

**BUSINESS ANALYTICS AND PERFORMANCE OF COMMERCIAL BANKS IN
KENYA**

By

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**A RESEARCH PROJECT PRESENTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE MASTER OF BUSINESS ADMINISTRATION
DEGREE, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI**

NOVEMBER 2014

DECLARATION

This project is my original work and has not been presented for any award in any other University.

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Date

D61/79194/2012

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

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DEDICATION

I dedicate this research project firstly to my father who led the path to academic excellence having also studied to master's level and encouraging me to pursue the same. To my mother for her dedication in bringing me and my siblings up into what we have become and achieved today, could have been much more difficult without her. And finally to my sister also pursuing her master's degree has been a motivation and an encouragement to me to follow in the path that she had thought wise to begin.

ACKNOWLEDGMENTS

I would like to first and foremost recognize and appreciate the effort and input by my supervisor, Mr. Joel Lelei for the constant follow-up on progress and guidance during the execution of the research study. He has been of great assistance in his supervision of this study and to him I am grateful. I would also like to appreciate the organizations that participated in this study and the individuals who were patient with me during the period of data collection that were of great assistance in receiving, dispatching and returning the questionnaires.

ABSTRACT

Businesses that have embraced ICT in their operations are increasingly collecting data from business transactions building up their data assets to a level that may be used as a competitive advantage. Banks are at the front level on this and with the relatively new concept that is Business Analytics they are able to leverage on this to gain competitive advantage and improve their performance. This study focused on commercial banks in Kenya. The objectives of the study were to identify the areas of application of business analytics, the factors that drive adoption and use of business analytics, the challenges faced in application of business analytics and the impact that business analytics has on organizational performance. This study employed a cross-section survey design. This was a census study as the target population was all the 44 commercial banks in Kenya. The respondents to the study were the IT managers or equivalent of the banks and the instrument used for data collection was a questionnaire. Descriptive analysis was performed on the data and regression analysis performed to establish the level of impact of the objectives on business analytics. Results from the study showed that application of business analytics in the banks was at a large extent and the driving factors also were at a large extent. The challenges to business analytics were at a moderate extent. The study showed that business analytics had an impact on performance of commercial banks in Kenya and developed a model for determining the level of impact based on the objectives. Being a relatively new field in Kenya, further study of the concept was recommended so as to bring out more aspects on business analytics and its effect on organizations.

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In today's challenging business environment, firms and organizations are finding themselves with a set of limited strategies that marginally improves their performance. Firms in industries offering similar products and use comparable technologies have business processes as among the last options for differentiation, where analytics competitors are squeezing every last bit of value, as advanced by Davenport (2006). An organization's competencies and resources that are superior to those of its rivals may be the source of competitive advantage if matched appropriately to opportunities faced (Peteraf, 1993). However, firms in the same industry tend to have similar resources reducing their potential strategic advantage, hence their relative performance.

At the forefront of the pursuit of better company performance is adoption of ICT. Application of ICT within a firm may not only stand by itself as a competitive strategy but would also support other strategies in use. Otieno (2010) in his study found that in enhancing strategic advantage the use of ICT supports strategies by providing communication links, streamlining and shortening services design time, enhances competitive advantage through Electronic Data Interchange for communication among bank branches, and provides service intelligence through collection of information on innovation, customers, competitors and the operating environment. This suggests that firms would expect competitive advantage and benefit in performance improvement. One of the applications of ICT as a strategy is in Business Analytics. Companies can apply business analytics to external factors according to Porter's five forces which are potential and existing competitors, suppliers, customers and substitute products, and for internal factors which are process & operations and human resource management as advanced by Shun and Junyu (2012), in order to improve upon their strategic planning and execution.

The banking sector is one that relies heavily on data and information and has also been one of the leaders in embracing ICT. Hence banks collect a lot of data that would be a useful source of performance improvement through business analytics. The Kenyan banking sector is beginning to put out plans on where big data could deliver the most

value however many financial firms are cautious about making these investments, (Mbaluka 2013). Big data is a precursor to business analytics and its uptake by banks is an indication of a move towards BA. This study assesses the impact of the use of business analytics on the performance in firms in the banking sector in Kenya and further analyzes the drivers to and challenges faced in adopting and utilizing business analytics.

1.1.1 Business Analytics

According to Sharma et al (2010) BA is the gathering, storage, statistical analysis and interpretation of large amounts of organizational data with the aim of making better decisions and improving organizational performance and gaining competitive edge. BI has been applied as an umbrella term to describe concepts and methods to support improved decision making by using fact based support systems, whilst business intelligence and analytics (BIA), coined in 1989, has gained ground in IT and academics in the recent past and it refers to the technologies, systems, practices and applications that analyze business data that the firm better understands its business, as proposed by Lim et al (2012). As the BI concept became popular in the 1990s, BA was introduced to reflect the analytical component in BI (Chen et al, 2012) giving rise to the adoption of the term BA.

BA could be viewed as a system that identifies challenges and opportunities in data using analytic methods with one of the most common applications of BA being planning and forecasting (Xia and Gong, 2014). Data to be analyzed usually has been integrated into one database or data warehouse from a number of operational databases, where analysis is done using tools such as data mining, visualization, online analytical processing (OLAP), statistical analysis and predictive models. Data from various different sources is integrated into an intelligible body for enhanced strategic planning and decision support, delivered at the right time, right location and in the right form, resulting in improved decision making (Tan et al, 2011).

Several scholars have listed applications of business analytics that can contribute to organizational performance such as in marketing that can reduce customer attrition and

improve customer profitability, increase value of e-commerce, also in production and manufacturing, sales and forecast, production plans, in finance, human resource and research and development as observed by Sharma et al (2010).

Organizational profitability and performance is at the core of firms and BA promises this, as Ranjan (2008) proposed that the expectation of implementing smarter business processes is where business intelligence impacts the performance of firms. All firms desire to gain advantage over their competitors and are prepared to adopt BA if seen to offer the advantage they need. In addition improvements in ICT has led data analytics technologies to use parallel computing approaches to address limitations of existing database systems to improve through put, according to Tambe (2014), and that the increase in rate and scale of data collection has raised the value of innovation in data processing technologies.

Many challenges to business analytics have been proposed by academics and practitioners alike but for Rseehuus and Ervik (2012) the four main challenges faced by organizations are strategic alignment, agility within the organization, commitment to BA implementation and information maturity. Business analytics is seen by Xia and Gong (2012) as having benefits such as facilitating faster and more accurate reporting, improved decision making, improved customer service and increased revenue.

1.1.2 Organizational Performance

Kanogo (2013) was of the view that organizational performance is a detailed analysis of its performance against its goals and objectives. It focuses on the financial performance, market performance and shareholder value of the organization. Divenney et al (2008) proposed that a firms performance encompasses the following areas of the firms outcomes; financial performance, consisting of profits, return on assets and return on investments, market performance, consisting of sales and market share and shareholder return. Some organizations measure performance based on how efficient the organization

utilizes its resources to produce profit (Mutuku et al 2013). Further to that utilization of resources is also based on the strategy chosen by the organization.

Mutuku et al (2013) deduced that within the concept of the Balanced Scorecard introduced by Kaplan and Norton (1992) as a basis for strategic management system, financial and non-financial aspects of a firm were blended with business strategy in the process of measuring the firm's performance. There exists various strategies where firms could switch from one to another based on information indicating which one would improve company performance. Esfandiari and Rizvandi (2014) argue that strategy planning plays a pivotal role in development of business organizations and that it is of critical importance to employ long term plans to realize organizational objectives that guarantee better performance. Choice of strategy starts from clearly establishing a firm's individual situation from identifying opportunities and taking account of its resources, considering that that the company can also choose to adopt a combination of these strategies (Puiu and Stanciu, 2008).

