

**BUSINESS INTELLIGENCE AND COMPETITIVENESS OF
COMMERCIAL BANKS IN KENYA**

By

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DECLARATION

I declare that this project is my original work and has never been submitted for a degree in any other university or college for examination/academic purposes.

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DEDICATION

This research project is dedicated to my parents, Mr Martin Mugambi and Dr Helen Mugambi. You two have always been my strongest pillars of support and your constant encouragements have made me achieve this far.

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ABSTRACT

The rapidly changing business environment has introduced a number of challenges that organizations have to deal with to remain competitive. It has become increasingly crucial for businesses to make decisions not only faster, but smarter especially for businesses that operate in a highly dynamic market with changing client demands and fierce competition. This study was guided by four objectives including; to find out the various BI technologies employed by commercial banks and how they are utilized, to examine the personnel capacity to use BI, to investigate whether application of BI systems improve a bank's competitiveness, and to examine the various challenges faced by the management in implementation of BI systems. This study adopted a cross section survey design which aimed at finding out the prevalence of an issue by taking a snap-shot of the population at the time of study. The population of interest in this study consisted of all 44 commercial banks operating in Kenya. The sample size included the same number in the population, specifically comprising of ICT managers, Operations managers, BI heads and BI users. For the commercial banks sampled, the study concluded that through the application and utilization of the BI systems; strategies for product diversification, product development, market development and market penetration are effective in achieving competitiveness are highly effective, the level of product innovation has gone up, the level of customer satisfaction, customer loyalty and retention in the banks has improved, banks are experiencing growth in size, increase in sales and profit as well as increase in market share as compared to other banks. This study recommends that the management of the respective banks to strategize and embark on capacity building so as to enable the staff be able to use some of the BI technologies they are not aware of, and that the management seek strategies towards mitigating the so many challenges related to use of the BI system in their banks. In this case, the management needs to establish the risks at once and thereafter establish the right counteractions towards each of them. This way, the competitiveness in the banking sector, in each of the banks too will be realized. Risk management enables bank to monitor and control the sizes and concentrations of risks resulting from its activities such as lending money to their customers.

CHAPTER ONE

INTRODUCTION

1.1 Background

The rapidly changing business environment has introduced a number of challenges that organizations have to deal with to remain competitive. It has become increasingly crucial for businesses to make decisions not only faster, but smarter especially for businesses that operate in a highly dynamic market with changing client demands and fierce competition (Bogdan & Emina, 2011). The challenge comes in where information for making decisions is either not delivered accurately and effectively to the intended person in the right format and in a timely manner or it is ambiguous and often not enough to base a decision on.

Business Intelligence (BI) systems improve the timeliness and quality of information by using analytical tools to combine operational and historical data to present valuable and competitive information to business planners and decision makers (Khan & Quadri, 2012). Modern organizations implement BI to gain a sustainable competitive advantage and some regard such intelligence as a valuable core competence (O'Brien & Kok, 2006). According to Olszak and Ziemba (2006), Banks are among the wide group of users of BI who can greatly benefit from it. Furthermore, banks are known to be among the leaders in the area of adopting new technologies which is why they are the fertile soil for implementing such a complex infrastructure.

Implementing BI tools will enable banks to understand their business better, manage risk and compliance, improve performance, expand their markets, increase their understanding of their customers, analyze channel profitability, devise product strategy, achieve operational excellence, and above all gain visibility into their profitability (icreate, 2014). It is also important for banks to respond to issues such as process automation, increased client expectations, aggressive competition, mergers and acquisitions, new product development, market segmentation among others as well as manage their risks. Banks have to harmonize their operations with the national and international policies regulating the banking industry. By providing a detailed view of a company's performance, BI allows companies to spot trends and other behaviour that may fall foul of compliance regulations (IBM, 2014).

Despite the benefits, there are several technical, human and business issues inherent to BI implementation. From a business perspective, it is a challenge to determine what data should be available to whom and what level. The main challenge is that the organization might resist the change of as incorporating a BI culture, processes and technologies needed to implement BI such. Mugo et al, (2012) reported that high cost in adoption of the technology, lack of adequately skilled personnel and failure to prioritize on the technology are some of the challenges a bank can face during implementation of BI. Generally, the main challenges are lack the necessary skills to use BI tools, high cost of deploying BI tools and complexity of BI tools.

The core purpose of this research was to study and analyse how BI Systems are integrated in banks to drive decision making at different levels of management. It sought to understand how BI impacts on the competitiveness of a bank and the challenges they face in implementing and deriving value from these systems.

1.1.1 Business Intelligence

BI can be defined as an umbrella term to describe concepts and methods to improve business decision making by using fact-based support systems (Power, 2007). Herschel et al, (2005) described it as a set of technologies that gather and analyse data to improve decision making. Generally, these are the various technologies, methodologies, applications and tools that organizations use to collect analyse and interpret data.

BI aims at optimizing an organization's ability to turn high volumes of data into actionable insights that can ultimately drive decision making hence facilitating managerial work (Negash, 2004). It allows experts to gather and analyse information from disparate sources across various lines of businesses. This integration of data across the enterprise provides the end users with a unified version of information used for the purpose of self-service reporting and monitoring of business activities. BI incorporates data-driven visualization tools that transform the way a user absorbs and understands the information at hand, thereby expediting their time to value insights, and enabling them to make better business decisions (Ranjan, 2009).

1.1.2 Competitiveness

For a company, competitiveness is the ability to provide products and services more effectively and efficiently than the relevant competitors (Blunk, 2006). Michael Porter is recognized as the leading authority on competitiveness and competitive strategies in various sectors of business and economy. In his book 'Competitive Advantage', Porter (1985) states that cost minimization, products differentiation and market focus are exclusive functions of competitive advantage.

Strategic competitiveness is achieved when a firm successfully formulates and implements a value-creating strategy where strategy can be described as an integrated and coordinated set of commitments and actions designed to exploit core competencies and gain a competitive advantage (Hitt et al, 2011). Competitive Advantage describes the attributes that organizations have that allow them to perform better than their competitors in the industry. A firm builds competitive advantage when it creates or develops attributes or resources that enable it to outperform its competitors (Bernard & Koerte, 2007). It should implement a strategy that competitors are unable to duplicate or find too costly to imitate. When choosing a strategy, firms make choices among competing alternatives as the pathway for deciding how they will pursue strategic competitiveness (Hitt et al, 2011)

Hitt et al. (2011) argue that technology is significantly altering the nature of competition and contributing to the unstable competitive environment. It is notable that the rate of technology diffusion, (speed at which new technology become available and are used) has increased substantially. Power (2012) states that a firm can gain an advantage from having better information technology and better information

resources. In some situations, making better, faster, and more effective decisions can actually create "decision superiority" (Power , 2012). According to (Porter, 1998), technology intelligence has a significant influence on the ability to innovate and is a major source of competitive advantage. Barney (1991) presents a resource-based view of firms which argues that a sustainable competitive advantage is achieved by developing existing resources and creating new resources and capabilities in response to changing market conditions.

1.1.3 Banking Industry in Kenya

According to the financial report of the year 2013, the banking sector is comprised is 43 commercial banks, 1 mortgage finance company. Out of the 43 commercial banks, 30 are locally owned and 13 are foreign owned. All these are regulated by the Central Bank of Kenya. Despite the country facing poor economic performance and being a victim of the global financial crisis in 2008, the banking sector has maintained a solid growth path and remained largely profitable. The scope and scale of bank operations has widened nationally and regionally with 11 Kenyan banks having subsidiary branches operating across East Africa. This growth is expected to remain stable in the future.

BI systems have been largely adopted to meet the need for faster reporting of data flow among Kenyan banks (TechnologyBanker, 2012). National Bank of Kenya for instance, has implemented Misys BI, which enables the bank to adapt to the customers changing demands and respond quickly by bringing new products to market much more rapidly, adapt to local management and regulatory changes, and meet any future technology changes (PRNewswire, 2011). Chase Bank has partnered

with Naivas Stores by giving their customers loyalty cards that double as prepaid cards. BI will help them analyse customer behaviour and make future decisions on managing our client's financial base and their lifestyle. African Banking Corporation (ABC) has also implemented a BI system under the FLEXCUBE Universal Banking Solution. Imperial bank also uses Oracle Financial Services Software solution which helps them obtain complete view of its customers, their product relationships and transaction behaviour to drive loyalty, customer satisfaction and targeted campaigns for customers and prospects (Oracle, 2010). Another BI solution is the Microsoft BI solution which has been implemented at Barclays bank. It enables conversion of data to meaningful business information crucial to driving maximum value for their shareholders. Estimates are that by implementing BI systems that help in generating quick, predictive reports among others, banks make savings that far exceed the investments made towards this technology.

1.2 Problem Statement

Banks have over time accumulated a large repository of data which is not efficient for decision making (Rajesh, 2012). BI tools provide the functionality of converting this data into an asset to the organization by extracting information and knowledge that is valuable when making operational and strategic business decisions (Negash, 2004). It can change the way the bank analyses and segments customer data by providing information about what products a customer uses the nature of their business relations with the bank and how often they interact with the bank. The bank can also evaluate and monitor the effects of marketing campaigns throughout the life of each product to see which customers are generating revenue with the product and which are delinquent (Bannan, 2007). The benefits of BI systems on banks are; cost saving,

better support on decision making, time saving based on faster delivery of readily accessible data, achievement of strategic business goals based on forecasted trends and data analysis (Horakova & Skalska, 2013). Such benefits suggest that BI systems hence is no longer just an option, but rather a must have for all banks.

