AN ANALYSIS OF THE EFFECT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON SERVICE INNOVATION AND COMPETITIVE ADVANTAGE. A CASE OF COMMERCIAL BANKS IN KENYA.

BY

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DECLARATION

This research project is my own original work and has not been submitted for a degree in any other college or university for examination purposes.

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ABSTRACT

The research study aimed at broadening understanding about service innovation as a critical organizational capability through which information and communication technology adoption influences the competitive advantage of a firm. In the context of commercial banks, the study examined the effect of Information and communication technology adoption on competitive advantage through service innovation practices. A research framework and the associated questions were proposed. An empirical survey was conducted and questionnaires mailed to ICT Managers and Marketing Managers in thirty commercial banks in Mombasa, Kenya. Partial least square technique and Statistical package for social science (SPSS) technique were used to analyze the data.

The study found that, first; Information and communication technology adoption has a positive and significant effect on service innovation in process. Second; Information and communication technology adoption has a positive and significant effect on service innovation in product. Third; Service innovation in process has a positive and significant effect on external competitive advantage. Fourth; Innovation in product has a positive and significant effect on external competitive advantage. Fifth; Service innovation in process has a positive and significant effect on internal competitive advantage, and finally; Service innovation in product has a positive and significant effect on internal competitive advantage

The study also found that many commercial banks have made moderate effort to align information and communication technology strategy with business strategy to improve customer service and product offerings

DEDICATION

To almighty God for gift of life, time and energy needed to come up with the final research document. To my wife Lena for her patience and encouragement. To my childrens Ida, Ismael, and Sussy for their great inspiration. Lastly but not least, to others not mentioned above but worked behind the scene and made it possible for me to come up with this final document of research project.

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LIST OF ACRONYMS & ABBREVATION

ATM	-	Automated Tellers Machines
AVE	-	Average Variance
CBK	-	Central Bank of Kenya
Pc	-	Composite reliability
ICT	-	Information and Communication Technology
PLS	-	Partial Least Squares
SPSS	-	Statistical package for social science

DEFINITION OF THE TERMS

a) Competitive advantage.

Competitive advantage is gained through outstanding organizational conditions and strong value creation capabilities in a firm. That is, competitive advantage is achieved by fully deploying and using idiosyncratic, valuable and inimitable resources and capabilities and can be viewed externally as outcome performance and internally as organizational capabilities. (Bhatt, *et a,* 2005)

b) Composite reliability

Composite reliability is a measure of the overall reliability of a collection of heterogeneous but similar items. Hair *et al.* (1998) recommends a composite reliability above 0.70 thresh hold as a benchmark for acceptable reliability values.

c) Cronbach's alpha

Cronbach's alpha measures how well the sum score on the selected items capture the expected score in the entire domain, even if that domain is heterogeneous. Cronbach's alpha increases with the average correlation between items, so optimization of it tends to select items that have correlation of similar size with most other items. It is related to the outcome of an analysis of variance of the item data into variance due to the individuals in the sample and variance due to the items. The higher the proportion of variance due to individuals, the higher the Cronbach's alpha.

d) Innovation

Fichman,(2001) defined innovation as "the initiation, adoption and implementation of ideas or activity that are new to the adopting organization and entails identifying and using opportunities to create new products, services, or work practices."

e) Jackknife

Jackknife provides a way of decreasing bias and obtaining standard errors in situations where the standard methods might be expected to be inappropriate. The jackknife estimate of the statistic is given by mean of the pseudo-values, and the standard error by the standard error of the mean of the pseudo- values.

f) Service process innovation

Process innovation refers to the introduction of a new production method that includes a novel way of handling a commodity commercially and can be applied to the entire value chain process, including manufacturing, data processing, distribution and service (Zaltman, *et al,* 1973)

g) Service product innovation

Product innovation refers to the introduction of a new good or a new quality of an existing good and involves the development, production and dissemination of new consumer and capital goods and services (Zaltman, *et al,* 1973)

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

Modern firms in all sectors of the economy are making significant investments in information and communication technology to align business strategies, enable innovative functional operations and provide extended enterprise networks. A number of information systems researchers have regarded information and communication technology as an important ingredient of innovation development and business strategy alignment (Dewett & Jones, 2001).

Firms implement information and communication technology to enhance and/or enlarge the scope of their products and services. As many innovation activities involve adding new services, expanding existing ones and/or improving the service delivery process, the success of an organization hinges on how well it implements its service innovation to create new markets and enhance competitive capability (Berry *et al.* 2006).

The banking industry is an important sector in Kenya to analyze the effect of information and communication technology (ICT) because it is going through intense change, in particular the retail side of the business. Information and communication technologies are having a great impact in the reshaping of the banking industry by leading to the development of new financial products and for new means of delivering them. With regards to the delivery of products, for instance, the last decades have witnessed the emergence and use of Automated Tellers Machines (ATMs) and telephone banking, and of late the spread of Internet and e-banking. These new channels for the delivery of products have the advantage of meeting customer's needs not only in terms of longer hours of service, but are also a more efficient, cheaper means of delivering the products.

In the immediate post – independence Kenya, the banking and financial industry was highly controlled. However, after 1982, the government relaxed the hitherto stringent rules in the issuance of licenses to operate non-bank financial institutions (NBFI). The low capital requirement starting from five million shillings for non – bank financial institutions brought about the mushrooming of these institutions in the country. In June 1994, the Central bank of Kenya licensed some of these institutions to operate as commercial banks by taking deposits and making short term loans. This saw some Micro-finance institutions being converted into commercial banks. The continued entry of new players has resulted to increased competition in banking industry (Macey and Ottara, 2003).

Competition in the banking sector has been heightened by the fact that, the cost of banking technology, once prohibitive, is no longer a barrier to entry into the industry. Because of developments in technology and general erosion of entry barriers into banking, it is easier for non-bank financial institutions to move into banking than banks to diversify out of financial services. For instance, a case to mention is the entry of telecommunication players such as Safaricom ltd and Zain ltd in money transfer services. Safaricom's M-Pesa and Zain's ZAP money transfers services have a clear edge over the banks money transfers services, because they cost overwhelmingly less and deliver funds over great distances in real time. For instance, M-Pesa lowest transaction cost ranges between thirty shilling, to seventy shilling, divided in different proportions between the sender and the recipient. Zain's ZAP charges a flat rate of ten shillings for all transactions. In contrast, local charges for Money Gram, Xpress Money, and Western Union, all money transfer services offered through various banks, ranges from one hundred shilling to ten thousand shilling pushing them beyond the reach of ordinary Kenyans and hence making the banks to be clearly at a disadvantage.

1.2 Problem statement

In the recent past, the banking sector has witnessed rapid growth resulting in a scramble for the available customers and their ever-changing needs. Commercial banks have been experiencing declining customer bases due to the increased competition in the industry especially from micro-finance institutions, investment banks, and cooperative societies. The growing competition has necessitated the development of new competitive strategies by embracing and using information and communication technology as an ingredient of innovation and business strategy alignment. ICT is considered as a value creation tool in service innovation practices and as a strategic key in the attainment of the comparative advantage.

The commercial banks in Kenya of late have been affected by issues such as changing customer needs leading to mergers and reorganization, changes in the regulatory framework where liberalization exists but the market still continue to be restrictive, increased demand for non-traditional services including the automation of a larger number of services, shift in working hours, and a move towards emphasis on the customer rather than the product, and entry of non-traditional players who now offer financial service product (Financial post, July 2008)

Some past studies carried out on commercial banks in Kenya by Mullins *et al* (2006) Boaz *et al* (2008), Gathoga (2000), Kamau (2004), Fridah (2007), and Ouko (2006) focused on, Use of information technology in commercial Bank of Africa, Financial liberalization and bank efficiency in commercial Banks, Response of declining quality loan in commercial bank, Use of information technology in training, Strategic response of commercial banks, and E-banking in commercial banks respectively

However, there is scarce evidence of systematic empirical investigations or studies based on the effect of information and communication technology adoption on competitive advantage through service innovation practices among commercial banks in Kenya. To address the gap and advance understanding of information and communication technology adoption in enhancing service innovation practices, the study explored and analyzed the effects of information and communication technology adoption as an ingredient in service innovation practices and as a strategic key in the attainment of comparative advantage.

1.3 Purpose of the study

The study examined how information and communication technology is adopted and managed to enhance service innovation practices and competitive advantage among commercial banks.

It also aimed at broadening understanding about service innovation as a critical organizational capability through which information and communication technology adoption can influence the competitive advantage of a firm.

1.4 Objectives of the study

1.4.1 General objective

To analyze the effect of information and communication technology adoption on service innovation and competitive advantage among commercial banks in Kenya.

1.4.2 Specific objective

i. To ascertain whether information and communication technology adoption by commercial banks in Kenya enhances service innovation practices.

ii. To establish whether service innovation practices enhances competitive advantage among commercial banks in Kenya.

iii. To examine whether information and communication technology adoption is a strategic key in the attainment of comparative advantage.

iv. To ascertain whether Commercial banks ICT strategic plan has supported business strategic plan in improving customer service and product offerings.

1.5 Research questions

i. To what extent has information and communication technology adoption by commercial banks in Kenya enhanced service innovation practices?

ii. To what extent has service innovation practices enhanced competitive advantage among commercial banks in Kenya?

iii. To what extent has information and communication technology adoption been a strategic key in the attainment of comparative advantage?

iv. To what extent has Commercial banks ICT strategic plan supported business strategic plan in improving customer service and product offerings?

1.6 Significance of the study

The findings of the study can benefit the following:

i. **Policy makers at the commercial banks**: The study will help the Banks top Management in two fold;

(a) In broadening their understanding about service innovation as a critical organization capability through which information and communication technology adoption influences the competitive advantage of a firm.

(b) It will serve as a guide and reference in implementing appropriate information and communication systems that add value in service innovation practices to yield significant competitive advantage.

ii. **ICT consultants**: This study may also benefit ICT consultants who endeavour to provide advice to commercial banks in the acquisition and use of ICT to enhance

service innovation and competitive strategies.

iii. **Academic researchers**: This study is expected to generate interest among academia that lead to further study on the dynamic area of service innovation through the use of ICT by banks to enhance competitive strategies in the financial industry. This study will also contribute to the existing body of knowledge on the use of ICT in financial sector in the face of ever growing challenges.

iv. **The public and customers of commercial banks**: The public and the customers are expected to benefit from the results of this study because of improved service diversification and delivery

1.7 Scope of the study

The study was limited to commercial banks within Kenya only and did not cover other financial institutions like investment banks, mortgage firms, and Micro-finance firms. A survey was conducted on commercial banks in Mombasa. All data maintained in Nairobi headquarters and needed for the study was easily accessed from the branches in Mombasa or their respective bank website. The study concentrated on analyzing the effects of information and communication technology adoption as an ingredient in service innovation practices and as a strategic key in the attainment of comparative advantage.

1.8 Limitations of the study

Limitations to the study were:

(i) Subjective biases on data reported by ICT and Marketing Managers in each of the surveyed banks.

(ii) Not all ICT and Marketing Managers in sampled banks responded.

1.9 Assumptions

The following conditions were assumed to prevail:

i. The services offered by the banks are similar and that product differential is minimal.

ii. The responses given were truthful.

iii. Commercial banks listed in NSE were able to attract more funds during listing and part of the funds was used to implement ICT strategies aimed at enhancing service innovation, customer service and product offerings.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Firms are making significant investments in information and communication technology to align business strategies, enable innovative functional operations and provide extended enterprise networks. These firms have adopted information technology to foster changes in managing customer relationships, manufacturing, procurement, the supply chain and all other key activities (Barua & Mukhopadhyay, 2000) and to enhance their competitive capabilities (Sambamurthy *et al.* 2003). A number of information systems researchers have posited information technology as an important ingredient of innovation development (Corso & Paolucci, 2001; Dewett & Jones, 2001). Firms implement information technology to enhance and/or enlarge the scope of their products and services. As many innovation activities involve adding new services, expanding existing ones and/or improving the service delivery process, the success of an organization hinges on how well it implements its service innovation to create new markets (Berry *et al.* 2006).

