THE RELATIONSHIP BETWEEN BUSINESS INTELLIGENCE SYSTEMS AND CUSTOMER SATISFACTION IN HIGHER EDUCATION INSTITUTIONS IN KENYA

BY

COLLINS MAINA KIBIWOTT

UNITED STATES INTERNATIONAL UNIVERSITY – AFRICA

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COLLINS MAINA KIBIWOTT

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STUDENT DECLARATION

I the undersigned, declare that this is my original work and has not been submitted to any institution other than United States International University-Africa for Academic credit.

Signed…..……………………………………..Date……………………………………

STUDENT ID: 646274

The project report has been presented for examination with my approval as the appointed Supervisor.

Signed: ___________________________ Date: __________________________

Dr. Joseph Ngugi Kamau

Signed: ___________________________ Date: __________________________

Dean, Chandaria School of Business
ABSTRACT

Superior customer satisfaction is key in running a successful higher education business today in the world. This requires that managers are aware of their surrounding environment and its effects on their company’s operations. The purpose of this study was to establish the role of business intelligence in achieving customer satisfaction in higher education institutions in Kenya. The primary focus of this research was to investigate the extent of business intelligence system use to shape a collective judgement in respect to customer satisfaction. In this context, the research was establishing the intensity business intelligence system use, identify the extent of business intelligence system use and Establish Embeddedness of Business intelligence systems in delivering customer care services and ensuring customer satisfaction in higher education institutions in Kenya.

This study used descriptive research design. The target populations of this study was 8200 that included students, members of staff and faculty of United States International University. This study adopted random sampling method. This involved the selection of 269 women using simple random sampling. The sample size of this study was therefore 269 respondents. This study used primary data that was collected using semi-structured questionnaires. Content analysis was used to analyze qualitative data and the findings were then presented in a prose form. On the other hand, inferential and descriptive statistics were used to analyze the quantitative data using Statistical Package for Social Sciences (SPSS version 24). Descriptive statistics included mean, standard deviation, frequency and percentages. In relation to inferential statistics, the study used correlation analysis to establish the relationship between the independent and the dependent variables. The results were then presented in tables.

The intensity of use of business intelligence systems was critically reviewed, as well as the extent of use of business intelligence systems in achieving customer satisfaction in higher education institutions in Kenya. Further, the embeddedness of use of business intelligence systems was also critically reviewed. As such, the research contributed with an in-depth account of how business intelligence system used in the process of achieving customer satisfaction in higher education institutions in Kenya. In particular, the core contributions lie in extending the business intelligence systems literature by identifying administrative and symbolic uses of business intelligence in addition to the informational uses.
The study established that majority the universities in Kenya use BIS as part of their routine jobs, in creating and harnessing opportunities, to improve customer service and to predict the future. The study also found out that higher education institutions in Kenya have greatly increased the use of BIS, to serve its internal and external customers, to increase quality of customer service and to predict opportunities that come in the future along with dynamic consumer behaviors.

The study also found out that majority of higher education institutions in Kenya, greatly use BIS in identifying and solving problems, in decision making processes and rationalizing judgements of management. The study also revealed that higher education institutions use BIS in shaping their decision processes and to increase efficiency and effectiveness in the organization. Moreover, majority of higher education institutions in higher learning use BIS to coordinate activities between workgroups and in managing divisional objectives. The study also revealed that these institutions use BIS in organizational both internal and external communication.

The study also found out that majority of the organizations use BIS in business process execution, decision making routines of the organization, and in business strategy formulation process that led to the alignment of BIS to the overall corporate strategy. Also, the research found out that the process of information for analytical decision making is carried without interruption due the use of BIS greatly. The study recommended that management should provide full support of the business intelligence system by ensuring that all the required resources are availed for the sustainability of the business intelligence system. New employees should be inducted into the business intelligence system in order to understand how to use the system and its benefits. All employees should also be trained on BI and be incorporated into the team that is in direct touch with the business intelligence systems. The researcher recommended further research on cost benefit analysis of Business Intelligence (BI) systems since the study focused on the strategy value of BI approach only.
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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

The concept of business intelligence became more and more used during the last years, and now, this association of terms is used across different fields from data technology to business modeling. Business intelligence represents a wide area of applications and technologies for collecting, storing, analyzing and providing access to information for improving businesses process modeling quality (Davenport, 2010). The business intelligence statement, “getting the right information to the right people at the right time” focuses on the fact that business intelligence uses information and not data due to the included capabilities for processing raw data into intelligent information, that is valid and accepted by the entire company and which can be consistently used in process modeling. The business intelligence term was introduced by Gartner Group in middle of the 90s. The concept, on the other hand, existed long before being used in mainframe reporting systems (Davenport, 2010).

One of the main characteristics of modern organizations is the data revolution that has been steadily taking place over the last two decades. Many practitioners and scholars even see organizational and management decision making to be in the middle of a gradual transformation from an instinct-driven “art” to a progressively data-driven approach (May, 2009; Davenport, 2010; Brynjolfson, et al. 2011). Many factors have contributed to this modern phenomenon. One of the main contributors is Information Technology (IT) and the emergence of organizational information systems such as enterprise resource planning (ERP), customer relationship management (CRM), transaction and accounting systems, and other similar technologies. IT is nearing ubiquity in modern workplaces. As a result, organizations today have access to almost unlimited amounts of data – sales, demographics, economic trends, competitive data, consumer behavior, efficiency measures, financial calculations, and more. Business Intelligence (BI) has played a critical role in this transformation, through the development of methods, systems and tools that have enabled the collection, storage and analysis of this vast quantity of data recognized as BI systems and applications (Kalakota & Robinson, 1999; Liautaud & Hammond, 2002; Rasmussen et al. 2002).
Companies in today’s world compete on analytics. The conscious management of information has gained more managerial focus than ever, because the bottleneck of organizational success is no longer financial capital or raw materials or other physical resources, but knowledge assets (Pirttimäki, 2007). Furthermore, the sheer speed whereby a global economy operates today necessitates a fast and easy access of the management to operative information, which can be used to evaluate performance metrics, understand customer behavior and forecast market trends (Hedgebeth, 2007).

Davenport (2006) uses the term intelligent companies to describe organizations that not only know what products their customers want, but they are able to determine the prices they are willing to pay, how many items each customer segment will buy in a lifetime and what triggers them to buy even more. Many organizational functions that have traditionally depended on creativity and human insight can today be improved with sophisticated quantitative techniques, which Business Intelligence (BI) among other tools of information technology can provide. Pirttimäki (2007) defined BI fittingly as “a support tool of extensive, relevant, and proactive management and decision-making in companies in which shaping the future is considered more important than reacting to it.” By implementing BI, the organization can learn from the data already gathered into their operational systems, turn that information into strategic knowledge and stay ahead of the competition within their industry sector (Ramakrishnan, et al. 2012). Consequently, by taking advantage of superior intellectual resources – both human and IT – one can exploit and develop its traditional resources better than its rivals do (Sharma & Dijaw, 2011). As companies today are forced to utilize information more effectively than before, advanced BI and analytics tools have become a prerequisite for competitive advantage.

With the rapid advancement and development of Information and Communication Technologies (ICT), organizations are now able to generate, collect and distribute huge amount data from internal and external sources. This is also happening in Higher Educational Institutions (HEIs). As a result, many universities have evolved in abundance of information, and some even suggest that educators are “drowning” in massive data (Celio & Harvey, 2005; Ingram et al., 2004). Meanwhile, according to JISC (2011), today's further and higher education institutions (HEIs) are facing a multitude of pressures: they are coping with rapid and radical developments in ICT which have the potential to fundamentally alter the way in which teaching, learning and research are conducted. Also, JISC (2011) points out that most of the current student information systems in universities
mainly collect, process and store data in databases, thus they serve as merely an information source rather than a decision support environment. Therefore, it is imperative for HEIs to explore the value of their data warehouse and make better use of data available.