Today, the competitive landscape in Kenya's banking sector is intensifying as the economy opens up to several bank and non-bank institutions who are offering various financial services. This competition has prompted to deploy new operational and technological strategies to remain competitive. The new banking environment in Kenya is all about differentiating banking products, increased choices, security and accessibility. They are increasingly diversifying the offered products and services and drawing business away from the traditional forms of banking.

Technological advancements have had a significant impact on the transformation of the banking sector by providing platforms for offering competitive products. Banks have introduces internet banking, mobile banking and other E-Banking facilities to enhance delivery channels to their customers (Abishua, 2010). IT is becoming more of a service partner and companies need to have systems in place to collect data, analyse and give projections on how they will generate revenue, thus BI is used to deliver reports and projections (Nalika, 2013). Banks are moving from handling normal customer transactions to analysing their clients, by collecting information about their lifestyle, and then use this information to provide better services. Consequently, implementation of BI technology can become a key differentiator and decisive factor as automation takes the centre stage in the competitive landscape (icreate, 2014). From a reporting and data visualization perspective, banks require the

ability to present data in different and meaningful ways and in real-time. It is critical that banks should have the ability to generate incisive reports thus a fast turnaround time on information, enabled by BI, is key in the competitive environment. Implementing BI tools will enable Kenyan banks to understand their business better, manage risks and compliance, improve performance, expand their markets, increase their understanding of their customers, analyse channel profitability, device product strategy, achieve operational excellence and above all, gain visibility into their profitability (Shailendra, 2011). Such BI tools include data warehousing, data mining, scenario development and reporting and analytical tools for predictive and descriptive modelling.

Macharia, (2014) argues that there is a link between the resource-based capabilities of firms to the firms' competitiveness, emphasizing that BI is a resource that improves competitiveness. Moreover, Karama (2014) concluded that BI systems are valuable given that it enhances KM, improves decision making, managing customer's issues and innovation. Additionally, Mugo et al. (2012) recommended that technology intelligence can greatly increase competitiveness in terms of product innovation, customer satisfaction and market orientation. A study done in South Africa by O'Brien & Kok (2006) concluded that BI gives an organization a sustainable competitive advantage since it can assist an organization to retain high-value customers through improved quality and superior service delivery, and reduce costs through more effective and responsive management. They further argue that the main reasons for under-utilization of BI applications are lack of knowledge, shortage of technical skills, lack of training and weak implementation of BI processes.

Ubiparić & Đurković, (2011) argue that in order to make full use of data generated by basic information systems, banks should implement BI systems which can give insight into historical data and enable banks to anticipate future behaviour of the system and most of their business indicators. They also enable modelling client behaviour, not only in terms of using new services but also from the perspective of potential risks. Eckerson (2008) presents that the key to making BI pervasive is getting users to adopt and use the BI tools that an organization purchases for them. In support of this, Maria,(2010) argues that delivering BI value is the responsibility of the organization itself, rather than the responsibility of the vendor/s of the products. This means that the organization should focus on factors that will enhance the adoption of BI.

Despite the notable number of studies done on the competitiveness and profitability in the banking sector, research on BI in the banking sector is generally limited. It was important to conduct a research that investigates how BI enhances competitiveness in the banking sector. The study therefore intended to study the various methods that BI can facilitate operational and corporate decision making leading to improved competitiveness of a bank hence the research question; Does the use of BI in Kenya's banking Sector improve profitability and competitiveness?

1.3 Objectives of the Study

This research sort to establish the influence of BI on competitiveness in Kenya's banking sector. The specific objectives of the study include:

- 1) To establish out the various BI technologies employed by commercial banks and how they are utilized.

- 2) To establish the personnel capacity to use BI.
- 3) To determine whether application of BI systems improve a bank's competitiveness.
- 4) To determine the various challenges faced by the management in implementation of BI systems.

1.4 Value of the Study

The research findings will be beneficial to various groups of users such as bank managers, vendors of BI systems, researchers as well as the government.

Previous researchers have shown that banks are expanding their ICT strategy framework to make their operations more efficient and impact on their competitiveness. The research findings will provide insightful knowledge to the leadership of a commercial bank regarding the benefits of applying BI in their organization. They will appreciate that investing in developing BI skills in their organization will make them more competitive in the banking industry.

The government, particularly the ICT board, Ministry of Information, Kenya Bankers Association and the Central Bank of Kenya can use the outcomes of this research to aid in establishing policies that can enhance the use of BI Systems by firms in the country. Moreover, they can formulate regulations that can improve the competitive landscape on the banking industry thus attracting potential investors which will have a positive impact on the economy.

It is also hoped that the research findings will help researchers as a source of future reference for those who wish to advance the research on BI in banking. The further areas of study to be established upon completion of the research can be used by scholars to carry out further research along the same line. BI vendors can also utilize the research findings to evaluate customer satisfaction so as to identify ways of improving their products and services and addressing customer concerns.

CHAPTER TWO

LITERATURE REVIEW

This chapter explores the concept BI and discusses the various ways BI impacts on the competitiveness of a bank. It also analyses the theories associated with BI and competitiveness.

2.1 Business Intelligence

The history of BI dates back to 1865, when Richard Millar originally coined this term to describe how Sir Henry Furnese, a banker, received first-hand information about his business environment, enabling him to react faster than his competitors and thus gain greater profits (Devens, 1865). In his popular article titled '*The Business Intelligence System*', computer scientist H. P Luhn defines BI as the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal (Luhn, 1958). He describes an automatic intelligent system developed to disseminate information to various sections of an organization.

BI systems are responsible for analysing the available data and transforming it into important information and knowledge used for effective decision making, strategic thinking and strategic action in organisations (Olszak & Ziemba, 2007). BI is not just about tactical issues like reporting, BI value is increasingly linked to performance management frameworks. That means BI can be used to define new sets of performance metrics and making more decisions through facts-based analysis. It's not just about getting the right information to the right people at the right time but

determining that the information is in fact being used to make better decisions (IBM, 2014).

Figure 1.1 below is an overview of the architecture of a BI system. It illustrates how data from various sources is gathered, validated, cleaned, transformed, aggregated and loaded into a data warehouse through a process known as ETL-Extraction, Transformation and Loading. In this context, a bank's BI operational database layer can be comprised of including Customer Information System, Loan Management System, Product Management System and Transaction Processing System (Negash, 2004).

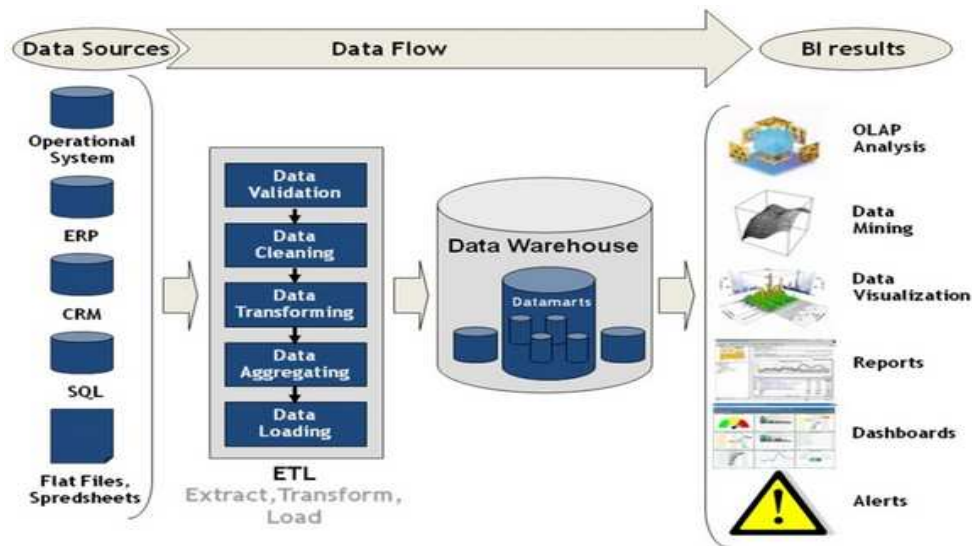


Fig 1.1: Business Intelligence Process Flow.

Adapted from *intechopen.com* by E. Krmac (2010) Retrieved 25/06/2015, from <http://www.intechopen.com/books/supply-chain-management-new-perspectives/intelligent-value-chain-networks-business-intelligence-and-other-ict-tools-and-technologies-in-suppl>

Online Analytical Processing (OLAP) tools enable users to analyse multidimensional data interactively from multiple perspectives. Data mining and knowledge retrieval deal with complex statistical analysis, discovering hidden relationships between data and forecasting the behaviour trends of business systems thus allowing business to make proactive knowledge-driven decision (Ubiparipović & Đurković, 2011). Querying tools offer a user a static view of information to be analysed, answering predefined questions. Reporting tools are more flexible and customized to user specific needs. They enable users to create, schedule and run their own reports. Visualization tools i.e. dash boards, graphical tools and scorecards give the user the visual interpretation of complex data relationships that facilitate decision making (Vatovec, 2011).

2.1.1 Types of Business Intelligence

According to Sandu (2008), BI is categorized into Traditional BI, Operational BI and Real-time BI. Strategic BI and Tactical BI form the traditional BI which, but not the operational workers on the front lines of business.