2.2. The banking system in Kenya

The Banking industry in Kenya is governed by the Companies Act, the Banking Act and the Central Bank Act and other prudential guidelines, which are normally issued by the Central Bank of Kenya. The Central Bank is the main regulator of banks in Kenya. It is the regulating and supervising agency and the manager of monetary policy operations in Kenya. The Central Bank Act, Chapter 492 laws of Kenya, empowers it to formulate and implement monetary policy and foster the liquidity, solvency and proper functioning of the financial system. Central Bank of Kenya promotes a sound and stable banking system in Kenya by enforcing the requirements of the Banking Act and prudential

regulations, fostering liquidity and solvency of banking institutions, ensuring efficiency in banking operations and encouraging high standards of customer service. The Capital Markets Authority regulates all companies, including banks that are listed in the Nairobi stock exchange.

Kenya features a commercial banking system dominated by numerous commercial banks and a small number of non-bank financial institutions, which concentrate mainly on mortgage finance, insurance, lease hire and related financial services. Over the years the sector has grown into a more complex scene of banking institutions of different types and ownership. According to statistics by the Central Bank of Kenya, by the end of the year 2008, there were forty seven banking institutions. The commercial banks and the non-banking financial institutions offer corporate and retail banking services but a small number, offer other services, which include investment banking. In addition there are eleven specialized establishment set by the government to assist the specific sectors of the economy. These include Agricultural Finance Corporation, Industrial and Commercial Development Corporation, Kenya Industrial Estate, Industrial Development Bank, among others.

Some major developments that have taken place so far in the banking sector in Kenya include the implementation of risk-focused supervision by the Central Bank, amendments of banking legislative such as those governing interest rates as well as the amounts that are deposited at the Central Bank of Kenya (As part of the deposit protection fund), legislation, off-site data processing and surveillance and inspections (Banking Supervisory Report, 2006).

There have also been a number of cooperative societies that collect members' contributions and extend loans to their members. Some of these cooperative societies offer front office banking facilities and serve their clients just as any commercial bank

does. The Government of Kenya (2002), in addition, highlights the emergence and recognition of microfinance institution as alternative sources of funds for loans, hence as sources of increasing competition in the banking industry.

The increasingly advanced levels of information technology embraced by banks have also had a positive impact in the sector. The new and dynamic information systems adapted by most banks have enabled them to process data faster and efficiently. This has enabled them to downsize their branch operations, thereby cutting on cost and improving service delivery to their customers.

The above changes have contributed to the increasing competition in the banking industry, especially with regards to the number of financial products available in the market that is comprised of an increasingly more sophisticated clientele

2.3 ICT and banking industry

2.3.1 Electronic Money

During the 1990s, and taking advantage of new information technologies two different groups of electronic money were developed and introduced around the world: pre-paid cards and digital money through internet. These two kinds of products are often classified under the generic label of electronic money or new payment systems. In certain cases they are labeled as digital cash or electronic cash. By using the word "cash" one common feature is underlined: the goal is to be the equivalent of paper cash. Ideally, two main characteristics of the paper cash should be maintained: anonymity and liquidity.

Digital money is an electronic replacement for cash. It is storable, transferable and unforgeable. The main advantages of digital money are increased security, anonymity and preservation of privacy, reduction of transactions costs, easier international payments, consumers have access to much larger markets and therefore overall efficiency

improves, better means of control of personal finances by users directly instead of financial institutions.

Pre-paid Smart cards consist of a plastic card with an embedded chip and represent a technological advance in comparison with cards with magnetic bands. Pre-paid cards can serve as a payment mechanism by loading and storing monetary value in the chip embedded in the card. The value loaded in the card can later be disbursed when paying for the provision of goods and services (Chaum, 1992).

2.3.2 Products delivery

With regards to the delivery of products, for instance, the last decades have seen the appearance of Automated Tellers Machines (ATMs) and telephone banking, and are now seeing the spread of Internet banking. These new channels for the delivery of products have the advantage for costumers of longer hours of service, but are also a more efficient, cheaper means of delivering the products. Many banks already report a majority of transactions being conducted electronically with personal contact between client and bank employee. Finally, it should be noticed that while the rapid development of information technology has made some banking tasks more efficient and cheaper, technological investments are taking a larger share of banks resources. Currently, apart from personnel costs, technology is usually the biggest item in the budget of a bank, and the fastest growing one (White, 1999).

2.4 Conceptual framework

The main emphasis in the literature is on the discussion of information and communication technology (ICT) adoption and its influence on service innovation practices and competitive advantage. Based on Rogers's (1983) innovation diffusion theory, implementation represents the infusion stage in the process of innovation

diffusion (Cooper & Zmud, 1990). Therefore, once it has adopted and adapted a technology, a firm begins to use it in a comprehensive and integrated manner to support organizational work and innovative practices.

Figure 2.1 below presents the research framework of the present study. It shows the relationships that are hypothesized to exist among information technology adoption, service innovation practices and competitive advantage.

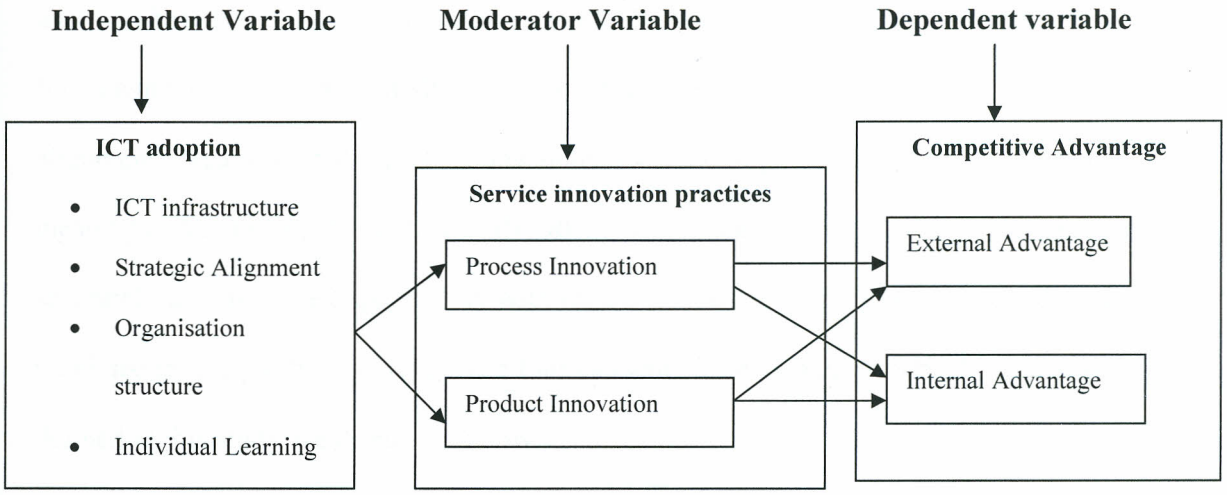


Fig. 2.1 Conceptual framework

Figure 2.1 above shows the relationship that exists between ICT adoption, Service innovation practices, and Competitive advantage. The conceptual frame work shows Information and communication technology adoption as the independent variable that is used as a strategic key in the attainment of competitive advantage- the dependent variable. However, the effectiveness of ICT adoption in achieving competitive advantage depends on how it enhances service innovation Practices - moderator variable, and how service innovation influences competitive advantage.

2.4.1 Information and communication technology adoption

Swanson (1994) suggested that information systems innovation among organizations can be categorized into three distinct types: innovations that occur within the information systems function (Type I), at the individual user or work group level (Type II) and at the organizational level (Type III). Consistent with the perspective of Type III innovations, the researcher will discuss and analyze information technology adoption at the organizational level and conceptualize information and communication technology adoption based on four elements in Scott Morton's (1995) MIT90 model. The terms of the four elements are slightly modified as information technology infrastructure, strategic alignment, organizational structure and individual learning, without losing the original meanings. Another element in the MIT90 model, management process, is considered separately and discussed specifically with regard to service innovation, to investigate its relationship to the other elements. The four elements of information technology adoption defined in this study are discussed below.

a) Information technology infrastructure: Information technology infrastructure includes networks; management and provisioning of large-scale computing, electronic data interchange and shared databases, and research and development to identify emerging technologies (Davenport *et al.* 1989). Almost two-thirds of the information and communication technology budget of an organization is spent on information technology infrastructure, not only to enable the sharing of information across different departments but also to provide flexibility to respond to changes in business strategy (Weill *et al.* 2002). Adequate investment and management of information technology infrastructure are the foundation of information technology adoption.

b) Strategic alignment: Strategic alignment suggests that the effect of information and communication technology on performance will depend on how well the information

technology strategy and corporate strategy coincide (Chan *et al.* 1997). Companies can be successful in aligning their information technology and business strategies by balancing internal and external factors as well as business and information technology domains (Henderson & Venkatraman, 1993). A number of studies have shown that aligning information and communication technology and business strategies is critical for successful information technology adoption and positively associated with effective organizational performance (Chan *et al.* 1997).

c) Organizational structure: Organizational structure specifies the formal line of communication; helps control, integrate and coordinate work activities; and defines the allocation of work roles (Porrass & Robertson, 1992). While information technology is being adopted, organizational structure is often reexamined and adjusted to improve performance via pooled resources, innovation and collaboration across organizational boundaries (Dewett & Jones, 2001).

d) Individual learning: For the organization to effectively take advantage of information technology, both end-users and information technology personnel must acquire new information technology-related skills and knowledge (Grover *et al.* 1999; Scott Morton, 1995). The acceptance of new information technology may hinge on the proper assessment and identification of organization divisions that would benefit the most, which subsequently may influence the adoption behavior of others (Rogers, 1983). Moreover, the successful adoption of new information technology requires people in the entire organization to adapt and provide employee support and training, to reap greater benefits beyond the change in technology.

2.4.2 Service innovation

Fichman (2001) defines innovation as 'the initiation, adoption and implementation of ideas or activity that are new to the adopting organization'. It entails identifying and using opportunities to create new products, services, or work practices (Tushman & Nadler, 1986). When faced with keen competition, one of a firm's predominant problems is whether to pursue an aggressive growth strategy through service innovation practices. Early studies on service innovation suggested that service was in itself a product or at least an integral part of a product and should be managed under new product development for service companies (Easingwood, 1986). Others have suggested that project learning and communication are critical to service development (Blazevic & Lievens 2004). In sum, to create new markets, firms must implement specific service innovation practices to develop scalar business models, manage customer experience, monitor employee performance and provide managerial process innovation (Berry *et al.*, 2006).

Two commonly raised categories of service innovation are product innovation and process innovation (Avlonitis *et al.* 2001). For example, Gadrey *et al.* (1995) categorized four types of service innovation according to service context, namely innovations in service products, architectural innovations that bundle or un-bundle existing service products, innovations that result from the modification of an existing service product and innovations in processes and organization for an existing service product. Further, Lyytinen & Rose (2003) identified service process innovations as services that (1) support the administrative core (administrative process innovation), (2) support functional processes (technological processes innovation), (3) expand and support customer interfacing processes (technological service innovation) and (4) support inter-organizational processes and operations (technological integration innovation).