Organizations' requirements to improve quality of decision-making and quality of partner service should turn to the development of information technology infrastructure that will represent a holistic approach to business operations, customers, suppliers, etc. (Wells and Hess, 2004). Theory and practice from many studies show that the above-mentioned requirements are largely met by BI systems (Liautaud & Hammond, 2002; Olszak & Ziemba, 2004): BI has the strong ability to eliminate redundant data extraction processes and duplicate data housed in independent data marts across the enterprise; and application areas of BI can be seen from sales and marking analysis, planning and forecasting, financial consolidation, statutory reporting, budgeting, and profitability analysis (Thompson, 2004; Watson & Wixsom, 2007). All of above applications play critical roles in business operations. Therefore, BI has become a strategic initiative, and many business leaders now regard BI as instrumental in driving business effectiveness and innovation (Watson & Wixsom, 2007). Moreover, BI has been used in many other sectors, for instance, in manufacturing companies for order shipment and customer support, in retailing sector for user profiling to target grocery coupons during checkout, in financial services for claims analysis and fraud detection, in transportation for fleet management, in telecommunications for identifying reasons for customer churn, in utilities for power usage analysis, and health care for outcomes analysis.

In Africa, the standardization of the ICT infrastructure that supports decision making processes in the higher education institutions is therefore dependent on the statutory obligations which the institutions have to comply (Russom, 2012). In South Africa there are 23 public Universities and each of these universities has to submit, Higher Education Management Information System (HEMIS) statistics data to the Department of Higher Education and Training (DHET) three times a year. The public Higher Education Institutions (HEIs) rely financially on the subsidies and block grants given to them by the Department of Higher Education and Training (DHET). The HEMIS data is used by the DHET to allocate subsidies and block grants to the institutions. Management Information Systems (MIS) form the basis of providing information for decision-making, policy formulation and provide information to support the execution of strategies within the higher
education sector. However, taking MIS as it is implies maneuvering into a wide variety of information systems that fall into these systems (Russom, 2012)

This is a fundamental postulation to be made in this research study, because if the role of business intelligence is to be understood in its various incarnations, students, researchers and practitioners of MIS must have a broad understanding of business intelligence and its inherent predictive analytics characteristics. The Technology Acceptance Model (TAM) as theorized and published form the basis for measuring business intelligence technology adoption and acceptance at university of Venda and any other university with BI technology in South Africa (Davis, 1989)

In Kenya, a study carried by Cherono (2014) on the Standard Group Ltd found out that they face the normal external challenges affecting all other media houses like poaching of staff, regulatory framework, competition, changing customer needs and preferences and technological advancements. Sustainable competitive advantage is no doubt not easy for any company in any industry to achieve. For a company to remain competitive in the long run, it must have strategies in place that cannot be easily imitated by other players. It must ensure that its competitiveness stems from uniqueness. Therefore, there must be a fit between the day to day operations of the company and its drivers of competitive advantage. Business intelligence system use must be mobilized to enhance competitiveness. From the resources of the company, there was a high chance of developing through business intelligence infrastructure strategies that would be difficult to be imitated by their immediate competitors.

1.2 Problem Statement

Customer satisfaction is the backbone of profitable customer relationships. If an organization can accurately monitor and measure customer service factors and customer satisfaction, it is easier to make appropriate corrections and ensure customer retention, good client references and new customer acquisition. To identify the problems affecting customer satisfaction, one must understand delays in delivery, response time for information requests, the number and nature of complaints and claims and numerous other factors. To effectively manage customer relationships, the organization must also set priorities to serve key customers and to understand buying behavior and customer satisfaction for various market segments, client profiles, products and services.
Customers and general public seeking services from higher education institutions in Kenya do not exactly get the best in terms of customer service. Many a time, there is dissatisfaction among local students, parents and faculty due to poor people skills, incompetence, corruption, crudeness and low morale among service staff. There is urgent need to have this situation remedied especially with the move towards attaining the Kenyan vision 2030 which would mean more enrolment of students in universities as well as proliferation of higher education institution in Kenya. Great customer satisfaction happens when you exceed expectations and expectations are higher than ever (American Council on Education, 2016).

To deliver great customer service, higher education institutions must understand the needs of their customers, and adapt to improve the way those needs are met (Pearce & Robinson, 2003). While Business Intelligence (BI) use continues to be closely aligned with sales analysis and reporting, more and more companies are evolving in their use of it to not only understand, predict and influence the behavior of their customers, but to plan, evaluate and monitor their supply chains with the ultimate goal of driving performance improvements on customer satisfaction. This research brought some insight of how the extent of use, intensity of use, and the embeddedness of use of business intelligence systems impacts on indirectly quantifiable customer satisfaction measures like volume sales, customer loyalty, and winning new customers. This also described how embeddedness of business intelligence use can effect a higher quality of work, the better motivation of employees, improvement of communication in the organization and higher quality knowledge sharing between employees. To ensure the better performance of the organization and the value added of BIS users should accept, use and take full advantage of their capabilities. Understanding the effective use (Burton-Jones & Grange, 2013) of BIS is thus “critically important” (Straub & Guidice, 2012) for achieving their designed goals and benefits. According to Burton-Jones and Grange (2013, p. 636), effective use at the individual level is defined as “using a system in a way that helps attain the goals for using a system”

1.3 General Objective

The general objective of this study was to establish the role of business intelligence systems in achieving customer satisfaction in higher education institutions in Kenya.
1.4 Specific Objectives

1.4.1 To establish how intensity of use affect customer satisfaction in higher education institutions in Kenya

1.4.2 To establish the extent of use and its effect in customer satisfaction in higher education institutions in Kenya

1.4.3 To establish embeddedness of Business intelligence systems and its influence on customer satisfaction in higher education institutions in Kenya

1.5 Significance of the Study

1.5.1 Management of Higher Education’s Institutions in Kenya

This study will help the management of higher education institutions of Kenya in identifying areas which they need to improve on in order to improve quality of service to its customers. It will help them to be aware of where, when and how to increase their resources so as to make their services better. The study will also assist the customer care department to be aware of weakness areas and how to improve on these areas so as to improve the quality of service offered to faculty, staff and students.

1.5.2 Higher Education Institutions’ Staff

This study can provide practical understanding of role of business intelligence in achieving superior customer service in higher education institutions. This study will also provide practical information and knowledge for management decision making in service delivery to customers as well as indicate service bench marks.

1.5.3 Students Fraternity

As key stakeholders in the higher education sector, customers will benefit from improved and better service delivery due to the recommendations of this study. The advantages will include delightful customer experiences characterized by prompt, effective and delightful service delivery.

1.5.4 Commission of University Education

The study finding will assist policy makers in designing policies aimed at enhancing customer service delivery, this study will enlighten them on various factors affecting customer service delivery in higher education institutions in Kenya.
1.5.5 Researchers and Academicians

The study will be of great to academicians and future scholars at will provide literature to future research as well as provide basis for future research role of business intelligence in achieving customer satisfaction. The study is also important as it gives researchers exposure to a wider scope of knowledge that they can use in case they need to carry future research on similar topics.

1.6 Scope of the Study

The study sought to investigate the role of business intelligence systems use in achieving customer satisfaction in higher education institutions in Kenya. It targeted faculty, staff and students of United States International University, Africa. The sample population of the study was limited to customers of USIU-A, thus the ability to generalize the entire population of higher education institutions in Kenya was severely limited. The sample is however, to a large extent, similar in nature to the population in various other universities in Kenya, and thus generalized to represent a sufficient scope of the study. Although business intelligence has many dimensions, the study only focused on the extent of use, intensity of use and the embeddedness of business intelligence systems. The study was conducted between February 2018 and April 2018.
1.7 Definition of Terms

1.7.1 Business Intelligence Systems
Turban, et al. (2002) defines BI as a computer-based decision analysis usually done online by managers and staff. It includes forecasting, analyzing alternatives and evaluating risk and performance.

1.7.2 Intelligence
Intelligence is information that is analyzed, interpreted, and infused with developed implications (Fleisher & Bensoussan, 2007).

1.7.3 Customer Service
Customer service is a series of activities designed to enhance the level of customer satisfaction creating a feeling that a product or service has met the customers’ expectations (Turban, 2002)

1.7.4 Customer Loyalty
Customer loyalty is the development of a positive state of mind by the customer towards the organization (Asante & Kwasi, 2012).

