THE RELATIONSHIP BETWEEN FINANCIAL ENGINEERING AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

BY

FELIX W KARIUKI

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DECLARATION

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

Felix Kariuki (D61/70077/2007)

Signed ..... Date 14/11/2010

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

Signed ..... Date Nov 14, 2010

W. Nyamute

Lecturer, DF&A

SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

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DEDICATION

I dedicate this work to my beloved wife Waithira, my parents and my children Kariuki, Ngonyo, Wacuka and Muchiri for being so understanding and supportive during my study period.

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ABSTRACT

Under modern business conditions, financial engineering activities are considered as the driving force behind business success. Universal trend such as globalization, liberalization and technological change has meant that banks have to continuously re-engineer themselves to remain competitive. The objective of this study was to investigate financial engineering and its effect on financial performance of commercial banks in Kenya.

This study used a causal research design. The population of interest in this study comprised commercial banks in Kenya. There were 43 operating commercial banks in Kenya as of December 2009. Primary data was collected using a questionnaire with close ended and open ended questions administered to the management staff of the commercial banks. The targeted respondents were senior, middle and low management staff in the respective banks. Secondary data was obtained from annual reports of commercial banks as well as from the annual reports of the Bank Supervision Department of the Central Bank of Kenya. A descriptive analysis technique was employed. The findings were presented using tables and charts.

The commercial banks in Kenya were found to have adopted various financial engineering strategies such as technological innovation, product innovation, process innovation as well as, market innovation.

The financial engineering strategies were found to have a positive impact on the financial performance of commercial banks in Kenya.. The research established that that taking all other independent variables at zero, a unit increase in technological innovation will lead

to a 0.205 increase in financial performance (Return on Assets). A unit increase in product innovation will lead to a 0.169 increase in the financial performance (Return on Assets); a unit increase in market innovation will lead to a 0.156 increase in financial performance (Return on Assets) while a unit increase in process innovation will lead to a 0.128 increase in financial performance (Return on Assets). This therefore technological innovation contribute more to the financial performance (Return on Assets) of the bank, while process innovation contributes the least to financial performance (Return on Assets).

Financial engineering brings in various benefits; the most important being improved customer service, market expansion and increased return on investment. The study recommends that commercial banks in Kenya need to employ various financial engineering strategies to enable them to be more competitive grow faster and earn better return on investments.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

In today's global and dynamic competitive environment, financial engineering 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). 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). The ability to innovate is increasingly viewed as the single most important factor in developing and sustaining competitive advantage (Tidd, 2001). It is no longer adequate to do things better; it's about "doing new and better things (Slater and Narver, 1995). Much emphasis has been placed on building innovative organizations and the management of the innovation process, as essential elements of organizational survival (Brown, 1997). Bessant and Francis (1999) suggest that effective innovation must involve all areas of a

bank with the potential to affect every discipline and process (McAdam, 2000). Innovation can be transformational, radical or incremental depending on the effect and nature of the change. Afuah (1998) suggests that innovations do not have to be breakthroughs or paradigm shifting; however Kim and Mauborgne (1999) maintain that organizations should strive for the larger innovations.

1.1.1 Concept of Financial Engineering

Financial engineering is the phenomenon of product and/or process innovation in the financial industries – the development of new financial instruments and processes that will enhance shareholders', issuers' or intermediaries' wealth. Finnerty (2001) lists countless recent financial innovations – from adjustable rate preferred stock to zero-coupon convertible debt – but these all can be classified into three principal types of activities: securities innovation; innovative financial processes; and creative solutions to corporate finance problems (Lees, 1992). Storey (1989) suggests that the conceptualizations about what innovation is, is closely wrapped up with what it is for, because, clearly, it is not an end in itself. Hence, to a large extent, conceptualizations have to be inferred from treatments of its objectives. Traditional definitions tended to place emphasis on conscious intent as an elemental feature, emphasizing the formal, planned and deliberate aspects of the financial engineering process.

Financial engineering strategy provides a clear direction and focuses the effort of the entire organization on a common financial engineering goal (Dharan, 2002). Management needs to develop the strategy and communicate the role of financial engineering within a company, decide how to use technology and drive performance improvements through

the use of appropriate performance indicators. Oke (2002) suggested that the first step in formulating an innovation strategy is to define what innovation means to the firm or the areas of focus in terms of innovation. By understanding the drivers of innovation needs, a firm can develop its focus areas for innovation. The importance of having a clearly defined new innovation strategy guiding the innovation process was recognized by Griffin (1997) and Cooper et al. (2002). Financial engineering strategy needs to specify how the importance of innovation will be communicated to employees to achieve their buy-in and must explicitly reflect the importance that management places on innovation. The management of high performing companies was visibly and tangibly committed to new product development and explicitly formulated and communicated the firm's new product development strategy (Bessant and Francis, 1999).

To develop an effective financial engineering process, banking management need to focus not only on products, technology and processes, but also on the culture of the organization, its norms, values and beliefs (Gunasekaran, 1996). There is a need to develop a climate that is conducive to creativity (Ahmed, 1998), with a strong external focus on multiple stakeholders (Cagliano, 2001). The need to understand user needs (Rothwell, 1992) and the importance of culture (Ekvall, 1999) are also consistent themes in the literature. The attention of practitioners and academics have for many years been preoccupied with the quality movement in banks, focusing on product and process improvements through an evolutionary incremental process (Ghobadian and Gallear, 1996).

1.1.2 Relationship between Financial Engineering and Financial Performance

All financial engineering strategies are implemented using a few basic techniques, such as increasing or reducing risk (options, futures and other more exotic derivatives), pooling risk, swapping income streams (interest rate swaps), splitting income streams ('stripped' bonds), and converting long-term obligations into shorter-term ones or vice versa (maturity transformation) (Dharan, 2002). But to be truly innovative, a new security or process must enable issuers or investors to accomplish something they could not do previously, in a sense making markets more efficient or complete.

Finnerty (2001) describes ten forces that stimulate financial engineering. These include risk management, tax advantages, agency and issuance cost reduction, regulation compliance or evasion, interest and exchange rate changes, technological advances, accounting gimmicks and academic research. Much of the research attention to innovation focuses on the new idea. But at least as important is the adoption and spread of an innovation – its diffusion – across an industry. Indeed, faster diffusion means a higher societal return on the underlying investments in the innovation (Walston et al, 2001). Innovation strategy is a determinant of company financial performance and provides additional insights into the indirect contribution of the individual dimensions of innovation strategy to company performance. The primary function of the financial system is to facilitate the allocation and deployment of economic resources, both spatially and across time, in an uncertain environment (Meuter et al, 1992). This function, in turn, encompasses a payments system with a medium of exchange; the transfer of resources

from savers to borrowers/investors/users of the resources (and the eventual repayment to the savers); the gathering of savings for the purpose of pure time transformation (deferral/smoothing of inter-temporal consumption); and the reduction of risk through insurance and diversification.

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 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).

1.1.3 Adoption of Financial Engineering and Performance

The emergence of financial engineering in banks has also been influenced by the realization on Wall Street in the early to mid-1990s that there was a need for a new kind of graduate training (Rahl, 2000). The financial institutions wanted people with heavy mathematics skills and some finance training, and had previously been fed from a haphazard network of different programs. Commercial banks in Kenya have developed new innovations that have influenced their financial performance. These includes mobile banking technologies, electronic money transfer, internet banking transactions, ATM deposits and withdrawals, online account opening among others. All these innovations

contribute heavily in building customer base, capital base as well as enhancing profitability which results to improved financial performance.

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 he focuses on what he calls technological knowledge.

Chien and Danw (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 entitled 'efficiency, customer service and financing performance among Australian financial institutions' showed that all financial performance measures as interest margin, return on assets, and capital adequacy are positively correlated with customer service quality scores.

1.1.4 Kenya Banking Industry

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. The banking sector was liberalised in 1995 and exchange controls

lifted. The Central Bank of Kenya, which falls under the Minister for Finance's docket, is responsible for formulating and implementing monetary policy and fostering the liquidity, solvency and proper functioning of the financial system. The Central Bank of Kenya publishes information on Kenya's commercial banks and non-banking financial institutions, interest rates and other publications and guidelines. Banks in Kenya have come together under the Kenya Bankers Association (KBA), which serves as a lobby for the banks' interests and addresses issues affecting its members.

There are forty-six banks and non-bank financial institutions, fifteen micro finance institutions and forty-eight foreign exchange bureaus in Kenya. Thirty-five of the banks, most of which are small to medium sized, are locally owned. The industry is dominated by a few large banks most of which are foreign-owned. 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. Banks generally earn their revenues from taking in funds and lending them out at a higher rate. The interest spread between deposits and loans continued to be between 9 and 10% in 2009, offering much profit potential. Profit after tax of the overall banking system increased by 14.5 %, or KShs 4.37 billion, from KShs 30.15 billion in December 2008 to KShs 34.52 billion in December 2009. This growth is a continuation of the strong growth in profit after taxes that the industry has achieved for the past several years. The increase

in profit reflected an increase in interest income on loans and advances, which rose by 21.3% or KShs 16 billion to KShs 91.2 billion in December 2009 from KShs 75.2 billion in December 2008. The increase in interest income was due to the growth of 14.33% in loans issued. The average commercial bank monthly average rates remained high, moving between 14.67% and 15.09% in 2009.

1.2 Statement of the Problem

Under modern business conditions, financial engineering activities are considered as the driving force behind business success and overall economic development. Despite engineering absorbing real and substantial costs, and the clarity of organizational objectives in terms of innovation has led to an increased emphasis on the evaluation of return on investment. Doyle (2004) observes that systematic evaluation rarely occurs within organizations. Making causal connections between investment in innovation, and future management performance and organization success is externally difficult. Constable and McCormick (1996) highlight the difficulty in establishing a statistical link between the incidence of financial engineering and company performance. Similarly, Rae (1986) 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.