The present study divides service innovation practices into two categories: service process innovation, or changes in service delivery and/or development processes as defined by method, functionality, administration, or other features; and service product innovation, or changes in service products/offerings as defined by changes in general product features. These definitions of service innovation are selected to help the researcher focus on examining the effect of information and communication technology adoption on service innovation practices.

a) Service process innovation:

Process innovation refers to the introduction of a new production method that includes a novel way of handling a commodity commercially (Schumpeter, 1934) and can be applied to the entire value chain process, including manufacturing, data processing, distribution and service (Zaltman et al. 1973). Adopting information and communication technology may have positive impacts on internal operational processes as well as external cross-enterprise processes that integrate other organizational and supply chain processes (Joglekar & Yassine, 2002). The adoption of information and communication technology enhances a company's response to customer demands with shorter delivery times and enables customers to monitor their deliveries (Jackson, 1990) Externally, companies can not only improve delivery speed and progress visibility, but also take advantage of information and communication technology in designing or modifying new service processes (Avlonitis et al. 2001), such as using Web or mobile services for customer information inquiry and consultation, enriching multi-channel purchasing features and enhancing after-sale services. Internally, information and communication technology may enhance service development capabilities and administration efficiency to shorten product design time, reduce the number of prototypes that must be built, cut costs, improve quality (Karagozoglu & Brown, 1993) and foster better collaboration,

communication and coordination among project members (Ozer, 2000). Therefore, the researcher suggests that information technology adoption has positive and significant effects on service process innovation.

b) Service product innovation

Product innovation refers to the introduction of a new good or a new quality of an existing good (Schumpeter, 1934) and involves the development, production and dissemination of new consumer and capital goods and services (Zaltman *et al.* 1973). Compared to physical products, service products are easier to imitate and more difficult to protect under commercial patents. Even so, innovating service products is still an important task for service firms, to remain competitive. Adopting information and communication technology provides a means for production and marketing staff to create numerous opportunities to innovate new services (Vermeulen & Dankbaar, 2002). Using information technology applications, such as information management and business intelligence, enable employees to access past service innovation projects, thereby allowing them to learn from previous experiences and update their current market strategy. In doing so, firms are capable of developing new services that are better suited to market demand and offer better post-selling services to fit customer needs (Demirhan *et al.* 2006). In particular, direct marketing and customization approaches have been widely applied in the financial sector and information and communication technology can help firms quickly identify customer needs from customer profile analysis and frequent interactions with customers and provide customized products and/or services. Thus, the researcher suggests that service firms that fully utilize information technology will do better in differentiating their products and providing superior services.

2.4.3 Service innovation practices and competitive advantage

Competitive advantage can be gained when an organization produces its goods or services more cheaply than its competitors and resolves bargaining situations to its own advantage (Bakos & Treacy, 1986). Recent discussions on competitive advantage have broadened the scope from value chain *and* value creation capabilities perspectives and suggest that competitive advantage is gained through outstanding organizational conditions and strong value creation capabilities in a firm (Piccoli & Ives, 2005). That is, competitive advantage is achieved by fully deploying and using idiosyncratic, valuable and inimitable resources and capabilities and can be viewed externally as outcome performance and internally as organizational capabilities (Bhatt & Grover, 2005). Thus, in this study, based on the above discussion, the researcher categorizes competitive advantage as external and internal, to examine the effect of service innovation on competitive advantage externally and internally.

External competitive advantage is attainable by providing high-quality products and services to meet customer desires and being constantly aware of market changes and quick to react to trends and competitors' strategies. Firms depend on the effective use of existing assets to enhance profitability and apply innovation practices to establish their values when faced with imitation by competitors (Roberts & Amit, 2003). The effects of service process innovation on external competitive advantage can be examined by evaluating customer satisfaction with quality, delivery time and installation assistance (Day, 1994). Process innovation may also increase the effectiveness and efficiency of operations (Tushman & Nadler, 1986). It follows that firms that constantly innovate service processes would excel at utilizing new marketing techniques and enhancing customer satisfaction to fulfill the constantly changing needs of their customers. Furthermore, launching new products and improving existing products help firms grow

their sales and become market leaders (Iansiti, 1995). Offering new service products to fit customer needs would enable firms to keep pace with the shifting desires of customers and help improve brand image. Thus the researcher postulate that both service process innovation and service product innovation would have positive and significant effects on external competitive advantage.

Internal competitive advantage depends on internal resources and capabilities. It emphasizes the importance of creating and encouraging a corporate environment in which employees plan, develop and launch new, innovative services (De' Brentani & Ragot, 1996). The effects of service innovation practices on internal competitive advantage can be examined by evaluating employee job satisfaction, domain knowledge and level of creativity after new services are launched (Atuahene-Gima, 1996). Firms that continuously provide innovative services are often characterized by a service-oriented working environment, better cross-function coordination and well-defined training and learning mechanisms. Employees in such environments may be more satisfied and motivated to learn and build new knowledge (Brown & Duguid, 1991). Whenever a new service process is provided and/or a new service product is launched, employees will need to learn about the new processes or services. Consequently, employees will tend to become more creative and acquire new knowledge (Rubery *et al.* 2002). Similarly, if firms launch new services as a routine practice, employees was more able to adapt to new roles and new practices in selling the new services and was more satisfied with their work, by assuming a challenging, ever-changing role, instead of selling the same services time after time (Smith *et al.* 2005).

2.5 Gaps in literature review

Systematic empirical studies of the relationships among ICT, service innovation and competitive advantage in commercial banks are scarce in Kenya. To address this gap and

shed new and important light on these constructs, the researcher explored ICT adoption as a coordination mechanism, which has led to changes in innovation-related activities in Commercial banks Kenya.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This section focused on describing the methodology that the researcher adopted to achieve the objectives. It covers research design, area of study, target population, sample size and sampling strategy, data collection instruments and procedures, and data analysis.

3.2 Research design

Churchill (1991) wrote that exploratory studies are important in increasing the researcher's familiarity with the problem, in gathering information about practical problems, in clarifying concepts, in formulating a problem for more precise investigation and in establishing priority for further research. A component-based structure equation model that links information and communication technology adoption, service innovation practices, and competitive advantage constructs was devised. The different sub-constructs in each construct were used to capture dimensions of each of the three construct and the linkages between them. Since banking services are similar, the line of service and product differential is quite thin. It is because of this that, an exploratory survey-based study of commercial banks was conducted to evaluate the validity of the linkages. A descriptive study was also used to collect both qualitative and quantitative data.

3.3 Area of study

The study was carried out on commercial banks within Mombasa. Only the main branch offices were targeted since all data needed for the study and maintained in Nairobi headquarter could be accessed in these branches. The study concentrated on analyzing the effect of ICT adoption on service innovation and competitive advantage.

3.4 Target population

The population of interest consisted of all the commercial banks operating in Kenya. However, data was captured from the main branches of sampled banks in Mombasa, Kenya. According to the Banking Supervisory Report (2008), there are forty seven commercial banks in Kenya (see Appendix II).

The choice of commercial banks was influenced by the desire to investigate service firms in a highly competitive, dynamic and technology-driven industry.

3.5. Sample size and Sampling strategy

From the population a two-stage stratified random sampling technique was employed to select the banks for the study. This study was limited to sixty five percent of the total banks in Kenya. This means that thirty commercial banks were selected. This was appropriate because statistically this sample size is acceptable as it conforms to the widely held rule that a sample size should not be less than thirty for large population i.e. $n \geq 30$. (Antony & Michael, 1999). Also the larger the sample, the more likely its mean and standard deviation are representative of the population mean and standard deviation (Kothari, C. 1990). Table 3.1 shows the sample size and sampling strategy adopted.

Table 3.1: Sample size and Sampling Strategy

Item	Commercial bank Category	Size of population	Sample size
1	Listed in Nairobi Stock Exchange (NSE)	9	8
2	Not Listed in Nairobi Stock Exchange (NSE)	38	22
	TOTAL	**47**	**30**

Source: Banking Supervisory Report (2008) & Nairobi Stock exchange report (2008)

The study was conducted at the main branches of the banks in Mombasa that are sampled. To collect data, two questionnaires were administered in each bank. One questionnaire collected technical data, and the second collected banks bio-data and

general performance in the market and were filled by the ICT manager and marketing manager respectively. The following procedures were followed:

First, a comprehensive list of all commercial banks in Kenya was drawn (Appendix II). Secondly, a dichotomized list consisting of all commercial banks listed on Nairobi Stock exchange and those not-listed was drawn. Finally each bank was given a unique number for sampling purposes. A random number table was used to arrive at the indicated number of banks after which each bank was given a unique number. This procedure was considered effective as each bank had a equal chance of being included in the study.

3.6. Data collection instrument

Primary data was collected by the use of structured and semi structured questionnaires, one for ICT manager and the other for marketing manager. Information was gathered by employing both closed and open ended, and a five point scale assigned number questionnaires (see Appendix I). The data was secured by means of a self-administered questionnaire as part of a wider examination of the information technology adoption, service innovation practices and competitive advantage in Commercial banks.

3.7 Data collection procedure

A one week preliminary survey in all selected banks was undertaken so as to familiarize with their management structure, identify research assistant and make arrangements with the respondents for the actual data collection. The questionnaires were administered by the "drop and pick later" method. The ICT manager and the marketing manager were targeted because the study focused on respondents who were able to give an overall understanding of the banks' management systems, functions, automation systems, service innovations and competitive strategies. Secondary data was also collected from respective banks website, annual reports and prospectus.

3.8 Data analysis

Partial least square method was used to show causal-predictive analysis and to explain complex relationships of the three constructs by following a component-based strategy. Structural equation modeling procedures implemented in PLS was used to perform a simultaneous evaluation of both the quality of measurement (the measurement model) and construct interrelationship (the structural model) (Appendix III and Appendix IV respectively). Also Statistical Package for Social Sciences (SPSS) was used to give means, standard deviations, and average variances as a way of describing the location of a distribution, measuring the spread or variability, and capturing its scale or degree of being spread out respectively.

3.9 Presentation of findings

Tables and charts were used to interpret the data so as to form conclusions regarding the research objectives. Also correlation matrix, measurement model and structural model were also used to show the degree of correlation between the three constructs under study, the results of the partial least squares estimation with loadings for the three constructs, and to explain the result of PLS estimation with loading for the three constructs using path coefficient respectively.

CHAPTER FOUR

4.0 DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents data analysis and research findings of the study. Partial least squares regression was primarily used to evaluate the research questions and to explain the relationship between the three constructs. Also Statistical Package for Social Sciences (SPSS) was used to give means, standard deviations, and average variances. The study aimed at analyzing the effect of ICT on service innovation and competitive advantage. The results obtained are shown in the following sections.

4.2 Response rate

A total of sixty questionnaires accompanied by covering letters explaining the purpose of the research were given to the targeted respondents in the selected commercial banks. Three weeks after the questionnaires were given, only respondents from twelve commercial banks had provided the data representing a response rate of 40%. Follow-up telephone calls were made to those who had not responded, and this increased the total responses to eighteen corresponding to a total valid return of 60%. Table 4.1 summaries the above response rate.