1.7.5 Customer Satisfaction
It is a concept that refers to how customers perceive the performance of a product or service in relation to their needs and expectations; delivering superior value over competitors to the target customers (Schiffman & Kanuk, 2007)

1.8 Chapter Summary
This chapter gave an insight of the phenomena under study, as well as a background of the problem statement. It as vividly described the general objective of the study that is to find out the role of business intelligence systems in achieving customer satisfaction in higher education systems in Kenya. The chapter went on to give the current use business intelligence systems use in achieving customer satisfaction and illustrated the existing gaps between the two variables. The chapter has also outlined the significance of the study as well as its scope and limitations. The next chapter conducted a critical literature review of the area of study. The literature review was guided by the research questions in this chapter. Chapter three discussed the research methods and procedures that were used to select the sample size, collect data and analyze the collected data. Specifically, the study comprised of sections such as research design, target population, data collection methods, research
procedures, pilot testing of the research instruments and data analysis methods. Chapter four presented data analysis, interpretation and presentation of the findings. Lastly chapter five presented summary of the findings, discussion of the findings, conclusions and recommendations for practice and areas for further research.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction
This chapter assesses literature relating to the research questions. Hence, the literature reviewed relate to; the role of business intelligence systems in achieving customer satisfaction in higher education institutions in Kenya. Today's business operates in a rival and competitive environment.

2.2 Intensity of Use of Business Intelligence Systems and Customer Satisfaction

2.2.1 Business Intelligence Systems and Applications
BI systems are increasingly adopted across a wide range of industry sectors and in all sizes of firms to support managerial decision making with the goal of improving organizational performance. According to Gartner (2015), the worldwide investment in BI systems was $14.4 billion in 2013, a growth of 8% compared 2012 with further interest and adoption of these solutions predicted. In fact, the implementation of BI system was among the top five IT investment initiatives in business organizations for a number of years (IDC, 2012). BI systems aim to provide information that is timely, relevant and easy to use to managers at various organizational levels. The information provided by BI systems is both strategic and operational and are deployed to help improve decision making and attain enhanced operational competitive advantage (Werner & Abramson 2003). With the challenges of technical implementation overcome by business organizations, the focus is now shifting towards its business value. Successful adoption and effective use of any IT innovation is expected to impact organizational performance. IT innovations in general offer the potential to change organizational processes, routines and management controls (Mishra & Agarwal, 2010) and BI systems are no different. Some firms investing in BI systems and implementing best practices have seen increased revenues and significant cost savings (Watson et al., 2006) and reduction in stock return volatility (Rubin & Rubin, 2013), while others have not seen the promised benefits (Gessner & Volonino, 2005). BI systems are considered risky as they require collaboration among IT and business managers, and among operational personnel (Wagner & Weitzel, 2001)

Computer-based business intelligence systems go back a long way, in one case or another, for close to forty years (Thomsen, 2003). According to Thomsen (2003) BI as a term
replaced decision support, executive information systems, and management information systems. With each new iteration, capabilities increased as enterprises grew ever-more sophisticated in their computational and analytical needs and as computer hardware and software matured. According to Hannula and Pirttimaki (2003), in the 1980’s the term was identified with its emphasis on the need for continuous monitoring of customers, competitors, suppliers, and other fields. Business Intelligence systems therefore comprises a variety of intelligence information such as customer intelligence, competitor intelligence, market intelligence, technological intelligence, product intelligence and environmental intelligence.

In the 1990s, much investment in Information Technology (IT) was focused on enterprise applications such as Enterprise Resource Planning (ERP), Supply Chain Management (SCM), and Consumer Relationship Management (CRM) and on connectivity between trading partners via the Internet and more traditional means such as Electronic Data Interchange (EDI). The business benefits of these investments included transactional efficiency, internal process integration, back-office process automation, transactional status visibility, and reduced information sharing costs (Williams & Williams, 2003). By the late nineties and early 2000, Data Warehousing (DW) was accepted in the business arena. Although early justifications for data warehousing were primarily driven by the needs to provide integrated reporting functionality, the value of data warehousing became clear for carrying out large analysis tasks to assist data-driven decision making both for tactical and strategic management decisions. As the role of analysis expanded rapidly within an enterprise, teams of business analysts within an enterprise were involved in extracting interesting patterns from enterprise wide data. This notion of extracting and unlocking useful information from raw data is termed as business intelligence.

2.2.2 Critical Success Factors in BI Systems

Past studies in the BI systems field have predominantly focused on the critical success factors for BI implementation (Yeoh & Koronios, 2010), impact on supply chain performance (Trkman et al., 2010), data collection strategies for BI implementation (Ramakrishnan et al., 2012), role of culture and leadership in BI implementation, role of organizational capabilities in assimilating the BI systems (Elbashir et al., 2011), and the effect of culture and maturity on BI systems success (Popovic et al., 2012) among others. Though several research publications describe the benefits from BI research, cost of these
studies were exploratory in their approach and do not adequately explain the important issues of information systems as they relate to BI systems (Jourdan et al., 2007). While the extent of use of BI systems drives the value generated by the organization in terms of its improved performance and decision making (Elbashir et al., 2013), studies analyzing the use of BI systems are limited. Various components of enterprise performance systems such as BI systems were often studied in isolation with strategic execution discussed at strategic level decision support at the IT department level, and process efficiency at the operational level. Several organizational factors are expected to moderate the impact of IT innovations on business performance.

Although use of an IT system by itself does not guarantee business performance, it is considered an important factor along with other factors such as IT infrastructure capability information, management practices and others (Mithas et al., 2007, Barua & Mukhopadhyay, 2000). Implementing, managing and working with BI system requires a sophisticated and specialized IT infrastructure including recent technologies such as data warehouses, data mining and multi-dimension and visualization tools (Gibson et al., 2004, Mansmann & Scholl 2007). IT infrastructure capabilities enable other organizational capabilities and impact firm performance (Fink & Neumann 2007). Given its relationships with and dependence on IT components, the role of IT infrastructure capability is considered important in the context of BI systems.

2.2.3 BI systems and Process Optimization

Business intelligence (BI) empowers organizations with business insights that lead to better, faster, more relevant decisions. This ensures the right information is gotten at the right time, and in the right format. According to Ubiparipović and Durković (2011) BI systems enable banks to anticipate future behavior of the customers and most of their business indicators. They also enable modelling client behavior not only in terms of using new services but also from the perspective of potential risks.

Some of the notable areas where BI is applied in banks are analytical customer relationship management, bank performance management, enterprise risk management, asset and liability management and compliance. Commercial banks in developing countries offer financial services through relying on information gathered to provide superior value for the banks customers and improve their satisfaction. According to (Porter, 1998) Technology
intelligence exerts a significant influence on the ability to innovate and is viewed both as a major source of competitive advantage and of new product innovation. This strategy enables the banks to provide considerable insulation from competition. It also forms a basis of measuring the strategic value. Organizations put in place a set of activities, methods, best practices, policies, and automated tools that stakeholders use to develop and continuously improve information systems and software. Business Intelligence (BI) maturity model describes the stages that most organizations follow when evolving their BI infrastructure from a low value, cost-center operation, to a high value, strategic function that drives market share. Examples of maturity models are Gartner’s Maturity Model for Business Intelligence (BI) and Performance Management which recognizes five levels of maturity: unaware, tactical, focused, strategic, and pervasive. It is used for the assessment of the input effort, BI and PM maturity. The other maturity model is AMR Research's Business Intelligence/Performance Management Maturity Model, the key characteristics of this model are reacting, anticipating, collaborating and orchestrating (Rajteric, 2010). Some models focus on the technical aspect and others on the business point of view. Business Intelligence (BI) models help in identifying the existing problems of BI implementation and provide symmetric guidelines (Chuah et al., 2013). Most Information Technology (IT) driven BI and data warehousing initiatives tend to focus on the technical aspects, therefore the technical challenges and trade-offs are at least well understood, attention now shifts towards the ways in which BI can be used to deliver business value McIntyre (2009).