1.1.3 Commercial Banks in Kenya

The banking sector in Kenya is regulated by the Central Bank of Kenya (CBK) currently constituted under Article 231 of the constitution 2010. The CBK has the responsibility of formulating monetary policy, promoting price stability, issuing currency and other functions as stated by an act of parliament. Beck and Fuchs (2004) stated that by regional standards the Kenyan financial system was relatively well developed and diversified, a praise it enjoys to this day, and that it enjoyed higher levels of credit channeled to the private sector and higher deposits in financial institutions as compared to other sub-Saharan countries. Beck et al (2010) stated that Kenya's financial system is the largest and most developed in East Africa and that its stability has improved in the recent past however still many challenges endure, the banking system is still fragmented, small banks serving niche markets and not contributing to competition in the sector and outreach of the financial system still limited. The Kenyan financial landscape has in the last ten years witnessed the innovation that is MPESA and mobile money in general, seen

as being complementary to the set of financial services offered by large financial institutions (Allen et al, 2013).

There are currently 43 licensed commercial banks and 1 mortgage finance institution in Kenya, consisting of foreign owned, government owned and local private owned institutions. Of these 31 are locally owned and 13 are foreign owned. Of the locally owned financial institutions, 3 have significant government and state shareholding. The Kenyan Banking sector asset base stood at KShs. 2.5 trillion, loans and advances stood at KShs. 1.5 trillion, while deposits were at KShs. 1.9 trillion with profit before tax at KShs. 61.5 billion, as at 30th June 2013. The number of depositors within the same period stood at 18.9 million, (www.centralbank.go.ke, 2013).

Indiatsy et al (2014) construed that there has been growing competition from international as well as local banks would require critical analysis of the competitive forces in the industry. This competition was attributed to an increase in uptake of customer credit history and approvals to commence agency-banking and entry of international banks into the Kenyan market. Mulatya (2012) found that major African banks such as Eco-Bank has branches in more African countries, including Kenya, than any other bank, CFC-Stanbic Bank is one of the largest banks in Africa to have for a long time operated in other African countries.

Muthoni (2012) proposed that current strategies used by banks are price and product differentiation, expansion, technology and mergers. She further stated that increase in competition has resulted from innovations such as e-banking, use of Automatic Teller Machines (ATMs), modification of products and new entrants into the Kenyan Market. She highlighted the key issues facing banks in Kenya as changes in regulatory and monetary framework, increase in demand for non-traditional services, decline in interest margins and an emphasis on customer service rather than the product. Buluma (2012) maintained that in the recent past there have been a number of strategic moves by banks in Kenya such as rebranding, mergers, takeovers, increase in banking hours, and a renewed focus on the lower end of the market. Use of ICT has also enhanced efficiency and increased delivery channels with products such as e-banking, m-banking that have reduced the dependability of cash as the main means of settling payments.

According to Mbaluka (2013) the value of data is largely underestimated by many banks in Kenya perhaps due to lack of time and resources and knowledge. She points out that banks could create more value by leveraging on the data they have, but this is not happening on a large scale. However, this is changing due to developments in different fields, both technological and non-technological. This implies that banks in Kenya are progressively embracing business analytics so as to leverage on the data they have and create more value.

1.2 Research Problem

Development of IT has brought about a revolution in the banking industry where banks are seen to fast track for IT based products and services (Kanogo 2013). In recent history banking has evolved from traditional customer queues for services in the branches to modern day banking where services can be accessed from outside of the banking hall walls through ICT (Muriuki 2011). Mbaluk (2013) found five key business areas that present low-risk opportunities for measurable performance of using big data which were; target marketing, customer service, intelligent forecasting, customer profiling, consumer detection and fraud detection. Preceding research literature have attributed a lack of direct causal impact of IT on firms performance, mainly due to the lack of IT/strategy alignment and many have called for more research into the factors that affect this IT/strategy alignment and its impact on company performance (Almajali & Dahalin 2011).

Impact of technology in banking operations is still misunderstood, according to Muriuki (2011). Referencing from previous studies by Pooja and Sing (2009), which concluded that innovations had least impact on bank operations, and Mwanja and Muganda (2011), that found that technology had significant contribution to bank operations, she highlighted that their findings were in conflict. She then proceeded to propose further study in the Kenyan context to establish the effect of technology. Otieno (2010) in his study had alluded to there being no study done in Kenya that has explicitly addressed the application of ICT strategy in enhancing competitiveness, hence performance, in commercial banks in Kenya.

BA is said, by Ranjan (2008), to provide critical insight enabling organizations make right and timely decisions and facilitates the scrutiny of various aspects of business operations to raise new revenue or save on costs by increasing return on investment and supporting decision support information. Research studies have described a number of applications of BA and how they could improve performance and competitive advantage. However a clearly articulated theoretically grounded model of the factors and processes necessary in realizing performance gains from BA has been elusive according to Sharma et al (2010). Knowledge of the factors and requirements necessary for BA applications could enable organizations take advantage of the new information and apply it to their strategic decision making, thereby reacting faster to factors facing the said industry. Sharma et al (2010) observed that previous studies on business analytics had speculated on how it might contribute to competitive advantage however a clear theoretical based model of the factors involved in realizing the potential performance benefits is yet to be brought forward.

Njuguna (2013) revealed that implementation of business intelligence dashboard by Kenya Power, they successfully improved their decision making process. However Otieno (2010) found that challenges faced by banks in adoption of use of ICT included resistance to change, security risks, high initial costs, cost of keeping up with ICT developments, fraud, costs of software, high costs of training staff, switching to new core banking systems etc. These challenges would then inevitably affect the implementation of BA in the commercial banks. The Kenyan banking sector is beginning to put out plans on where big data could deliver the most value however many financial firms are cautious about making these investments in a move towards BA (Mbaluka, 2013).

There exists a gap in linking application of BA to a firm's performance. Grossman and Siegel (2014) argued that there is little debate about the importance of business analytics in supporting the strategic goals of an organization, however, that there is yet to be a consensus about how best to align analytics efforts within the organization, and further what analytics process the firm needs to support.

This study aims at determining the impact of business analytics to firm performance in commercial banks in Kenya. This study will also aim at determining the drivers to, areas and extent of application of BA and success factors necessary. It also seeks to identify the extent of use and challenges of application of BA. The study strives to develop a model that commercial banks in Kenya could use to determine the impact of BA to their performance and adjust accordingly to gain optimally from it. And finally it is expected to identify and recommend new areas of study in this field of BA. This research aims to fill the gap raised in the previous paragraphs by finding solutions to the following question; How Business Analytics impacts on performance in commercial banks in Kenya.

1.3 Objectives of study

The objectives of this study are to;

- i. Establish the extent to which BA has been used in commercial banks in Kenya
- ii. Determine the drivers for adoption of BA in commercial banks in Kenya
- iii. Establish the challenges faced in the application of BA in commercial banks in Kenya
- iv. Determine the impact of BA application on firm performance in commercial banks in Kenya.

1.4 Value of the study

This study aims at revealing the influence of BA on performance of commercial banks in Kenya. It will begin by assessing the drivers leading to its adoption that Kenyan commercial banks can identify to gauge their needs for BA. Commercial banks in Kenya may then be in a position to carry out a self-assessment and see whether they are experiencing the identified factors that point to drivers that would lead them to adopt the use of BA.

The study will also look at which functional areas in the commercial banks are applying BA in and the extent of their application. Banks will be able to identify areas most appropriate for the use of BA in an effort to improve on the company's performance.

Challenges to implementation and application will be brought to fore that organizations can appraise themselves and address in order to guarantee successful implementation of BA.

The impact of BA on company performance is expected to be exposed empowering commercial banks in Kenya to make informed decisions with regard to application of BA. Finally this study is expected to identify gaps and further recommend areas for future research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Previous studies on IT and organizational strategy have shown how IT can be linked to business strategy through a planning process and that a close association between IS and business strategies is a key factor for success of IS planning as outlined by Masa'deh et al (2008). IT and business strategy alignment is critical to firms carrying out BA to enable its successful application. Data and information lie at the heart of information systems of companies. Thousands of transactions by the business get captured and stored by information systems on a daily basis building up to large amounts of data in possession by the company.