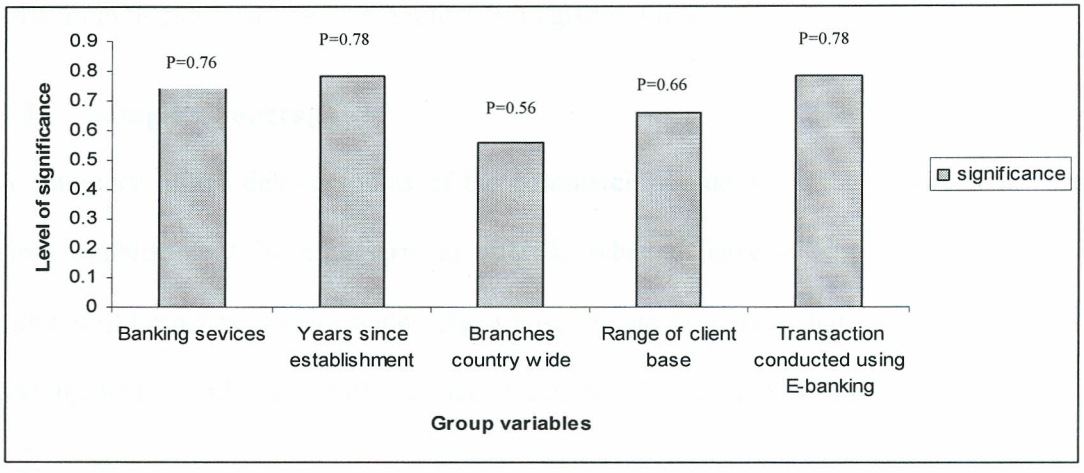
Table 4.1 Response Rate in Respect to Commercial Bank Category.

Commercial Bank Category	Sample Size	Early Response		Late Response		Total Response	
		n	Rate %	n	Rate %	n	Rate %
Listed in Nairobi Stock Exchange (NSE)	9	6	20%	2	6.67%	8	26.67%
Not listed in Nairobi Stock Exchange (NSE)	21	6	20%	4	13.33%	10	33.33%
TOTAL	**30**	**12**	**40%**	**6**	**20%**	**18**	**60%**

Source: Research Data (2009)

To examine non-response bias, following Armstrong and Overt (1997), a comparison of early and late response in table 4.1 was performed. Figure 4.1 depicts non-response bias of the independent sample test performed.

Figure 4.1 Non-response bias of the independent sample test.



Source: Research Data (2009)

The early response was classified as (n = 12), while the follow-up contacts were considered late (n = 6). The independent sample tests revealed no statistically significant differences between the two groups in terms of Banking service offered (P = 0.76), years the firm was established (P = 0.78), number of branches country wide (P = 0.56), range of client base (P = 0.66), and volume of transactions conducted using E-banking (P = 0.78). The significance was greater than .05 for the two groups, that is, the two variances were approximately equal.

The overall response rate in the two bank categories is shown in table 4.2 below

Table 4.2 Overall response rate in the two respective Bank category

Commercial bank category	Sample size	Responded		Did not respond	
		n	Rate %	n	Rate%
Listed in Nairobi Stock Exchange	9	8	89%	1	11%
Not listed in Nairobi Stock Exchange	21	10	48%	11	52%
TOTAL	**30**	**18**		**12**	

Source: Research Data (2009)

Out of the nine sampled commercial banks listed in Nairobi Stock Exchange, respondents from eight banks returned filled questionnaires, representing a response rate of 89%. On the other hand respondents from ten commercial banks out of twenty one not listed in Nairobi Stock Exchange returned filled questionnaires, representing a response rate of 48% an indication that they were reluctant to give out information.

4.3 Sample demographics

A summary of the demographics of the commercial banks surveyed in terms of years since establishment, banking services offered, whether listed in NSE, bank ownership, number of branches country wide, client base, range of market share, total ATM points country wide, and volume of transaction conducted using E-banking is shown in table 4.3.

Table 4.3 Demographics of the Sample Commercial Banks

Variable	Category	n	Rate (%)
Years since established in Kenya	- Less than 5 years	3	16.67
	- Between 5 - 10 years	3	16.67
	- Between 10 - 15 years	4	22.22
	- Over 15 years	8	44.44
	Aggregate	**18**	**100**
Banking services offered	- Retail banking	4	22.22
	- Corporate banking	5	27.78
	- Both retail and corporate banking	9	50
	Aggregate	**18**	**100**
Whether listed in NSE	- Listed in Nairobi Stock Exchange	8	44.44
	- Not listed in Nairobi Stock Exchange	10	55.56
	Aggregate	18	100
Bank ownership	- Local	8	44.44
	- Foreign	4	22.27
	- Both local and foreign	6	33.33
	Aggregate	**18**	**100**
Number of branches country wide (fulltime and satellite)	- Less than 20	2	11.11
	- Between 21 - 40	4	22.22
	- Between 41 - 60	6	33.33
	- More than 60	6	33.33

	Aggregate	**18**	**100**
Range of client base	- Below 300,000	-	0
	- Between 300,000 - 600,000	2	11.11
	- Between 600,000 - 900,000	6	33.33
	- More than 900,000	10	55.56
	Aggregate	**18**	**100**
Range of market share country wide	- Below 10%	4	22.22
	- Between 11% - 20%	3	16.67
	- Between 21% - 30%	4	22.22
	- Between 31% - 40%	4	22.22
	- Above 40%	3	16.67
	Aggregate	**18**	**100**
Total ATM points country wide (including PESA points	- Below 60	1	5.56
	- Between 61 - 90	2	11.11
	- Between 91 - 120	3	16.67
	- More than 120	14	66.66
	Aggregate	**18**	**100**
Volume of transaction conducted using E-banking (Electronic purses, Internet and mobile banking)	- Below 20%	0	0
	- Between 21 – 40%	0	0
	- Between 41 – 60%	4	22.22
	- Above 60%	14	77.78
	Aggregate	18	**100**

Source: Research data (2009)

Out of the eighteen commercial banks surveyed, 44.44% had been established for more than fifteen years at the time of the survey, an indication that majority of the banks that responded are banks that have been operating for more than fifteen years. Also 50% were offering both retail and corporate banking services thus diversifying their products offering to fit customer needs and keep pace with the shifting desires of customers and help improve brand image. Out of the surveyed commercial banks 44.44% were locally owned and this shows that locally owned banks were more willing to give data for needed for study. 55.56% were not listed in Nairobi Stock Exchange and this shows that majority of commercial banks are privately owned. 33.33% had more than sixty branches

country wide showing effort made by many commercial banks to open braches in major towns. 55.56% had more than nine hundred thousand clients showing a high clientele base. 66.66% had more than one twenty ATM points country wide and more over 77.78% had above sixty percent transactions being conducted using electronic banking systems an indication that majority of the banks have adopted ICT systems to enhance response to customer demands to satisfy them with quality, delivery times and to enable customers to monitor their deliveries.

4.4 ICT infrastructure

The study attempted to find out the extent of budget allocation for purchasing ICT hardware and software as well as the emphasis given on ICT staffing and training, and sophisticated internal applications. The data was analyzed using mean scores and standard deviation to determine the extent of ICT adoption in terms of acquisition of ICT hardware and software, ICT staffing and training, and usage of internet applications. The analysed results are shown in table 4.4.

Table 4.4 ICT infrastructure (ICTI)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
ICTI 1	Allocation of budget for purchasing ICT hardware	9	0.5	6	0.33	3	0.17	0	0	0	0	4.33	0.75
ICT I 2	Allocation of budget for purchasing ICT software	8	0.44	6	0.33	4	0.22	0	0	0	0	4.22	0.79
ICTI 3	Emphasis on ICT staffing and training	9	0.5	5	0.28	3	0.67	1	0.06	0	0	4.22	0.92
ICT I 4	Use of sophisticated internet application	7	0.39	6	0.33	4	0.22	1	0.06	0	0	4.05	0.91

n = 18 Group mean = 4.21 Group standard deviation (σ) = 0.85

Source: Research data (2009)

As evidenced by the results in table 4.4 above, allocation of general budget for purchasing ICT hardware was the most ICT infrastructure carried out and had a mean

score of 4.33, with 50% of the respondents rating it as very great extent. This shows that this variable is very important. The low standard deviation (0.75) is indicative of a high consensus among the respondents.

Allocation of budget for purchasing ICT software had a mean source of 4.22, with 44% of the respondents rating it as very great extent. These findings show that many of the banks had actively moved towards having a shared database to enhance response to customer's demands. This is in agreement with Jackson (1990), who contends that shared database facilities shortening of delivery times and enable customers to monitor their deliveries.

Emphasis on ICT staffing and training had a mean score of 4.22, with 50% of the respondent rating it as very great extent. This is an indication of the significance of this variable in the successful adoption and functioning of ICT and in enabling the bank to reap greater benefits. Embracing sophisticated Internet application had a mean score of 4.05, with 39% of the respondents rating it as very great extent. The higher mean score is an indication that many banks have a great number of transactions conducted electronically with minimal personal contact between customers and bank employees.

The results of the findings in table 4.4 are consistent with what was stated by Weill *et al* (2002), that almost two-thirds of the information and communication technology budget of an organization is spent on information infrastructure, not only to enable the sharing of information, but also to provide flexibility to respond to changes in business strategy.

4.5 Strategic alignment.

The nature of strategic alignment in relation to ICT in commercial banks was investigated, and data analyzed using mean scores and standard deviation to determine

the extent of ICT support on business strategies and ICT compliance with business strategies. The results are shown in table 4.5.

Table 4.5 Strategic alignment (SA)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
SA 1	ICT support on business strategies in strengthening customer service	6	0.33	6	0.33	5	0.28	1	0.056	0	0	3.94	0.91
SA 2	ICT project implementation in compliance with business strategies	6	0.33	7	0.38	4	0.22	1	0.56	0	0	4	0.88
SA 3	ICT application support on business strategies to improve process management	5	0.28	6	0.33	5	0.28	2	0.11	0	0	3.78	0.97
SA 4	ICT application support on business strategies to improve product/ service offering	4	0.22	6	0.33	7	0.38	1	0.056	0	0	3.72	0.92

n = 18 Group mean = 3.86 Group standard deviation (σ) = 0.91

Source: Research data (2009)

The response obtained show that ICT support on business strategies to strengthen customer service has a mean score of 3.94, with a total 33 % of the respondent rating it very great extent and 33% rating it great extent . ICT project implementation in compliance with business strategies had a mean score of 4, with a total 33 % of the respondent rating it very great extent and 38% rating it great extent. This shows that the effect of ICT on performance depends on how well the ICT strategy and corporate strategy coincide. The low standard deviations (0.88) indicate that the respondents had high consensus on this view.

ICT applications support on business strategies to improve process management had a mean score of 3.78, with a total 28 % of the respondent rating it very great extent and 33% rating it great extent This shows that majority of the banks have benefited from aligning ICT strategies with business strategies.

ICT applications support on business strategies to improve product/service offerings had a mean score of 3.72, with a total 22 % of the respondent rating it very great extent and 33% rating it great extent These findings shows that majority of the banks have lately adopted ICT applications such as internet banking, mobile banking, etc, as well as partnering with other service providers to offer money transfer services. The low standard deviation (0.87) shows a high consensus among the respondents.