Dodgson (2001) observed the innovation activities of small firms in Europe, which adopted a pattern of innovation strategy that highly depended on external sources; he contended that external innovation resources claimed for the largest contribution to the formation of a firm's technology competence. Reinhilde and Bruno (1999), judging from

the analysis on manufacturing firms in Belgium, asserted that a firm's inclination toward either internal sources or external sources in formulating its innovation strategy, rested directly with the technological conditions of the firm, and most high-tech firms would tend to mainly rely on internal research and development.

The review of the literature shows that there have been several studies on commercial banks in Kenya. Gitonga (2003) did a study on innovation processes and the perceived role of the CEO in the banking industry. Kihumba (2008) conducted a study on the determinants of financial innovation and its effects on banks performance in Kenya. Odhiambo (2008) carried out an investigation on innovation strategies at the Standard Chartered Bank, Kenya Limited. These studies focused on innovation processes and financial innovation as a strategy and thus did not cover the effects of financial engineering on the financial performance of the commercial banks in Kenya. None of these studies have focused on the effect of financial engineering on the financial performance of Kenyan banking industry. This research focusing on the effects of financial engineering on financial performance of banks in Kenya is a modest attempt to bridge the gap build by the passage of time with major changes occurring due to global economic crisis among other factors. It is an effort to bring to light the influence and insights into effects of financial engineering as a factor that affects financial performance in banks in Kenya. This study, therefore, sought to fill the lacuna in knowledge by investigating the relationship between financial engineering and the financial performance of commercial banks in Kenya.

1.3 Objectives of the Study

1.3.1 Main Objective

The general objective of this study was to investigate the financial engineering and its effects on financial performance of commercial banks in Kenya.

1.3.2 Specific Objectives

The specific objectives of this study were:

i. To determine the financial engineering strategies adopted by commercial banks in Kenya.

ii. To investigate the effects of financial engineering on the financial performance of commercial banks in Kenya.

1.4 Importance of the Study

This study is important to the commercial banks in Kenya as they would be able to identify what financial engineering approaches 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 will form a basis for further research. The students and academics will use this study as a basis for discussions on the innovation strategies adopted by banking industry in Kenya and their effect on financial performance.

The Central Bank of Kenya would also find the results of this study invaluable, as it will 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 bank and so determine whether such strategies adopted in the industry conform to the guidelines provided for the industry by the regulators.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter summarizes the information from other researchers who have carried out their research in the same field of study. The specific areas covered here are theories of innovation, product innovation, market innovation, process innovation, technology innovation, empirical review and conclusion.

2.2 Financial Engineering

As financial engineering attempts to define itself as a field with connections closer to the engineering disciplines than more traditional finance, associations are being set up, and the general engineering community does not quite know what to do (Finery, 2001). Recent changes in patent laws and interpretations, along with encouragement for institutions to do more patenting have led to an explosion of new patents. Some of these are in financial engineering but it is not clear which can be defended. Certainly, financial patents will have an impact on the efficiency of markets and the rate of financial innovation (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 organizations. 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.

2.2.1 Financial Performance

Performance is the outcome of all of the organization's operations and strategies (Wheelen and Hunger, 2002). Measuring financial performance accurately is critical for

accounting purposes and remains a central concern for most organizations. Performance measurement systems provide the foundation to develop strategic plans, assess an organization'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 "retail" 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 "real" 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.

2.2.2 Measuring Financial Performance

Since their inception, companies have used various yardsticks for measuring and reporting financial performance. The two main items used to measure financial performance are the firm's market share within the particular industry in which it operates and its profitability. Profitability is then used to measure the company return on capital employed hence value to its shareholders. Accountants and economists have derived and used various financial ratios to assess company financial performance. These ratios mainly involve the company liquidity – cash flow liquidity ratio, debt management – financial leverage index, asset management – return on total assets, profitability – cash flow margin and finally return on investment – dividend yield (Brealey, 2003).

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 usually 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 financial performance, there are limitations and imperfections associated with the use of financial ratios, particularly the use of very few ratios in isolation (Goh, 2003)...

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).

2.2.3 Financial Engineering and Financial Performance

Financial engineering is also having an impact on banking. Innovation in combination with electronic technology is creating a world in which maturity transformation - turning short-term deposits into long-term loans, the central function of banks - is unnecessary. Economic agents - individuals, households, companies - will no longer require this service. Their portfolios of assets and liabilities will be broadly matched in maturity terms: short-term assets will match short-term liabilities; longer-term liabilities will offset longer-term assets. As a result, as Walston et al (2001) suggests, 'traditional banking is dying. But the grieving throng around the deathbed faces a long and expensive vigil.' Regarding the importance of 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.

2.3 Theories of Financial Engineering

2.3.1 Innovator's Solution Theory

Christensen and Raynor's (1997) theory of the innovator's solution is a brilliant analysis of why companies fail to innovate. It explains convincingly why corporate managements don't learn about good ideas, and why managers succumb to inherent pressures to run away from the challenge of disruptive competition rather than stand and fight. The decisions made as a result of these pressures make sense in the short run to the

individuals involved, but in due course they send the organization into an inexorable death spiral (Anthony and Christensen, 2008).

But while their analysis of the causes of failure to undertake disruptive innovation is effective, their proposal for solving the dilemma of disruptive innovation is less helpful. The central premise of their thesis – the innovator's solution – is to accept the grim reality that big companies are inherently and constitutionally disinclined to tackle disruptive innovation. A modern organization will crush disruptive new ideas, because they represent a threat to management, to careers, to power structures, to customary ways of things, to client bases, to brands, to corporate culture. The authors' solution is to protect genuine innovators and their disruptive change ideas from these hostile forces.

According to Christensen and Raynor, corporate leaders should put up a wall between the innovation and the existing hierarchy. Leadership should create an independent business unit, which will provide a safe and protected environment for innovation. There the innovation can flourish without having to fight off the interferences and intrusions and anti-innovation attitudes of the hierarchy.

Allowing a different culture to flourish in a separate organization eventually leads to repeated power struggles and culture clashes, which members of the mainstream organization invariably win. Interest in the new ventures tends to be cyclical. Brief surges of enthusiasm, triggered by abundant resources and the desire to diversify, are followed by sharp declines. The life spans of both internal venture units and corporate venture capital funds, therefore, tend to be short – on average, only four to five years.

Christensen and Raynor's innovator's solution theory rests on the hope that if one can build enough commercial success in the marketplace, he/she has a better chance of eventually winning that battle of persuasion. Surely, their argument goes, the hard numbers will win the war. Unfortunately the track record shows that even with strong commercial success, numbers and reason are not enough to dislodge the forces of stasis and inertia.

2.3.2 Innovator's Dilemma Theory of Innovation

The innovator's dilemma theory was proposed by Christensen in 2003. The crux of Christensen's (2000) insight is that firms wishing to innovate face an irresolvable dilemma: their existing customers will encourage them to focus resources on building a better widget; while somewhere else another company is building a gadget, either for new sub-segments of the market, or for an altogether new market. The technological trajectory of the gadget, however, will lead it to eventually usurp the position of widgets in the whole marketplace by destroying the widget market altogether. Therefore, widget companies that listen closely to their existing customers and perfect their technology will one day inevitably face a situation where the market for their technology has been made redundant by the market for the next-best-thing: the gadget. Those feckless existing customers will then defect to gadgets, leaving widget producers high and dry.

The story thus told may be captured in the following relationship and its consequences for firm strategy: The better aligned management incentives are to serving the existing customer base by improving the current technology of the firm, the more likely the incumbent firm is to be blindsided by a market for a fresh new technology created by a

challenger entrepreneurial firm. This fresh new technology initially appeals only to customer markets that do not appeal to the firm, but goes on to capture the firm's core customer base over time. Ergo, a well-meaning management team just cannot win by doing the right thing.

Analytically, this dilemma was explained by Christensen as having three key elements: The first is that there is a strategically important distinction between what I call sustaining technologies and those that are disruptive … Second, the pace of technological progress can, and often does, outstrip what markets need. This means that the relevance and competitiveness of different technological approaches can change with respect to different markets over time. And third, customers and financial structures of successful companies color the sorts of investments that appear to be attractive to them, relative to certain types of entering firms (Christensen, 2003).

Christensen's framework – while having its share of admirers and detractors – has certainly heightened practitioner awareness of the basic phenomenon of creative destruction described by Schumpeter, i.e. that market churn is a fundamental feature of competition and the evolution of economic systems. The dilemma this situation appears to pose for incumbent firms is also a "perennial" issue in research on the economics of innovation, technology evolution, firm strategy, marketing and entrepreneurship. This means that potentially relevant literature is enormous. So in our review of the literature below, we restrict ourselves to summarizing three central issues that are historical staples in the literature, plus an overview of current conversation. The latter is based on 145

peer-reviewed articles that specifically refer to "Christensen", "the innovator's dilemma", or both.

First, the economic incentives for incumbent firms to engage in uncertain innovative activities have been examined in detail in the literature on the economics of technological innovation and firm strategy (Reinganum, 1983). The central proposition of this research is that incumbent firms will experience disincentives to create new technologies that disrupt existing technologies because the new technology cannibalizes the rent stream from the old. Non-incumbent challengers do not face this disincentive. So they rationally invest more and as a result will contribute a disproportionally large share of major innovations (Reingenum, 1983). Thus, incumbents face the unsavory prospect of having to decide when to start cannibalizing themselves in the full knowledge that much uncertainty pervades this choice. If they listen to their existing customers too much and stay with them too long they face being disrupted by an entrepreneurial attacker; if they listen inadequately to their existing customers and migrate to a new technology too early then they lose the rent stream from the old product. The uncertainty surrounding this choice is indeed deep, as Rosenberg (1996) has cautioned. The simultaneous advance in new technology, along with the substantial upgrading of old technology, underlines the pervasive uncertainty confronting industrial decision makers in a world of rapid technological changes (Rosenberg, 1996).