Strategic BI focuses on reaching long term objectives by providing valuable information needed to monitor the key performance metrics only to senior executives and analysts (Sandu, 2008). These BI applications cater for the need of top level management and financial analysts who are interested in analysing the company's performance in areas with a key role in reaching the strategic objectives and whose decisions are based on analysis of historical data.

Tactical BI focuses on achieving short term business objectives by analysing current data. Rather than planning, tactical BI addresses the action steps that must be taken to achieve the company's short term objectives such as marketing campaigns and promotions (Sandu, 2008). It provide a department manager with a quick view into how his or her department is performing and highlight areas of concern, so the manager can take appropriate action.

Operational BI embeds the analytical process with the operational business structure to support near real-time decision making in the day to day business operations (Santosh, 2007). BI at this level requires more data granularity so as to address the specific needs of every business function. Sandu (2008) point out that operational BI helps companies to provide visibility into the current status of the business operations to thousands of users across the organization. Employees are able to spot emerging trends, make fast decisions and take immediate actions when problems arise.

Real-time BI systems have evolved from operational BI where by it analysis data as soon as it enters the organization and deliver the information about a business as they occur (Sandu, 2008). Its main objective is to minimize the time from when a business event occurs to when a corrective action regarding the event is initiated. Operational and real-time BI optimize the decision making process by reducing to eliminating latency (Popeang, 2012).

2.1.2 Personnel capacity to utilize BI

As pointed out earlier, one of the main challenges when implementing a BI solution revolves around meeting the needs of end user. Some BI solutions can only be mastered by a few highly-trained users thus; the solution might not generate insights across the organization (Microsoft, 2009). In addition, Eckerson (2008) reports that BI tools were historically designed to serve the needs of power users, not executives, managers, and field staff. As a result, the casual users, who typically represent 80% of employees in an organization, found the first generation of BI tools hard to use, which increased training and support costs, adding significantly to the expense of a BI solution. Today's conventional BI implementations rely on IT departments to develop reports for the end user.

According to Oracle (2013), a BI solution should provide business users with the ability to access the information they need without the need for assistance from professional analysts. It is important to choose a BI solution that supports the skill sets of the organization and that is easily accessible to all. BI solutions featuring familiar tools and interfaces will increase adoption rates while reducing training time and cost. Furthermore, Eckerson (2007) recommends that to increase BI usage among the casual workers, the BI solution should focus on usability by delivering a clean interface where extraneous functions are hidden.

2.1.3 Business Intelligence and Competitiveness

BI can be a key internal strength that can place a firm in a superior market position as compared to its competitors. Power, (2012) reinforces this notion by stating that the ability to make business decisions based on tightly focused, fact-based analysis is

emerging as a measurable competitive edge in the global economy. Businesses that use BI systems are capable of analysing data to develop intelligence information that contributes towards achieving competitive advantage through forecasting competitors' moves, facilitating the making of fact based decisions, identifying gaps in the market and internal information (Frost, 2015).

The bank's marketing department can use data mining to analyse customer databases and develop statistically sound profiles of individual customer preferences for products and services. Products and services can be offered by understanding the customers' requirements which ultimately lead to saving money on promotions and offerings that would otherwise be unprofitable (Rao & Dey, 2012). Banks can construct models to predict the probability of selling certain products or services in order to facilitate cross-selling. Advantages of having correctly estimated probabilities are two-fold; lowering the marketing campaign costs along with a high response rate and raising the quality of customer relations (DeMers, 2013).

BI achieves customer segmentation by analysing customer characteristics and behaviours with an appropriate criterion. The system identifies the customers and how they behave in terms of customers' past purchasing patterns and how the bank can influence changes in customer behaviour in a way that benefits both the organization and the customer (Loshin, 2003). This helps the bank to understand customer needs about banking products and services, and consequently develop, implement and offer new market leading products and services to gain and maintain competitive advantage. Identification of customer segments more accurately can also aid in developing tailored promotions for target customers in certain market conditions

thereby ensuring a successful marketing campaign for a bank. The BI can build models for expected client lifetime value, so that bankers can treat clients accordingly, considering client's profitability based on his complete history (Rao & Dey, 2012).

Risk management enables bank to monitor and control the sizes and concentrations of risks resulting from its activities such as lending money to their customers (Bogdan & Emina, 2011). A BI solution enables banks to measure and manage operational risks in a scientific manner, not just to conform to industry best practices and regulations, but also for making sound business decisions (icreate, 2014). Lack of knowledge regarding customers' risk profile may prove to be a great disadvantage in offering new customers credit cards, extending existing customers lines of credit, and approving loans. Construction of models to give signals of possible transactions on stolen credit cards can show that number of transactions increases rapidly after the theft. By comparing expected average number or value of daily transactions, the authorization system can issue an early warning (Rao & Dey, 2012). Moreover, being able to detect fraudulent actions is an increasing concern for many businesses and with the help of BI system, fraudulent actions can be detected and stopped (Pratte, 2001).

The productivity paradox of IT implies that there is no significant empirical evidence for productivity increases by IT investment (Brynjolfsson, 1993). Bannister and Remenyi (2000) dispute the phenomenon by arguing that the increasing growth rate of IT investments would not be occurring if it added no value and that the apparent productivity paradox is due to the application of inappropriate measurement techniques that do not clearly quantify the results of IT investments in comparison

with the inputs. Additionally, Maria (2010) presents that BI investment is often made to maintain or achieve a competitive advantage thus the benefits are mostly qualitative and difficult to tie back to productivity measures. She further argues that the productivity impact of technology takes time to emerge and if assessment is made immediately after implementation, no benefit may be visible. BI benefits can be described as lagging benefits.

The benefit of BI is seen in improved decision quality and decision speed by using available data of a firm in offering tools that support the management and the stakeholders (Greitemeyer, 2002). A firm can measure user satisfaction, based on a set of predefined BI objectives such as user satisfaction with the relevancy, accuracy, consistency and timeliness of data being used to make decisions (IBM, 2014). Rockar, (2009) argues that the only paradox of BI is that it is an ever evolving concept driven by competition, market demand and new technologies such that as business strategies and technologies change so must BI strategies change in order to support and keep pace with the needs of business organizations.

2.1.4 Challenges of Business Intelligence

Lupu et.al (1997) reported that about 60% - 70% of BI applications fail due to the technology, organizational, cultural and infrastructure issues. Most BI projects fail to deliver the promised benefits because of one missing element; a business centric focus. Organizations can achieve BI success by connecting it to organization's strategic goals, culture and strengths (Palaniappan & Ramanigopal, 2012). In support of that fact, Yeoh et al (2009), argue that some firms experience BI failures because business needs and requirements for the BI system are not clearly defined early. In

such firms, BI initiative is mainly driven by the IT management alone and is viewed as a technological issue. Studies show that BI implementation should take a business orientation approach i.e. without a specific business purpose, the BI initiatives rarely produce a substantial impact on business (Yeoh & Koronios, 2009).

Though the demand for BI tools is growing at a rapid pace, there is still criticism that the programs are too complex and difficult to use by ordinary BI system users (Palaniappan & Ramanigopal, 2012). Many firms still do not consider them to be highly essential for its complexity and demands high technical knowhow. Such firms do not have sufficient expertise or is not able to hire such expertise to manage a project implementation on time and within budget or to design the system adequately. Furthermore, as operational BI gains popularity, more naïve users get to interact with the system, not only the traditional system analysts, so it is not only the number of users but an increase in support for these users from an implementation standpoint.

Most BI systems are limited due to their high cost of purchase and maintenance such that small companies cannot afford them. This is mostly associated with operational BI which is expected to capture and analyse large volumes of data without degrading the performance of existing business processes (Eckerson, 2007). Not only are many BI solutions expensive, they are resource-intensive because they require you to maintain multiple, non-integrated systems and tools. For a cost-effective solution that fits your budget, you need to work within the technology infrastructure you already have in place, minimizing start-up and implementation costs (Microsoft, 2009).

2.2 Theories of BI and Competitiveness

This section examines BI on the theoretical base of the Resource-based view of Strategic Management, the Technology acceptance Model and the Knowledge Management Theory.

2.2.1 Resource Based View

Resource based view (RBV) is founded on the idea that to achieve competitive advantage, a firm must conduct an appraisal of its competencies, capabilities and resources (Andrew, 1971) and identify the distinct ones or those that are superior in relation to those of rivals and match them appropriately to environmental opportunities (Peteraf, 1992). Greitemeyer (2002) describes the term resources as input goods that are refined with the ability and skill of a firm and transformed to a competitive advantage and that cannot be used or imitated by rivals in the long run. According to Peteraf (1992) and Barney (1991), resource heterogeneity and resource immobility are the fundamental assertion of the Resource Based View.

Using the above mentioned dimensions of RBV, BI can be regarded as a valuable resource that can lead to sustained strategic advantage. According to Pareek (2006), the demand for information in enterprises is continuously increasing and constantly changing with a greater need for current, accurate, integrated information, often on short notice, to support its activities. He proceeds to argue that the increase in information demand has led to an increase in BI demand because of the benefits derived from its usage. He presents that BI involves the coordination of core information with relevant contextual information to detect significant events and give its users the ability to evaluate business trends, adjust to changing situations and to

make intelligent decisions. The demand for BI tools is increasing as firms continue to accept the advantage of data warehouse solutions (Greitemeyer, 2002). On the other hand, supply of BI is low compared to its demand. According to Greitemeyer (2002), firms do not have the competences and knowledge to implement the BI applications and thus they need the support of external consultants. However, there is a scarcity of such specialists.