Information is then increasingly becoming a major competitive factor in today's business world (Bucher et al, 2009). Companies in the banking sector hold a lot of information on their customers, such as bio data, mobile phone number, occupation etc., and economic information such as inflation rate, interest rates, Gross Domestic Product (GDP), industry information such as number of depositors, outstanding loans, levels of risk and a lot more. Commercial banking institutions are at the fore in the use of ICT to enhance their operations, especially in Kenya, with the development of mobile money services that majority of the banks have taken up. Other main applications of IT by banks in Kenya are the use of Automatic Teller Machines (ATM), use of Electronic Fund Transfer (EFT) systems, internet banking, use of debit cards to settle payments etc.

Rapid advancements in computing power have empowered institutions holding such vast amounts of data to carry out analysis beyond the traditional operations and transactions previously performed by IT, leading to the development of BA. Through BA initiatives, businesses are gaining insights from the large volumes of data they hold generated by enterprise-wide applications such as enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM) etc. (Lim et al, 2013). Companies in the banking sector worldwide, including Kenyan banks, have not been left behind in application of BA to gain advantage over their competitors.

2.2 Application of Business Analytics

BA is a broad range of analytical techniques and software solutions for gathering, consolidating, analyzing and providing access to information to enterprises that they may make better informed decisions (Ranjan 2008). Analytics have definitely found inroads into companies such as banks, telecommunication companies, major retail outlets etc. More so in marketing departments where there is a strong desire to reach the right people at the right place and at the right time with the right offerings. As such marketing analytics has entrenched itself firmly in helping companies to understand more about their customers, areas of opportunities, building brand loyalty and preventing attrition. Mbaluk (2013) found five key business areas that present low-risk opportunities for measurable performance of using big data which were; target marketing, customer service, intelligent forecasting, customer profiling, consumer detection and fraud detection. Additionally, Trkman et al (2010) alluded that BA has been identified as an important tool in supply chain management.

Shung and Junyu (2012) say that analytics have found their way into consumer industry, mostly banks and telecoms, more specifically in marketing assisting companies to understand their customers, areas of opportunity and building brand loyalty. Also they advanced areas of application of BA in organizations, they broke them down into internal and external factors. External factors were based on Porter's five forces, that is competitors, suppliers, customers and substitute products. The internal factors were processes and operations, HR management capped with support from organizational top management. Decision path consulting (2010) found three major areas of operations that BA is applied albeit with major challenges, these are in finance, sales and marketing and in operations. Njuguna (2013) revealed that implementation of business intelligence dashboard by Kenya Power, they successfully improved their decision making process.

2.3 Drivers to Business Analytics

Ranjan (2008) construed that understanding data and shaping it into useful information is a key strategy for any organization to gain competitive advantage and that a success

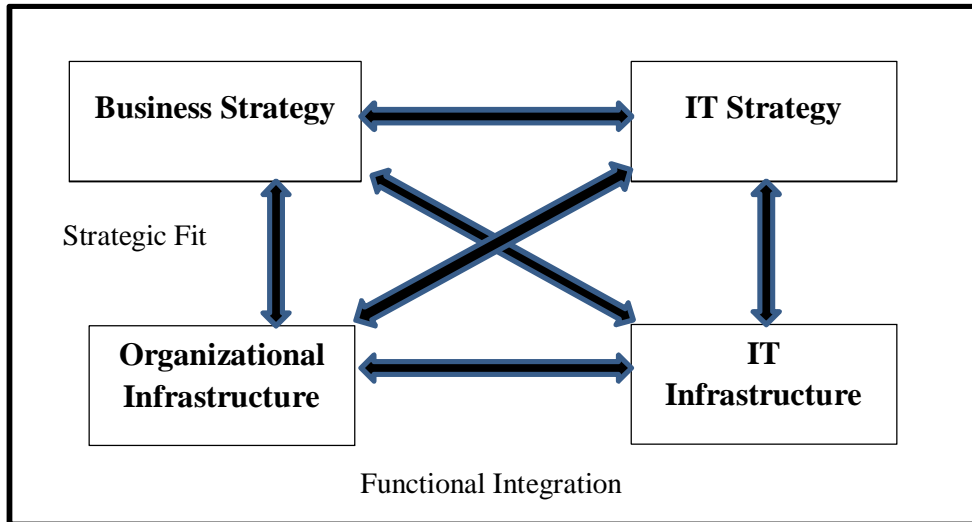
factor for organizations is finding ways of integrating the vast amounts of data generated from business processes and making sense of them. Further with the development of company intranets, extranets and the internet has created a favourable environment for rapid development of internet banking to take root in developing countries according to Nazir et al (2011). Internet banking can enhance the institution's strategic initiatives and simultaneously empower customers, they state further. Internet banking offers a means for banks to collect data from the transactions made by customers such as types of transactions, frequency, currency used etc. This offers an opportunity for the banks to carry out analysis on the data and come up with products that complement customer habits. A major driver for BI Ranjan (2008) is that firms already have systems that collect data however end up in situations with no tools to put this data and information to use for strategic decision making. Operation transactions captured by banks over time tend to be vast. These firms are then faced with the idea that they could use these vast amounts of data to leverage their competitive advantage and this has been made increasingly possible by the fast advancement in computer and associated technologies.

Availability of large integrated databases and development of powerful tools of visualization and data analysis has generated interest in business analytics for improvement of decision making hence better organizational performance and enhanced competitive advantage (Sharma et al, 2010). Additional advancements in ICTs have greatly impacted their application and consequently how organizations do business. Recent improvements in business analytics including new technologies, system integration and user interface design have been driven by business value, and to increase this analytics are increasingly getting embedded into larger systems, accordingly data collection, storage and processing together with other matters specific to analytics are increasingly considered into overall system design (Kohavi, 2002).

Making reference to the Strategy Alignment Model (SAM) of Henderson and Venkatraman (1989), Figure 1, Masa'deh (2008) inferred that IT-business alignment is achievable by building linkages among four strategic domains, that is business strategy,

IT strategy, organizational infrastructure and processes and IT infrastructure and processes.

Fig. 1 Strategic Alignment Model



Henderson and Venkatraman (1989)

2.4 Challenges in the Application of Business Analytics

An overseeing factor to success of a BI initiative is IT and business strategy alignment. Several empirical studies over the past decade investigating the correlation between IT investments and firm performance have failed to find a strong correlation said Masa'deh et al (2008). One of the directions of research for BA is on the requirements for a successful implementation. A study by Tan et al (2011) suggested that management of a successful BA initiative depends on a series of four main dimensions in the following order, information quality, master data management, warehousing architecture and analytics all working together. Also that each maturity level is a requirement to the next level. Getting of these factors right and in the order prescribed may prove challenging to banks. Decisionpath Consulting (2010) identified finance, operations and sales and marketing as the business areas that offer the biggest challenges to application of BA.

Business enterprises are faced with the challenge of identifying the components that construct business intelligence within the firm, the task is to be able to identify within the business domain what information the business needs to know for successful implementation of BA (Green, 2007). Ranjan (2008) observed that organizations need to make sure that appropriate security and privacy controls are put in place in the implementation of BI projects in reference to the challenge of potential sensitivity of data involved. Xia and Gong (2012) said that there is a high cost of implementing BI technologies financially challenging small and medium sized companies especially, with additional costs accruing from hardware standards and business transactions. They further said that I technologies involve complicated setups and related data mining techniques which require technical expertise to manage, and that companies that do not use BI technologies think that BI is not essential to their daily operations. Trkman et al (2010) established that the success of IT investments in BI are not self-assured, the main challenge being how to best utilize the data provided by the software. Organizations that already have systems in place to collect data and gather information often do not have suitable approaches to put the information to use for strategic decision making.