Second, the marketing literature has focused on a central and unsettling suggestion made by Christensen (2003), that the innovator's dilemma consists in the fact that by doing the right thing (i.e. listening to current customers) leading firms often end up losing their

markets to upstart newcomers. This is unsettling because compelling evidence exists in the marketing literature that market orientation leads to positive business performance (Matsuno et al., 2002). The essence of this debate suggests a trade-off between two fundamental functions of good management: the creation of satisfied customers and the creation of innovations.

Third, organizational researchers have been concerned with the questions that the innovator's dilemma poses for organizational change, in particular the problem that disruptive technologies pose for organizational capabilities (Henderson, 1993). The essence of this problem is very well understood in the literature on organizational learning: it is an example of organizations having to cope with the difficulties inherent in trading-off the exploitation of existing technologies, capabilities and markets with the exploration for new technologies, capabilities and markets. March captured this trade-off as the relationship between exploration of new possibilities and exploitation of old certainties (March, 1991). Firms balance exploration with exploitation by trading-off the costs of exploration (investments in survival) with the benefits of exploitation (maximizing returns to investors).

Contingency theorists take issue with the assumption that the search is for best practice, and instead seek to identify sets of variables which will make appropriate a particular type of management development strategy from a repertoire of possibilities. Climate mainly influences organizational structure appropriate pattern. Ashton et al. (1975) suggest that the organizational climate mainly influences what occurs in management

development, though organizational structure and technology significantly determine the most appropriate pattern.

2.3.3 Disruptive Innovation Theory

Disruptive innovation theory was hypothesized by Christensen in 1997. He suggested that in a quickly changing and uncertain world, innovation is the key to competitive advantage. Yet innovation also increases uncertainty and market pressure. The more radical the innovation, the more difficult it is to estimate its market acceptance and potential. The increasing complexity and market dynamics create a substantial knowledge gap between theory and practice. Many companies are not organized to give new ideas a chance, to recognize trend breaking points in the market, to adapt quickly to changing market circumstances, or to cause market changes in the first place.

Disruptive innovations change the game. They attack an existing business, and offer great opportunities for new profit growth. Only radical innovations lead to growth. Innovation is disruptive is a successfully exploited product, service or business model that significantly transforms the demand and needs of an existing market and disrupts its former key players". Damanpour (1996) defines it as "... those that produce fundamental changes in the activities of an organization and represent a large departure from existing practices", and Leifer (2001). A radical innovation is a product, process or service with either unprecedented performance features or familiar features that offer significant improvements in performance or cost that transform existing markets or create new ones.

Breakthrough innovations are based on inventions that serve as a source of many subsequent inventions. Ambiguous, extremely turbulent and uncertain times, combined with a long development time, make breakthrough innovations a highly risky matter. Disruptive innovation frequently results from a combination of the emergent qualities of several smaller ideas based on observing the world differently, challenging presuppositions, expanding boundaries, spotting the "white space", discovering the as yet unrealized needs of customers, setting challenging targets, thinking the unthinkable and challenging our underlying mental models. Innovation patterns appear as fractals, with small decision cycles imbedded in larger decision cycles in which the basic development steps (identify – develop – plan – implement) are the guiding principle. Within this basic outline, the process of disruptive innovation is a rhythm of searching and selecting, exploring and experimenting, of learning and unlearning, and cycles of divergent and convergent thinking. It is a complex and interactive process of probing and learning or feedback. Contrary to linear, incremental innovation processes, such as the stage-gate concepts (Cooper et al., 2002a, b), disruptive innovation is more like a spiral or circular development process of continuous fast feed-forward and feed-back loops. This disruptive innovation development process is an interdependent system, based on the concepts of system thinking and of dynamic strategic thinking with learning as a central aspect (Brown and Eisenhardt, 1995). This process is affected by exogenous determinants such as economic, social and political factors, competition and infrastructure, and endogenous determinants such as resources, corporate structure and corporate culture.

2.4 Technological Innovations

One of the consequences of the development of computer and financial technologies is the incredible growth in electronic trading. This has both good and bad implications for ordinary investors. On the positive side, the tools developed by cutting edge financial institutions over the last two decades are now available to the individual household. Yet, as with most technologies, the tools are more advanced than the general population understanding of how to use them properly. Although trading costs have come down dramatically for the individual investor, the possibility of doing serious damage to your nest egg is even greater.

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; Porter, 1990). 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).

If management skills and activities are conceptualized to be situation specific and embedded in the organizations in which they are practiced then the question arises about what is the best way to prepare managers for the "complexity, uncertainty, uniqueness and value conflicts" which Schon (1988) postulates characterize organizational environments.

A number of issues merit attention when discussing management development strategies. Management development is now viewed as one of the key organizational processes aimed at delivering successful organizational adaptation and renewal. However, Pulmer (1992) cautions that success will only occur if management development strategies are adapted and implemented in ways that are congruent with the changing needs and expectations of the new organizations. Storey (1990) is critical of the management development literature for propounding "universal nostrums" without "due regard for context" because it is context which shapes and influences the way development is formulated and enacted.

Margerison (1991) cautions that management development may fail if there is no clear policy statement. Doyle (1994) lists a number of guidelines when preparing such a policy. These guidelines generally emphasize a holistic approach which links to the reality of what managers do; take cognisance of required competencies and characteristics; consider organizational culture and context; focus on linkages with business strategies and policies; and map out the cultural philosophy of management. The policy should also ensure flexibility so that both organizational and individual needs can be accommodated.

Mumford (1993) classified three approaches to management development which similarly have significant implications for management development strategy and which reflect particular sets of organizational contingencies. Management development can be conceptualized as progression through different levels of maturity, a progression that can only take place in the context of a holistic approach to management development in

which both "hard" and "soft" managerial issues are considered in framing the right strategy.

A systems perspective, as advocated by Doyle (1994) views management development in terms of an integral part of a wider organizational system, and linked to the context and reality of managerial work. A systems perspective reveals the synthesizing, relational and integrative qualities of an 28onceptualiz and fosters an awareness of the complex interactions and patterns of causal relationships that exist both internally and external to the 28onceptualiz (Mumford, 1993). Such a perspective leads to the conclusion that management development is at one and the same time both a system and a process, and as an open system, it interacts dynamically with variables from other environmental and organizational subsystems, activities and processes.

A systems perspective leads to the development of a broader set of strategies, policies and plans; it permits the notion of 28onceptualiz development through management development; it encourages productivity and responsiveness; it leads to a better assessment of performance and overall programme effectiveness; and it contributes to the creation of a positive learning culture enabling the encompassing of generative learning. In framing management development within a more holistic perspective, systems thinking extends its context beyond the rational-functional to include qualitative dimensions, and produces new insights which themselves challenge some of the fundamental assumptions on which existing conceptions of management development activity and strategy are premised.

Management development is perhaps best conceptualized as an open system consisting of an assemblage of interrelated elements directed towards common goals (Doyle, 1994). The process is then neither fragmented nor piecemeal, but integrated, congruent and supportive of organizational goals (Higgins, 1995). Inherent in a systems model is the existence of a coherent and supportive infrastructure, with management recruitment, selection, reward and promotion considerations all feature as core inputs. Higgins, (1995) advocates a unified approach to management development which sees it located at the very heart of the organization's philosophy, mission, business goals, and HR strategy, in a process that is coherent and integrated across all functions and hierarchies, so that effective management of the enterprise and development of managerial talent are a single integrated activity.

2.5 Product Innovation

Product innovation provides the most obvious means for generating revenues. Process innovation, on the other hand, provides the means for safeguarding and improving quality and also for saving costs. Improved and radically changed products are regarded as particularly important for long-term business growth (Hart, 1996). The power of product innovation in helping companies retain and grow competitive position is indisputable. Products have to be updated and completely renewed for retaining strong market presence.

Different terminologies have been used to categorize and describe product development. Cooper et al (2002), for example, embraces two distinct activities: old product development, which involves updating and improving existing products, and new product

development, which involves a greater degree of innovational challenge. Meyer (1996) similarly categorized product development into primary and secondary innovations. Primary innovations were broadly concerned with the development of new markets and relate to instances where there is a high degree of technical originality and a commensurate change in consumer behaviour. Secondary innovations, on the other hand, are basically business or company focused and typically involve improvements to an existing market.

Product portfolio decisions are the manifestation of a firm's innovation and marketing strategies. The common approach to managing new product development is to develop and manage a portfolio of specific projects (Wheelwright and Clark 1992). Practically speaking, choosing the product portfolio determines the firm's strategy for the medium term future and is senior management responsibility (Storey et al. 1998; Cooper et al. 2002). Operationally, portfolio decisions involve two strategic components: a development strategy regarding the number and rate of new product introductions (introduction intensity), and a market entry strategy regarding the relative speed to market (pioneering intensity). Past research suggests that better-managed firms structure their portfolios by striking a balance in the product innovation portfolio across these strategic components. However, past research has not systematically decomposed the components of portfolio strategy to examine how the components work together in relation to financial performance.

2.6 Market Innovations

Counterpoints to financial engineering include traditional market efficiency arguments against active management, such as Bill Sharpe's arithmetic. Even if it is possible to beat the market, and notwithstanding the fact that past performance should not be the sole criterion for judging investment managers, the riskiness of active strategies can be very different from passive strategies. Such risks do not necessarily average out over time, and investors' risk tolerance should be part of the process of selecting an investment strategy to match their goals.

Market innovation is concerned with improving the mix of target markets and how chosen markets are best served (Kim and Mauborgne, 1999). Its purpose is to identify better (new) potential markets; and better (new) ways to serve target markets. Market segmentation, which involves dividing a total potential market into smaller more manageable parts, is critically important if the aim is to develop the profitability of a business to the full. Incomplete market segmentation will result in a less than optimal mix of target markets, meaning that revenues, which might have been earned, are misread (Slater and Narver, 1995).