4.6 Organizational structure

The study also sought to determine whether the organizational structure of the banks had been changed by adopting new information technology systems and applications to enhance employee empowerment, to enable interdepartmental integration, to increase operation mobility, and to enable managers make more timely decisions. The results are shown on table 4.6

Table 4.6 Organizational Structures (OS)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
OS 1	Change of OS through ICT adoption to enhance employee empowerment	4	0.22	5	0.28	5	0.28	4	0.22	0	0	3.5	1.07
OS 2	Change of OS through ICT adoption to enhance cross-function integration	4	0.22	4	0.22	5	0.28	4	0.22	1	0.056	3.33	1.2
OS 3	Adjustment of OS through ICT adoption for new business practices	3	0.17	4	0.22	5	0.28	5	0.28	1	0.56	3.17	1.17
OS 4	Change of OS through ICT adoption to increase operational mobility	4	0.22	5	0.28	5	0.28	4	0.22	0	0	3.5	1.07
OS 5	Change of OS through ICT adoption to help managers make more timely decisions	8	0.44	5	0.28	4	0.22	1	0.056	0	0	4.11	0.94

n = 18 Group mean = 3.5 Group standard deviation (σ) = 1.09

Source: Research data (2009)

As shown in table 4.6 above, change of organization structure through ICT adoption to enhance employee empowerment had a mean score of 3.5, with a total 22 % of the

respondent rating it very great extent and 28% rating it great extent. Change of organizational structure through ICT adoption to enable inter-departmental integration had a mean score of 3.33, with a total 22 % of the respondent rating it very great extent and 22% rating it great extent. Organization structure adjustment for new business practice through adoption of new information technology systems and applications had a mean score of 3.17, with a total 17 % of the respondent rating it very great extent and 22% rating it great extent. These findings are consistent with what was stated by Dewett and Jones, (2001) that, while information technology is being adopted, organization structure is often re-examined and adjusted to improve performance via pooled resources, innovation and collaboration across organizational boundaries.

Change of organizational structure to increase operational mobility by adopting new information technology systems and applications had a mean score 3.5, with a total 22 % of the respondent rating it very great extent and 28% rating it great extent

Change of organization structure to help managers make more timely decisions through adoption of new information technology systems and application had a mean score of 4.11, with a total 44 % of the respondent rating it very great extent and 28% rating it great extent, an indication that most banks have incorporated expert systems and decision support systems (DSS) to help managers make timely decisions. The low standard deviation of 0.94 is an indication of the high consensus among respondents.

4.7 Individual Learning

The extent of banks training their employees on ICT related skills and knowledge, and the ability of employees to innovate new ideas, and approaches to work effectively by adopting new ICT applications was investigated and results of the percentages and mean scores shown in table 4.7.

Table 4.7 Individual Learning (IL)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		σ
IL 1	Provision of sufficient training on ICT systems and applications	6	0.33	6	0.33	4	0.22	2	0.11	0	0	3.89	0.99
IL 2	Employees ability to learn new ICT applications quickly	4	0.22	7	0.39	6	0.33	1	0.06	0	0	3.78	0.85
IL 3	Ability of employees to adopt new ICT applications for their work	4	0.22	5	0.28	7	0.39	2	0.11	0	0	3.61	1.16
IL 4	Employees' ability to innovate new ideas and approaches to work effectively by adopting new ICT application.	7	0.39	6	0.33	4	0.22	1	0.06	0	0	4.06	0.91
IL 5	Resistance to adopting new information systems and applications by employees	6	0.33	6	0.33	4	0.22	2	0.11	0	0	3.89	0.99

n = 18 Group mean = 3.85 Group standard deviation (σ) = 0.99

Source: Research data (2009)

Findings in table 4.7 shows that employees ability to innovate new ideas and approaches to work effectively by adopting new ICT application was the most highly rated and had a mean score of 4.06, with a total 39 % of the respondent rating it very great extent and 33% rating it great extent. This is an indication of increased job satisfaction resulting from job enrichment and enlargement by using the user friendly ICT systems and applications. The low standard deviation (0.91) is an indication of high consensus among the respondents in regard to this view.

Results of the findings shows that majority of the commercial banks had provided sufficient training while implementation new ICT systems and applications. This had a mean score of 3.89, with a total 33 % of the respondent rating it very great extent and 33% rating it great extent. Employees' ability to learn new ICT applications quickly had a mean score of 3.78, with 22 % of the respondent rating it very great extent and 39% rating it great extent. Employees' ability to adopt new ICT applications for their work had a mean score of 3.61, with 22% of the respondent rating it very great extent and 28%

rating it great extent. This is a reflection of the effort made by many banks to make their employees acquire the related ICT skills and knowledge to deliver their services effectively and efficiently. All these findings are in agreement with Rogers (1983) that, the successful adoption of new ICT requires people in the entire organization to adapt and provide employee support and training in order to reap greater benefits beyond the change in technology.

Majority of the respondents reported little resistance to adopting new information systems and applications by employees in their banks. This had a mean score of 3.89, with a total 33 % of the respondent rating it very great extent and 33% rating it great extent. The high mean score is an indication of minimal resistance to adopting new information systems and application whereas the low standard deviation is an indication of high consensus among the respondents. The low resistance is an indication that most banks had prepared their employees for the change by giving them the necessary training on ICT related skills and knowledge and the benefits accruing from the use of the new ICT systems. In general, the findings in table 4.7 are in agreement with the view of Scott Morton (1995) that for the organization to effectively take advantage of information technology, both end-users and ICT personnel must acquire new ICT-related skills and knowledge.

4.8 Process Innovation

This objective aimed at establishing whether ICT adoption enhances service innovation practices. The two types of service innovation identified were process innovation and product innovation. The findings on process innovation were analyzed using mean scores and standard deviation to determine the extent of service process innovation in sampled commercial banks. Table 4.8 shows the extent of various process innovation practices.

Table 4.8 Process Innovations (PRI)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
PRI 1	Offering new practices in customer service	8	0.44	6	0.33	4	0.22	0	0	0	0	4.22	0.79
PRI 2	Offering new practices in customer information enquiring consultation	7	0.39	7	0.39	3	0.17	1	0.06	0	0	4.11	0.87
PRI 3	Offering new practices in selling products/services	5	0.22	6	0.33	5	0.28	2	0.11	0	0	3.78	0.91
PRI 4	Offering new practices in providing after sales service	4	0.22	5	0.28	5	0.28	4	0.22	0	0	3.5	1.07
PRI 5	Offering new practices in developing new products/services	5	0.28	5	0.28	5	0.28	2	0.11	1	0.06	3.61	1.16
PRI 6	Offering new practices in promoting new products/services	4	0.22	6	0.33	6	0.33	2	0.11	1	0.06	3.67	0.94
PRI 7	Offering new practices in internal administration & operations	3	0.17	6	0.33	7	0.39	2	0.11	0	0	3.56	0.9

n = 18 Group mean = 3.78 Group standard deviation (σ) = 0.96

Source: Research data (2009)

The result shown in table 4.8 above indicates that offering new practices in customer services were rated highly in terms of new practices carried out by the banks in the past few years. This is evidenced by the high mean score (4.22) given by the respondents with a total 44 % of the respondent rating it very great extent and 33% rating it great extent. The low standard deviations (0.79) reiterate the same i.e. high consensus among the respondents. This shows that most banks have lately made effort to improve customer service delivery in order to maintain a high level of customer satisfaction.

Offering new practices in customer information enquiry and consultation had a mean score of 4.11, with a total 39 % of the respondent rating it very great extent and 39% rating it great extent. This shows that in the past few years many banks have put in place systems that allow customers to make enquiry on their account status or consult management in relation to the same. E-banking systems have been used to facilitate

customer information enquiry and consultation. This has been complemented by improved customer care service in banking hall.

Offering new practices in selling products/services had a mean score of 3.78, with 22 % of the respondent rating it very great extent and 33% rating it great extent. This was supported by the respondents who stated that, for the past few years their respective banks have witnessed more customer conducting transactions using internet banking, mobile banking, and ATM among other E-banking systems. Also 87% of the respondents concurred that their institution have incorporated Saturday as one of their working day, moving from the traditional five working days in a week schedule, and at the same time increasing normal banking hours in week days. The respondents also reported that direct sales are one of the new practices in selling products carried out by their institutions.
The above response is in agreement with the view of Jackson (1990) that, the adoption of ICT systems enhances company response to customer demands with shorter delivery times and enables customers to monitor their deliveries.

Offering new practices in providing after sales service had a mean score of 3.5, with a total 22 % of the respondent rating it very great extent and 28% rating it great extent. The low mean score is a reflection that some of the commercial banks have not made good effort to improve their after sales service. Offering new practices in developing new products/services had a mean score of 3.61, with a total 28% of the respondent rating it very great extent and 28% rating it great extent, an indication that banks have moderately made effort to add or develop new products/services.

Offering new practices in promoting products/services and offering new practices in internal administration and operations had a mean score of 3.67, and 3.56, with 22% and 17% of the respondent rating them very great extent and 33%and 33% rating them great extent respectively. The moderate mean scores of 3.67 and 3.56 is an indication that bank

have to invest more in using ICT systems to promote products/services as well as perfecting internal administration and operations.

4.9 Product Innovation

The study sought to determine the extent to which commercial banks have fully utilized ICT in differentiating their products and providing superior services. Thus findings on the extent of revision and improvement of existing products/services, repackaging of existing products/services, extension of products/services, and creation and establishment of new lines of products/services for the past few years was analyzed and results of the percentages and mean scores shown in table 4.9.

Table 4.9 Product Innovations (PDI)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
PD 11	Revision and improving existing products/services	8	0.44	6	0.33	4	0.22	0	0	0	0	4.22	0.79
PD 12	Repackaging existing products/services	5	0.28	6	0.33	4	0.22	3	0.17	0	0	3.72	1.14
PD 13	Extension of products/service	5	0.28	7	0.39	3	0.17	3	0.17	0	0	3.78	1.03
PD 14	Creating and establishment of new lives of products/services	7	0.39	7	0.39	3	0.17	1	0.06	0	0	4.11	0.87

n = 18 Group mean = 3.96 Group standard deviation (σ) = 0.97

Source: Research data (2009)

Findings in table 4.9 above shows that revision and improving existing products/services was the most product innovation carried out for the past few years as evidenced by the high mean score of 4.22, with a total 44 % of the respondent rating it very great extent and 33% rating it great extent. The need of revision and improving new products/services has been a result of high competition in banking industry. As a result many commercially banks have adopted ICT applications such as information management and business

intelligence, to enable employees to access past service innovation projects, thereby allowing them to learn from previous experience and update their current market strategies especially by developing new products/services that are better suited to market demand. The low standard deviation of 0.79 is an indication of the consensus among the respondents on this view.

Repackaging existing product/services had a mean score of 3.72, with 28% of the respondent rating it very great extent and 33% rating it great extent. Repacking of existing products/services has been necessitated by the changing needs of the customers and increasing competition in banking industry. This is consistent with Zaltman *et al,* (1973), that innovating and/or repackaging service products is an important task for service firms to remain competitive.

Extension of products/services for the past few years had a mean score of 3.78, with 28% of the respondent rating it very great extent and 39% rating it great extent. The moderate mean score is an indication that commercial banks have moderately offered post-selling services to fit their customer's needs. This is evidenced by the high standard deviation of 1.03, an indication of the consensus among the respondents.

Creation and establishment of new lines of products/services for the past few years had a mean score of 4.11, with a total 39 % of the respondent rating it very great extent and 39% rating it great extent. The high mean score shows that majority of the banks have diversified to new lines of products/services as well as making their customers or would be customers be aware of them through direct marketing or customization. The low standard deviation (0.87) indicates that respondents had high consensus on this view. Also this is consistent with Demirhan *et all* (2006) argument that direct marketing and customization approaches have been widely applied in the financial sector and ICT can

help firms quickly identify customer profile analysis and frequent interactions with customers and provide customized products and/or services.

4.10 External Advantage

The study sought to find out whether service process innovation and service product innovation have positive and significant effect on external competitive advantage. The respondents were asked whether for the past few years their respective banks have been successful in providing new service to enter new market, to gain competitive advantages, and to offer higher quality than competitors. The results obtained are shown in table 4.10 below.