2.5 Impact of Business Analytics Application on Firm Performance

As firms come to the realization of the prospect of better decision making and increased customer value, they are increasingly adopting BA in their operations (BusinessWeek Research Services, 2009), which empowers business executives' proactive abilities to anticipate, forecast, avoid, correct and control situations in their organizations. The contribution of business analytics to organizational performance is not fully appreciated as it is a fairly new concept in Kenya, alluding to a lack of proper understanding of its operations and the main goal of its application. A major goal of BA is to automate and integrate as many steps and functions as possible and secondly to provide data for analytics that are as tool-independent as possible (Biere, 2003). This then sets the stage for application of BA to extract information that could be used to enhance decision making and in a timely manner. This is expected to improve the performance of the organization in the levels of operation that is corporate, business and functional levels, and also to improve its competitive advantage. Ultimately this will improve on its overall

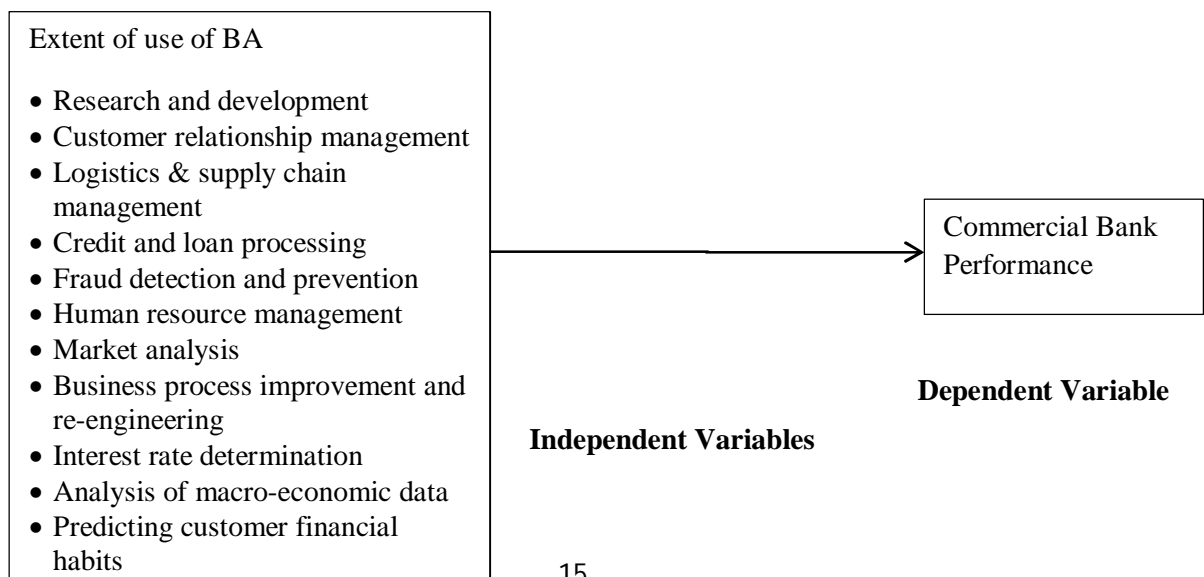
performance in the industry. In the banking industry the main indicators of performance are number of depositors, bank reach in terms of branches, loan portfolios and asset base among others. Competition in the business environment is increasingly becoming intense leading to escalation in the importance of information advantage. Subsequently the adoption of BA to support decision making in organizations is increasingly becoming a popular research topic (Xia and Gong, 2014).

2.6 The Conceptual Framework

In the past decade IT has simultaneously progressed with global development emerging as a very important part of most business firms endearing organizations to understand how to manage IT strategically (Almajali & Dahalin). Green (2007) was of the view that BA is fueled from the utilization of information aligned with business performance. This implies that IT is of major importance to a company's performance in the present day and alignment with company strategy is driving BA.

Here the conceptual framework illustrates the interaction between the independent variables and the dependent variables, where the independent variable is a property of an observable attribute that has a measurable effect on the dependent variable. Here the extent of use of BA is the independent variable that has an effect on the bank's performance.

Figure 2: Conceptual Model



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the approach used to carry out the study in order to achieve the research objective. The research design is revealed, the target population, data collection method and finally the data analysis.

3.2 Research Design

This research study has adopted the cross-section survey design. Cross-section survey involves the study of a representative sample of the population at a specific point in time. Cross-section survey design was chosen as it is the most appropriate in comparing the performance of the banks for those that apply BA and those that don't at a single point in time.

3.3 Population

The target population is all the 44 commercial banks in Kenya as study subjects as at 31st July 2014 according to CBK. The study was a census study. A census study approach was selected due to the relatively small number of commercial banks in Kenya and also to collect as much data as possible so as to project a representative picture of the sector.

3.4 Data collection Method

A structured questionnaire was used to collect primary data from each respondent from the commercial banks. The questionnaire included open and close ended questions and matrix questions. The questionnaire is divided into four sections geared towards collecting data in line with the research objectives. The respondents of this study were the ICT Managers or equivalent being that BA stems from the basis of ICT. The questionnaire is separated into five sections, Section A for demographic information, Section B for application of BA, Section C for driving factors towards BA, Section D for challenges faced and Section E for impact realized from BA.

3.5 Data Analysis

Questionnaires were collected and checked for accuracy and completeness then tabulated for facilitation for analysis. Demographic data was analysed by use of frequency and

percentages. The extent of application of business analytics, drivers to and challenges faced in application of business analytics were analysed using mean and standard deviation. The impact of business analytics on company performance was measured from three perspectives, first is level of operation in the organization, namely corporate level, business level and functional level, second is competitive advantage and third is on performance. This was done by multiple regression based on the model below.

$$y_i = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_{11}x_{11} + e$$

Variables:

y_1 = Organizational Level

y_2 = Competitive Advantage

y_3 = Organizational Performance

x_1 = Research and Development

x_2 = Customer Relationship Management

x_3 = Logistics and Supply Chain Management

x_4 = Credit and Loan Management

x_5 = Fraud Detection and Prevention

x_6 = Human Resource Management

x_7 = Market Analysis

x_8 = Business Process Improvement and Re-engineering

x_9 = Interest Determination

x_{10} = Analysis of Macro Economic Data

x_{11} = Predicting Customer Financial Habits

CHAPTER FOUR: DATA ANALYSIS AND INTEPRETATION

4.1 Introduction

This chapter carries out analysis and discussions on the data collected from the respondents and proceeds to make interpretations. The questionnaires given to the respondents contained five sections, demographic information, application of business analytics, driving factors towards business analytics application, challenges faced and impact realized from application of business analytics. 44 respondents were approached and only 18 participated in the study.

4.2 Demographic Information

This section is divided into two parts, the first part for the organization and the second for the ICT manager or equivalent. The organization demographic details sought were name, period of operation in Kenya, number of employees, number of branches and number of depositors. Further the demographic details sought of the in-charge of ICT were name, gender, age, level of education, period of time worked as the in-charge of ICT and the title of the in-charge of ICT in the respondent's organization.

4.2.1 Period of operation of organization

The respondent organizations were asked to indicate the period in which they have been operating in Kenya with the response based on a 5 point likert scale. The data was analysed and the results are shown in Table 4.2.1.

Table 4.2.1: Respondents years of operation

Years in Operation	Frequency	%
1-10	6	33.33
11-20	1	5.56
21-30	5	27.78
31-40	2	11.11
Over 40	4	22.22

Source: Author (2014)

Save for the 11-20 years in operation bracket with 5.56% of the respondents, the rest are more generously distributed throughout the remaining brackets with the 1-10 years bracket carrying 33%.

4.2.2 Number of employees in the organization

The respondents were requested to indicate the number of employees working in the organization. The data collected was analysed and the outcome is represented in Table 4.2.2.

Table 4.2.2: Number of Employees

No. of Employees	Frequency	%
1-50	0	0.00
51-100	1	5.56
101-200	5	27.78
201-300	3	16.67
301-400	2	11.11
Over 400	7	38.89

Source: Author (2014)

A large percentage of the organizations have over 400 employees at 38.89% with the rest distributed throughout the other brackets but with the 1-50 employees bracket having no respondents and the 51-100 employees with the least at 5.56%.