2.2.4 BI Techniques and Models

A business intelligence (BI) system does not exist as a final product, its producers offer technological platforms and knowledge for their implementation (Ubiparipović & Durković, 2011). BI environment therefore often consists of many different components, such as data integration, operational data stores, data warehouses, data marts, cubes, reports, dashboards, alerts. This makes BI heavily dependent on and has to be tightly integrated with other key platforms and applications such as data quality, master data management (MDM), portals, security, mobile delivery and others. According to Dayal, Castellanos, Simitis, and Wilkinson (2009), BI architecture typically consists of a data warehouse (or one or more data marts), which consolidates data from several operational databases, and serves a variety of front-end querying, reporting, and analytic tools. A data
warehouse (DW) is a special type of database where data is organized in a manner convenient for conducting analytical processes on large data sets. It contains a copy of data isolated from operational databases and structured specifically for reports and analyses. DW and On-line analytical processing (OLAP) form the information basis for applying BI (Ubiparipović & Durković, 2011).

On-line analytical processing (OLAP) refers to the way in which business users can slice and dice their way through data using sophisticated tools that allow for the navigation of dimensions such as time or hierarchies. These systems process queries required to discover trends and analyze critical factors. Advanced analytics is referred to as data mining, forecasting or predictive analytics, this takes advantage of statistical analysis techniques to predict or provide certainty measures on facts (Ranjan, 2009).

Whilst Business Intelligence (BI) remains one of the top technology issues for Chief Information Officers (CIOs), little research has been done regarding the actual business value realized as a result of BI investment (Negash & Gray, 2003). Apart from operational and efficiency benefits, IT can offer payback on a strategic level, making the prospect of clearly identifying the benefits an even more difficult challenge (Gibson et al., 2004). The strategic value of BI solutions is depicted by the ability to manage and exploit the information potential of multitude of internal and external data from sales, demographics, economic trends, competitive data, consumer behavior, efficiency measures, financial calculations, and more (Ubiparipović & Durković, 2011).

2.3 Extent of Use of Business Intelligence Systems on Customer Satisfaction

2.3.1 Business intelligence Application in Originations

In recent years, the ability to obtain useful information in real time has become an extremely important, if not even a critical, factor of success for companies. The time managers have available for making business decisions has been drastically reduced. Competitive pressures require businesses to make intelligent decisions based on their incoming business data, and these decisions must be made quickly (Business Intelligence and Data Warehousing, 2005). The usual problem is not a lack of data, but the opposite – a huge amount of data must be converted into useful information in a timely manner in order to provide managers a solid basis for their decisions. The ability to convert nontransparent data into useful information in real time can offer a company a significant competitive advantage. The tool that enables managers to do this is business intelligence. Given the
rapid pace of today's business environment, these systems have become an almost indispensable part of the success of an organization. With the help of business intelligence, managers can quickly and effectively detect important trends, analyses the behavior of customers and facilitate expedient decision-making.

Business Intelligence is a broad concept which includes the appropriate orientation of the entire organization. It deals with the acquisition, management and analysis of large amounts of data about business partners, products, services, customers and suppliers, activities, and transactions between them (Lu & Zhou, 2000). In other words, it is an organized and systematic process by which an organization acquires, analyses and circulates information from internal and external sources which is relevant to its business activities and decision-making (Lönnqvist & Pirttimäki, 2006). It is a comprehensive concept, whereby an entire organization is committed to use the available information systems (including business intelligence) in the most effective way with the aim of obtaining quality and timely information for decision-making, thereby creating competitive advantages. Such a concept must be supported by the senior management of a company and extended throughout the organization.

2.3.2 Business Intelligence Tools

Business Intelligence systems include information tools which help users obtain the required information efficiently and easily. Examples of analytical tools for real-time data processing are On-Line Analytical Processing (‘OLAP’) and data mining tools. It encompasses software that allows users to convert masses of opaque data into useful information, at the same time allowing users to create their own inquiries, reports and viewing modes, which puts business intelligence systems one step ahead of classical transactional (‘OLTP’) information systems.

A business intelligence system is usually not a single application but consists of different components closely related to each other, enabling users to select and analyses data, make aggregations and display the results in a form that is easy to use and understand. Business intelligence technology enables users to quickly understand complex information so that they can make better and faster decisions and thereby efficiently achieve business goals. Key benefits that business intelligence aims to create are the increased efficiency and effectiveness of the organization. Some business intelligence solutions enable a faster flow of and easier access to information within the organization (for example, by facilitating the
means of creating, modifying and distributing standard reports). Some other, more recent solutions are based on a more aggressive approach that in certain cases requires a redefinition of existing processes and their optimization, which can create new, previously unknown possibilities and opportunities (Lokken, 2001).

Business intelligence provide sophisticated visualization tools to analysts who can see patterns in millions of data points. Deliver a dashboard to the Vice President (VP) of marketing with social media sentiment scores about that new product. English (2005) ascertains that the essential element of BI is the understanding of what is happening within an organization and its business environment, as well as appropriate action-taking for achieving organizational goals. From this, derives the importance of the human factor within BI. There is no such thing as business intelligence without the people to interpret the meaning and significance of information and to act on their knowledge gained (English, 2005).

### 2.3.3 Benefits of Business Intelligence Systems

Some benefits are more or less directly visible such as the greater flexibility of users by creating reports, faster access to and a better overview of data, and so on. Other benefits are less obvious and it is hard to determine whether they are actually a result of the use of business intelligence or something else (for example, it may be difficult to figure out what really contributed to the increased income in the last quarter). Of course, the truth may also lie somewhere in between, so a certain improvement could be partly the result of the use of business intelligence and partly the result of other factors.

Here, the question arises of how to measure the benefits of business intelligence, whereby there is already a problem of how to determine the benefits themselves. As we will see later, it is even more difficult to measure or evaluate these benefits in such a way that supports an evaluation of the justification of an investment in a business intelligence system. Similar problems arise with investments in information technology in general. In any case, let us now look at the commonly agreed benefits of business intelligence.

Due to the wide applicability of business intelligence in both the internal and external business environments, organizations can enjoy many benefits. Thompson (2006, p. 1), for example, lists the following benefits business intelligence brings to companies: (1) faster and more accurate reporting; (2) an improved decision-making process; (3) improved
customer satisfaction; (4) increased revenues; (5) savings in IT; and (6) savings in other areas (in addition to information technology).

Business Intelligence (BI) enables the business to make intelligent, fact-based decisions. The most cogent argument for establishing a new roadmap to business Intelligence (BI) excellence is to rid the organization of the technology scramble and cobbled together solutions that Information Technology (IT) has had to deal with as it struggled to meet business requirements. According to Ranjan (2009) a BI organization fully exploits data at every phase of the BI architecture as it progresses through various levels of informational metamorphosis. Data is first collected including metadata, such as the creator or creating system, the time of creation, the channel on which it was delivered, sentiment contained in plain text, and so on. According to Olszak and Ziemba (2006) metadata facilitate the process of extracting, transforming and loading data through presenting sources of data in the layout of data warehouses. Metadata are also used to automate summary data creation and queries management. For data to be used, it is important to ensure it is clean. Venter and Tustin (2009) depicts that the purpose of a data warehouse is to provide rich, timely, clean and well-structured information to BI analysis tools. Once that is done, the organization can take advantage of the vast amounts of information, give it to users in a way they can understand. Deliver predictive scores to the customer service representatives, so they know which offers are most likely to result in a positive outcome.

This is also consistent with the findings from Finnish research (Hannula & Pirttimäki, 2003) where around 75% of interviewees felt content and humane approaches are the key aspects in success application of BI. BI provides employees with information to make better business decisions, and can be used in environments ranging from workgroups of 20 users to enterprise deployments exceeding 20,000 users. In an extranet environment, BI is deployed in applications that allow organizations to deliver new services and build stronger relationships with customers, partners, and suppliers via the internet. Hence, English (2005) defines BI as “the ability of an enterprise to act effectively through the exploitation of its human and information resources.” Technology is the component that adds to quality information with which business users can analyze business operations: what has happened, what is happening, and what will happen in the future.