Market orientation as a business culture leads to business performance improvement, as proved by numerous studies (Slater and Narver, 1995). It is precisely product innovation that is considered as a moderator of the link between market orientation and successful business operation (Slater and Narver, 1995). Innovations have a positive impact on business performance by leading to a market share increase and/or cost reduction and, in turn, a profit rise. Market oriented enterprises deliver superior quality products to their

customers while complying with ecological, health and safety standards as well as with legal norms. Accordingly, market orientation is expected to produce a significant positive impact on all analyzed effects of innovative activities.

Sales has been proposed as the most important measure of business performance on which managers should focus (Schon 1998), and is a measure of firm performance that is often closely associated with the marketing function. Similarly, gross profit (sales revenue minus cost of selling) is an indicator of the firm's value chain, specifically measuring a firm's ability to convert inputs into valuable outputs (McAdam and McClelland; 2002).

The market in which an enterprise offers its products can be a predictor of the effects of innovative activities. Strengths and weaknesses of competitors, demands raised by consumers, legal regulations, as well as ecological, health and other standards, motivate enterprises to develop products taking into account the situation in a particular market. Enterprises often find themselves having to modify their products sold on the international market, not only to achieve outstanding business performance and competitive advantage, but also to enter the market in the first place and to remain in it. Accordingly, the market range can have an impact on the effects of innovative activities. It is to be expected that the more present an enterprise is in the international market, the more oriented its innovation activities are towards improving product quality, ecological and health aspects, as well as towards complying with legal standards and various regulations.

2.7 Process Engineering

Engineering, by the very nature of its development and application, builds on whatever is accepted theory at any given stage of the cycle. Investment theories tend to lurch forward in leaps, usually after the disappointment of a prolonged bear market. New theories emerge, correcting the ills exposed by a calamitous decline and engineering applies the new wisdoms. Process re-engineering challenges 100 years of established thinking and practice about work, organization and management. It advocates a new business model along with unique techniques calling for a revolution in the way business gets done (Hammer and Stanton, 1995).

Hammer and Champy became increasingly concerned, the longer they worked with organizations, about misuse and abuse of the term re-engineering and the fact that many who used the term did not understand it. Almost any organizational change effort began to fall under this label. Process re-engineering became associated with downsizing, restructuring, automation, more use of technology, delayering, flattering the hierarchy, reorganizing and total quality management. While related to some of these terms, Hammer and Champy view process re-engineering as different from them in critical ways. Process innovation embraces quality function deployment and business process re-engineering (Cumming, 1998). It is a type of innovation, which is not easy, but its purpose is now well understood. An efficient supplier who keeps working on productivity gains can expect, over time, to develop products that offer the same performance at a lower cost. Such cost reductions may, or may not, be passed on to customers in the form of lower prices. Process innovation is important in both the supply of the core product as

well as in the support part of any offer. Both components of an offer require quality standards to be met and maintained. In the case of services, which by their very nature rely on personal interactions to achieve results, the management of process innovation is a particularly challenging activity (Johne and Storey, 1998). Implementing and developing the innovation process requires energy to overcome the resistance to change. Therefore, it is essential that visionary and committed leadership provide the energy to overcome this resistance. Leaders in an innovative role must be competent and knowledgeable about their work, and must also excel at inspiring employees (Higgins, 1995).

Kakabadse and Kakabadse's (1998) studies revealed that the best leaders were those who were with the 34onceptualiz in a senior position for a considerable number of years and were predominately outwardly looking in nature. This factor is important for banks with scarce management resources. Moreover, existing managers in banks are less likely to spend time benchmarking other organizations in regard to leadership and innovation (Raymond et al., 1998). The cultures of some companies are much more supportive of such innovations than are the cultures of others. A strategy that favors the development and introduction of innovations with these characteristics might be called proactive (Calantone et al, 1995). According to Porter, (1990), companies with a reactive innovation strategy aim to hit many singles. These are easier to achieve than home runs, but each one by itself does not move a team as far.

As originally conceived of, the marketing concept holds that all company activities must be organized around the primary goal of satisfying customers' needs. Organisational

structures and procedures reflect a market-orientation, and all personnel are expected to be truly customer-focused. Market-oriented firms are also recognized to pay a great deal of attention to customer research prior to new products being developed and produced (Damanpour, 1996).

As indicated above, a succession of incremental, imitative, late innovations can have a very dramatic cumulative effect. However, this strategy appears less dynamic than that of the proactive innovator; neither is always and automatically better. The reactive innovation strategy requires more emphasis on process than product innovation. Because innovations of this type are easier to achieve, reward systems need to emphasize results. Results need to be viewed in terms of commercial success. The culture of reactive innovators tends to be less supportive of creative genius and more congenial to those who progress systematically in a logical fashion (Prahalad and Hamel, 1994).

In some ways, reactive innovators need to devote more time and attention to their competitors than do proactive innovators. Because the reactive innovator emphasizes adoption of the inventions of others, there is clearly a need to stay current on what inventions are being introduced, how they are being received, and what factors determine the most opportune time for a late mover to introduce its innovation. Further, imitative innovations require not just awareness but also a detailed understanding of the product or service being imitated (Fulmer, 1992).

In order to optimally exploit required knowledge, an enterprise must have in place an adequate organizational structure. The studies done so far suggest that a continuous adjustment of the organization is one of the thirteen basic functions of innovation

management (Teece et al, 1997) and that innovation is unavoidably linked to organizational changes. These strategic and organizational changes are aimed at creating the best possible conditions for the implementation of innovation activities within an enterprise.

Enterprises in transition countries very often undergo such changes due to their adjusting to new business conditions. While they need not be directly focused on innovation activities, strategic and organizational changes are expected to be conducive to them, as their purpose is to improve the enterprise conditions and discover new techniques and methods aimed at enhancing its business performance.

2.8 Empirical Studies

Internationally, research on financial engineering forms a huge body of research focused on problems of technology-based change in organizational and social settings. The popularity of the financial engineering in financial performance research testifies to its usefulness. 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 financial engineering process has also been associated with the creation of core competencies and with the development of dynamic capabilities.

As Hao and Hunter (1997) studied that the role played by financial innovation and development on the rate of economic growth in a cross-section of countries. In particular, they attempted to focus on second stage financial innovations such as the exigency of

trading in financial futures, the openness of a country's financial markets and banking system to foreign investors, and the extent to which the equity markets are open, liquid, and deep. Indicator variables were created to capture a country's financial innovations as well as banking system structure. From their cross-country growth regressions, their findings suggest that financial development, as exemplified, for example by the presence of a well functioning financial futures market(s), is positively linked to the growth rate of GDP. On the other hand, other financial variables under study (such as the presence of a commodities futures market) appeared not to sufficient to capture the level of sophistication required to pick-up their full growth benefits.

Hammer (1990) stresses that organizations 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.

Ekvall, (1999) observes that systematic evaluation rarely occurs within organizations. Making causal connections between investment in innovation, and future management performance and 37onceptualiz success is externally difficult. Francis (2000) highlights the difficulty in establishing a statistical link between the incidence of innovation and company performance.

In the local scene, 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. Odhiambo (2008) in an investigation on innovation strategies at the Standard Chartered Bank found that innovations were used in co-ordination and input of key departments and individuals; adequate resources and well trained personnel are also necessary for the strategy to be successful. He recommended that the innovations should incorporate the low-level employees since they are better placed to understand the needs of consumers. He also found that there is poor coordination between the key departments and individuals, very few resources are allocated for research and development on the processes involved, there are high rates of skills mismatch and top-management takes a dictatorial role in carrying out the process. Use of various aspects of innovations is thus expected to have great effects on the financial performance of an organization. This study looks into the effects of financial engineering on the financial performance of commercial banks in Kenya.

2.9 Conclusions

Financial engineering typically involves creativity, but is not identical to it: financial engineering involves acting on the creative ideas to make some specific and tangible difference in the domain in which it occurs. All financial engineering processes begin with creative ideas. We define financial engineering as the successful implementation of

creative ideas within an organization. In this view, creativity by individuals and teams is a starting point for financial engineering; the first is necessary but not sufficient condition for the second.

The available literature shows that there exist a strong relationship between financial engineering 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 innovations with a specific reference to commercial banks. This study sets to fill the research gap that exists as no study has been done to investigate the relationship between financial engineering and financial performance of commercial banks despite their strategic positioning to adopt innovations. The available literature provided insights on how different engineering 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 financial engineering 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 financial engineering on financial performance of the commercial banks in Kenya.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter sets out various stages and phases that will be followed in completing the study. It involves a blueprint for the collection, measurement and analysis of data. This section is 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 will be executed and how respondents will be approached, as well as when, where and how the research will be completed. Therefore in this section the research will identify the procedures and techniques that will be used in the collection, processing and analysis of data. The following subsections are included; research design, target population, data collection instruments, data collection procedures and finally data analysis.

3.2 Research Design

This study used a causal research design. A causal survey design is a non-experimental investigation in which researchers seek to identify cause and effect relationship by forming groups of individuals/objects in whom the independent variable is present or present at several levels and then determining whether the groups differ in the dependent variable (Cooper and Schindler, 2003). In this case, the research problem is relationship between financial engineering and financial performance of commercial banks in Kenya. The research aims at understanding the variables of financial engineering and its effects on financial performance of commercial banks in Kenya.

3.3 Population of Study

The population of interest in this study comprised commercial banks in Kenya. There are 43 commercial banks in Kenya as of December 2009 (CBK Report, 2009). Thus 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 is 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 financial engineering 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 themselves. The researcher followed up on the respondents to closely monitor the administration of the questionnaires.

Secondary data on financial data was obtained from annual reports of commercial banks which were obtained from the Central Bank and from individual commercial banks.

3.5 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.

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 not 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.

3.6 Data Analysis

Before processing the responses, the completed questionnaires were edited for completeness and consistency. The data was 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 analyze the qualitative data collected while descriptive methods were used to analyze quantitative data.