4.2.3 Number of Branches

The respondents indicated the number of branches that they have in the country, with the data represented in Table 4.2.3.

Table 4.2.3: No. of Branches

No. of Branches	Frequency	%
1-30	15	83.33
31-60	0	0.00
61-90	1	5.56
91-120	0	0.00

121-150	1	5.56
Over 150	1	5.56

Source: Author (2014)

Majority of the organizations have between 1 and 30 branches country wide at 83.3%. The minority have above 30 branches at a total of 16.6%.

4.2.4 Number of Depositors

The respondents were also requested to state the number of depositors that they have with their organizations and their responses are detailed in Table 4.2.4.

Table 4.2.4: No. of Depositors

No. of Depositors	Frequency	%
1-500,000	12	66.67
500,001-1,000,000	1	5.56
1,000,001 – 1,500,000	2	11.11
1,500,000 – 2,000,000	1	5.56
Over 2M	2	11.11

Source: Author (2014)

Majority of the respondents have their depositors between 1 and 500,000 at 66.7% while those banks with over 2 million depositors comprise of 11.11%. The brackets of 500,000 to 1 million and 1,500,000 to 2 million both hold 5.56% of the population.

4.2.5 Gender of Respondents

16 of the 18 collected responses had the ICT in-charge being male while the remaining 2 did not indicate the gender. This implies a not less than 89% of male domination.

4.2.6 Age

The study sought responses on the age of the person in-charge of ICT. The data was collected and the results are displayed in Table 4.2.6.

Table 4.2.6: Age of ICT In-Charge

Age	Frequency	%
21-25	1	5.56
26-30	1	5.56
31-35	3	16.67
36-40	6	33.33
41-45	5	27.78
46-50	1	5.56
Over 50	1	5.56

Source: Author (2014)

From the data collected about 51% of the in-charge of ICT are between the ages of 36 and 45, 16% between the ages of 31 and 35 and the rest evenly distributed within the age brackets surrounding the brackets mentioned.

4.2.7 Level of Education

The respondents were asked to indicate their highest achieved level of education. Refer to table 4.2.7.

Table 4.2.7: Level of Education

Level of Education	Frequency	%
Diploma	0	0.00
Higher National Diploma	1	5.56
Undergraduate Degree	5	27.78
Master's Degree	11	61.11
PhD	0	0.00
Other	1	5.56

Source: Author (2014)

Greater than 60% of the in-charge of ICT are at master's degree level followed by about 28% with an undergraduate degree. A small percentage of 5.56% are higher national diploma holders as well as another set of 5.56% with alternative educational qualifications.

4.2.8 Period as Head of ICT

The study also sought to find out the period of time that the respondents had been the in-charge of ICT with the results displayed in Table 4.2.8.

Table 4.2.8: Period as In-Charge ICT

Time as Head of ICT (Years)	Frequency	%
1-3	4	22.22
4-6	4	22.22
7-10	5	27.78
11-13	0	0.00
Over 13	2	11.11

Source: Author (2014)

The respondents time as head of ICT are evenly distributed between 1 and 10 years with a small group having been the heads for over 13 years at 11%.

4.3 Application of Business Analytics in the Bank

Respondents were asked to rate the extent to which the organization uses business analytics in the specified functions in the questionnaire, using the likert scale with the following ratings: 1 - No extent, 2 - Little extent, 3 - Moderate extent, 4 - Large extent and 5 - Very large extent. The data was analysed using mean and standard deviation. The mean is interpreted using the likert scale where values are rounded off to the nearest integer, for instance a mean of 3.7 is rounded up to 4, implying a state of large extent. The results of the responses on application of business analytics and their derived means are presented in Table 4.3.

Table 4.3: Application of Business Analytics

Application of Business Analytics	Mean	SD
R&D	3.8	1.00

CRM	4.2	0.86
Logistics & Supply-chain management	3.0	1.19
Credit & Loan Processing	4.4	0.70
Fraud Detection & Prevention	4.2	0.79
HRM	3.8	1.04
Market Analysis	3.6	1.33
Business Process Re-engineering	4.1	0.94
Interest Rate Determination	3.9	0.90
Analysis of macro-economic data	3.8	0.92
Predict customer financial habits	3.8	1.10

Source: Author (2014)

From the responses received the organizations registered a high level of adoption of business analytics in the listed organizational functions. Majority of the applications had scores approximating 4 implying a large extent. Logistics and supply-chain management had a score of 3 which is of moderate extent.

4.4 Driving Factors

The driving factors to the adoption of business analytics were sought from the respondents and equally the mean and standard deviation of the factors was computed. The mean is interpreted according to the likert scale having the values rounded up or down to the next significant figure. The results are given in Table 4.4.

Table 4.4: Driving Factors of Business Analytics

Driving Factor	Mean	SD
Competitive Advantage	4.2	0.99
Corporate level strategy	4.2	0.79
Business level strategy	4.3	0.59
Functional level strategy	4.0	0.69
Increase ROI	4.2	0.92
Improved customer relations	4.1	0.83
Advancement in ICTs	4.4	0.62
Increase in customer data	4.1	0.96

Operational necessity	4.2	0.73
Trend following	3.1	1.03

Source: Author (2014)

From the responses obtained the respondent organizations consider the listed driving factors highly significant for the adoption of business analytics. Averaging at a score of 4 meaning they consider the factors driving business analytics to a large extent. Trend following as a driver to business analytics is however considered to be of moderate extent as is evident in its score of 3 after rounding down.

4.5 Challenges to Business Analytics

The challenges faced by the organizations in application of business analytics were analysed on their mean and standard deviation. Their mean was also interpreted based on the likert scale, rounding the scores to the nearest significant value. The outcome of the analysis is represented in Table 4.5.

Table 4.5: Challenges to Business Analytics

Challenges	Mean	SD
Technical Expertise	3.4	1.29
Top level management support	2.8	1.25
Availability of appropriate data	3.1	1.02
Cost of implementation	3.4	1.34
Lack of information on BA	2.9	1.23
Lack of evidence on benefits	2.9	1.26
Miss-alignment of IT and corporate strategy	2.9	1.30
Interpretation of outcome of BA	2.7	1.18
Technological challenges	3.1	1.11
User attitude	3.1	0.80
Information security	3.1	1.00

Source: Author (2014)

The results show that the organizations had the view that the challenges listed were of moderate impact to adoption of business analytics as the means score a rounded value of 3 alluding to a moderate extent.

4.6 Impact of Business Analytics on Organizational Performance

The impact on the organizational performance was divided into three separate measures of performance, that is Organizational Level, Competitive Advantage and Performance Indicators. Organizational level performance was analysed using mean and standard deviation. The mean was rounded up or down to the nearest figure in line with the likert scale. Multiple regression analysis was performed on each of the above mentioned and a model developed for each. Multiple regression analysis was used in analyzing the impact of the extent of application of business analytics to competitive advantage and performance of the banks.

4.6.1 Organizational Level Performance

Responses were received on the performance of the organizations at the various organization levels. Likewise the means were interpreted in accordance to the likert scale with the means rounded up or down to the nearest significant figure, and the results are as shown in Table 4.6.1.

Table 4.6.1: Organizational Level Performance

Organizational level decision	Mean	SD
Corporate	4.2	0.92
Business	4.1	0.96
Functional	3.9	1.00

Source: Author (2014)

Functional level performance was indicated to be the least impacted by business analytics with corporate and business level scoring similar points.

4.6.2 Competitive Advantage

Responses were received on the extent of the gain of competitive advantage as a result of application of business analytics. With the means translated by way of rounding to the nearest significant number as per the likert scale used. The outcome is presented in Table 4.6.2.1.