2.2.2 Theory of Knowledge Management

Lucey, (2005) defines Knowledge Management (KM) as the process by which an organization formally created, gathers, organizes, analyzes, shares and applies its knowledge in terms of resources, documents, experience and people skills. Draft et. al. (2010) define KM as the efforts to systematically gather knowledge, organize it, make it widely available through out the organization and foster a culture of continuous learning and knowledge sharing. Knowledge should be managed in a systematic way that combines technological infrastructure and organization in such a way that value is created and leveraged from intellectual assets (White & Bruton, 2007). Knowledge can either be explicit or tacit. Explicit knowledge can be codified or written down as rules, guidelines, processes or manuals. In contrast, tacit knowledge comes from experience and is internal to an individual i.e. intuition, perspectives, values etc. (White & Bruton, 2007). Lucey (2005) states that the key objective of KM is to transform tacit knowledge into explicit knowledge thus enabling personal knowledge to be available to others in the organization.

IT systems facilitate the enabling of organizations to collect, store & analyze data so it can be transformed into information and knowledge and shared across the enterprise. BI is an IT application for KM that analyzes data and extracts significant patterns and relations (Draft et al. 2010). In the effort of leveraging competitive advantage through investing in technology, BI and KM have shown a good return on investment (Cody et al. 2002). Nemati et al. (2002) proposes that a knowledge warehouse architecture can serve as an extension of the data warehouse. This will enhance capturing, coding, retrieval and sharing of employees knowledge across the organization hence gaining and sustaining strategic advantage in the market (Khan & Quadri, 2012). In the integration of KM and BI, explicit information is blended and integrated with the data and techniques used in BI to provide a richer view of the decision making problem set and alternative solution scenarios (Herschel & Jones, 2005).

The effectiveness of BI system should be measured based on how well it promotes and enhances mental models and understanding of the decision makers and how well it improves decision making and hence, firm performance (Rostami, 2014). BI should therefore be viewed as an integral part of KM. Proper integration of BI & KM can help organization to get wide benefits including maximizing organizational efficiency, enhancing organizational learning and improving organization performance.

2.2.3 Technology Acceptance Model

Technology Acceptance Model (TAM) was initially introduced by Fred Davis in 1986 as an extension or adaptation of the theory of reasoned actions (TRA). Davis, (1989) brought out two main assumptions that TAM is based on; Perceived Usefulness (PU)

and Perceived Ease of Use (PEU). He defined PU as the degree of performance improvement expected from using the system. This means that people tend to use or not use an application to the extent they believe it will help them perform their job better. PEU refers to the degree to which a person believes that using an application would be free of effort. An application should not only be useful but also it should not be hard to use. Essentially, the performance benefits should outweigh the effort of using it (Davis, 1989). Additionally, Davis argues that if a system is easy to use, it can make the system appear more useful to the user. It is arguable that TAM enables analysis of technology perceptions of a user in terms of the tasks that are to be performed resulting in implementable outcomes.

In this research context, TAM can enable measuring of beliefs towards BI by studying individual user perceptions. The choice to use BI as a technology is preceded by the belief that users have regarding the capabilities of BI (Vessy & Galletta, 1991). The effort expended when using a BI system for decision making will determine whether the user goes on to apply the system or not (Deane , 2011). The reward for using a BI system is the perception by users that using it will help them perform their decision tasks with minimum required effort. In a study done by Deane (2011), it was established that the perceived ease of use of a BI system will positively affect the intention to use the BI system. The perceived usefulness of BI can be proved to be positive whereby a user prefers to use the BI system since they believe that it enhances the process of decision making as compared to the older system. In contrast, Arvidsson & Pettersson, (2012) concluded that how useful a user perceives the BI system to be does not affect the amount of usage to the same extent as predicted by TAM. Their research results indicated that what drive BI usage is not merely its

usefulness but rather, other factors that are more directly ties to the purpose of the system itself, such as what tasks or decisions the user is actually faced with. BI system is not predefined but instead it is supposed to be general enough to accommodate whatever informational needs its users have.

2.3 Summary of Literature Review & Research Gaps

The key research issue is to study how implementation of BI impacts competitiveness of a bank. It also aims at identifying personnel capacity to utilize BI tools as well as the challenges associated with implementation of BI. TAM is widely used by researchers to provide explanations of usage behaviour in relation to adoption of information technology. So the model of the technology acceptance becomes very important and critical in relation to BI system. The RBV model is applicable in analysing BI as an organization resource that impacts competitiveness. In addition, BI techniques are used in KM for generating and transferring knowledge. Integrating KM and BI will enable the measurement of the effectiveness of BI activities based on how well it promotes and enhances knowledge within the firm, hence improving decision making and performance of the firm.

2.4 Conceptual Framework

The conceptual framework below depicts bank's competitiveness as the dependent variable while BI usage is the independent variable.

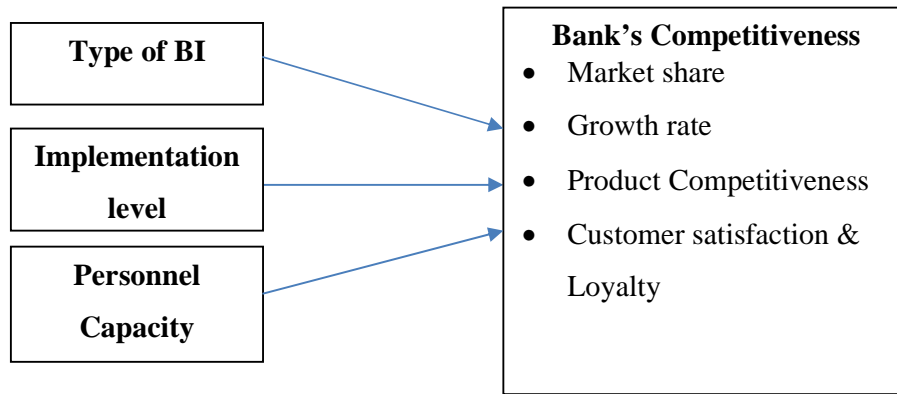


Figure 2.1 Conceptual Framework

Hypothesis

This research seeks to test the hypothesis that BI can improve competitiveness in commercial banks in Kenya.

1. H0: BI application decreases Bank competitiveness
2. H1: BI application increases Bank competitiveness

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter discusses the methodology that was used in the research so as to achieve the research objectives. The areas covered included the research design, population of the study and data collection methods.

3.1 Research Design

Research design is a plan and structure of investigation used to achieve the research objectives (Kerlinger, 1986). It describes the methods used for collection, measurement and analysis of data. This research was descriptive in nature since it has a clear statement of the problem, specific hypothesis and detailed information needs (Malhotra, 1999). It adopted a cross section survey design which aimed at finding out the prevalence of an issue by taking a snap-shot of the population at the time of study. It was appropriate because information from the given sample was collected only. It is used for generalization within a particular parameter thus; data collected can be standardized to allow easy comparison (Kothari, 2004).

3.2 Population and Sampling

The population of interest in this study consisted of all 44 commercial banks operating in Kenya. A census study was carried out since the population was small (Kothari, 2014). Moreover, all banks have their head offices in Nairobi hence easily accessible. The targeted respondents were ICT managers, Operations managers, BI heads and BI users. These groups of respondents were perceived to have relevant information required to achieve the objective of the study.

3.3 Data Collection

The research used primary data which was collected using a structured questionnaire. This was the tool of choice since it allowed for uniformity of questions and responses, and it was deemed as a fast way of data collection given the time constraint of the research activity. The questionnaire had closed and open ended questions categorized under four sections. Section A covered demographic information of the respondents. Section B focused on personnel capacity to utilize BI tools while Section C focused on data pertaining to BI usage in the banks to improve competitiveness. Finally, Section D covered the benefits and challenges faced during implementation.

3.4 Data Analysis

The questionnaire data was checked for accuracy and completeness of recording of the responses, it was coded and checked for coding errors and omissions. Quantitative data was analysed through descriptive statistics using Statistical Package for Social Sciences (SPSS) and presented through percentages, mean, standard deviation and frequencies. Descriptive statistics was used to analyse data regarding the types of BI technologies utilized in banks as well as the BI challenges. Inferential statistics, specifically regression model were used to analyse how integration of BI tools in the banking system impacts the bank's competitiveness. Bank's competitiveness is the dependent variable Y, was considered to be a function of several independent variable including type of BI system X1, training and personnel capacity X2 and BI implementation level X3.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND PRESENTATION

4.1 Introduction

This research sought to establish the influence of BI on competitiveness of commercial banks. The specific objectives of the study were; to find out the various BI technologies employed by commercial banks and how they are utilized, to examine the personnel capacity to use BI, to investigate whether application of BI systems improve a bank's competitiveness and to examine the various challenges faced by the management in implementation of BI systems.

Table 4.1 Response Rate

Response rate	Frequency	Response rate
Responded	36	81.8
Not responded	8	18.2
Total	44	100

A total of 44 questionnaires through the survey monkey.com were sent to the respective banks in an attempt to gain the respondents view on influence of BI on competitiveness in Kenya's banking sector. Out of these, only 36 of the questionnaires were returned while the rest 8 we never received back giving the study a response rate of $81.8 \approx 82\%$ which is adequate according to Ogier, (2005) who advocates for a response rate of 70% or more.