A 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, this will help in determining the relationship between financial engineering and financial performance in the Kenyan banking industry. Data analysis used SPSS version 17. 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, the researcher conducted a multiple regression analysis so as to determine the relationship between financial engineering and financial performance of commercial banks in Kenya. The regression equation ($\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon}$):

Whereby Y = Financial Performance (Return on Assets)

X_1 = Technology innovations

X_3 = Product innovations

X_1 = Market innovations

X_4 = Process innovations, and

a is an error term normally distributed about a mean of 0 and for purposes of computation, the a is assumed to be 0. Financial performance of the commercial banks was measured, quantified and operationalized using profitability measures of the companies. Financial engineering was measured and quantified in terms of its variables which were technology, product, market and process innovations. To quantify technology, the study will use mobile banking technologies, electronic money transfer, internet banking transactions, ATM transactions and technology account opening. For product innovations, the research will use measures of brands'brand visibility, competitive position and diversification. Market innovations will be measure through pricing, product, promotions and location, while process innovations, the study will consider quality of the personnel, number of customers served in a given time and quality of service offered.

The multiple regression analysis enabled measuring the financial performance of the commercial banks as a result of financial engineering strategies. The equation was solved by the use of statistical model where SPSS version 17 was applied.

CHAPTER FOUR

4.0 DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents analysis and findings of the study as set out in the research methodology. The results are presented investigating the relationship between financial engineering and financial performance of commercial banks in Kenya. The primary data was gathered exclusively from questionnaire as the research instrument. The questionnaire was designed in line with the objectives of the study. To enhance quality of data obtained, Likert type questions were included whereby respondents indicated the extent to which the variables were practiced in a five point Likert scale. Secondary data was obtained from the Central bank and from the annual reports of commercial banks in Kenya.

4.1.1 Response Rate

The study targeted 43 respondents in collecting data with regard to financial engineering and its effects on financial performance of commercial banks in Kenya.

Table 4.1: Response Rate

	Frequency	**Percentage**
Responded	30	70
Not responded	13	30
Total	**43**	**100**

Source: Researcher, 2010

Findings from the study revealed that 30 out of 43 target respondents filled in and returned the questionnaire comprising 70% of the targeted respondents. This commendable response rate was made a reality after the researcher made personal calls and visits to remind the respondent to fill-in and return the questionnaires. In addition, secondary data was obtained from the bank's annual reports and from the Central Bank of Kenya.

4.2 General Findings

4.2.1 Gender of the Respondents

Findings from the study revealed that 63% of the respondents of this study were male, while 37% of the respondents were female.

Table 4.2: Gender Composition

Gender	Frequency	Percentage
Male	19	63
Female	11	37
	30	**100**

Source: Researcher, 2010

4.2.2 Age

Findings from the study revealed that 44% of the respondents were 31-40 years of age, 30% were 41-50 years of age, 16% of the respondents were aged less than 30 years, while 10% of the respondents were more than 50 years.

Table 4.3: Age Bracket

Age bracket	Frequency	Percent
Less than 30 years	5	16
31-40 years	13	44
41-50 years	9	30
More than 50 years	3	10
Total	**30**	**100**

Source: Researcher, 2010

4.2.3 Level of Education

The study sought to investigate the highest level education achieved by the respondents.

Table 4.4: The Respondents' Highest Level Education

Level of education	Frequency	Percent
Diploma/HND	6	20
Undergraduate Degree	17	56
Postgraduate/PhD	6	20
Others	1	4
Total	**30**	**100**

Source: Researcher, 2010

On the highest qualification achieved, 56% of the respondents indicated that they had acquired an undergraduate degree level of education, 20% of the respondents indicated that they had acquired a HND/diploma level of education, another 20% of the respondents indicated that they had acquired a postgraduate level of education, while 4% of the respondents indicated that they had acquired other levels of education such as certificate education and international awards.

4.2.4 Respondents' Departments

The study sought to investigate the Respondents' Departments in the Bank

Table 4.5: Departments

Department	Frequency	Percent
Operations	7	24
Marketing and Product Development	9	30
Risk	6	20
Finance	8	26
Total	**30**	**100**

Source: Researcher, 2010

Results from the study revealed that 30% of the respondents worked in the marketing and product development, 26% of the respondents worked in the finance department, 24% of the respondents were in operations departments, while 20% of the respondents worked in the risk department.

4.3 Financial Engineering

4.3.1 Extent financial engineering strategies affect the financial performance a bank

The study sought to investigate the extent to which financial engineering strategies affect the financial performance of a bank.

Table 4.6: Extent to which financial engineering strategies affect the financial performance of a bank

Extent	Frequency	Percent
Very great extent	13	44
Great extent	9	30
Moderate extent	4	14
Little extent	3	10
Not at all	1	2
	30	**100**

Source: Researcher, 2010

Findings from the study revealed that 44% of the respondents indicated that financial engineering strategies affect the financial performance of a bank to a very great extent, 30% of the respondents indicated financial engineering strategies affect the financial performance of a bank to a great extent, 14% of the respondents indicated that financial engineering strategies affect the financial performance of a bank to a moderate extent while 10% of the respondents indicated that financial engineering strategies affect the financial performance of a bank to a little extent.

4.4 Technology Innovation

In this section, the study aimed at establishing the extent in which technological innovation strategies adopted by the bank affect the performance of a bank. Results depicted in table 4.7 revealed that majority of the respondents agreed that technological innovation strategies adopted by the bank affect the performance of a bank to a very great extent and to a great extent as shown by 44% and 30% respectively of the respondents.

Table 4.7 : Extent to which technological innovation strategies adopted by the bank affect the performance of a bank

Extent	Frequency	Percent
Very great extent	13	44
Great extent	9	30
Moderate extent	4	14
Little extent	3	10
Not at all	1	2
	30	**100**

Source: Researcher, 2010

4.4.2 Extent to which the bank makes use of various technological innovations in its operations

The study further inquired on the extent the bank made use of various technological innovations in its operations. Findings from the study revealed that majority of the respondents agreed that the banks used various technological innovations such as electronic money transfer shown by a mean of 1.02, mobile banking technologies shown by a mean of 1.12, ATM deposits and withdrawals shown by a mean of 1.10. The least cited technological innovations were online account opening and internet banking transactions shown by means of 3.8 and 3.2 respectively.

Table 4.8 Extent the bank makes use of various technological innovations in its operations

Technological innovation	Very great extent	Great extent	Moderate extent	Low extent	No extent	Mean	SD
Mobile banking technologies	63%	10%	7%	10%	6%	1.123	1.106
Electronic money transfer	67%	20%	10%	4%	3%	1.023	0.6064
Internet banking transactions	41%	40%	5%	4%	3%	3.212	0.7738
ATM deposits and withdrawals	73%	10%	10%	4%	3%	1.109	0.6064
Online account opening	21%	20%	25%	24%	3%	3.812	0.7738

Source: Researcher, 2010

4.4.3 Extent technology innovation affects competitiveness of bank which is a factor of performance

The study further inquired on the extent into which technology innovation affects competitiveness of bank, which is a factor of performance. Findings from the study revealed that most respondents cited that technology innovation affects competitiveness of bank to a great extent as was shown by 40 percent while 33 percent cited that technology innovation affects competitiveness of bank to a very great extent. 14 percent however cited that technology innovation affects competitiveness of bank to a moderate extent.

Table 4.9 Extent to which technology innovation affects competitiveness of bank

Extent	Frequency	Percent
Very great extent	10	33
Great extent	12	40
Moderate extent	4	14
Little extent	3	10
Not at all	1	2
	30	**100**

Source: Researcher, 2010

4.4.4 Extent to which various factors have affected adoption of technology innovation strategies by banks

In this section, the study aimed at establishing the extent to which various factors have affected adoption of technology innovation strategies by banks. Results presented in table 4.10 revealed that majority of the respondents agreed that high cost or too expensive projects most affected adoption of technology innovation strategies by banks as was shown by a mean of 4.18. In addition, the respondents cited lack of financial resources, lack of skills and innovativeness, no need for innovativeness and network problems/unreliable infrastructure as the factors that affected adoption of technology innovation strategies by banks as was shown by means of 3.6, 3.1, 2.9 and 2.5 respectively.

Table 4.10 Extent to which various factors have affected adoption of technology innovation strategies by banks

Factors	Least affected	Less affected	Moderately affected	More affected	Most affected	Mean	SD
Network problems/unreliable infrastructure	29.2	39.6	14.6	14.5	2.1	2.508	1.090
Lack of financial resources	37.5	58.3	2.1	2.1	0	3.687	0.624
Lack of awareness and knowledgeable of innovative strategies	29.2	43.8	8.3	8.3	10.4	2.270	1.267
High cost or too expensive projects	43.8	27.1	6.3	12.5	10.4	4.187	1.393
Lack of skills and innovativeness	35.4	33.3	16.7	10.4	4.2	3.145	1.148
No need for innovativeness	10.4	41.7	10.4	16.7	20.8	2.958	1.367

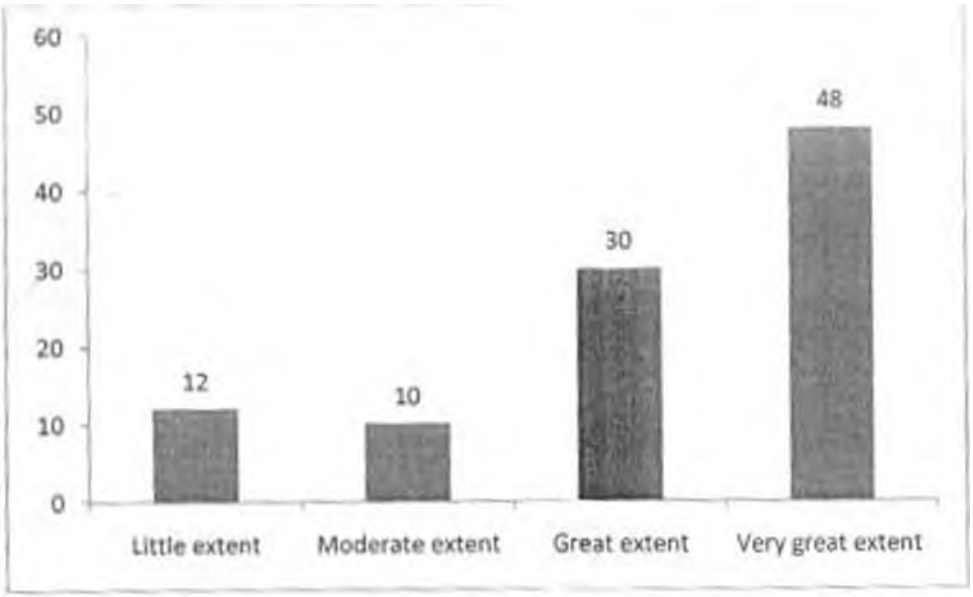
Source: Researcher, 2018

4.5: Product innovations

4.5.1 Extent to which banks employ product development as an innovation to influence its productivity

The study went further to establish the extent banks employed product development as an innovation to influence its productivity. Findings from the study revealed that majority of the banks employed product development as an innovation to a very great extent as was shown by 48 percent and to a great extent shown by 30 percent.