In enterprise performance management (EPM), organizations must understand and have constant visibility into their key performance indicators and metrics that span across their
organizations. By doing this, organizations ensure their strategy is aligned from top to bottom and across the organization from marketing to sales to manufacturing to human resources. Providing this enterprise insight is a key strength of BI. With business intelligence, users are able to turn this information into knowledge, and knowledge into profit. BI enables the organization to track, understand, and manage your business in order to maximize enterprise performance.

2.3.4 The need for Business Intelligence Systems in Organizations

With BI, organizations are able to improve operational efficiency, build profitable customer relationships, and develop differentiated product offerings. As Jaklič & Popovič (2009) state, various recent international studies show a high level of awareness by professionals about the potential benefits of business intelligence in their business operations. For the fourth consecutive year, business intelligence remains a top IT priority of major international companies, while improved efficiency and operational performance are a key business priority for the fifth year in a row (Jaklič & Popovič 2009). Many companies have positioned business intelligence and business performance management (‘BPM’) as their top strategic priority for years 2009 and 2010.

Strategic value can be measured by various aspects including increased turnover, an improvement of customer satisfaction as a consequence of the faster response times to their requests and expectations, a cost reduction due to time saving and reduced work tasks, an expansion of market share due to the possibility of the transparent monitoring of sales volumes, structures and trends, as well as the easier detection of areas with poor sales, deviations from past trends, an increase in profit due to better support for decision-making and due to time-saving, and faster decision-making which may be critical to the survival of the company in a strong competitive environment. According to Porter (1990) Strategic value is about competitive pricing, cost, product or market differentiation. Thus this research will focus on ways in which Equity Bank uses Business Intelligence (BI) system to facilitate decision making, respond to customer issues, innovate and improve quality of products and services.

Cui et al., (2007) view BI as way and method of improving business performance by providing powerful assists for executive decision maker to enable them to have actionable information at hand. BI tools are seen as technology that enables the efficiency of business
operation by providing an increased value to the enterprise information and hence the way this information is utilized. Tvrdíková (2007) describes the basic characteristic of BI tool as the ability to collect data from heterogeneous source, to possess advance analytical methods, and the ability to support multi users’ demands. Zeng et al., (2006) categorized BI technology based on the method of information delivery; reporting, statistical analysis, ad-hoc analysis and predicative analysis. The concept of Business Intelligence (BI) was brought up by Gartner Group since 1996. It is defined as the application of a set of methodologies and technologies, such as J2EE, DOTNET, Web Services, XML, data warehouse, OLAP, Data Mining, representation technologies, etc, to improve enterprise operation effectiveness, support management/decision to achieve competitive advantages. Business Intelligence by today is never a new technology instead of an integrated solution for companies, within which the business requirement is definitely the key factor that drives technology innovation. How to identify and creatively address key business issues is therefore always the major challenge of a BI application to achieve real business impact. (Golfarelli et al., 2004) defined BI that includes effective data warehouse and also a reactive component capable of monitoring the time-critical operational processes to allow tactical and operational decision-makers to tune their actions according to the company strategy.

2.4 Embeddedness of Business Intelligence in Customer Satisfaction

2.4.1 Integration of BI with Organizational Processes

Business Intelligence (BI) is defined by Nemati (2005) as a suite of tools and technologies that enhance the decision making process by transforming data into valuable and actionable knowledge to gain a competitive advantage. According to (Hannula & Pirttimaki, 2003), Business Intelligence (BI) can broadly be defined as an organized and systematic process which is used to acquire, analyze and disseminate information which is significant to their business activities. Business Intelligence (BI) is also defined as a set of technologies that gather and analyze data to improve decision-making Herschel et al., (2005). Several characteristics of Business Intelligence (BI) emerge from these definitions, that is, it refers to both internal and external information gathering, analysis and dissemination of valuable information for decision making.

Becket and Brookes (2008) observed that quality in universities can be interpreted and measured in a number of different ways and that there is still no universal consensus on
how best to manage quality within universities. According to the Gap-model the perceived service quality is “the degree and direction of the discrepancy between consumers’ perceptions and expectations” (Parasuraman et al., 1988). The introduction of the Service quality model stimulated the search for a general scale and instrument for the measurement of service quality by both scholars and industry practitioners. Robledo (2001) observed that the SERVQUAL model has since been improved on, promulgated and promoted by researchers resulting in new models across the globe. However, Aldridge and Rowley (1998) content that the most widely used and debated tool of measuring service quality remains the SERVQUAL instrument. The concept that underpins all these instruments is that customers’ assessment of service quality is a key determinant of customer satisfaction (Robledo, 2001).

Application of Business Intelligence has several challenges that include: Disconnected and Disjointed Information this problem occurs due to a business using several different Business Intelligence (BI) tools instead of a single integrated Business Intelligence (BI) system. Unfamiliar Interfaces on integrated solutions require using multiple systems, each with a unique user interface which must be learned. Requirement for Specialist Staff many organizations require IT professionals who are specialists in individual systems. Complexity some BI solutions are too complex, which leads to lost productivity. Data Delivery Business Intelligence solutions that provide limited features and limited interfaces create problems when it comes to sharing information according to East (1998).

Business Intelligence (BI) solutions require data from many different, and often disparate, data sources. The unique aspects of each organization require significant time and effort to get them up and running. At the end of the day, there is considerable effort required to stand up and run these solutions. The most common challenge companies are facing in the current competitive business environment is management of its own data (Ponomarjovs, 2013). Once insight has been gained from the Business Intelligence (BI) solution, there is no clear path to action, and often no link to the underlying detailed data. Acting on the findings is limited, and is especially challenging from the Business Intelligence solution itself. Business intelligence practices and performance in firms are greatly involved in new market intelligence, product intelligence, technology intelligence and strategic alliances intelligence. Business intelligence is engaged in developing customer related strategies that are aimed at increasing the size of the market to increase competitive advantage of a given financial institution (Herring, 1998).
To maintain competitive advantages, organizations need to carry out strong research and achieve development skills, product engineering skills, creativity and marketing skills, good cooperation with distribution channels, incentives based on subjective measures to communicate the importance of a financial institution characteristics and stressing on continuous improvement and innovation which attract highly skilled and creative people. In the landscape of modern business, organizations persistently strive to create mechanisms for gathering information and developing competitive financial products to improve their financial service delivery, improve customer satisfaction and create competitive advantage for a financial institution (Seng & Lin, 2004).

Business Intelligence helps firms sustain and develop distinct competitive advantages by using the entire organization and its networks to develop actionable insights about the environment that is the customers, competitor, regulators, technology and many other stakeholders. It uses a systematic and ethical process involving, planning, collection, analysis, communication and management (Calof & Wright, 2008). In this ever more competitive environment, the complex relations arising from a situation where information is a basic resource and obtaining intelligence is a requirement for making decisions in search for knowledge to gain competitive advantage over rivals in the market (Tanev & Bailetti, 2008).

According to Chuah and Wong, (2013) Business Intelligence (BI) applications have appeared the top spending priority for many Chief Information Officers (CIO) and it remain the most important technologies to be purchased for past five years (Gartner Research 2007; 2008; 2009). Although there has been a growing interest in BI area, success for implementing BI is still questionable (Ang & Teo 2000; Lupu et.al., 1997); Computerworld (2003)). Lupu et.al, (1997) reported that about 60% - 70% of business intelligence applications fail due to the technology, organizational, cultural and infrastructure issues. Furthermore, EMC Corporation argued that many BI initiatives have failed because tools were not accessible through to end users and the result of not meeting the end users’ need effectively.

2.4.2 Challenges in Implementation of BI systems

The first challenge facing BI system is the cost. BI has evolved and everybody has some form of BI in place now, as it is becoming a fairly substantial cost item. The overall cost of BI – the cost of technology, upkeep and implementation – is certainly one of the challenges
that implementers are facing. The second challenge is the number of users. The number of business users now tapping into BI is increasing dramatically, especially as we begin to move into operational intelligence. We’re seeing more naïve users – not the traditional analysts or data scientists – so it is not only the number of users but an increase in support for these users from an implementation standpoint.