4.2 Demographic information

4.2.1 Role of respondent in the Bank

Table 4.2: Role of Respondent in the Bank

Roles	Frequency	Percentage
General Manager/CIO	2	7
Head of IT	7	20
Head of BI	2	7
Head of Business Development	5	12
BI administrator	2	7
Others	17	47
Total	36	100

The study wished to find the roles of respondent in the bank. Majority of the respondents sampled (47%) indicated that they operated in other departments besides IT, BI and Business Development mentioned. According to the findings, 20% of the respondents were heads of IT, whereas 12% were heads of business development. This was an implication that majority of the staff were well informed of the BI system in the commercial banks which would positively impact on competitiveness. The same information is shown in the figure below;

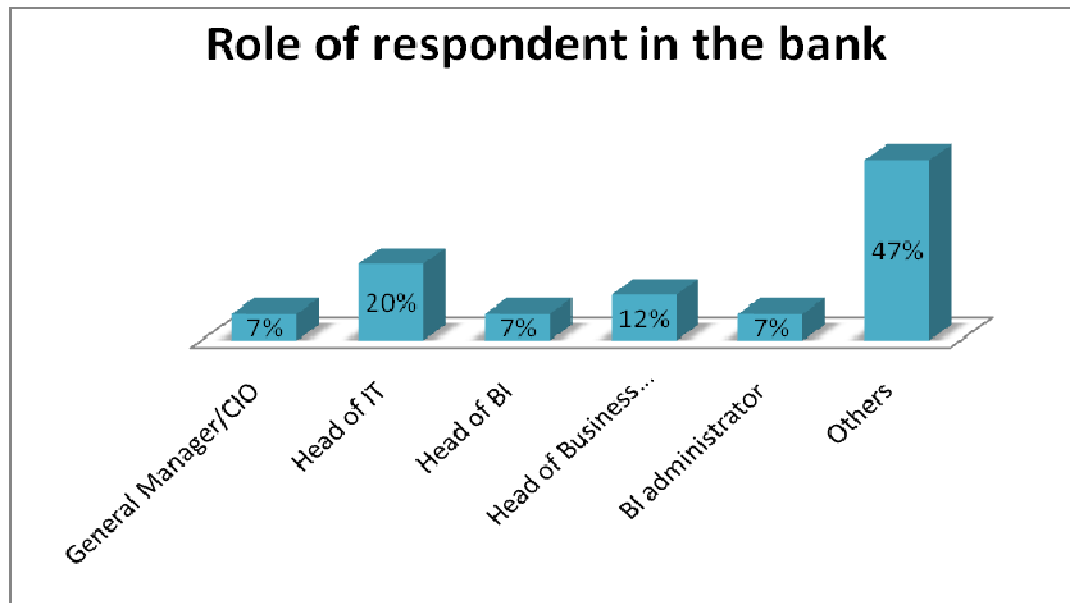


Figure 4. 1 Role of Respondent in the Bank

4.2.2 Category of the Bank

Table 4. 3 Category of the Bank

Bank Category	Frequency	Percentage
Top tier	7	20
Middle Tier	24	67
Small Tier	5	13
Total	36	100

The study wished to find out the category of the bank within the banking industry in Kenya. According to the findings, 67% indicated that their bank was a middle tier whereas 20% said their commercial bank was a top. This implied that banks in the middle tier category are keen on utilizing BI to improve their competitiveness. The figure below presents the same information;

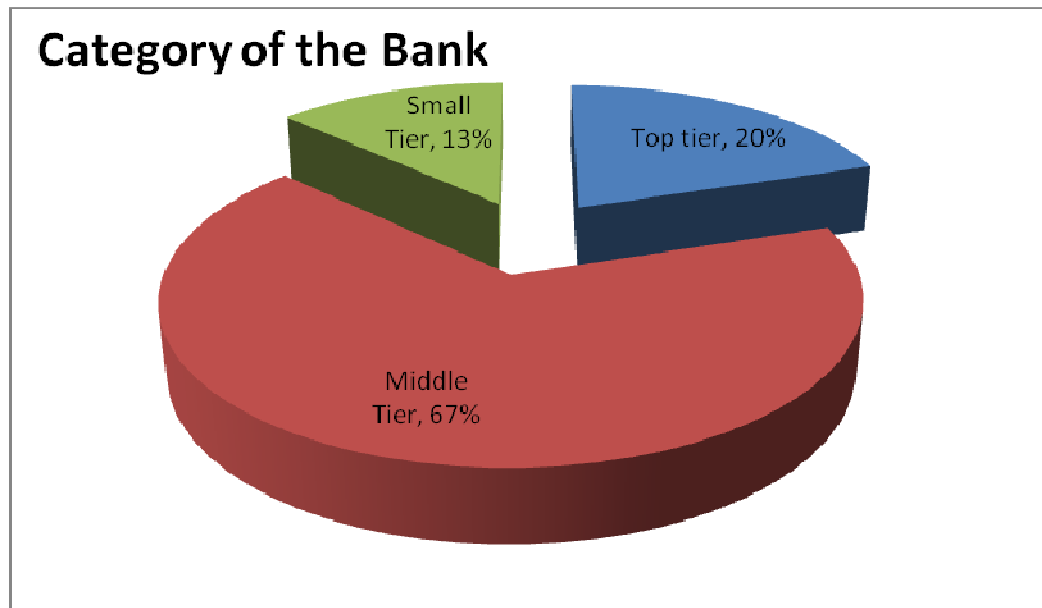


Figure 4.2: Bank Category

4.2.3 Duration of Bank Operation

Table 4. 4 Duration the Bank has been in Operation

	Frequency	Percentage
Years of operation		0
< 2 yrs.	7	20
2 – 5 yrs.	7	20
6 – 10 yrs.	2	7
>10 yrs.	19	53
Total	36	99

The researcher wanted to find out on the duration the bank has been in operation.

Majority of the respondents as shown by 53% indicated that their bank had been in operation in more than 10 years, whereas 20% said between 2-5years. This was an implication that most of the banks were in operation for many years which would probably been contributed by BI usage.

4.2.4 Duration of BI usage in Bank

Table 4. 5 Duration the Bank has been using BI Tools

Years of BI usage	Frequency	Percentage
< 2 yrs.	5	13
2 - 5 yrs	10	27
6 - 10 yrs	10	27
>10 yrs.	12	33
Total	36	100

The study was to establish the duration the banks has been using BI tools. It was established that most of the banks had been using BI for more than 10 years as shown by 33%. This shows that there is a positive relationship between the duration of BI usage and the duration of Bank's operation.

4.2.5. Products/Services offered by Bank

Table 4.6 Average no of Products/services the Bank Offer

	Frequency	Percentage
Products and services offered		0
< 15	7	20
15 – 30	17	47
30 – 50	7	20
> 50	5	13
Total	36	100

The researcher was to find out the average no of products/services the bank offer. Majority of the respondents as shown by 47% said between 15-30 products/services, whereas 20% said less than 15, an implication that the BI systems alongside other practices has enhanced the development of the products and services they offer.

4.2.6. Types of BI systems used by Bank

Table 4. 7 Types of BI Systems used By the Bank

BI system used	Yes	Percentage
BOARD	1	2
Comma Soft	0	0
Corporate Planning	3	7
Cyberscience	1	2
Dimensional Insight	0	0
IBM	6	14
Microsoft	9	22
MicroStrategy	0	0
Oracle	6	14
Phocas	0	0
Pyramid Analytics	1	2
SAP	4	10
TARGIT	0	0

According to the figures displayed in the table above, Microsoft BI products was the highest as shown by 22%, IBM and Oracle followed with 14% then SAP had 10%. Corporate planning had 7% and Cyberscience, BOARD, Pyramid Analytics as shown

by an equal 2% each respectively. The study found out that; Comma Soft, Dimensional Insight, MicroStrategy, Phocas and TARGIT were rarely used by the banks in their operations. This implied that Microsoft, IBM, Oracle and SAP are the most commonly used BI systems since they are well established in the market. The percentage use of BI system in the banks has also been presented;