Table 4.10 External Advantages (EA)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
EA 1	Success in providing new services to enter new markets	9	0.5	5	0.28	4	0.22	0	0	0	0	4.28	0.8
EA 2	Success in providing new services to gain more competitive advantage	8	0.44	6	0.33	4	0.22	0	0	0	0	4.22	0.79
EA 3	Success in providing new service to offer higher quality than competitors	7	0.39	7	0.39	3	0.17	1	0.06	0	0	4.11	0.88

n = 18 Group mean = 4.2 Group standard deviation (σ) = 0.83

Source: Research data (2009)

Table 4.10, shows that success in providing new services to enter new market for the past few years was the greatest external advantages gained by commercial banks. This is reflected by the high mean score of 4.28, with a total 50 % of the respondent rating it very great extent and 28% rating it great extent. Respondents reported that of late their respective banks have provided value addition services to meet customer desires and boost customer satisfaction by improving quality and delivery times. This is an indication

of management reaction to market changes and competitors strategies. The view is consistent with Day (1994) that the effect of service process innovation on external competitive advantage can be examined by evaluating customer satisfaction with quality, delivery time and installing assistance.

Success in providing new services to gain competitive advantage was also highly rated and had a mean score of 4.22, with a total 44 % of the respondent rating it very great extent and 33% rating it great extent, an indication that most commercial banks have diversified from their traditional banking services to include other services such as money transfer services, mortgage services, brokerage services just to mention a few. The low standard deviation of 0.79 is an indication of the high consensus among the respondents.

Success in providing new services to offer higher quality than competitors had a mean score of 4.11, with a total 39 % of the respondent rating it very great extent and 39% rating it great extent. This shows that for the past few years commercial banks have put more effort to meet the shifting desires of their customers in order to maintain them and attract new ones, at the same time maintaining a competitive edge. This is consistent with what Lansiti, (1995) who contended that offering new services products to fit customer needs would enable firms to keep pace with the shifting desires of customers and help improve brand image.

4.11 Internal Advantages

This section attempted to find whether service innovation practices have positive and significant effect on internal competitive advantage. The respondents were asked whether for the past few years their respective institutions have been able to provide new services that increases employee job satisfaction related skills and domain knowledge as well as

enhancing innovative capabilities of employees. The results of data analyzed using mean scores and standard deviations are shown in table 4.11.

Table 4.11 Internal Advantage (IA)

ITEM	SCALE / VARIABLE	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
		5		4		3		2		1			
		f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
IA 1	Ability to provide new services and increase employee job satisfaction	6	0.33	6	0.33	5	0.28	1	0.01	0	0	3.94	0.91
IA 2	Ability to provide new services and increase employee related experience	7	0.39	5	0.28	5	0.28	1	0.06	0	0	4	0.94
IA 3	Ability to provide new services and enhance the innovations capability of employees	5	0.28	6	0.33	5	0.28	1	0.06	0	0	3.67	0.92

n = 18 Group mean = 3.87 Group standard deviation (σ) = 0.93

Source: Research data (2009)

Table 4.11 above shows that ability to provide new services and increase employee job satisfaction for the past few years had a mean score of 3.94, with a total 33 % of the respondent rating it very great extent and 33% rating it great extent. This is a reflection of the effort made by commercial banks to eliminate repetitive tasks performed by the employees by continuously launching new services with ever-changing role. These findings concurs with the statement by Smith *et al,* (2005) that, if firms launch new services as a routine practice, employees was more able to adapt to new roles and new practices in selling the new services and was more satisfied with their work by assuming a challenging, ever-changing role instead of selling the same services time after time.

Ability to provide new services and increase employee related experience was the greatest internal competitive advantages gained by many commercial banks, in the past few years. This is reflected by the high mean score of 4, with a total 39% of the respondent rating it very great extent and 28% rating it great extent. These findings are

consistent with what was stated by Brown & Duguid (1991) that firms that continuously provide innovative services are often characterized by a service-oriented working environment, better cross-functional, coordination and well defined training and learning mechanisms. Employees in such environment may be more satisfied and motivated to learn and build new knowledge.

Ability to provide new services and enhance innovative capability of employees had a mean score of 3.67, with a total 28 % of the respondent rating it very great extent and 33% rating it great extent. This shows that for the past few years' commercial banks have moderately launched a new service that enhances innovative capability of employees. This is in agreement with Rubery *et al,* (2002) that, whenever a new service process is provided/and or a new service product is launched, employees will need to learn about the new process or services. Consequently employees will tend to become more creative and acquire new knowledge.

4.12 Types of transaction/payment systems used by customers

The study sought to determine the most frequently used mode of electronic transaction/payment system in commercial banks for the past few years. Table 4.12 shows the extent of usage of various transactions/payment systems.

Table 4.12 Types of transaction/payment systems used by customers

SCALE / TRANSAC-TION SYSTEMS	Very great extent		Great extent		Moderate		Little extent		To no extent		Mean	Standard deviation σ
	5		4		3		2		1			
	f	Rate %	f	Rate %	f	Rate %	f	Rate %	f	Rate %		
Master card	4	0.22	5	0.28	7	0.39	2	0.11	0	0	3.61	0.95
American express	3	0.17	4	0.22	8	0.44	2	0.11	1	0.06	3.33	1.05
Electronic purse	2	0.11	3	0.17	9	0.5	3	0.17	1	0.06	3.11	0.99
E-cash	1	0.06	4	0.22	8	0.44	4	0.22	1	0.06	3	0.94
Debit cards	8	0.44	5	0.28	5	0.28	0	0	0	0	4.17	0.83
Credit cards	7	0.39	6	0.33	5	0.28	0	0	0	0	4.11	0.81
Credit transfer	4	0.22	6	0.33	6	0.33	2	0.11	0	0	3.67	0.94

n = 18 Group mean = 3.57 Group standard deviation = 0.93

Source: Research data (2009)

Results in table 4.12 shows that the most frequently used mode of electronic transaction system was debit card with a mean score if 4.17, with a total 44 % of the respondent rating it very great extent and 28% rating it great extent. The low standard deviation of 0.82 is shows a high consensus among the respondents on the same issue. Ranked second in usage was credit cards and had a mean score of 4.11, with a total 39 % of the respondent rating it very great extent and 33% rating it great extent. Credit transfer, master card, American express, electronic purse, and E-cash had mean score of 3.67, 3.61, 3.33, 3.11 and 3, with 22%, 22%, 17%, 11% and 6% of respondents rating them very great extent respectively. The high standard deviation in each is an indication of least consensus among the respondents.

4.13 Strategic partnership in money transfer/transaction

The nature of strategic partnership in relation to money transfer/transaction system was investigated and results of the percentages shown in table 4.13

Table 4.13 Strategic partnership in electronic money transfer/transaction

TRANSFER/TRANSACTION MODE	Banks that have partnered		Banks that have not partnered	
	F	Rate %	f	Rate %
Money gram	17	94%	1	6%
Western union	16	89%	2	11%
*X*press money	4	22%	14	78%
M-Pesa	10	56%	8	44%
Zap	3	17%	15	83%
Pesa point	17	94%	1	6%

n = 18

Source: Research data (2009)

The study findings in table 4.13 above shows that Money gram and Pesa point transfer transaction system are used by 17 out of the 18 commercial banks studied, representing a rate of 94%. Only one studied bank reported that it has not partnered with Money gram and Pesa point. Out of the 18 commercial banks studied, 16 have patterned with Western Union, 10 with M-Pesa, 4 with Xpress money, and 3 with Zap. This shows that many commercial banks are moving towards strategic partnership to facilitate quick money transfer. This is because it enhances response to customers' demands with shorter delivery times and enables customers to monitor their deliveries at the most convenient time and place with minimal inconveniences hence giving banks competitive edge.

4.14 Measurement properties

In this section, the study sought to establish the relationship between the dependent variable (competitive advantage), moderator variable (service innovation), and independent variable (information and communication technology). Partial least squares regression was used to evaluate the research questions and to explain the relationship between the three variables under study.

The expected factor structure was obtained in all eight constructs (see Appendix IV). Scale reliability was tested using Cronbach alpha. Cronbach alpha determines the internal consistency or average correlation of items in a survey instrument to gauge its reliability. Alpha coefficient ranges from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous and/ or multi-point formatted questionnaires or scales. The higher the score, the more reliable the generated scale. Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient. Properties of the measurement model are summarized in table 4.14

Table 4.14 Summary of constructs

Construct name and identifier	Items	Cronbach alpha	Composite reliability (ρ_c)
Information and communication technology infrastructure (ICTI)	4	0.85	0.90
Strategic alignment (SA)	4	0.86	0.91
Organizational structure (OS)	5	0.86	0.90
Individual learning (IL)	5	0.87	0.91
Process innovation (PRI)	7	0.92	0.94
Product innovation (PDI)	4	0.93	0.95
External advantage (EA)	3	0.92	0.95
Internal advantage (IA)	3	0.87	0.92

Source: Research data (2009)

After scale reliability was tested using Cronbach alpha, values were in the range 0.85 to 0.93 for the eight constructs as seen in the table 4.14 above, indicating a high internal consistency of measure of reliability (Nunnally 1978). Composite reliability was then assessed by examining the composite reliability values for the constructs. Composite reliability measures the overall reliability of a collection of heterogeneous but similar items. Composite reliability above 0.7 thresholds and an extracted variance above the 0.5 threshold are recommended by Hair *et al.* (1998). The composite reliability (ρ_c) values for

the constructs examined were all above the suggested threshold of 0.7, showing the overall reliability of item values for the constructs.

The correlation matrix and the statistics of the observed variables are shown in table 4.15.

Table 4.15 Means, SD, correlations and average variance extracted

Construct	Mean	SD	AVE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ICTI (1)	4.21	0.89	0.72	**0.85**							
SA (2)	3.86	0.91	0.84	0.603**	**0.92**						
OS (3)	3.50	1.09	1.16	0.383**	0.691**	**1.08**					
IL (4)	3.85	0.98	0.98	0.448**	0.573**	0.665**	**0.99**				
PRI (5)	3.78	0.96	1.29	0.373**	0.657**	0.574**	0.480**	**1.44**			
PDI (6)	3.96	0.97	1.03	0.283**	0.505**	0.550**	0.450**	0.775**	**1.01**		
EA (7)	4.20	0.83	0.68	0.312**	0.509**	0.467**	0.440**	0.715**	.745**	**0.82**	
IA (8)	3.87	0.93	0.86	0.310**	0.545**	0.496**	0.440**	0.683**	0.613*	0.633**	**0.93**

Notes:
a) Figures in shaded diagonal are values of the square root of the AVE
*b) * p < .05, ** p < .01*

n = 18

Source: Research data (2009)

As evidenced by the results in table 4.15 above, average variance extracted values (AVEs) were all above the recommended threshold of 0.5 (Barclay *et al.* 1995) and the square root of those values were all greater than the construct correlations - the off-diagonal entries in table 4.15. The convergent and discriminant validity tests were both satisfied i.e there exist a high degree of correlation between the three variables under study.

Appendix IV shows the results of the partial least squares estimation, with loadings for information and communication technology adoption, service innovation practices and competitive advantage. Of the thirty-five loadings, thirty were above 0.8, indicating that each measure was accounting for 50% or more of the variance of the underlying latent variable. The path coefficients for the research constructs are expressed in a standardized form (see appendix III). Five of the six path coefficients were above 0.3, with the lowest

path coefficient being 0.23, indicating that they are meaningful and significant (Chin 1998). The significance levels of paths in the research model were determined using the partial least squares *jackknife* resampling procedures (Sambamurthy & Chin 1994). Overall, the results suggest a satisfactory fit of the model to the data. As for R-square values, information and communication technology adoption explains 42% of the variance in process innovation and 31% of the variance in product innovation, service innovation practices explains 60% of the variance in external advantage, and 49% of the variance in internal advantage. They are all significant at $p < .01$, that is, they all have a positive and significant effect on each other.