Figure 4.1 Extent to which banks employ product development as an innovation strategy to improve their profitability



Source: Researcher, 2010

4.5.2 Extent to which product innovation adopted by the bank affects the profitability of the bank

In this section, the study aimed at establishing the extent product innovation adopted by the bank affects the profitability of the bank. Findings from the study revealed that most respondents (44 percent) cited that product innovation adopted by the bank affects the

profitability of the bank to a very great extent while 30 percent cited that product innovation adopted by the bank affects the profitability of the bank to a great extent, 14 percent and 10 percent cited that product innovation adopted by the bank affects the profitability of the bank to a moderate and to a little extent respectively.

Table 4.11 Extent to which product innovation strategies adopted affects the profitability of the bank

Extent	Frequency	Percent
Very great extent	13	44
Great extent	9	30
Moderate extent	4	14
Little extent	3	10
Not at all	1	2
	30	**100**

Source: Researcher, 2010

4.5.3 Extent to which various factors have affected the adoption of product innovation in banks.

The study further inquired on the extent into which various factors affected the adoption of product innovation in banks. Results presented in table 4.12 revealed that majority of the respondents cited that quality of the systems, management support of competitive strategies, information intensity and specialization of business were the main factors that affected the adoption of product innovation in the bank as was shown by a mean of 4.1, 3.6, 3.1 and 2.9 respectively.

Table 4.12 Extent to which various factors have affected the adoption of product innovation in banks.

Factors	Least affected	Less affected	Moderately affected	More affected	Most affected.	Mean	SD
Size of organization	29.2	43.8	8.3	8.3	10.4	2.270	1.267
Quality of the systems	43.8	27.1	6.3	12.5	10.4	4.187	1.393
Information intensity	35.4	33.3	16.7	10.4	4.2	3.145	1.148
Specialization of business	10.4	41.7	10.4	16.7	20.8	2.958	1.367
Management support of competitive strategies	37.5	58.3	2.1	2.1	0	3.687	0.624

Source: Researcher, 2010

4.5.4 Areas considered as key success factors in product innovation strategies for greater profitability

The study further inquired on the various areas considered as key success factors in product innovation strategies for greater profitability. Results presented in table 4.13 indicated that product development, product differentiation and product visibility were the main key success factors in product innovation strategies for greater profitability.

Table 4.13 Areas considered as key success factors in product innovation strategies for greater profitability

Success factors	No Idea	Not at all	Fairly Strong	Strong	Very Strong	Mean	SD
Product Development	1.9	11.2	18.3	18.8	41.5	4.1310	12.9
Product diversification	8.3	13.8	25.2	12.9	29.3	2.6952	18.3
Product differentiation	4.5	12.1	18.8	21.1	35.0	3.1381	1.65
Product/brand visibility	9.5	9.0	27.9	11.7	31.7	3.0619	1.775

Source: Researcher, 2010

4.5.5 Extent of agreement on statements relating to the effect of product innovation and its effect on the profitability of the bank.

The study in this section aimed at establishing the respondent's extent of agreement on various statements relating to product innovation and its effect on the profitability of the bank. Findings from the study presented in table 4.14 revealed that majority of the respondents agreed to a great extent that product innovation helps the bank retain and grow competitive position, shown by a mean of 3.43, improved and radically changed products are regarded as particularly important for long-term bank growth, shown by a mean of 3.12 and that products at the bank have been updated and completely renewed for retaining strong market presence shown by a mean of 3.10.

Table 4.14 Extent of agreement on statements relating to product innovation and its effect on the profitability of the bank.

Statement	No extent	Less extent	Moderate extent	Great extent	Very great extent	Mean	SD
Improved and radically changed products are regarded as particularly important for long-term bank growth	10	12	20	24	32	3.126	1.775
Product innovation help the bank retain and grow competitive position	5	5	18	24	48	3.432	1.638
Products at the bank have been updated and completely renewed for retaining strong market presence.	15	10	20	25	30	3.100	1.656
The bank is involved in both old product development and new product development which greatly enhance its profitability	8	10	20	34	28	2.945	1.69

Source: Researcher, 2010

4.5.6 Extent to which various factors drive the bank towards a product development and hence profitability

The study further inquired on the extent in which various factors drive the bank towards a product development and hence profitability. Results revealed in table 4.15 revealed that shared commitment by everyone in the organization and the bank's vision and mission statements drives a bank towards a product development and hence profitability as was shown by means of 1.0 and 1.1.

Table 4.15 Extent to which various factors drive the bank towards a product development and hence profitability

Factors	Very great extent	Great extent	Moderate extent	Low extent	No extent	Mean	SD
The bank's vision and mission statements	63%	10%	7%	10%	6%	1.123	1.106
Shared commitment by everyone in the organization	67%	20%	10%	4%	3%	1.023	0.6064
Clear Communication & Communications channels	41%	40%	5%	4%	3%	3.212	0.7738

Source: Researcher, 2010

4.5.7 Extent of agreement on various statements that relate to the effect of product development on the performance of the bank

This section aimed at establishing the extent of agreement on various statements that relate to the effect of product development on the performance of the bank. Findings from the study presented in table 4.16 revealed that most respondents agreed that product development that are radical, inventive and early offer greater rewards and performance improvement as was shown by a mean of 3.9 and that the bank's product development strategy aims to hit many singles shown by a mean of 3.7.

Table 4.16 Extent of agreement on various statements that relate to the effect of product development on the performance of the bank

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	SD
Product development is important in both the supply of the core product as well as in the support part of any offer.	8%	12%	14%	34%	32%	3.122	.654
Product development that are radical, inventive and early offer greater rewards and performance improvement	4%	8%	12%	30%	46%	3.956	.675
The bank's product development strategy aims to hit many singles.	18%	10%	18%	12%	42%	3.787	.989

Source: Researcher, 2010

4.6 Market innovations

The study revealed that most respondents agreed that market innovation adopted by the bank affects the financial performance of the bank to a great extent.

The study further inquired on the extent into which the banks employed various market innovation strategies. Results depicted in table 4.17 revealed that majority of the respondents agreed that most banks created value through pricing, created and nurtured strong products, employed customer satisfaction and retention and embarked on

environmental analysis and response to changes as the various market innovation strategies as was shown by means of 2.0, 2.1, 2.4 and 2.5 respectively.

Table 4.17 Extent to which the banks employed various market innovation strategies

Extent	Very great extent	Great extent	Moderate extent	Low extent	No extent	Mean	SD
Creating value through pricing	29.2	56.3	4.2	4.2	6.3	2.0208	1.041
Availability of resources and capabilities	22.9	39.6	25	12.5	0	2.708	.9618
Customer satisfaction and retention	20.8	35.4	33.3	6.3	4.2	2.4750	1.024
Creating and nurturing strong products	20.8	62.5	0	14.6	2.1	2.1458	.9891
Environmental analysis and response to changes	2.1	14.2	32.1	30.8	20.8	2.5042	.7707
Aggressive anti-competitors marketing campaigns	4.5	12.1	18.8	21.1	35.0	3.1381	1.65

Source: Researcher, 2010

4.6.2 Extent to which the bank employs factors that influence profitability

The study further inquired on the extent to which the banks employed factors that influence profitability. Majority of the respondents indicated that environmental analysis and response to changes influence market performance and hence profitability to a great extent as shown by a mean score of 3.67, availability of resources and capabilities influences market performance and hence profitability to a great extent as shown by a mean score of 3.62, creating value through pricing influences market performance and hence profitability to a moderate extent as shown by a mean score of 3.21, customer satisfaction and retention influences market performance and hence profitability to a moderate extent as shown by a mean score of 2.71, creating and nurturing strong products influences market performance and hence profitability to a moderate extent as shown by a mean score of 2.60, while aggressive anti-competitors marketing campaigns influences

market performance and hence profitability to a little extent as shown by a mean score of 2.10.

Table 4.18 Extent to which the bank employs factors that influence profitability

Factors affecting market performance	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean	Std dev
Creating value through pricing	27.1	37.5	6.3	14.6	14.6	3.208	1.184
Availability of resources and capabilities	2.1	16.7	10.4	60.4	8.3	3.625	1.003
Customer satisfaction and retention	25	25	12.5	29.2	8.3	2.708	1.352
Creating and nurturing strong products	8.3	50	18.8	18.8	4.2	2.604	1.026
Environmental analysis and response to changes	2.1	27.1	16.7	10.4	43.8	3.667	1.342
Aggressive anti-competitors marketing campaigns	45.8	22.9	12.5	12.5	6.3	2.104	1.292

Source: Researcher, 2010

4.6.3 Level of agreement on various statements that relate to the effect of the market innovation on the financial performance of the bank.

