increment and return on equity shown by means of 1.12 and 1.54 respectively. Further ,most respondents agreed to a very great extent that technological innovations contributed on the economic growth of banks, competitive positioning and assured the survival of the bank as was shown by low means of 1.100, 1.105 and 1.117 respectively. However, the least cited results of technological innovations were efficiency and higher profitability shown by means of 2.58 and 2.37 respectively.

## **5.2 Conclusions**

The study concludes that the banks had employed various technological innovations. These included ATM services, mobile phone transactions and internet based banking services. Organizations with immature technological knowledge learn rapidly and enjoy strong productivity gains as they harvest the low-hanging fruit, while organizations with mature technological knowledge have to search more carefully for learning opportunities, work harder to exploit them and enjoy smaller returns.

The study further concludes that technological innovations had lead to improved financial performance of commercial banks in Kenya. These were through increased bank sales, profits increment and return on equity. Technological innovation may be linked to performance and growth through improvements in efficiency, productivity, quality, competitive positioning and market share, among others. The study also found that technological innovation is positively related with performance.

## **5.3 Recommendations**

The study recommends that for banks to be highly competitive, they need to employ modern technological innovations such as internet based banking services. Technology is one of the key elements that define a society or civilization. The critical role of technological innovation in the

development of a company and its contribution on the economic growth of firms has been widely documented

#### **5.4 Limitations of the Study**

The researcher encountered various limitations that tended to hinder access to information sought by the study. These included:

The researcher encountered problems of time as the research was being undertaken in a short period which limited time for doing a wider research. However the researcher countered the limitation by carrying out the research across all the commercial banks in Kenya which enabled generalization of the study findings.

The respondents approached were reluctant in giving information fearing that the information sought would be used to intimidate them or print a negative image about the bank. The researcher handled the problem by carrying with him an introduction letter from the University and assured them that the information they gave would be treated confidentially and it was to be used purely for academic purposes.

The researcher also encountered problems in eliciting information from the respondents as the information required was subject to areas of feelings, emotions, attitudes and perceptions, which could not be accurately quantified and/or verified objectively. The researcher encouraged the respondents to participate without holding back the information they had as the research instruments did not bear their names.

Lack of sufficient funds limited the researcher from accessing all the financial institutions in Kenya to collect data for study. The researcher however limited herself to the commercial banks in Kenya due to inadequacy of funds.

Most of the respondents were busy throughout. Due to official duties time was a major concern. The researcher had to continuously remind them and even persuaded them to provide the required information by emphasizing the importance of their participation in the study assuring them that they could be provided with a copy of the final project on request.

### **5.5 Areas of Further Study**

The study has explored the effects of technological innovations on financial performance of the commercial banks in Kenya. The banking industry in Kenya however is comprised of various other financial institutions which differ in their way of management and have different settings all together. This warrants the need for another study which would ensure generalization of the study findings for all the banks in Kenya and hence pave way for new policies. The study therefore recommends another study be done with an aim to investigate the effects of technological innovations on the financial performance of banks in Kenya.

The study also recommends that another study be done to investigate the factors influencing technological innovations in the financial institutions in Kenya. This would necessitate in determining the extent to which the financial institutions have adopted technological innovations and thus enhancing financial performance.

This study aimed at establishing the effects of technological innovations on the financial performance of the commercial banks in Kenya. Other studies need to be carried out on other aspects that affect financial performance. These could include organizational structure and company mergers.

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**APPENDICES**

**Appendix I: Introduction Letter to the Respondents**

**July 2010**

**THE HUMAN RESOURCE MANAGER,**

**.....Ltd,**

**P.O Box.....**

**Nairobi.**

**Dear Sir,**

**RE: REQUEST TO COLLECT DATA FOR MBA RESEARCH PROJECT**

I am a student at the University of Nairobi pursuing a Masters of Business Administration program.

Pursuant to the pre-requisite course work, I would like to conduct a research project on **EFFECTS OF TECHNOLOGICAL INNOVATIONS ON THE FINANCIAL PERFORMANCE OF THE BANKING INDUSTRY IN KENYA**. The focus of my research will be the Commercial Banks in Kenya and this will involve use of questionnaires administered to members of the management team.