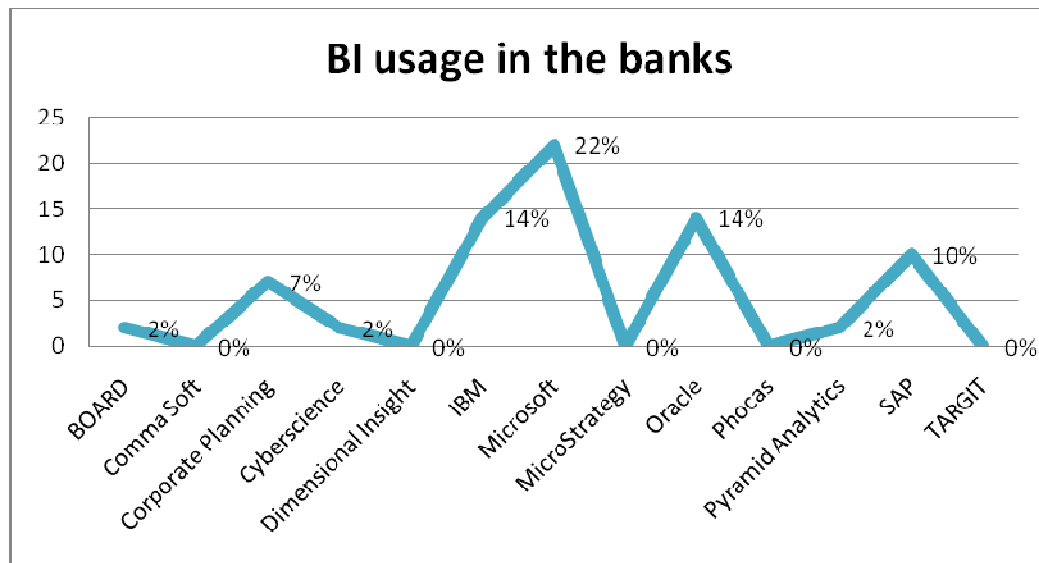


Figure 4. 3 Types of BI Systems used by the Bank

4.3 Personnel Capacity to Utilize BI Tools

Table 4. 8 Personnel Capacity to Utilize BI Tools

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Means score
I frequently use SQL	0	0	0	10	24	36	4.40
I frequently use Plain Reports	0	0	7	17	12	36	4.13
My knowledge and experience in BI is above average	0	0	5	26	5	36	4.00
I have gone through sufficient BI training.	0	0	12	14	10	36	3.93
I am very satisfied with the performance of packages used for retrieving data for analysis	0	2	10	14	10	36	3.87
I frequently use Dashboard	5	2	2	14	12	36	3.73
I frequently use BI as an input for decision making	0	2	10	12	10	36	3.60
I am very satisfied with the overall satisfaction level of the BI solution?	0	2	14	17	2	36	3.53
I frequently make presentations that uses data from BI analysis	2	2	7	10	12	36	3.53
Management always employs BI as the basis for their decisions	0	2	17	12	5	36	3.53
I frequently use Scorecards	5	2	2	12	12	36	3.47
I frequently use OLAP	5	0	12	12	7	36	3.47
I frequently use Crosstab Analysis	2	5	10	17	2	36	3.33
I frequently use Drill-through Analysis	2	2	14	14	2	36	3.33
I frequently use Data mining & Predictive Analytics	5	2	10	14	5	36	3.33
Overall mean of the variable	55.18/15=3.68						

The results in the table above depict the extent to which respondents agree with the statements related to Personnel Capacity to utilize BI tools. According to the results, majority of the respondents indicated that their knowledge and experience in BI is above average and that they have gone through sufficient BI training. Many respondents also indicated that they frequently use SQL, Plain Reports, Scorecards, OLAP and Dashboards. Majority of the respondents were neutral on the statements that; they frequently use Crosstab Analysis, Drill-through Analysis, Data mining & Predictive Analytics. This implied that the respondents are only conversant with the basic functionalities of BI systems and may not be aware of complex functions of data mining and analytics, thus, the organization should be keen on training their staff more on BI usage.

Majority of the respondents indicated that they frequently use BI as an input for decision making, they frequently make presentations that uses data from BI analysis and that management always employs BI as the basis for their decisions. Moreover, majority indicated that they are very satisfied with the performance of packages used for retrieving data for analysis and they were very satisfied with the overall BI solution. This shows that BI is being utilized in the banks and its usage has a positive impact on the bank.

4.4 BI usage and Bank Competitiveness

Table 4. 9 Ways of Improving Competitiveness through BI System

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Means score
We use BI tools for Forecasting	0	0	5	24	7	36	4.07
We use BI tools for Customer Credit Risk Profiling	0	2	2	24	7	36	4.00
We use BI tools for Marketing strategy analysis	0	0	12	14	10	36	3.93
We use BI tools for Customer Segmentation	0	0	10	19	7	36	3.93
We use BI tools for determining interest rates	0	2	2	26	5	36	3.93
We use BI tools for Credit Risk Assessment	0	2	7	17	10	36	3.93
We use BI tools for Security/Fraud detection	0	5	5	14	12	36	3.93
Improved the quality of decisions I make in this organization	0	0	10	19	7	36	3.93
The speed at which I analyze decisions had increased	0	0	7.2	24	5	36	3.93
We use BI tools for CRM	0	2	7	19	7	36	3.87
We use BI tools for product Innovation	0	2	7	19	7	36	3.87
We use BI tools for Strategic planning	0	0	12	19	5	36	3.80
We use BI tools for Market penetration & development analysis	0	2	10	17	7	36	3.80
We use BI tools for Pricing and profitability	0	0	12	19	5	36	3.80
We use BI tools for loan assessment	0	2	12	12	10	36	3.80
We use BI tools for Market Segmentation	0	0	12	22	2	36	3.73
We use BI tools for Product portfolio analysis	0	2	7	24	2	36	3.73
Greater use of analytical aids in decision making	0	2	12	14	7	36	3.73
BI provides relevant information for individual & collaborative decision making	0	2	12	17	5	36	3.67
Overall mean of the variable	73.38/15=4.892						

The results in the table above depict findings on respondents' level of agreement on statements related to ways in which the bank improves competitiveness through BI system. According to the results, majority of the respondents were in agreement that; they use BI tools for Forecasting, Customer Credit Risk Profiling, Marketing strategy analysis, Customer Segmentation, Determining interest rates, Credit Risk Assessment, Security/Fraud detection, product Innovation, Strategic planning, Market penetration & development analysis, Pricing and profitability, loan assessment, Market Segmentation, Product portfolio analysis and Customer Relationship Management. In addition, many respondents indicated that BI improved the quality of decisions they make in their organization, the speed at which they analyze decisions had increased, there was great use of analytical aids in decision making and that BI provides relevant information for individual & collaborative decision making as shown by the mean scores above. This clearly implies that BI usage has a positive impact on various factors that impact a bank's competitiveness.

4.5 Level of Bank Competitiveness

Table 4. 10: Performance of the Banks in Kenya

	Very Low	Low	Neutral	High	Very High	Total	Mean Score
Rate the increase in market share of your bank in the banking industry	0	0	10	10	17	36	4.21
Rate the effectiveness of the bank's product diversification strategies in achieving competitiveness	0	0	10	10	17	36	4.07
Rate the level of product innovation as compared to other banks	0	2	7	12	14	36	4.07
Rate the increase in sales in your bank	0	0	7	19	10	36	4.07
What is the level of customer satisfaction in your bank as compared to other banks?	0	0	5	26	5	36	4.00
Rate the effectiveness of the bank's market penetration strategies in achieving competitiveness	0	0	10	17	10	36	4.00
Rate the Growth in size of your bank as compared to other banks	0	0	12	10	14	36	4.00
What is the level of customer loyalty and retention in your bank as compared to other banks?	0	0	10	19	7	36	3.93
Rate the effectiveness of the bank's market development strategies in achieving competitiveness	0	0	12	14	10	36	3.93
Rate the bank's profit growth as compared to other banks	0	2	7	17	10	36	3.93
Rate the effectiveness of the bank's product development strategies in achieving competitiveness	0	0	10	19	7	36	3.92
Overall mean of the variable	44.13/15=2.						

The study was to establish the respondents' level of agreement with statements related to performance of the banks in Kenya. According to the results, majority of the respondents were in agreement that there is a high level of increase in growth rate, market share and sales of their bank in the banking industry. The results also show that the strategies for market penetration, market development product development and product diversification for achieving competitiveness were highly effective and the level of product innovation as compared to other banks is high. Moreover, there is a high increase in sales, a higher level of customer satisfaction, and customer loyalty & retention in the bank as compared to other banks. Respondents also indicated a higher bank growth rate, profit growth as compared to other banks shown by the mean scores above.

This results depict that usage of BI in commercial banks leads to improved competitiveness of the bank.

4.6 Challenges of Business Intelligence System

Table 4. 11 BI Challenges

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Means score
Lack of business strategy, objectives and measures of BI progress hinders successful BI implementation	0	5	7	19	5	36	3.67
Establishing and maintaining an appropriate level of data quality to feed into the BI system is very challenging	0	2	12	22	0	36	3.53
Integrating the BI tool with other operational, performance management and transactional systems is very challenging	0	5	12	19	0	36	3.40
Maintaining and managing BI solutions is very challenging	2	5	10	17	2	36	3.33
Transforming the workplace to a culture of fact-based decision-making using BI tools is a challenge	0	10	7	19	0	36	3.27
Securing executive sponsorship and financial backing prevents BI adoption	0	7	14	12	2	36	3.27
Overloading of IT specialists in supporting BI usage has strained the adoption process and utilization of BI tools	2	2	17	14	0	36	3.20
It is difficult to find a cost-effective BI solution	0	10	12	14	0	36	3.13
BI tools are very complex to the end users	2	7	19	7	0	36	2.87
BI system end users do not know what they want from a BI system	5	7	12	12	0	36	2.87
The quality of the presentation, visualization of the information and response time is poor or limited	5	7	17	5	2	36	2.80
BI systems are inflexible and incompatible	5	7	17	7	0	36	2.73
The company does not have sufficient expertise or is not able to hire such expertise	2	10	19	5	0	36	2.73
IT experts building the system do not understand the business thus the BI system does not meet the needs of the Business	5	10	14	7	0	36	2.67
Overall mean of the variable	43.47/15=2.898						

The researcher wanted to know the respondents' extent of agreement with statements regarding BI challenges. Majority of the respondents were in agreement that; lack of business strategy, objectives and measures of BI progress hinders successful BI implementation and that establishing and maintaining an appropriate level of data quality to feed into the BI system is very challenging as shown by the mean scores of 3.67 and 3.53 respectively.