The study further inquired on the level of agreement on various statements that relate to the effect of the market innovation on the financial performance of the bank. Findings from the study presented in table 4.19 revealed that majority of the respondents agreed that market orientation is expected to produce a significant positive impact on all analyzed effects of innovative activities, shown by a mean of 3.9, market development helps the bank to get better (new) ways to serve target markets shown by a mean of 3.4 and that market development purpose bank is to identify better (new) potential shown by a mean of 3.3.

Table 4.19 Level of agreement on various statements that relate to the effect of the market innovation on the financial performance of the bank.

Effect of the market innovation strategies	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	SD
Market development purpose bank is to identify better (new) potential markets	10%	12%	20%	24%	32%	3.326	1.775
Market development helps the bank to get better (new) ways to serve target markets	5%	5%	18%	24%	48%	3.432	1.638
The bank is involved in market segmentation which is aimed at developing the profitability of a business to the full	15%	10%	20%	25%	30%	3.100	1.656
Market orientation as a bank culture leads to its business performance improvement	8%	10%	20%	34%	28%	2.945	1.69
Market orientation is expected to produce a significant positive impact on all analysed effects of innovative activities	4%	8%	12%	30%	46%	3.956	.675

Source: Researcher, 2010

4.7 Process innovations

4.7.1 Extent process engineering affects the financial performance of the bank

In this section, the study aimed at establishing the extent process engineering affects the financial performance of the bank. Results depicted in table 4.20 revealed that most respondents cited that process engineering affect the financial performance of the bank to a very great extent as was shown by 40 percent while 30 percent cited that process engineering affect the financial performance of a bank to a great extent. 18 percent cited that process engineering affect the financial performance of the bank to a moderate extent.

Table 4.20 Extent to which process engineering affect the financial performance of the bank

Extent	Frequency	Percent
Very great extent	11	40
Great extent	9	30
Moderate extent	6	18
Little extent	3	10
Not at all	1	2
	30	**100**

Source: Researcher 2010

4.7.2 Process Innovation Strategies

The study also sought to investigate the extent to which various process innovation strategies are used in the bank.

Table 4.22 Use of process innovation

	Mean	SD
Increasing profit	4.432	.986
Enhancing quality personnel	3.988	.676
Saving of costs	3.887	.866
Attracting more customers	3.758	.575
Increasing competitiveness	3.765	.768
Providing the means for safeguarding and improving quality of service	4.310	.545

Source: Researcher, 2010

4.7.4 Extent of agreement on various statements that relate to the effect of process innovation on the profitability of the bank

This section aimed at establishing the extent of agreement on various statements that relate to the effect of process innovation on the profitability of the bank. Findings from the study revealed that most respondents agreed that process innovation is important in both the supply of the core product as well as in the support part of any offer shown by a mean of 3.42 and that process innovation that are radical, inventive and early offer greater rewards and performance improvement shown by a mean of 3.1.

Table 4.23 Extent of agreement on various statements that relate to the effect of process innovation on the profitability of the bank.

Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean	SD
Process innovation is important in the supply of the core product	5%	5%	18%	24%	48%	3.432	1.638
Process innovations that are radical, inventive and early offer greater rewards and performance improvement	15%	10%	20%	25%	30%	3.100	1.656
Companies with a reactive innovation strategy aim to hit many singles.	8%	10%	20%	34%	28%	2.945	1.69

Source: Researcher, 2010

4.8 Multiple regression

4.8.1 Correlation and the Coefficient of Determination

Table 4.24: Correlation and the Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Market innovations	0.428	0.183	0.149	0.8125
Product innovations	0.430	0.185	0.151	0.8825
Process innovations	0.326	0.106	0.069	0.8825
Technology innovations	0.475	0.226	0.194	0.8201

Source: Researcher, 2010

The table above presents the correlation (R) and the coefficient of determination between financial performance (Return on Assets) as the dependent variable and the independent variables (technological, market, process and product innovations). From the findings, the study found that there was a positive relationship between the dependent variable and the independent variables (technological, competition, process and product innovations).

Of all the four independent variables, technology had the highest relationship with Return on Assets with a correlation of 0.475 followed by product with 0.430. Market came third with a correlation value of 0.428 while process had the weakest relationship with Return on Assets of banks of 0.326.

As aforementioned, of all four predictors to Return on Assets, technology had the highest coefficient of determination (strength of relationship between technology and the banks' profitability) of 0.226 while product, market and process had coefficients of 0.185, 0.183 and 0.106 respectively.

4.8.2 Coefficient of Determination (R2)

Table 4.25: Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.681	0.463	0.361	0.752

Source: Researcher, 2010

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (financial performance) that is explained by all the four independent variables (technological, market, process and product innovations).

The correlation and the coefficient of determination of the dependent variables when all independent variables are combined can also be measured and tested as in the table below. From the findings 46.3% of financial performance (Return on Assets) is attributed to combination of the four independent factors (technological, market, process and product innovations) investigated in this survey. A further 53.7% of financial performance (Return on Assets) is attributed to other factors not investigated in this survey.

4.8.3 Multiple Regression Analysis

Table 4.26: Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.853	1.068	0	0.799	0.433
	Market innovation	0.156	0.203	0.135	0.619	0.543
	Product innovation	0.169	0.193	-0.08	-0.358	0.724
	Process innovation	0.128	0.250	-0.242	-0.891	0.383
	Technology innovation	0.205	0.16	0.346	1.284	0.213

Source: Researcher, 2010

Dependent Variable: Financial performance (Return on Assets)

The researcher conducted a multiple regression analysis so as to determine the relationship between the banks' Return on Assets and the four attributes investigated in this survey. The regression equation ($Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha$) was:

$Y = 0.853 + 0.205X_1 + 0.169X_2 + 0.156X_3 + 0.128X_4 + 0$

Whereby Y = Financial performance (Return on Assets)

X_1 = Technological innovations

X_2 = Product innovations

X_3 = Market innovations

X_4 = Process innovations

According to the regression equation established, taking all factors (technological, market, process and product) constant at zero, the financial performance (Return on Assets) of the banks as a result of these independent factors (innovation strategies) will be 0.853. The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in technological innovation will lead to a 0.205 increase in financial performance (Return on Assets). A unit increase in product innovation will lead to a 0.169 increase in the financial performance (Return on Assets); a unit increase in market innovation will lead to a 0.156 increase in financial performance (Return on Assets) while a unit increase in process innovation will lead to a 0.128 increase in financial performance (Return on Assets). This therefore implies that all the four variables have a positive relationship with technological innovation contributing more to the financial performance (Return on Assets) of the bank, while process innovation contributes the least to financial performance (Return on Assets).

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary and Conclusion

The objective of the study was to establish the various financial engineering strategies adopted by commercial banks in Kenya and their impact on the banks' financial performance.

The study established that financial engineering strategies affect the financial performance of a bank to a great extent. In addition, the study revealed that technological innovation strategies adopted by the bank affect the performance of a bank to a great extent. On the extent the bank makes use of various technological innovations in its operations, the study established that the banks used various technological innovations such as electronic money transfer, mobile banking technologies, ATM deposits and withdrawals.

On the various factors have affected adoption of technology innovation strategies by banks, the study revealed that high cost or too expensive projects most affected adoption of technology innovation strategies by banks, lack of skills and innovativeness , no need for innovativeness and network problems/unreliable infrastructure as the factors that have affected adoption of technology innovation strategies by banks. The study further established that technology innovation affects competitiveness of bank to a great extent its productivity.

On the extent to which various factors have affected the adoption of product innovation in the bank, the study revealed that quality of the systems, management support of competitive strategies; Information intensity and specialization of business were the main factors that influenced the adoption of product innovation in the bank. On the areas considered as key success factors in product innovation strategies for greater profitability, the study revealed that product development, product differentiation and product visibility were the key success factors in product innovation strategies for greater profitability.

The study further established that market innovation adopted by the bank affects the financial performance of the bank to a great extent. The study established that most banks created value through pricing, created and nurtured strong products, employed customer satisfaction and retention and embarked on environmental analysis and response to changes as the various market innovation strategies. On the factors that influence profitability, the study revealed that environmental analysis and response to changes influence market performance and hence profitability, availability of resources and capabilities, creating value through pricing, customer satisfaction and retention, and creating and nurturing strong products.

On the various process innovation strategies used, the study revealed that new products introduction; reduction of costs, improved innovation process, and conformance to regulations was used as process innovation strategies. Correlation results further revealed that the four variables have a positive relationship with technological innovation

contributing more to the financial performance of the bank, while process innovation contributes the least to financial performance.

On the effect of product innovation and its effect on the profitability of the bank, the study revealed that majority of the respondents agreed that product innovation helps the bank retain and grow competitive position, radically changed products are regarded as particularly important for long-term bank growth and that products at the bank have been updated and completely renewed for retaining strong market presence.

On the effect of product development on the performance of the bank, the study revealed that that most respondents agreed that product development that are radical, inventive and early offer greater rewards and performance improvement and that the bank's product development strategy aims to hit many singles.

On the topic of the effect of the market innovation on the financial performance of the bank, the study revealed that majority of the respondents agreed that market orientation is expected to produce a significant positive impact on all analyzed effects of innovative activities, market development helps the bank to get better (new) ways to serve target markets and that market development purpose bank is to identify better (new) potential.

On the area of use of process innovation, the study revealed that most respondents cited that process innovation aims at increasing profit, providing the means for safeguarding, enhancing quality personnel, improving quality of service and saving costs.

The study concludes that commercial banks in Kenya have adopted various financial engineering strategies aimed at improving performance. These included technological

innovation strategies such as electronic money transfer, mobile banking technologies, ATM deposits and withdrawals and innovation strategies which included new products introduction, reduction of costs, improved innovation process, and conformance to regulations.