The third challenge is in the area of operational BI and the new sources of data available. We are seeing a tremendous increase in the volumes of data (big data) being analyzed and stored in data warehouses and experimental areas. This data is used for complex advanced, embedded and streaming analytics. There are now very interesting sets of data in BI, which is certainly different from the traditional, more strategic or tactical forms of BI. This doesn’t diminish the need for traditional BI; it just means we must expand our BI architectures to embrace these new areas.

These big challenges lead to the fourth, which is the performance and scalability of the environment. Obviously, if we are starting to bring in operational people, operational BI, streaming analytics, big data applications, etc., it means that the performance has to be a major focus of the BI implementers sub-second response time for many operational intelligence queries while simultaneously supporting the more strategic or long running queries as well. It’s a mixed workload environment, and that can cause a performance issue. So our technology also has to scale up to handle it. A terabyte used to seem like a lot of data, but not anymore. Computerworld (2003) stated that BI projects collapse because of failure to recognize BI projects as cross organizational business initiatives, unengaged business sponsors, unavailable or unwilling business representatives, lack of skilled and available staff, no business analysis activities, no appreciation of the impact of dirty data on business profitability and no understanding of the necessity for and the use of meta-data.

2.4.3 Data sources and Use of BI

In the banking industry data sources can be from operational databases, historical data, and external data for example, from market research companies or from the Internet, or information from the already existing data warehouse environment. The data sources can be relational databases or any other data structure that supports the line of business applications. Data can also reside on many different platforms and can contain structured information, such as tables or spreadsheets, or unstructured information, such as plaintext files or pictures and other multimedia information. Big data refers to large datasets that are
challenging to store, search, share, visualize, and analyze (Dijicks, 2012) universities are challenged by big data and require them to be proactive in managing and utilizing corporate it if they want to keep up with or stay ahead of the competition.

Business intelligence (BI) gives enterprises the capability to analyze the vast amounts of information they already have to make the best business decisions. Banks are able to tap into their huge databases and deliver easy-to-comprehend insight to improve business performance and maintain regulatory compliance (Nemati, 2005). The applications of business intelligence in the banking are therefore far-reaching.

While the Business Intelligence (BI) solution typically contains the necessary data that are required for identifying opportunities for improvement, significant effort is often required to get to these insights. Often, the level of effort required to find valuable data points exceed the cost of finding it. Moldovan (2011) studied the financial industry and found that mining financial data presents some challenges, difficulties and sources of confusion, especially when determining short term trends and validating them. Business Intelligence (BI) solutions require data from many different, and often disparate, data sources. The unique aspects of each organization require significant time and effort to get them up and running. At the end of the day, there is considerable effort required to stand up and run these solutions. The most common challenge companies are facing in the current competitive business environment is management of its own data (Ponomarjovs, 2013). Once insight has been gained from the Business Intelligence (BI) solution, there is no clear path to action, and often no link to the underlying detailed data. Acting on the findings is limited, and is especially challenging from the BI solution itself. A study carried out by Boro (2013) recommends that the commercial banks should make use of technology intelligence among other intelligences to increase their competitiveness in terms of product innovation, customer satisfaction and market orientation. These intelligences ensure that internal strengths of the financial institution are utilized for the betterment of the firm which leads to profitability.

### 2.4.4 Adoption of BI in Higher Education

Karama (2014) found out that Business Intelligence (BI) systems made contribution to value networks and not merely financial benefits, but also knowledge, among other benefits. The study confirmed that Business Intelligence (BI) systems are important investment that institutions need to consider to remain competitive. It is however important
to ensure that institutions that choose to invest in the Business Intelligence (BI) systems consider the challenges involved. Since HEIs are under a lot of pressure from such a productivity and efficiency perspective, some HEIs have introduced BI technologies as a solution to it. It makes BI becoming the key can open the door to the value of historical and existing data to assist decision-making for persons who work in HEIs.

JISC (2011) conducted a survey of BI solutions in Higher and Further Education aims to explore means by which senior managers can be improved where the current states of BI application in HEIs were investigated. Among 102 validated responses, the table shows 56% of respondents state BI systems or dashboard from BI are a reality now, or is coming next year for their university. Where only 9% of respondents show 'no interest' in BI and some of these is replies from institutions where other employee reported an active or imminently planned system. In addition, many organizations who intended to help institutions to use technology to support their strategic priorities have realized the benefits of BI systems and advised HEIs to consider BI systems like JISC who initiated projects which aim to 'help senior managers and decision makers make better use of both internal and external data in support of institutional management and decision making (JISC, 2011).

Also TSI inc. who assist Higher Education by providing specialized experience in (ETL) Extract Transform Load, data modeling, data warehousing and analytics/decision support. TSI has helped created educational data warehouses which enhance decision-making quality and capabilities to HEIs in Malaysia (Transforming Higher Education, 2007). Moreover, IT vendors stepped in the market of BI solution to HEIs. Some even have provided specific software to universities, like Oracle, SAP, IBM and SPSS. The BI solutions to HEIs are becoming an evitable trend for current higher education areas. Now some universities have applied BI systems as their educational university systems, while others focus on the research of BI techniques and tool.

Following sections presents the current status of BI application in HEIs from the terms of BI systems and its tools application. Some universities have adopted BI systems as their educational information systems. Here are some cases for better understand whole BI systems as a backbone of information systems to universities. In Piedade and Santos’s (2010) research, a student relations hip management system (SRM) is applied to enhance
the teaching learning process. The SRM system is associated with BI concept and techniques used to achieve knowledge about the students and to support the decision making process. Another case is Azizet et al., (2012) research. In his research, a conceptual frame of the BI system is proposed working for the whole university. It combined BI technologies with various EDM algorithm techniques and the whole structure was built based on the Data warehousing technologies. In the proposal system, data from the transactions systems are extracted to a data warehouse which is designed for the university. Then OLAP techniques are utilized to obtain students’ achievements and to conduct a descriptive analysis. Moreover, EDM algorithms are applied to predict potential areas of studies for the students. The next section focuses on the application of BI tools and its distinctive benefits in HEIs.

Head (2010) states that some universities in Australia have adopted BI systems to identify which students are at risk of dropping out. Those BI systems allow individuals who work with BI to intervene prompt to maintain both student engagement and fee based income. One function is that students are encouraged to utilize a system, which is called e-motion system and allows them to select which emotion best reflects their mood. After selected, the messages were sent into a word cloud. When the cloud shows "stressed" for one student, academic staff who works for student support will give some tips and relaxation advice to the student via updating blog. In addition, the information above is fed into a management system called student relationship management system (SRM). SRM can be seen as one of the data sources, which communicate with other university computer systems finally sending data into the university’s central data warehouse, then analyzed by BI systems system. After analysis, an alert identifying some students group thought to be most at risk is subsequently sent to academic staff team with an automatic email. Some universities already have benefited from the BI solution from terms of retention, income, student satisfaction and so on. Also, some universities in America use BI analyzing add/drop information and class failure patterns to identify at-risk students and direct them to support services (Durso, 2009). Moreover, Setiz’s research (2010) aims to find a BI solution to predict the path of students and alumni. More specifically, BI provides data-driven analysis of student behavior so by using predictive analytical model which can be realized via data mining. Next section is the other area for reviews of BI solutions in HEIs, where researchers show strongly interested.
2.5 Chapter Summary

This chapter has reviewed literature on the three specific research objectives that shall govern the scope of this study; the role of business intelligence systems in achieving customer satisfaction in higher education institutions in Kenya. The next chapter will describe the research design and methodology, outlining how data shall be sourced and analyzed for interpretation.
CHAPTER THREE

3.0. RESEARCH METHODOLOGY

3.1. Introduction

The purpose of this study was to investigate the relationship between business intelligence systems and customer satisfaction in higher education institutions in Kenya. This chapter presents the research design, target population, sampling design, data collection methods, research procedures and data analysis methods that will be used in this study.