Table 4.6.2.1: Competitive Advantage

Competitive Advantage	Mean	SD
Increase in deposits	3.9	0.87
Increase in Marker Share	3.7	0.75
Local Branch Expansion	3.6	1.04
Regional Branch Expansion	3.3	1.18
Flexibility in Banking Services	4.2	0.71
Efficiency	4.0	1.33
Development of New Products and Services	4.2	0.73
Speed in Reaction to Environmental Changes	3.6	1.10
Innovation	3.9	0.90
Customer Retention	3.5	0.71
Supplier Retention	3.1	0.83
Strengthened Financial Resources	3.6	0.92

Source: Author (2014)

Impact on competitive advantage was revealed to be at a large extent after rounding the mean to the nearest figure for which the majority was 4. Regional branch expansion and supplier retention however settled at a mean score of 3 revealing their moderate extent of impact.

Regression analysis was then performed on the Competitive Advantage. The table on regression analysis is displayed in Table 4.6.2.2 followed by the derived equation.

Table 4.6.2.2: Regression Analysis on Competitive Advantage

y₂	x₁	x₂	x₃	x₄	x₅	x₆	x₇	x₈	x₉	x₁₀	x₁₁
4	3	4	1	3	3	3	3	3	3	3	3
4	5	5	5	5	5	5	5	5	5	3	3
3	4	4	3	4	4	4	4	4	4	4	4
4	3	3	3	4	4	4	4	4	4	4	4
2	2	2	1	5	3	1	3	3	4	5	3
4	4	4	3	4	4	4	4	5	4	5	4
3	2	3	2	4	3	3	2	2	3	3	2
4	3	4	4	5	4	3	3	3	3	2	2
4	3	4	4	5	4	3	4	4	5	4	5

4	4	4	2	3	3	3	2	5	2	3	2
3	5	4	4	5	5	4	3	4	4	4	4
5	5	5	3	4	5	5	5	5	4	5	5
4	5	4	3	5	5	4	5	4	5	5	5
3	4	5	4	4	5	5	5	5	5	4	5
4	4	5	4	5	5	4	4	4	4	4	5
4	5	5	4	5	5	5	5	5	5	5	5
3	4	5	3	4	4	5	0	3	3	3	4
4	3	5	1	5	4	4	4	5	3	3	4

<i>Regression Statistics</i>	
Multiple R	0.85
R Square	0.73
Adjusted R Square	0.23
Standard Error	0.58
Observations	18

<i>Coefficients</i>	
a	4.49
x1	0.69
x2	0.01
x3	0.46
x4	0.41
x5	-1.5
x6	0.18
x7	0.66
x8	-0.25
x9	-1.09
x10	-0.12
x11	0.61

Source: Author (2014)

$$y_2 = 4.49 + 0.69x_1 + 0.01x_2 + 0.46x_3 + 0.41x_4 - 1.5x_5 + 0.18x_6 + 0.66x_7 - 0.25x_8 - 1.09x_9 - 0.12x_{10} + 0.61x_{11}$$

4.6.3 Organizational Performance

The respondents were asked to rate the extent to which the organizational performance gained as a result of business analytics. From their responses the means and standard deviation were computed, and interpreted according to the likert scale where they were rounded off. The results are displayed in Table 4.6.1.3.1.

Table 4.6.3.1: Organizational Performance

Performance Indicator	Mean	SD
Financial Performance	3.9	0.76
Increase in Depositors	3.8	0.81
Increase in Branches	3.6	0.92
Improvements in Loan Recovery	3.7	0.67
Efficiency in Operations	4.0	0.69
Reduction in Operating Costs	3.4	1.29
Return on Investments	3.7	1.08
Customer Satisfaction	4.0	0.97

Source: Author (2014)

Majority of the performance indicators had a rounded score of 4 showing a large extent as per the responses. Reduction in operating costs however had a lower score of 3 implying a moderate extent of performance.

Regression analysis was then performed on the performance indicators. The table on regression analysis is displayed in Table 4.6.3.2 followed by the derived equation.

Table 4.6.3.2: Regression analysis on Organizational Performance

y3	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11
3	3	4	1	3	3	3	3	3	3	3	3
4	5	5	5	5	5	5	5	5	5	3	3
5	4	4	3	4	4	4	4	4	4	4	4
3	3	3	3	4	4	4	4	4	4	4	4
3	2	2	1	5	3	1	3	3	4	5	3

4	4	4	3	4	4	4	4	5	4	5	4
3	2	3	2	4	3	3	2	2	3	3	2
4	3	4	4	5	4	3	3	3	3	2	2
4	3	4	4	5	4	3	4	4	5	4	5
4	4	4	2	3	3	3	2	5	2	3	2
4	5	4	4	5	5	4	3	4	4	4	4
4	5	5	3	4	5	5	5	5	4	5	5
4	5	4	3	5	5	4	5	4	5	5	5
3	4	5	4	4	5	5	5	5	5	4	5
5	4	5	4	5	5	4	4	4	4	4	5
4	5	5	4	5	5	5	5	5	5	5	5
3	4	5	3	4	4	5	0	3	3	3	4
4	3	5	1	5	4	4	4	5	3	3	4

<i>Regression Statistics</i>	
Multiple R	0.95
R Square	0.9
Adjusted R Square	0.71
Standard Error	0.35
Observations	18

<i>Coefficients</i>	
a	3.43
X1	0.87
X2	0.11
X3	0.74
X4	1.04
X5	-2.5
X6	0.22
X7	0.79
X8	-0.4
X9	-1.3
X10	0.07
X11	0.69

Source: Author (2014)

$$y_3 = 0.95 + 0.87x_1 + 0.11x_2 + 0.74x_3 + 1.04x_4 - 2.5x_5 + 0.22x_6 + 0.79x_7 - 0.4x_8 - 1.3x_9 + 0.07x_{10} + 0.69x_{11}$$

From the multiple regression analysis performed on independent variables y_2 and y_3 models giving the relationship between the independent variables x_1 to x_{11} and the dependent variables were developed. From the analysis on y_2 the R^2 value obtained was 0.73 indicating a significant correlation. From the analysis of y_3 the R^2 value obtained was 0.9 also indicating a high level of significance.

4.7 Discussion of Results

This study found that commercial banks in Kenya actively apply business analytics in various functions within their organizations, which concurs with a study done by Sharma et al (2010) that listed some of the areas of application being in finance, human resources and research and development. Driving factors were found to be of great significance in the adoption of business analytics with the listed driving factors all scoring above average. The challenges were however considered to have impacted application of business analytics moderately and that the banks have been able to overcome them. The study found that business analytics was key to performance in the banks in Kenya. Performance is expected to improve when business analytics is applied enhancing the competitive performance of the organization in line with the findings of Mbaluka (2013) that business analytics will become a key basis for competition for existing companies.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter a summary of the findings, conclusions drawn and recommendations of the study are stated. Here the purpose of the study is revisited, the research objectives are re-stated, the methodology and summary of findings followed by the conclusion and recommendations are stated.

5.2 Summary

This study sought to determine the impact of business analytics to the performance of commercial banks in Kenya. The study was also to determine the extent of application by the banks, the driving factors that prompt organizations to adopt business analytics, challenges faced in its application and finally the impact realized on the performance of the organization. The first objective was to determine the use and extent to which the organizations applied business analytics. Respondents were furnished with a list of identified areas of application of business analytics in the banking industry. From the responses obtained it has been revealed that application of business analytics is at a large extent in the various functions that they operate. The second objective was to determine the extent to which identified driving factors influenced the uptake of business analytics in the organizations. From the data collected and analysed the results show that the drivers were also experienced to a large extent in the organizations. This brings out the main reasons as to why the banks feel it necessary to take on business analytics and factors contributing to the performance of the organization featured prominently. Challenges affecting the implementation of business analytics were identified and listed with responses sought from the organizations. The responses were analysed and it came out that the challenges were experienced to a moderate extent within the organizations. The final objective was to determine the contribution to the performance of the organizations attributable to application of business analytics taking into account the factors that influence business analytics as described by the objectives of the study. A

conceptual model was proposed and a multiple regression model developed to expose a correlation between the elements identified in the objectives and the performance of banks in Kenya. From the results of the multiple regression analysis, the study found that there was a significant relationship between the application of business analytics in the banks with the competitive advantage and performance.