The study further concludes that financial engineering strategies led to improved financial performance of commercial banks in Kenya. Banks that used a wide range of strategies had better market performance and hence profitability and increased resources and capabilities.

The study recommends that commercial banks in Kenya need to employ various product innovation strategies such as product range extension, product replacement, product improvement, product repositioning and new product introduction to enable the banks to be more productive, to grow faster, to invest more and also to earn more profit. The product development strategies can be effectively adopted if there are quality systems in place, there is good information flow, there is specialization and also if the management fully supports the competitive strategies. The power of product innovation in helping companies retain and grow competitive position is indisputable.

5.2 Limitations of the Study

There was high level of respondents' reluctance to complete the questionnaire promptly as some respondents perceived the questionnaires to be seeking classified information from their banks.

The scope of the study was also limited by time factor. This put the researcher under immense time pressure.

Banks in Kenya have adopted financial engineering strategies at different times. Hence their experience on the impact of financial engineering on their financial performance has been different from one bank to the other.

5.3 Suggestions for further research

Further research can be carried out to investigate whether the reported impact of financial engineering on financial performance of commercial banks in Kenya is valid for individual banks.

Further studies can also be focused on other financial institutions such as microfinance institutions and SACCOs to determine what impact financial engineering strategies have on their financial performance.

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APPENDICES

Appendix I: Questionnaire

RELATIONSHIP BETWEEN FINANCIAL ENGINEERING AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

This questionnaire consists of seven parts. Please answer all the questions by ticking on the spaces provided or use the spaces left for you.

PART A : DEMOGRAPHIC INFORMATION

1) Gender: Male ( )

Female ( )

2) Age

Less than 30 Years ( )

31-40 Years ( )

41-50 years ( )

More than 50 Years ( )

3) What level of education have you completed?

Diploma' IINI) ( )

Other College Education ( )

Degree ( )

Postgraduate/PhD ( )

4) Which is your department?

Operations ( ) Credit ( )

Risk management ( ) Finance ( )

Marketing and Product Development ( )

Others Please specify ---------- ( )

PART B: INNOVATIONS

To what extent do financial engineering strategies affect the financial performance of this Bank?

Very great extent [ ]

Great extent [ ]

Moderate extent [ ]

Little extent [ ]

Not at all [ ]

PART C: FINANCIAL TECHNOLOGIES

1) To what extent do technological innovation strategies adopted by the bank affect the performance of this bank?

Very great extent [ ]

Great extent [ ]

Moderate extent [ ]

Little extent [ ]

Not at all [ ]

2) 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.

Technological innovation	**1**	**2**	**3**	**4**	**5**
Mobile banking technologies					
Electronic money transfer					
Internet banking transactions					
ATM deposits and withdrawals					
Online account opening					
Others (Others.....)					

3) Technology exerts a significant influence on the ability to innovate. In the light of this statement, to what extent does technology innovation affect competitiveness of bank which is a factor of performance?

Very great extent [ ]

Great extent [ ]

Moderate extent [ ]

Little extent [ ]

Not at all [ ]

4) On a scale of 1-5 rank how these general factors have affected adoption of technology innovation strategies by bank. Where 1 means least affected while 5 means most affected.

Factors	**1**	**2**	**3**	**4**	**5**
Network problems/unreliable infrastructure					
Lack of financial resources					
Lack of awareness and knowledgeable of innovative strategies					
High cost or too expensive projects					
Lack of skills and innovativeness					
No need for innovativeness					

5) What recommendations would you make on technology innovativeness for performance?

.....

.....

PART D: PRODUCT INNOVATIONS

1) To what extent does this bank employ product development as an innovation to influence its productivity?

Not at all [ ]

Little extent [ ]

Moderate extent [ ]

Great extent [ ]

Very great extent [ ]

2) Kindly indicate the new product developments that the bank has realized as a result of product innovation strategies?

.....

.....

3) To what extent does product innovation adopted by the bank affect the profitability of the bank?

Not at all [ ]

Little extent [ ]

Moderate extent [ ]

Great extent [ ]

Very great extent

4) On a scale of 1-5 rank how these factors have affected your adoption of product innovation in your bank. 1 means least affected while 5 means most affected.

Factors	1	2	3	4	5
Size of organization					
Quality of the systems					
Information intensity					
Specialization of business					
Management support of Competitive strategies					

5) In which of the following areas does your organization consider as a key success factors in product innovation strategies for greater profitability? Please tick on the area considered. 5. Very Strong, 4. Strong, 3. Fairly Strong, 2. Not all, 1 No Idea

Success factors	1	2	3	4	5
Product Development					
Product diversification					
Product differentiation					
Product/brand visibility					
Other (Specify.....)					

6) To what extent do you agree with the following statements relating to the effect of product innovation and its effect on the profitability of the bank? Rate your answer from 1-5 where 1= to no extent at all and 5 = to a very great extent.

	1	2	3	4	5
Improved and radically changed products are regarded as particularly important for long-term bank growth					
Product innovation help the bank retain and grow competitive position					
Products at the bank have been updated and completely renewed for retaining strong market presence.					
The bank is involved in both old product development and new product development which greatly enhance its profitability					

7) To what extent do the following factors drive your bank towards a product development and hence profitability? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent.

Factors	**1**	**2**	**3**	**4**	**5**
The bank's vision and mission statements					
Shared commitment by everyone in the organization					
Clear Communication & Communications channels					

8) To what extent do you agree with the following statements that relate to the effect of product development on the performance of the bank? Use a scale of 1-5 where 1= strongly disagree and 5 = strongly agree.

	1	2	3	4	5
Product development is important in both the supply of the core product as well as in the support part of any offer.					
Product development that are radical, inventive and early offer greater rewards and performance improvement					
The bank's product development strategy aims to hit many singles.					
Other (Specify……..)					

PART E: MARKET INNOVATIONS

9) To what extent does market innovation adopted by the bank affect the financial performance of the bank?

Very great extent [ ]

Great extent [ ]

Moderate extent [ ]

Little extent [ ]

Not at all [ ]

10) To what extent does this bank employ the following forms of market innovation strategies? Use a scale of 1 to 5 where 1 is to a very great extent and 5 is to no extent.

Extent	**1**	**2**	**3**	**4**	**5**
Creating value through pricing					
Availability of resources and capabilities					
Customer satisfaction and retention					
Creating and nurturing strong products					
Environmental analysis and response to changes					
Aggressive anti-competitors marketing campaigns					
Other (Specify.....)					

11) How often does your bank use these forms of market innovations? (Rank on a scale of 1-5, 1 being least frequent use while 5 being most frequent use)

Market Innovation strategies	**1**	**2**	**3**	**4**	**5**
Creating value through pricing					
Availability of resources and capabilities					
Customer satisfaction and retention of the					
Creating and nurturing strong products					
Environmental analysis and response to changes					
Aggressive anti-competitors marketing campaigns					

12) What is your level of agreement with the following statements that relate to the effect of the market innovation on the financial performance of the bank? Use a scale of 1-5 where 1= strongly disagree and 5 = strongly agree.

Effect of the market innovation strategies	1	2	3	4	5
Market development purpose bank is to identify better (new) potential markets					
Market development helps the bank to get better (new) ways to serve target markets					
The bank is involved in market segmentation which is aimed at developing the profitability of a business to the full					
Market orientation as a bank culture leads to its business performance improvement					
Market orientation is expected to produce a significant positive impact on all analysed effects of innovative activities					

PART F: PROCESS INNOVATIONS

13) To what extent does process engineering affect the financial performance of this bank?

Very great extent [ ]

Great extent [ ]

Moderate extent [ ]

Little extent [ ]

Not at all [ ]

14) Which are the main organizational characteristics that affect the bank's process innovation strategy in influencing its profitability?

.....

.....

15) On a scale of 1-5 rank the use of process innovation on the following uses. 1 means least used while 5 means most used.

Processing Innovation	1	2	3	4	5
Increasing profit					
Enhancing quality personnel					
Saving of costs					
Attracting more customers					
Increasing competitiveness					
Providing the means for safeguarding and improving quality of service					

16) To what extent do you agree with the following statements that relate to the effect of process innovation on the profitability of the bank? Use a scale of 1-5 where 1= strongly disagree and 5 = strongly agree.

Statements	1	2	3	4	5
Process innovation is important in both the supply of the core product as well as in the support part of any offer.					
Process innovations that are radical, inventive and early offer greater rewards and performance improvement					
Companies with a reactive innovation strategy aim to hit many singles.					
Other (Specify.....)					

17) Which are the challenges facing process innovation in this bank that affect financial performance?

.....

PART G: FINANCIAL INFORMATION

Kindly indicate the financial performance for the following years in this bank

Factor	2005	2006	2007	2008	2009
Profitability					
Assets					
Equity					
Return on Assets					
Other (Specify.....)					

THANK YOU FOR YOUR TIME AND COOPERATION

Appendix II: Commercial Banks and Other Financial Institutions in Kenya as at 31 December 2009

COMMERCIAL BANKS

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

27. Gulf African Bank Limited
28. Habib Bank A.G. Zurich
29. Habib Bank Limited
30. Imperial Bank Limited
31. Investment & Mortgages Bank Limited
32. Kenya Commercial Bank Limited
33. K-Rep Bank Limited
34. Middle East Bank Kenya Limited
35. National Bank of Kenya Limited
36. NIC Bank Limited
37. Oriental Commercial Bank Limited
38. Paramount Universal Bank Limited
39. Prime Bank Limited
40. Southern Credit Banking Corporation Limited
41. Standard Chartered Bank of Kenya Limited
42. Transnational Bank Limited
43. Victoria Commercial Bank Limited
44. United Bank Limited

OTHER FINANCIAL INSTITUTIONS

1. Housing Finance Company of Kenya Limited
2. Savings and Loan Ltd

Source: Central Bank of Kenya: - Bank Supervision Annual Reports