4.15 Summary of data analysis

The research data were analysed using the measurement model shown in Appendix III and the results showed that:

i. Information and communication technology adoption has a positive and significant effect on service innovation in process, (path = 0.65, $p < .01$).

ii. Information and communication technology adoption has a positive and significant effect on service innovation in product, (path = 0.56, $p < .01$).

iii. Service innovation in process has a positive and significant effect on external competitive advantage, (path = 0.34, $p < .01$).

iv. Innovation in product has a positive and significant effect on external competitive advantage, (path = 0.48, $p < .01$).

v. Service innovation in process has a positive and significant effect on internal competitive advantage, (path = 0.52, $p < .01$).

vi. Service innovation in product has a positive and significant effect on internal competitive advantage, (path = 0.23, $p < .05$).

CHAPTER FIVE

5.0. SUMMARY, CONCLUSIONS , AND IMPLICATIONS

5.1 Summary

This study developed a research framework and empirically investigated the effect of Information and communication technology adoption on competitive advantage through service innovation practices. The two service innovation practices highlighted were process innovation and product innovation. The implementation of these innovation activities requires the coordination of related and complementary resources across the banks business units. Based on the MIT90 model (Scott Morton 1995), the researcher used the information and communication technology adoption construct to conceptualize the relationship among information and communication technology infrastructure, strategic alignment, management processes, organizational structure and individual learning and to explain how such mechanisms can sustain and enhance service innovation practices in commercial banks.

5.2. Conclusions

The research model and the associated data analysis results add detail to the prevailing understanding of critical linkages between information and communication technology adoption and competitive advantage. The empirical results provide strong overall validation and point to the important role of information and communication technology adoption that coordinates four elements to improve the implementation of service innovation practices. Further, the R-square values of service process innovation (.42) and service product innovation (.31) indicated that information and communication technology adoption was well chosen to interpret the causal relationship with service innovation practices. The finding shows that continuous investments in information and communication technology resources is a desired approach in engaging service

innovation practices and commercial banks should follow-up by re-investigating other issues in strategy alignment, structure adjustment and individual learning. Moreover, the research findings showed that service innovation practices have positive and significant effects on competitive advantage. The R-square values of external competitive advantage (.60) and internal competitive advantage (.49) indicate that service process and product innovations interpret well the effects on obtaining and retaining competitive advantage. In that end, managers must therefore pay special attention to how service innovation, in conjunction with suitable processes and products, can enable all aspects of innovation interactions between the external and internal aspects of banks to obtain superior competitive performance. Hence, the nomological relationships among information and communication technology adoption, service innovation practices and competitive advantage constructs were demonstrated in the context of commercial banks and the results suggest that service innovation practices serve as a catalyst in the information and communication technology performance relationship.

5.3 Implications for research

The goal of this research study was to develop a theoretical perspective for understanding the links among information and communication technology adoption, service innovation practices and competitive advantage. The results have three significant implications.

First, the research findings provide an organization-wide perspective about information and communication technology adoption that is valid for the enterprise, business unit and process levels in a firm. The researcher propose that the value-added role of information and communication technology adoption lies in enabling a coordination mechanism that shapes a firm's capacity to launch frequent and varied innovation practices. Based on the MIT90 model, information and communication technology adoption is coordinated and accessed by elements of information and communication technology infrastructure,

strategic alignment, organizational structure and employee learning. The researcher discussed management processes with a specific focus on service innovation practices and investigated its relationship with others. This conceptualization has significant implications on how researchers should think about the valuation of information and communication technology adoption for service innovation practices.

Second, the research findings highlight an integrated perspective to link information and communication technology adoption, service innovation practices and competitive advantage. In particular, the research highlighted two service innovation practice dimensions, namely, process innovation and product innovation. The researcher propose that service innovation practices are important because they visualize how commercial banks continually develop their capabilities and focus on their process and product to shape their strategy. Furthermore, service innovation practices capture the interactions among information and communication technology infrastructure, strategic alignment, organizational structure and employee learning in shaping competitive advantage. Attention to the information and communication technology adoption and service innovation practices in the research model was important for researchers. However, further research is needed to understand the influence of information and communication technology adoption and service innovation practices on overall business functions and how firms could direct such processes effectively.

Finally, the research conceptualizations about service innovation practices illustrate the complementarity between information and communication technology adoption and competitive advantage. Thus conclusion can be made that service process innovation and service product innovation are the key enablers to competitive advantage. The research model suggests that gaining the competitive advantage will require attention to both service process innovation (in service development, service promotion and post-sales

services) and service product innovation (in service modification, line extension, repositioning and improvements to existing services). In addition, researchers should examine the nature of organization designs, governance structures and managerial skills that will foster such innovation practices and facilitate the development of product and strategic processes innovation described in the research model.

5.4 Implications for practice

Given the critical role of information technology in service innovation practices, it is important to understand the implications of the research findings for practice.

First, an understanding of the key service innovation practices affecting competitive advantage will put practitioners in a better position to develop appropriate strategies for resource deployment and, consequently, enhance its advantage. Commercial banks as well as other firms need to continue to emphasize service innovation to retain customers and employees. They should pull more resources into innovation programs and campaigns and foster closer relationships with customers to identify market opportunities and design new services accordingly.

Second, information and communication technology plays a critical role in the implementation of innovation practices. Given that dimensions, such as information and communication technology infrastructure, strategic alignment, organizational structure and individual learning of information technology adoption, significantly affect service innovation, it is imperative for top management to carefully consider the role of information and communication technology managers in innovation initiatives. Before beginning major service innovation programmes, managers may want to think about implementing managerial mechanisms that will improve information and communication technology adoption. Similarly, information and communication technology managers

are often faced with supporting organizational service innovation programmes and having a managerial mechanism in place can guide them in adopting guidelines and managerial postures that will ensure successful information and communication technology adoption.

Third, organizations may want to implement a two-pronged process innovation and product change strategy in dealing with the service innovation challenges posed by the use of information and communication technology, because both of these factors will yield significant competitive advantage. Additionally, the adoption of information and communication technology was more challenging for managers operating in environments with a high level of supplier interdependence and intense information and communication technology activity. Careful consideration must be given to planning and implementing information and communication technology in such environments.

Finally, the study provides a basis for managers to think about the types of competitive advantage and should assure top management that investments in information and communication technology for service innovation practices are worthwhile.

5.5 Limitations of the study

A few limitations should be kept in mind in interpreting the findings of this study. This research is subject to some data-related limitations.

First, all of the data were self-reported from two respondents in each of the surveyed commercial banks, which could potentially induce certain subjective biases. In this study, the respondents' perspectives on commercial banks practices in information and communication technology adoption were well represented. However, their views may not exactly represent the extent of practices in service innovation and competitive advantage.

Second, all of the surveyed banks are located in Kenya. Therefore, the results should be interpreted with caution when considering other firms or regions.

5.6. Suggestions for future research

Future research should consider information and communication technology adoption from a different perspective; to investigate how using information and communication technology applications in workflow and project management, communication and coordination and knowledge management would affect service innovation practices and performance in different service design stages (e.g., idea generation, service specification and modification and new service launch). Also, a cross-industry comparison study of information and communication technology adoption for service innovation practices to examine whether there are different influences for different industries or service sectors would also greatly contribute to the field.

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APPENDICES

APPENDIX I

QUESTIONNAIRE - I

To be filled by ICT Manager

This information is intended to provide the researcher with data to help gather information on the effect of ICT on service innovation and competitive advantage in commercial banks in Kenya. The information was treated as confidential and used for the research only. Your participation and cooperation was of great value and highly appreciated by the researcher.

Instructions

The questionnaire is set up in four sections. Please answer all questions in all the sections by ticking inside the box [√] the most appropriate answer.

Section A: Banks Profile questionnaire

1. Name of the Bank (optional) _____

2. Please indicate ownership of your bank.

   a) Local ☐

   b) Foreign ☐

   c) Both local and foreign ☐

3. Please indicate the banking services offered by your bank under the following categories

   a) Retail banking ☐

   b) Corporate banking ☐

   c) Both retail and corporate banking ☐

4. Please indicate whether your bank is quoted in Nairobi Stock Exchange (NSE)

   a) Quoted in NSE ☐

b) Not quoted in NSE ☐

5. Please indicate how long the bank been operating in Kenya

a) Less than 10 years ☐ b) between 10-20 years ☐

c) Between 21-30 years ☐ d) 31 years and above ☐

6. How many branches (both fulltime and satellite) are there countrywide?

a) Less than 20 ☐ b) between 21- 40 ☐

c) Between 41-60 ☐ d) between 61-80 ☐

e) More than 80 ☐

Please use the Survey measurement scales given below to answer the questions in the sections that follows

Survey measurement scales

No extent = 1	**Little extent = 2**	**Moderate = 3**	**Great extent = 4**	**Very great extent= 5**

Please indicate, on a scale of **1** to **5** in the box, the extent to which your institution has achieved the items in the following statements.

Section B: Information technology adoption questionnaire

[I] Information and communication technology infrastructure (ICTI)

For the past few years, our institution…

ICTI 1. has allocated a generous budget for purchasing information technology hardware. ☐

ICTI 2. has allocated a generous budget for purchasing information technology software. ☐

ICTI 3. has emphasized information technology staffing and training. ☐

ICTI 4. has embraced sophisticated Internet applications. ☐

[II] Strategic alignment (SA)

For the past few years,

SA 1. our ICT capability has supported business strategies that strengthen customer service. ☐

SA 2. our ICT projects have been implemented in compliance with business strategies ☐

SA 3. our ICT applications have supported business strategies to improve process management ☐

SA 4. our ICT applications have supported business strategies to improve product/service offerings ☐

[III] Organizational structure (OS)

For the past few years, our organizational structure, by adopting new information technology systems and applications,

OS 1. has been changed to enhance employee empowerment. ☐

OS 2. has been changed to enable inter-department (cross-function) integration. ☐

OS 3. has been adjusted for new business practices. ☐

OS 4. has been changed to increase operations mobility. ☐

OS 5. has been changed to help managers make more timely decisions. ☐

[IV] Individual learning (IL)

For the past few years,

IL 1. our institution has provided sufficient training while implementing new information and technology systems and applications. ☐

IL 2. our employees have been able to learn new information and communication technology applications quickly. ☐

IL 3. our employees have been able to adopt new information and communication

technology applications for their work. ☐

IL 4. our employees have been able to innovate new ideas and approaches to work effectively by adopting new information and communication technology applications. ☐

IL 5. Our employees have shown little resistance to adopting new information systems and applications. ☐

Section C Service innovation practices questionnaire

[I] Process innovation (PRI)

For the past few years, our institution has often offered new practices in …

PRI 1. customer service. ☐

PRI 2. customer information inquiry and consultation. ☐

PRI 3. selling products/services. ☐

PRI 4. providing after-sales services. ☐

PRI 5. developing new products/services. ☐

PRI 6. promoting new products/services. ☐

PRI 7. internal administration and operations. ☐

[II] Product innovation (PDI)

For the past few years, our institution has often …

PDI 1. revised and improved existing products/services. ☐

PDI 2. repackaged existing products/services. ☐

PDI 3. extended products/services. ☐

PDI 4. created and established new lines of products/services. ☐

Section D: Competitive advantage questionnaires

[I] External advantage (EA)

For the past few years, our institution has been successful in providing new services …

EA 1. to enter new markets. ☐

EA 2. to gain more competitive advantage. ☐

EA 3. to offer higher quality than competitors. ☐

[II] Internal advantage (IA)

For the past few years, our institution has been able to provide new services …

IA 1. and increase employee job satisfaction. ☐

IA 2. and increase employee-related experience and domain knowledge. ☐

IA 3. and enhance the innovative capabilities of employees. ☐

Thank you for your Co operation

QUESTIONNAIRE II

To be filled by Branch or Marketing Manager

This information is intended to provide the researcher with data to help gather information on the effect of ICT on service innovation and competitive advantage in commercial banks in Kenya. The information was treated as confidential and used for the research only. Your participation and cooperation was of great value and highly appreciated by the researcher.