3.2. Research Design

According to Cooper and Schindler (2014) research design is the comprehensive plan, structure or strategy of collecting data with the aim of obtaining answers to various research questions. It entails what the study is about, the reasons for carrying out the study, the location of the study, the type of data required, the possible sources of the data, the time periods of the study, the sample design, data collection techniques, data analysis methods and the style of preparing the final report. Sekaran and Bougie (2013) noted that there are three types of research design namely; descriptive, explanatory, and exploratory research designs. A descriptive study attempts to describe systematically a problem or provides information about a situation with the aim of showing what is prevalent with respect to the issue. An explanatory study goes beyond descriptive observations and attempts to clarify why and how there is a relationship between variables (Kumar, 2011). In exploratory research, a study is undertaken to explore an area about which little is known for feasibility or pilot study in order to assess if it is worth carrying out a full detailed investigation (Zikmund, 2013).

This study used a descriptive research design to investigate the relationship between business intelligence systems and customer satisfaction in higher education institutions in Kenya. According to Kumar (2011), a descriptive study aims to discover or establish the existence of relationships or independence between two or more aspects of situations. A descriptive research design is fitted for this study because an independent variable causes change in a dependent variable. In addition, descriptive design was fit for this study as it establishes a relationship and association between several variables in the same population (Leedy & Ormond, 2015).
The study gathered qualitative data and quantitative data from members of faculty, staff and students of USIU-A. Majority of the data sought was mainly quantitative. This was because quantitative data is always number-based and usually less in-depth but more breadth of information across cutting a large number of cases. It stands out as more objective than qualitative since it provided observed effects of a program on a problem or condition. The researcher can be guaranteed to get fixed responses and various statistical tests in analysis are possible with the use of quantitative data (Ekanem, 2010).

3.3 Population and Sampling Design

3.3.1 Target Population

Saunders et al. (2016) defined a target population as the full set of cases from which the sample is taken and which the researcher wants to generalize results from. Zikmund, Babin, Carr, and Griffin (2013) similarly define target population as all elements or people that a researcher would like to study. In other words, a target population comprises of all individuals, events or objects that have common characteristics and from which the researcher wants to generalize results (Cooper & Schindler, 2014). The Target population for this research was drawn from United States International University, Africa, in Nairobi, which is not homogeneous in nature. The study targeted 300 members of Staff and faculty and 100 students of the university. Saunders et al., (2016) recommend that, where no suitable list exists, the researcher will have to compile their own sampling frame to ensure that it is valid and reliable.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Population</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Faculty members</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time faculty</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Adjunct faculty</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td><strong>Students</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Graduate</td>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>Graduate</td>
<td>2,600</td>
<td>3100</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>4,800</td>
<td>7900</td>
</tr>
<tr>
<td><strong>Staff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>300</td>
<td>8200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8200</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author (2018)
3.3.2 Sampling Design
Sampling design is the method used to find a sample from a specific population and as such it is the procedure that a researcher uses while selecting items for the study’s sample (Cooper & Schindler, 2014). The sampling design comprises of the sampling frame, sampling technique and sample size.

3.3.2.1 Sampling Frame
Saunders et al. (2016) define sampling frame as the complete list of individuals or entities in the population, from which a probability sample is drawn and to which study findings are to be generalized. The study focused on 300 members of staff, 7650 students for the purpose of the research and 250 members of faculty.

3.3.2.2 Sampling Technique
Sampling techniques provides a way in which a researcher scientifically selects the elements to be studied. It is a process of selecting representative elements from the whole population in order to generalize the results (Saunders et al., 2016). Sampling techniques can be either probability sampling or non-probability sampling (Creswell, 2014). Probability sampling is a sampling technique in which every member of the population has a known, non-zero probability of selection, whereas in non-probability sampling, units of the sample are selected on the basis of personal judgment or convenience (Zikmund et al., 2013). This study used random sampling technique. According to Saunders et al. (2016) stratified random sampling is a probability sampling technique in which the population is divided into two or more relevant strata and a random sample is drawn from each stratum.

3.3.2.3 Sample Size
The sample size is a subset of the population or the number of items to be selected from the population to constitute a sample (Creswell, 2014). The sample size of a study is of major concern to the researcher as it aims to remove bias in the selection of the sample (Kumar, 2011). According to Zikmund et al., (2013), a small sample size may not serve to achieve the study objectives and a large one may incur huge cost and waste resources. While choosing the sample size, scientific methods need to be used. Saunders et al., (2016) argue that when the sample size is large, then there is a lower likelihood of error in generalizing the population.

According to Mugenda and Mugenda (2010), the sample picked to represent the population was guided by the formulae below (Yamenes formulae); 
\[ n = \frac{N}{1+ N (e)^2} \]
Where; \( n \) = Sample size, \( N \) = Population size and \( e \) = confidence level (0.06)
The target population for the study was 8200 small business ventures. From the above formulae, the sample size was, 

\[ n = \frac{8200}{1+8200 (0.0036)} = 269 \]

From a population of 8200 small businesses, 269 were picked. Below is the strata table

**Table 3.2 Sample Size Distribution**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Population</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time faculty</td>
<td>150</td>
<td>5</td>
</tr>
<tr>
<td>Adjunct faculty</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Graduate</td>
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<tr>
<td>Graduate</td>
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<tr>
<td>Undergraduate</td>
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</tr>
<tr>
<td>Staff</td>
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<td></td>
</tr>
<tr>
<td>Full time</td>
<td>300</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8200</strong></td>
<td><strong>269</strong></td>
</tr>
</tbody>
</table>

**3.4. Data Collection Methods**

The study used questionnaire to collect data from members of faculty, staff and students of United States International University. Christensen, Johnson, and Turner (2014) argue that questionnaires are the most commonly used method of data collection because they enable a researcher to save time, as it is possible to collect a large amount of information in case of large population. However, the authors caution that questionnaires must be kept short and that they are subject to non-response to selective items as well as reactive effects. The questionnaire was divided into five sections, that is; demographic information, intensity of use, extent of use, embeddedness of BI system and lastly customer satisfaction. The questionnaires will be self-administered to the respective respondents who will be asked to indicate their response on a five-level Likert scale ranging from 1 to 5 where 1 reflected Strongly Disagree, 2 reflected Disagree, 3 reflected Neutral, 4 reflected Agree, and 5 reflected Strongly Agree.

**3.5. Research Procedure**

Permission to conduct this research was granted in stages: initially by the research supervisors and then the Dean, Chandaria School of Business (Appendix D). Zikmund et al., (2013) define a pilot study as a small-scale research project that collects data from respondents similar to those that was used in the full study. The purpose of piloting is
specially to test the questionnaire and any weaknesses that may exist in it. Bryman (2012) posits that pilot studies are particularly crucial in self-completion questionnaires since the interviewer will not be present to clear up any confusion. Further, inappropriate questions and instructions can be identified and corrected. Bryman and Bell (2011) recommend that the pilot should be not be carried out on people who might be members of the sample employed in the full study as that may affect representativeness of any subsequent sample. Instead, it is best to find a small set of respondents who are comparable to members of the population from which the samples are taken.

According to Saunders et al. (2016), the pilot sample size should be sufficient to include any major variations in the population that are likely to affect responses, and recommend a minimum number of 10 respondents. Once data for pilot testing was collected, it was coded and entered in SPSS to test for reliability and validity of the research instrument. Testing for reliability of the research instrument is paramount in research. Reliability seeks to determine if scores to items on a research instrument are internally consistent, stable, and whether the test administration and scoring was consistent (Creswell, 2014). Zikmund et al. (2013) argue that pre-testing the research instruments reduces biases that may be caused by measurement errors. Zohrabi (2013) extensively categorizes reliability into two forms, that is, external and internal reliability. In the external reliability, focus is on the replication of the study. The internal reliability conversely constitutes the consistency in collection, analysis and interpretation of the data and it can be found when an independent researcher comes to similar findings as the original researcher after re-analyzing the information.