As shown in the above mean scores, majority of the respondents were neutral on the challenges they face as users of BI systems such as integrating the BI tool with other operational, performance management and transactional, maintaining and managing BI solutions, securing executive sponsorship and financial backing prevents BI adoption, Overloading of IT specialists in supporting BI usage has strained the adoption process and utilization of BI tools. They also agreed that it is difficult to find a cost-effective BI solution, BI tools are very complex to the end users, BI system end users do not know what they want from a BI system, The quality of the presentation, visualization of the information and response time is poor or limited, BI systems are inflexible and incompatible, the company does not have sufficient expertise or is not able to hire such expertise and that the IT experts building the system do not understand the business thus the BI system does not meet the needs of the Business.

4.7 Relationship Between BI Usage and Bank's Competitiveness

The following section presents the inferential statistics for the study (regression model and correlation analysis). Additive results for each of the independent variables were regressed alongside those of the dependent variable in order to obtain the below results;

4.7.1 Regression Model

Table 4. 12 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.889(a)	0.790	0.785	1.14624

a Predictors: (Constant),

Table 4.6 above shows that the value of co-efficient of determination (adjusted R square) is 0.785 for all the variables studied (type of BI system, training and personnel capacity, BI implementation level). This therefore implies that there was a variation of 78.5% between the independent (type of BI system, training and personnel capacity, BI implementation level) and dependent variable (competitiveness in Kenya's banking sector). Thus it means that (type of BI system, training and personnel capacity, BI implementation level) explained 78.5% of the competitiveness commercial banks in Kenya.

4.7.2 ANOVA- Analysis of Variance

Table 4. 13 ANOVA- Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	202.537	2	202.537	154.154	.000(a)
	Residual	53.868	41	1.314		
	Total	256.406	42			

a Predictors: (Constant), type of BI system, training and personnel capacity, BI implementation level

b Dependent Variable: Competitiveness in Kenya's banking sector.

The study used F-statistics to establish the appropriateness of the regression model to give reliable results. An F-significance value of $p=0.000$ was established. This shows that the regression model has a less than 0.001 likelihood (probability) of giving a wrong prediction.

4.7.3 Coefficients Results

Table 4. 14: Coefficients Results

Model	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
Constant	10.654	1.734	-	6.143	0.000
Type of BI system	0.416	.036	.614	11.626	0.010
Training and personnel Capacity	0.413	.000	.678	7.012	0.032
BI implementation level	0.042	.015	.006	0.109	0.021

a) Dependent Variable: Competitiveness in commercial banks.

The study results show that BI has an impact on competitiveness of commercial banks. The un-standardized regression coefficients show how every metric unit change in the independent variable, the dependent variable changes by X units. The equation's constant was found to be 10.654. This implies that a unit increase in Type of BI system would lead to a unit increase in competitiveness of commercial banks at a factor of 0.416. A unit increase in BI implementation level would influence competitiveness of commercial banks by a unit of 0.042. A unit increase in Training

and personnel Capacity would also lead to increase in competitiveness of commercial banks by a factor of 0.413 and vice versa.

The Standardized regression coefficients are based on changes in standard deviation units. This is the slope coefficient that results when X and Y are both standardized (i.e., transformed into z-scores) before the analysis is run. The coefficient value of (type of BI system, training and personnel capacity, BI implementation level), it also implies that one-standard deviation increase in (type of BI system, training and personnel capacity, BI implementation level), competitiveness in commercial banks would increase by 0.614, 0.678 and 0.006 respectively.

The results further shows that there is a significant relationship between competitiveness of commercial banks and the three variables (type of BI system, training and personnel capacity, BI implementation level), as shown by the p value; ($p=0.000<0.05$).

The equation; $Y = 0.416X_1 + 0.413X_2 + 0.042X_3$ was obtained indicating that the type of BI used matters the most and that it is the most influential component towards competitiveness of commercial banks.

All the components influencing competitiveness of commercial banks were found to be significant, the type of BI system leading at 0.010, BI implementation level at 0.021 and training and personnel capacity at 0.032 respectively. From the results above on Beta, there exists a positive relationship between BI and competitiveness of

commercial banks, thus the hypothesis that “there is no relationship between BI and competitiveness of commercial bank” proposed in this study is rejected.

4.8 Discussion of Findings

4.8.1 Personnel Capacity to Utilize BI Tools

Training is concerned with increasing the knowledge and skills of employees for doing specific jobs, and development involves the growth of employees in all aspects. There is therefore a need to well train and develop the employees concerning BI usage. It was established from the study that commercial banks frequently use basic functionalities of BI systems such as SQL, Plain Reports, OLAP and dashboards. Moreover, their knowledge and experience in BI is above average and they have gone through sufficient BI training. It was also established that banks frequently use BI as an input for analysis and decision making and that their level of satisfaction on the BI solution is high.

However, the results indicated that the banks do not fully utilize the complex functionalities of BI systems such as Data mining and predictive analytics. This shows a gap in training. The literature by (Microsoft, 2009) asserts that it is not always possible for the employees to understand all, that some BI solutions can only be mastered by a few highly-trained users thus; the solution might not generate insights across the organization.

4.8.2 Ways in which the Bank improves Competitiveness through BI System

Competitiveness which is the ability of a firm to offer products and services that meet the quality standards of the local and world markets at prices can be enhanced in

many ways; one being the effective utilization of the BI systems. It was established from the study that commercial banks use BI tools for Forecasting, Customer Credit Risk Profiling, Marketing strategy analysis, Customer Segmentation, Determining interest rates, Credit Risk Assessment, Security/Fraud detection, product Innovation, Strategic planning, Market penetration & development analysis, Pricing and profitability, loan assessment, Market Segmentation, Product portfolio analysis and Customer Relationship Management.

These results agree with the literature that by Power, (2012) who asserted that BI can be a key internal strength that can place a firm in a superior market position as compared to its competitors. Power, (2012) reinforces this notion by stating that the ability to make business decisions based on tightly focused, fact-based analysis is emerging as a measurable competitive edge in the global economy. The results agree with the literature that BI achieves customer segmentation by analyzing customer characteristics and behaviors with an appropriate criterion. The system identifies the customers and how they behave in terms of customers' past purchasing patterns and how the bank can influence changes in customer behaviour in a way that benefits both the organization and the customer (Loshin, 2003) which again helps the bank to understand customer needs about banking products and services, and consequently develop, implement and offer new market leading products and services to gain and maintain competitive advantage.

4.8.3 Level of Bank Competitiveness

The BI can build models for expected client lifetime value, so that bankers can treat clients accordingly, considering client's profitability based on his complete history

(Rao & Dey, 2012). An emerging theme over the past decade has been using business intelligence and analytics solutions to store, report, analyze and distribute role-based feedback to employees empowered to take action. These solutions enable companies to combine feedback collected across multiple channels. This in turn helps managers to think of ways in which they can enhance the competitiveness of their banks through several ways (Rao & Dey, 2012). The results in this study agree with the literature in that, the study found out that the strategies for market penetration, market development product development and product diversification for achieving competitiveness were highly effective and the level of product innovation as compared to other banks is high. Moreover, there is a high increase in sales, a higher level of customer satisfaction, and customer loyalty & retention in the bank as compared to other banks. Respondents also indicated a higher bank growth rate, profit growth as compared to other banks.

4.8.4 Challenges of Business Intelligence System

The study found out that most of the challenges that banks face during implementation and utilization of BI solutions are in line with the challenges discussed in literature review. The literature asserts that most BI systems are limited due to their high cost of purchase and maintenance such that small companies cannot afford them. This is mostly associated with operational BI which is expected to capture and analyse large volumes of data without degrading the performance of existing business processes (Eckerson, 2007). Not only are many BI solutions expensive, they are resource-intensive because they require the bank to maintain multiple, non-integrated systems and tools.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusions and recommendations on the influence of BI on competitiveness in Kenya's banking sector. The specific objectives of the study were; to find out the various BI technologies employed by commercial banks and how they are utilized, to examine the personnel capacity to use BI, to investigate whether application of BI systems improve a bank's competitiveness and to examine the various challenges faced by the management in implementation of BI systems. Recommendations for further studies are also presented.

5.2 Conclusions

Thorough training ensures staffs are current with evolving technology, software and the needs of the customer. The study concluded that the staff and the management in the commercial banks frequently use basic BI functionalities such as SQL, Plain reports, Dashboards, OLAP and scorecards. It was also concluded that complex BI modules such as data mining and predictive analytics were not frequently used because of lack of training or resources.

The study concludes that BI usage in Bank improves competitiveness because BI is used in various operations of a bank such as Customer Credit Risk Profiling, marketing strategy analysis, Customer Segmentation, determining interest rates, Credit Risk Assessment, Security/Fraud detection, product Innovation, Strategic

planning, Market penetration & development analysis, Pricing and profitability, loan assessment, Market Segmentation, Product portfolio analysis and customer relationship management. BI also improved the quality of decisions they make in this organization, The speed at which they analyse decisions had increased and use of analytical aids in decision making and that BI provides relevant information for individual & collaborative decision making.

The study concludes that through the application and utilization of the BI systems; market share has improved, there have been effectiveness of the bank's product diversification strategies in achieving competitiveness, the level of product innovation as compared to other banks has gone up, there is increase in sales in the banks, the level of customer satisfaction in the banks as compared to other banks has improved, the effectiveness of the bank's market penetration strategies in achieving competitiveness is good, the growth in size of the bank as compared to other banks has improved, the level of customer loyalty and retention in the bank as compared to other banks, the effectiveness of the bank's market development strategies in achieving competitiveness, the bank's profit growth as compared to other banks and the effectiveness of the bank's product development strategies in achieving competitiveness were high for the commercial banks sampled.