Instructions

Please answer all questions. Write in the space provided and tick inside the box [√] the most appropriate answer where applicable.

1. Name of the Bank (optional) _____

2. Please indicate ownership of your bank.

   a) Local ☐

   b) Foreign ☐

   c) Both local and foreign ☐

3. Please indicate the banking services offered by your bank under the following categories

   a) Retail banking ☐

   b) Corporate banking ☐

   c) Both retail and corporate banking ☐

4. Please indicate whether your bank is quoted in Nairobi Stock Exchange (NSE)

   a) Quoted in NSE ☐

   b) Not quoted in NSE ☐

5. Please indicate how long the bank been operating in Kenya

   a) Less than 10 years ☐ b) Between 10-20 years ☐

c) Between 21-30 years ☐ d) 31 years and above ☐

6. How many branches (both fulltime and satellite) are there countrywide?

a) Less than 20 ☐ b) Between 21- 40 ☐

c) Between 41-60 ☐ d) Above 61 ☐

7. How long has the bank been operating in Kenya

a) Less than 10 years ☐ b) Between 10-20 years ☐

c) Between 21-30 years ☐ d) 31 years and above ☐

8. Please indicate the range of client base

a) Below 300,000 ☐ b) Between 300,001 – 600,000 ☐

c) Between 600,000 – 900,000 ☐ d) Above 900,000 ☐

9. Please indicate how many ATM points your bank has across the country

a) Below 60 ☐ b) Between 61 – 90 ☐

c) Between 91 – 120 ☐ d) More than 120 ☐

10. Please indicate the extent to which the following transaction systems have been used to complete online transactions in your institution. Tick where appropriate.

TYPES OF PAYMENT	AVAILABLE				
	To no extent	Little extent	Moderate	Great extent	Very great extent
1. Debit cards					
2. Credit cards					
3. Electronic Purse					
4. E - Cash					
5. Visa Card					
6. Master Card.					
7. American Express					
8. Credit transfer					

Others.					

11. Please indicate the percentage volume of transaction conducted using ATM cards

a) Below 20% ☐ b) Between 21 – 40% ☐

c) Between 41 – 60% ☐ d) Above 60% ☐

12. Please indicate the percentage volume of transaction conducted using electronic purses e.g. Visa Cash

a) Below 20% ☐ b) Between 21 – 40% ☐

c) Between 41 – 60% ☐ c) Above 60% ☐

13. Please indicate the percentage volume of customers using Internet banking

a) Below 20% ☐ b) Between 21- 40% ☐

c) Between 41-60% ☐ d) Above 60% ☐

16. Please indicate the percentage volume of customers using mobile banking

a) Below 20% ☐ b) Between 21- 40% ☐

c) Between 41-60% ☐ d) Above 60% ☐

18. Please indicate by ticking inside the box whether your bank has partnered in any of the following to facilitate electronic money transfer and other services

	YES	NO
a) Money gram	☐	☐
b) Western Union	☐	☐
c) *X*press Money	☐	☐
d) M – Pesa	☐	☐
e) ZAP	☐	☐
f) Pesa Point	☐	☐

19. Please list some of the unique services introduced by your bank for the last three years

1)……

2)……

3)……

20. Please list some of the new innovations introduced by your bank for the last three years

1)……

2)……

3)……

4) ……

Thank you for your Co operation

APPENDIX II

List of Commercial Banks in Kenya

1. African Banking Corporation Limited
2. Akiba Bank limited
3. Bank of Baroda (Kenya) Limited
4. Bank of India
5. Barclays Bank of Kenya Limited
6. CFC Stanbic Bank Limited
7. Chase Bank (Kenya) Limited
8. Charterhouse Bank Limited
9. Citibank ltd
10. City Finance Rank Limited
11. Commercial Bank of Africa Limited
12. Consolidated Bank of Kenya Limited
13. Cooperative Bank of Kenya Limited
14. Corporative Merchant bank
15. Credit Agricole Indosueze
16. Credit Bank Limited
17. Development Bank of Kenya Limited
18. Diamond Trust Bank Kenya Limited
19. Dubai bank Kenya Limited
20. Ecobank Limited
21. Equatorial Commercial Bank Limited
22. Equity bank ltd
23. Family bank ltd
24. Fidelity Commercial Bank Limited

25. FINA Bank Limited
26. First American Bank of Kenya Limited
27. First community Bank ltd
28. Guardian Bank Limited
29. Gulf African bank Limited
30. Giro Commercial Bank Limited
31. Habib Bank A. G. Zurich
32. Habib Bank Limited
33. Imperial Bank Limited
34. Industrial Development Bank Limited
35. Investment and Mortgages Bank Limited
36. Kenya Commercial bank Limited
37. K-Rep Bank Limited
38. Middle East Bank Kenya Limited
39. National Bank of Kenya limited
40. National Industrial Credit Bank Limited
41. NIC bank ltd
42. Paramount Universal Bank Limited
43. Prime Bank Limited
44. Southern Credit Banking Corporation Limited
45. Standard Chartered Bank Kenya Limited
46. Trans-National Bank Limited
47. Victoria commercial Bank Limited

Source: Banking Supervisory Report (2008),

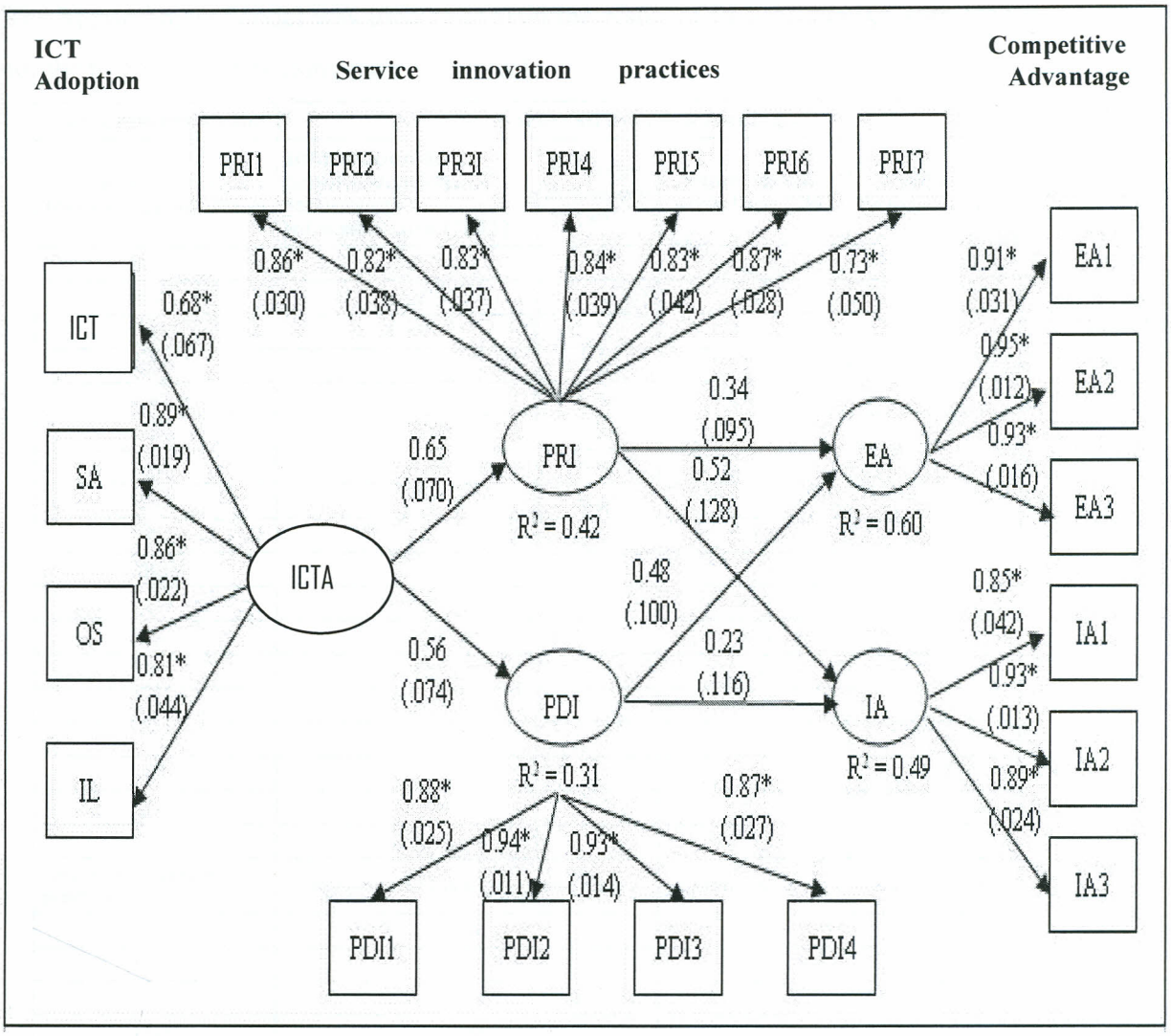
List of Commercial Banks listed in NSE

1. Barclays Bank of Kenya Limited
2. CFC Stanbic Bank Limited
3. Cooperative Bank of Kenya Limited
4. Diamond Trust Bank Kenya Limited
5. Equity bank ltd
6. Kenya Commercial bank Limited
7. National Bank of Kenya limited
8. NIC Bank
9. Standard Chartered Bank Kenya Limited

Source: Nairobi Stock exchange report (2008)

APPENDIX III

Partial Least Square (PLS) Measurement Model



Source: Research data (2009)

Notes:

a) * these values indicate loadings of the indicators for the reflective construct

b) The paths represent standardized beta estimates. Numbers in the parentheses indicate the standard errors obtained via jackknife estimates. All R2 values are positive and significant at p <.01

APPENDIX IV

Summary Analysis of the Measurement Model: Factor Structure

The Measurement Model was used to explain the result of PLS estimation with loading for the three constructs using path coefficient.

Measurement Items	Factor structure & loadings			
Information technology adoption	**Information & communication technology infrastructure (ICTI)**	**Strategic alignment (SA)**	**Organizational structure (OS)**	**Individual learning (IL)**
ICTI1	0.87			
ICTI2	0.88			
ICTI3	0.82			
ICTI4	0.75			
SA1		0.81		
SA2		0.81		
SA3		0.87		
SA4		0.88		
OS1			0.83	
OS2			0.84	
OS3			0.72	
OS4			0.81	
OS5			0.81	
IL1				0.73
IL2				0.90
IL3				0.92
IL4				0.81
IL5				0.72
Service innovation practices	**Service process innovation (PRI)**		**Service product innovation (PDI)**	
PRI1	0.86			
PRI2	0.82			
PRI3	0.83			
PRI4	0.84			
PRI5	0.83			
PRI6	0.87			
PRI7	0.73			
PDI1			0.88	
PDI2			0.94	
PDI3			0.93	
PDI4			0.87	
Competitive advantage	**External advantage (EA)**		**Internal advantage (IA)**	
EA1	0.93			
EA2	0.91			
EA3	0.95			
IA1			0.93	
IA2			0.85	
IA3			0.89	

Source: Research data (2009)