I kindly seek your authority to conduct the research in this bank through questionnaires and use of relevant documents. I have enclosed an introductory letter from the University. Your assistance is highly valued. Thank you in advance.

Yours faithfully,



**Appendix II: Questionnaire**

Kindly answer the following questions by filling the spaces provided.

**TECHNOLOGICAL INNOVATIONS AND FINANCIAL PERFORMANCE**

1. To what extent does this bank make use of the following technological innovations in its operations? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Technological innovation</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Mobile banking technologies					
Electronic money transfer					
Internet banking transactions					
ATM deposits and withdrawals					
Online account opening					
Others (Othersí í í í í í í í í í í í í í í í ..)					

2. Technological innovation is considered as a process which is science, technology and system based. In the light of this statement, rate the extent to which the following factors of technological innovations form the bank's technological system. Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Extent</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Internal capabilities					
Networking					
Technological learning ability					
Environmental factors					
Others (Othersí í í í í í í í í í í í í í í í ..)					

3. To what extent do you agree with the following statements about technological innovations and the process of its implementation in the bank? Use a scale of 1 to 5 where 1 is strongly agree and 5 is strongly disagree

<b>Technological innovations and the process of its implementation</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Different social groups are inevitably involved in technological innovation					
Networks of interest groups must be attracted into a new technological system					
Technological innovations compete for scarce resources					
The rapidity of technological innovation puts organizations under severe pressure to innovate effectively					
Others (Othersí ..)					

4. To what extent do the following factors affect adoption of various technological innovations in the bank? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Factor</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Firm-specific characteristics such as organisational structure, technological infrastructure					
Firm's external potential sourcing and networking such as technology transfer relationships and technical feedback with other organisations, customers and agents					
Firm's environmental condition for instance effects of government policies and role of financial systems as initiatives for cultivating innovative activities					
Others (Othersí í í í í í í í í í í í í í í í í í ..)					

5. To what extent do the following technological innovations affect the financial performance of this bank? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Technological innovation</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Mobile banking technologies					
Electronic money transfer					
Internet banking transactions					
ATM deposits and withdrawals					
Online account opening					
Others (Othersí í í í í í í í í í í í í í í í í ..)					

6. To what extent does competitive positioning affect the financial performance of this bank?

To a very great extent [ ]

To a great extent [ ]

To a moderate extent [ ]

To a little extent [ ]

To no extent [ ]

7. To what extent do the following technological innovations affect the market performance of this bank? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Technological innovation</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Mobile banking technologies					
Electronic money transfer					
Internet banking transactions					
ATM deposits and withdrawals					
Online account opening					
Others (Othersí í í í í í í í í í í í í í í í ..)					

8. To what extent do the following factors affect financial performance of the bank? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Factor</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Competitive environment					
Uncertain environment					
Service quality improvement					
Others (Othersí í í í í í í í í í í í í í í í ..)					

9. To what extent does financial performance of the bank influence the following factors? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Factor</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Increases sales					
Profits increment					
Return on equity					
Others (Othersí í í í í í í í í í í í í í í í í í í ..)					

10. To what extent do the following aspects of technological innovations influence financial performance of this bank?

<b>Financial performance measurement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Simple learning by doing					
Advances in the designing					
Constructing and managing complex and advanced industrial processes					
Manifestation of the ability to innovate technologies					
Others (Othersí í í í í í í í í í í í í í í í í í í ..)					

11. To what extent do technological innovations affect the performance of the bank in the following aspects? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent

<b>Technological innovation and Financial performance</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Contributes on the economic growth of banks					
Assures the survival of the bank					
Achievement of sustainable financial performance					
Higher profitability					
Efficiency					
Service quality					
Competitive Positioning					
Others (Othersí í í í í í í í í í í í í í í í í í í ..)					

12. What are the hindrances to technological innovations that influence financial performance in this bank?

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í í

13. What are the possible solutions to the challenges hindering technological innovations in this bank?

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í í

**THANK YOU!!**