5.3 Conclusion

The findings of the study show that adoption of business analytics has a positive impact on performance of banks in Kenya. Banks in Kenya show that they have been applying business analytics for various functions where they find need, especially those that boosts performance in their area of operation. From an organizational level perspective, the study has shown that the corporate level and business level performance are the major beneficiaries of business analytics. It has also been revealed that the banks in Kenya are well equipped in terms of stewardship in application of business analytics evidenced by the education level of the in-charge of ICT, the perception on the impact by the challenges to business analytics, which is relatively low and the high level of appreciation of the driving factors by the respondents.

Based on the model developed it is therefore possible to predict increase in organizational performance in banks in Kenya due to adoption of business analytics based on the attributes of level of application, perceived driving factors and challenges experienced. Banks can therefore interrogate these factors further and identify areas of improvement so as to gain maximum performance increase as a result of adoption of business analytics.

5.4 Recommendations

Banks need to have an ICT strategy in place that is aligned to the corporate strategy of the organization. This is to ensure that ICT plays its expected role of aiding the organization in implementing its corporate strategy and achieve its objectives. Business analytics is dependent on this so as to ensure the right framework is existent within the

organization for its smooth operation. Also this guarantees top level organizational recognition and support that is critical to its success. The in-charge of ICT is also a very important player in the organization. It is recommended that this position be a top management position. This will ensure that the in-charge can represent the needs of the ICT department at the corporate level, may also influence policy at this level and may also help steer the organization in a direction that ICT can ably and successfully support the organization strategy. This position should not be viewed as a technical position but rather a senior management position. Continuous research and development activities and monitoring and evaluation should also be carried out on the field of business analytics by the banks so as to have an informed picture of the current trends and the direction that business analytics is leading the organization and the industry at large. This would necessitate establishment of a unit focused on business analytics within the organization on a full time basis.

5.5 Limitations

This study encountered a number of limitations in its execution. The major limitation is attributed to the nature of the industry. The banking industry is highly sensitive and very competitive such that the respondents are either not willing to disclose information or policy dictates that they cannot disclose the information sought. Also the person to fill the questionnaire was the in-charge of ICT who was difficult to seek audience with based on his/her role in the organization. This left the option of leaving the questionnaire at the front office or reception and following it up from that point. The person receiving it at this point may not have been keen on ensuring handing over to the right person leaving the researcher at their mercy.

The geographical separation and location of the banks head offices were a major hindering factor in the study. Numerous trips had to be made to these locations consuming a lot of time and other resources. Coupled with repeated disappointments with regard to availability of the respondents or those that received the questionnaires, this turned out to be a major limitation to the study.

5.6 Recommendations for Further Study

One recommendation is on further research on return on investment from IT in organizations. This is necessary as this has been a grey area and previous research studies done on this have not convincingly pinned down a positive correlation between financial performance of an organization and level of IT application in that organization. This would set a solid foundation for research done on business analytics and pave way for the justification of its impact on organizational performance. Further to this, research on IT-Corporate level strategy alignment needs to be carried out so as to identify the impact realized by aligning the IT strategy to the corporate strategy. This will help establish the ICT strategy in the organization as a set of significant activities that will assist the organization carry out its corporate strategy and achieve its set objectives.

REFERENCES

- Allen, F., Carletti, E., Cull, R., Qian, J., Senbet, L., Valenzuela, P. (2013), *Improving Access to Banking Evidence from Kenya*, Policy Research Working Paper 6593, The World Bank Development Research Group Finance and Private Sector Development Team September 2013.
- Almajali, D. A., Dahalin, Z. M. (2011), *Factors influencing IT Business Strategic Alignment and Sustainable Competitive Advantage: A Structural Equation Modelling Approach*, IBIMA Publishing, Vol. 2011 (2011), Article ID 261315, 12 pages.
- Beck, T., Fuchs, M. (2004), *Structural Issues in the Kenyan Financial System: Improving Competition and Access*, World Bank Policy Research Working Paper 3363.
- Beck, T., Cull, R., Fuchs, M., Getenga, J., Gatere, P., Randa, J., Trandafir, M. (2010), *Banking Sector Stability, Efficiency, and Outreach in Kenya*, Policy Research Working Paper 5442, The World Bank Development Research Group Finance and Private Sector Development Team October 2010.
- Bucher, T., Gericke, A., Sigg, S., (2009), *Process-centric business intelligence*, Business Process Management Journal, Vol. 15 No. 3, pp. 408-429
- Buluma, O., (2012), *Strategies Adopted By Co-Operative Bank Of Kenya In Response To Loan Defaulters Among The Small And Medium Enterprises In Kenya*, Unpublished MBA Thesis. University of Nairobi.
- Business Week Research Services for SAS, (2009), *The Customer You Know: Keeping, Leveraging, and Profiting from Current Customers with Business Analytics*.

- Capgemini Consulting. (2012). *Electronic references*. Retrieved from <http://www.capgemini.com/blog/capping-it-off/2012/04/four-key-challenges-for-business-analytics>.
- Central Bank of Kenya, (2013). *Electronic references*. Retrieved from <http://www.centralbank.go.ke>.
- Chen, H., Chiang, R. H. L., Storey, V. C., (2012), *Business Intelligence and Analytics: From Big Data To Big Impact*, MIS Quarterly Vol. 36 No. 4, pp. 1-24.
- Davenport, T. H. (2006), *Competing on Analytics*, Harvard Business Review, January 2006, pp. 1-10.
- Decisionpath Consulting (2010), *How Effectively Are Companies Using Business Analytics?* DecisionPath Consulting Research.
- Devinney, T.M., Richard, P.J., Yip, G.S., and Johnson. G. (2008), *Measuring Organizational Performance in Management Research: A Synthesis of Measurement Challenges and Approaches*, Research Paper, Available at www.aimresearch.org.
- Esfandiari, M., Rizvandi, M. (2014), *An application of TOPSIS method for ranking different strategic planning methodology*, Management Science Letters 4, pp. 1445–1448.
- Green, A. (2007), *Business information – a natural path to business intelligence: knowing what to capture*, VINE: The journal of information and knowledge management systems Vol. 37 No. 1, 2007 pp. 18-23.
- Grossman, R. and Siegel, K. (2014), *Organizational Models for Big Data and Analytics*, Journal of Organization Design, JOD, 3(1): 20-25.

- Indiatsy, C., Mwangi, M., Mandere, E., Bichanga, J., and Gongera, G., *The Application of Porter's Five Forces Model on Organization Performance: A Case of Cooperative Bank of Kenya Ltd*, European Journal of Business and Management Vol.6, No.16, 2014.
- Kanog, J. N. (2013), *Effects Of Electronic Banking In International Business Environment And Performance By Diamond Trust Bank Limited In Kenya*, Unpublished MBA Thesis. University of Nairobi.
- Kaplan, R.S & Norton, D.P. (1992), *The Balanced Scorecard measure that drives performance*, Harvard Business Review Jan-Feb.
- Kohavi, R., Rothleder, N. J., Simoudis, E. (2002), *Emerging Trends In Business Analytics*, Communications Of The ACM August 2002/Vol. 45, No. 8, pp. 45-48.
- Lim, E.-P., Chen, H., Chen, G. 2012. Business intelligence and analytics: Research directions. *ACM Trans. Manage. Inf. Syst.* 3, 4, Article 17 (January 2013), 10 pages.
- Masa'deh, R., Hunaiti, Z., Yaseen, A. A. B. (2008), *An Integrative Model Linking IT-Business Strategic Alignment and Firm Performance: The Mediating Role of Pursuing Innovation and Knowledge Management Strategies*, Communications of the IBIMA Volume 2, 2008, pp. 180-187.
- Mbaluka, W. (2013), *Big Data Management and Business Value In The Commercial Banking Sector In Kenya*, Unpublished MBA Thesis. University of Nairobi.
- Mulatya, P. (2012), *Factors That Determine Internationalization Process Of Commercial Banks In Kenya*, Unpublished MBA Thesis. University of Nairobi.
- Muriuki, J. M. (2011), *Effect of Technology Adoption On Agency Banking Among Commercial Banks In Kenya*, Unpublished MBA Thesis. University of Nairobi.