There are various challenges that face BI systems usage and utilization for optimal commercial bank's competitiveness. This study concluded that lack of business strategy, objectives and measures of BI progress hinders successful BI implementation and that establishing and maintaining an appropriate level of data quality to feed into the BI system is very challenging. The study concluded that;

integrating the BI tool with other operational, performance management and transactional systems is very challenging, Maintaining and managing BI solutions is very challenging, Transforming the workplace to a culture of fact-based decision-making using BI tools is a challenge, Securing executive sponsorship and financial backing prevents BI adoption, Overloading of IT specialists in supporting BI usage has strained the adoption process and utilization of BI tools, It is difficult to find a cost-effective BI solution, BI tools are very complex to the end users, BI system end users do not know what they want from a BI system, The quality of the presentation, visualization of the information and response time is poor or limited, BI systems are inflexible and incompatible, the company does not have sufficient expertise or is not able to hire such expertise and that the IT experts building the system do not understand the business thus the BI system does not meet the needs of the Business.

The equation; $Y = 0.416X_1 + 0.413X_2 + 0.042X_3$ was obtained indicating that the type of BI used matters the most and that it is the most influential component towards competitiveness in Kenya's banking sector. All the components influencing competitiveness in Kenya's banking sector were found to be significant, the type of BI system leading at 0.010, BI implementation level at 0.021 and training and personnel capacity at 0.032 respectively.

5.3 Recommendations

The recommends the management to continue with the motive of usage of the BI system at the same time establishing any new and connected technologies for this has been found to enhance the banks performance and customer satisfaction to a large extent.

The personnel capacity on the usage of Drill-through Analysis, Data mining & Predictive Analytics was very low according to the results. This study therefore recommends the management of the respective banks to strategize and embark on capacity building so as to enable the staff be able to use some of the BI technologies they are not aware of. This can be achieved by hiring experts from outside of course at a reasonable price to train employees on how and the usage of Drill-through Analysis, Data mining & Predictive Analytics.

The study recommends that the management seek strategies towards mitigating the so many challenges related to use of the BI system in their banks. In this case, the management needs to establish the risks at once and thereafter establish the right counteractions towards each of them. This way, the competitiveness in the banking sector, in each of the banks too will be realized. Risk management enables bank to monitor and control the sizes and concentrations of risks resulting from its activities such as lending money to their customers (Bogdan & Emina, 2011).

5.4 Limitations of the study

The researcher experienced various limitations in the course of the study; financial constraints, one of the major problems that the researcher encountered is inadequate financial support which consequently slowed down the process of data collection and production of the final report of the study in time. Time constraints was a limitation as the research involved distributing questionnaires to different organizations most of whom were busy to spare enough time to respond. The duration within which the research was undertaken was also short leading to so much strain in time management and that's why the research focus on major manufacturing companies in Nairobi area

only. Lack cooperation; the researcher experienced a lot of unwillingness to cooperate among most of the respondent organization, some never even responded and others even delayed in responding to the questionnaires. It was difficult to have face to face communication as most of the respondents preferred use of emails and this was the main challenge during the whole research period. The likert scale that was used might have produced some bias as it is possible that the respondents provided non-committal answers by responding to neutral range of scale. Some respondents were biased while giving information due to reasons such as privacy and busy Schedules at their work place.

5.5 Recommendation for Further Studies

This study recommends that further studies be conducted on influence of BI on competitiveness in Kenya's banking sector while involving a large sample size than the one used in this study to find out if the results will be the same.

The study recommends that further study be done in other sectors to find out the extent to which they use the BI systems and whether it enhances competitiveness of the same organizations while establishing the impacts.

The researcher recommends that a more comprehensive study be done while establishing more and more effects of BI usage and utilization where the results used could as well be used to validate the model output of this study.

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Appendix I: Questionnaire

BUSINESS INTELLIGENCE AND COMPETITIVENESS OF COMMERCIAL BANKS IN KENYA

This questionnaire is designed to collect information on the strategic value of business intelligence systems in Kenya. The information obtained will be used for academic purposes only. Confidentiality of the information and the respondents will be highly observed.

Instructions:

1. Kindly respond to the following questions by placing a tick in front of the most appropriate response.
2. Where explanations are required, use the space below the items.
3. Kindly answer all questions.

SECTION A: BANK INFORMATION

1. What's your role in the bank and under which department are you in

General Manager/CIO

Head of IT

Head of BI

Head of Business Development

Business Intelligence administrator

2. Which category is your Bank?

Top Tier

Middle Tier

Small Tier

3. How long has your bank been in operation?

< 2 yrs.

2– 5 yrs.

6– 10 yrs.

>10 yrs

4. How long has the bank been using BI tools?

< 2 yrs.

2– 5 yrs.

6– 10 yrs.

>10 yrs

5. What is the average number of debit and credit accounts?

< 100,000

100,000 – 500,000

500,000 – 1,000,000

> 1,000,000

6. How many products/services does the bank offer?

< 15

15 – 30

30 – 50

>50

7. What BI system do you use?

Vendor		Vendor	
BOARD		Microsoft	
Comma Soft *		MicroStrategy	
Corporate Planning		Oracle	
Cyberscience		Phocas	
Dimensional Insight		Pyramid Analytics	
IBM		SAP	
Information Builders		TARGIT	

Others _____

SECTION B: PERSONNEL CAPACITY TO UTILIZE BI TOOLS

1. Please indicate the extent to which you agree with the following statements.

Key: 1 – Strongly disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly agree

	1	2	3	4	5
I have gone through sufficient BI training.					
My knowledge and experience in BI is above average					
I am very satisfied with the performance of packages used for retrieving data for analysis					
I am very satisfied with the overall satisfaction level of the BI solution?					
I frequently use BI as an input for decision making					
I frequently make presentations that uses data from BI analysis					
Management always employs BI as the basis for their decisions					
I frequently use Crosstab Analysis					
I frequently use Drill-through Analysis					
I frequently use Dashboard					
I frequently use Scorecards					
I frequently use Data mining & Predictive Analytics					
I frequently use OLAP					
I frequently use SQL					
I frequently use Plain Reports					

**SECTION C: WAYS IN WHICH THE BANK IMPROVES
COMPETITIVENESS THROUGH BI SYSTEM**

2. Please indicate the extent to which you agree with the following statements.

Key: 1 – Strongly disagree, 2 – Disagree, 3 – Neutral, 4 – Agree,

5 – Strongly agree

	1	2	3	4	5
BI tools are very appropriate for Strategic planning					
BI tools are very appropriate for Product analysis					
BI tools are very appropriate for Market trends analysis					
BI tools are very appropriate for New branch analysis					
BI tools are very appropriate for Performance Management					
BI tools are very appropriate for Customer Segmentation					
BI tools are very appropriate for Market Segmentation					
BI tools are very appropriate for Forecasting					
BI tools are very appropriate for Operations Planning					
BI tools are very appropriate for Pricing and profitability					
BI tools are very appropriate for determining interest rates					
BI tools are very appropriate for Financial analytics					
BI tools are very appropriate for Sales analytics					
BI tools are very appropriate for Operational analytics					
BI tools are very appropriate for Customer relationship management					
BI tools are very appropriate for Customer service/service					

BI tools are very appropriate for Customer Credit Risk Profile					
BI tools are very appropriate for Credit Risk Assessment					
BI tools are very appropriate for Portfolio evaluation					
BI tools are very appropriate for Quality analytics					
BI tools are very appropriate for Innovation					
BI tools are very appropriate for Security/Fraud detection					
BI provides relevant information to me for decision making					
Greater use of analytical aids in my decision making					
Better able to set my priorities in decision making					
Better possibilities for collaborative decision making					
Improved the quality of decisions I make in this organization					
The speed at which I analyse decisions had increased					
Discover more possible solutions					
I personally benefited from the existence of BI in this bank					
BI is extremely useful & important to the bank					
BI usage has increased my KPI's					
BI usage has increased my productivity					
BI use reduces operational costs					

SECTION D: CHALLENGES OF BUSINESS INTELLIGENCE SYSTEM

3. Please indicate the extent to which you agree with the following statements regarding BI challenges.

Key: 1 – Strongly disagree, 2 – Disagree, 3 – Neutral, 4 – Agree,

5 – Strongly agree

	1	2	3	4	5
Integrating the BI tool with other operational, performance management and transactional systems is very challenging					
Establishing and maintaining an appropriate level of data quality to feed into the BI system is very challenging					
The quality of the presentation, visualization of the information and response time is poor or limited					
Maintaining and managing BI solutions is very challenging					
BI systems are inflexible and incompatible					
BI tools are very complex to the end users					
Transforming the workplace from a culture of instincts to one of data-based decision-making is a challenge					
Securing executive sponsorship and financial backing prevents BI adoption					

Lack of business strategy, objectives and measures of BI progress hinders successful BI implementation					
It is difficult to find a cost-effective BI solution					
Overloading of IT specialists in supporting BI usage has strained the adoption process and utilization of BI tools					
BI system end users do not know what they want from a BI system					
IT experts building the system do not understand the business thus the BI system does not meet the needs of the Business					
The company does not have sufficient expertise or is not able to hire such expertise					
Other Challenges:					