- Muthoni, M., *Managing Change At National Bank Of Kenya Ltd*, Unpublished MBA Thesis. University of Nairobi.
- Mutuku, C., K'Obonyo, P., Awino, Z. B., Musyoka, M. (2013), *Top Management Team Diversity, Involvement Culture and Performance of Commercial Banks in Kenya*, DBA Africa Management Review August 2013, Vol 3 No 2. Pp. 70-80.
- Nazir, S., Naseer, Akhtar, M.N., Irshad, M. Z., *Why banks and financial institutions in Pakistan are turning towards Internet banking?*, IJCSI International Journal of Computer Science Issues, Vol. 8, Issue 6, No 3, November 2011, pp. 265-274.
- Njuguna, J. W. (2013), *Adoption Of Business Intelligent Dashboard And Decision Making At Kenya Power*, Unpublished MBA Thesis. University of Nairobi.
- Otieno, V. A. (2010). *Application Of ICT Strategy In Enhancing Competitive Advantage Among Commercial Banks In Kenya*, Unpublished MBA Thesis. University of Nairobi.
- Peteraf, M. A., (1993), *The Cornerstones of Competitive Advantage: A Resource-Based View*, Strategic Management Journal, Vol. 14, 179-1 91.
- Puiu, C., Stanciu, M. (2008), *Some Theoretical Aspects Concerning The Strategies' Definition And Typology*, Annals of the University of Petroșani, Economics, 8(2), pp. 95-100.
- Ranjan, J. (2008), *Business justification with business intelligence*, The journal of information and knowledge management systems Vol. 38 No. 4, 2008 pp. 461-475.

- Sharma, R. , Reynolds, P., Scheepers, R., Seddon, P. B., Shanks, G. (2010), *Business Analytics and Competitive Advantage: A Review and a Research Agenda, Bridging the Socio-technical Gap in Decision Support Systems*, IOS Press, 2010, pp. 187-198.
- Tambe, P. (2014), *Big Data Investment, Skills, and Firm Value*, Management Science 60(6):1452-1469.
- Tan, C., Sim, Y., and Yeoh, W. (2011), *A Maturity Model of Enterprise Business Intelligence*, IBIMA Publishing Vol. 2011, Article ID 417812, 11 pages.
- Trkman, P., McCormack, K., de Oliviera, M. P. V., Ladeira M. B., (2010), *The impact of business analytics on supply chain performance*, Decision Support Systems, DECSUP-11718; No of Pages 10.
- Xia, B. S., Gong, P., (2014), *Review of business intelligence through data analysis, Benchmarking: An International Journal* Vol. 21 No. 2, pp. 300-311.

APPENDICES

APPENDIX I: QUESTIONNAIRE FOR BANK ICT MANAGERS

SECTION A: DEMOGRAPHIC INFORMATION

1. Please fill in the details of the organization below:

a. Name of the Organization _____

b. Period of operation of the organization in Kenya (Tick one)

- 1-10 Years
- 11-20 Years
- 21-30 Years
- 31-40 Years
- Over 40 Years

c. Number of Employees in the organization.

- 1-50
- 51-100
- 101-200
- 201-300
- 301-400
- Over 400

d. Number of branches in Kenya

- 1-30
- 31-60
- 61-90
- 91-120
- 121-150

e. Number of depositors with the organization.

- 1-500,000
- 500,001-1,000,000
- 1,000,001-1,500,000
- 1,500,001-2,000,000

Over 2,000,000

2. Details of person in-charge of ICT.

a. Name

b. Gender

c. Age

21-25

26-30

31-35

36-40

41-45

46-50

Over 50 years

d. What is the highest level of education achieved?

Diploma

Higher Diploma

Bachelor's Degree

Master's Degree

Doctorate Degree

Other (specify) _____

e. For how long have you worked as the in-charge of ICT, tick one.

1-3 years

4-6 years

7-10 years

11-13 years

Over 13 years

f. What is the job title of the ICT in-charge? _____

SECTION B: APPLICATION OF BUSINESS ANALYTICS IN THE BANK

1. On a scale of 1–5, please rate the extent to which your organization applies BA to the following functions.

1-no extent

2-little extent

3-moderate extent

4 -large extent

5-very large extent

Function	1	2	3	4	5
Research and Development					
Customer Relationship Management					
Logistics and supply chain management					
Credit and loan processing					
Fraud detection and prevention					
Human Resource Management					
Market analysis					
Business process improvement and re-engineering					
Interest rate determination					
Analysis of macro-economic data					
Predicting customer financial habits					
Other (specify)					

SECTION C: DRIVING FACTORS TOWARDS APPLICATION OF BUSINESS ANALYTICS

1. On a scale of 1–5, please rate the extent which each the following were drivers in the adoption of Business Analytics. Use the following scale.

1-no extent

2-little extent

3-moderate extent

4-large extent

5-very large extent

Driving Factor	1	2	3	4	5
Competitive advantage					
Corporate level strategy decision making					
Business level strategy decision making					
Functional level strategy decision making					
Increase in Return on Investments					
Improved customer relations					
Advancement in ICTs					
Increase in customer and operational data					
Operational necessity					
Trend following					
Other (specify)					

SECTION D: CHALLENGES FACED IN APPLICATION OF BUSINESS ANALYTICS

1. On a scale of 1-5 please rate the extent to which the organization has faced each of the following challenges in application of Business Analytics. Use the following scale.

1-no extent

2-little extent

3-moderate extent

4-large extent

5-very large extent

Challenge	1	2	3	4	5
Technical expertise					
Top level management support					
Availability of appropriate data					
Cost of implementation					
Lack of information on Business Analytics					
Lack of evidence of benefits					
Misalignment of IT and corporate Strategy					
Interpretation of outcome of Business Analytics					
Technological challenges					
User attitude					
Information security					
Top level management support					
Other (specify)					

SECTION E: IMPACT REALIZED FROM APPLICATION OF BUSINESS ANALYTICS

1. Rate the extent to which Business Analytics has contributed to decision making in each of the following levels in the organization. Use the following scale.

- 1-no extent**
- 2-little extent**
- 3-moderate extent**
- 4-large extent**
- 5-very large extent**

Level	1	2	3	4	5
Corporate strategy decision making					
Business strategy decision making					
Functional strategy decision making					

2. On a scale of 1-5 please rate the extent to which the organization has gained in each of the following competitive advantages from application Business Analytics. Use the following scale.

- 1-no extent**
- 2-little extent**
- 3-moderate extent**
- 4-large extent**
- 5-very large extent**

Competitive Advantage	1	2	3	4	5
Increase in depositors					
Increase in market share					
Local branch expansion					
Regional branch expansion					
Flexibility in banking services					
Efficiency					
Development of new products and services					

Speed in reaction to environmental changes					
Innovation					
Customer retention					
Supplier retention					
Strengthened financial resources					
Other (Specify)					

3. To what extent has the organization performed as a result of adoption of Business Analytics? Use the scale below.

1-No extent

2-Little extent

3-Moderate extent

4-Large extent

5-Very large extent.

Performance Indicator	1	2	3	4	5
Financial performance					
Increase in depositors					
Increase in branches					
Improvements in loan recovery					
Efficiency in operations					
Reduction in operating costs					
Return on investments					
Customer satisfaction					
Other (Specify)					

THANK YOU FOR YOUR COOPERATION