Warrens (2014) posits that Cronbach’s alpha is the most commonly used coefficient for approximation of reliability of test scores for structured questionnaires and for calculating internal consistency. According to Saunders et al. (2016), internal consistency involves correlating the responses to each question to other questions in the questionnaire and measuring the consistency of responses. Cronbach’s alpha values range between 0 and 1 where a value of 0 indicates no reliability, while 1 indicates high reliability (Warrens, 2014). However, the threshold for interpretation of reliability of the research instrument is Cronbach’s alpha value of 0.7. Thus Cronbach’s alpha values less than 0.7 indicate that the research instrument is unreliable while Cronbach’s alpha values equal to or greater than 0.7 indicates that the research instrument is reliable (Tavakol & Dennick, 2011).
Research validity refers to the correctness or truthfulness of an inference that is made from a research study so that the results reflect the differences among the participants drawn from the population (Cooper & Schindler, 2014). According to Christensen et al., (2014), there are four major types of validity: Construct validity is the extent to which a construct is adequately represented by the measures used; Internal validity is the correctness of inferences made about cause and effect in connection with independent and dependent variables; and external validity, which is the degree to which results can be generalized to other people, settings, and time. According to Creswell (2013), the validity of a research instrument is improved by use of a pilot study. This study made use self-administered questionnaires. According to Bryman and Bell (2011), with a self-administered questionnaire (SAQ), respondents answer questions by completing the questionnaire themselves. As there is no interviewer in the administration of the self-completion questionnaire, the research instrument has to be especially easy to follow and its questions have to be particularly easy to answer (Saunders et al., 2016).

Bryman and Bell (2011) describe several advantages to using self-administered questionnaires over structured interviews: They are quicker to administer; there is absence of interviewer effects; no interviewer variability; and convenience for respondents. However, self-administered questionnaires have some shortcomings as well and these include: no one present to prompt if needed; cannot probe; have to ensure questions are salient to respondents; difficulties of asking questions in a different way; respondents can read all the questions before they start answering and this means they are not independent of each other; cannot ask a lot of questions; there is a risk of missing data and also poor response rates (Bryman & Bell, 2011; Cooper & Schindler, 2014).

3.6 Data Analysis Methods

3.6.1. Data Preparation
The data collected was cleaned up of errors and to remove inconsistencies, incompleteness, misclassification and gaps in the information obtained from the respondents (Kumar, 2011). Missing data is a common problem with questionnaires and can come in several forms: Invalid data is data with entry errors; Incomplete data is missing data needed to make a decision; inconsistent data could result from mistakes of aligning databases; while incorrect data occurs when data is falsified (Cooper & Schindler, 2014).
3.6.2. Descriptive Statistics
Descriptive statistics are measurements that depict the center, spread, and shape of distributions and are helpful as preliminary tools for data description. They help to describe the basic features of the data, to organize and summarize it in a simple way (Cooper & Schindler, 2014; Peck & Devore, 2012). Descriptive statistics make it possible to discern patterns that are not clearly apparent in the raw data through use of graphs, pie charts, and tables for ease of visual explanation. Descriptive statistics include measurement of central tendency and dispersion (Saunders et al., 2016). There are various measures of central tendency and the choice of which to use is based on certain criteria. According to Kumar (2011), a measure of central tendency is good or satisfactory if it possesses the following characteristics: It should be based on all observations; it should not be affected by extreme values; it should be close to the maximum number of observed values as possible; it should have a definite value; it should be subjected to complicated calculations; it should be capable of further algebraic formulation; and it should be stable with regard to sampling.

3.6.3. Inferential Statistics
Inferential statistics refer to statistical methods used to make inferences or to project from a sample to an entire population. Statistical analysis can be univariate when testing objective involving only one variable, bivariate when involving two variables, or multivariate when testing objectives and models involving three or more variables (Zikmund et al., 2013). We have several inferential tests including; Factor Analysis, Correlation, Analysis of Variance and Regression.

3.7 Chapter Summary
This chapter has entirely discussed the items that entail research methodology of the study. The research design was the first to be discussed where the researcher extensively defined what research design is and went ahead to explain the type of design used in the study. The chapter then explained what population means and the target population for the study clarified. The researcher has elaborated details of the sampling design, sampling frame, sampling technique and the sample size for the study. The data collection method for the study was expounded upon including the instruments the researcher used to collect data in the field. A research procedure was also deliberated upon. The chapter has finally defined data analysis and discussed data analysis methods used in the study. The next chapter (four) will deal with results and findings.
CHAPTER FOUR

4.0 RESULTS AND FINDINGS

4.1 Introduction

The Purpose of this study was to establish the role of business intelligence systems in achieving customer satisfaction in higher education institutions in Kenya. This chapter presents the data analysis results, interpretation and presentation. The researcher administered 267 questionnaires to faculty, staff and students of USIU. Out of the 267 administered questionnaires, 205 questionnaires were completed and returned, giving a response rate of 77% while the rest were not returned.

Table 4.1 Sample Size Distribution

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responded</td>
<td>205</td>
<td>77</td>
</tr>
<tr>
<td>Did not respond</td>
<td>62</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>267</td>
<td>100</td>
</tr>
</tbody>
</table>

4.2 Demographic Information

4.2.1 Gender

The research found out that majority of the respondents were male, 54% as compared to females 46% as shown in the figure 4.1.
4.2.2 Age Bracket Distribution
The research found out that majority of the respondents were aged between 31-40 years, 69.3%. While the least of the respondents, representing 2.9% were aged between 41-50 years as shown in the figure 4.2.

![Figure 4. 2 Age Distribution](image)

4.2.3 Level of Education
The research also found out that most of the respondents, representing 61.5% of the population had a university degree, followed by a 26.3% representing master’s degree. The remaining 12.2% of the population were qualified Ph.D. holders as shown in the figure 4.3.

![Figure 4. 3 level of education](image)
4.2.4 Period of Being in USIU-A

The research found out that majority 55% of the respondents have been in USIU for a period between 1-5 years, while minority 6% have been in USIU for a period less than one year as shown in figure 4.4.

![Figure 4.4 Period of Being in USIU-A](image.png)

**Figure 4.4 Period of Being in USIU-A**

4.2.5 Area of Operation/Interest

The study found out that majority of the respondents are in ICT or customer service department, 28% and 29% respectively. Risk and operations department had significantly low representation of 6% each as indicated in figure 4.5.

![Figure 4.5 Area of operation/interest](image.png)

**Figure 4.5 Area of operation/interest**
4.2.6 Level of Management
Most of the respondents 45.9% are in middle level management in their respective employments, while those in top management were represented by 17.1% Cadre staff were represented by a 37.1% of the population as indicated in figure 4.6.

![Figure 4.6 Level of Management](image)

4.3 Descriptive Statistics of Variables

4.3.1 Intensity of use of BIS
The research sought to find out the intensity of use of business intelligence system and its influence in customer satisfaction in higher education institutions in Kenya. The findings are illustrated in table 4.2. Majority of the respondents 64% of the population used BIS greatly as a routine part of their jobs. Majority 54% of the population greatly used business intelligence systems at every opportunity. Majority 48% of the respondents have greatly increased the use of BIS. Majority 48% use greatly the BIS to server its internal and external customers. Majority of the population, 61% used greatly BIS to improve the quality of customer service. 42% of the population, either used greatly or on average, BIS to predict the opportunities that come in the future. Majority 43% of the population use on average, BISs to predict the behavior of its customers in the market niche. 43% of the population greatly use BIS to create and retain customers.
**Table 4. 2 Intensity of Use of BIS**

<table>
<thead>
<tr>
<th>Business intelligence system intensity of use</th>
<th>Do not use (%)</th>
<th>Slightly used (%)</th>
<th>Used averagely (%)</th>
<th>Used greatly (%)</th>
<th>Used fully (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UI1 I use BIS as a routine part of my job</td>
<td>2</td>
<td>8</td>
<td>23</td>
<td>64</td>
<td>2</td>
</tr>
<tr>
<td>UI2 I use BIS at every opportunity</td>
<td>2</td>
<td>8</td>
<td>32</td>
<td>54</td>
<td>4</td>
</tr>
<tr>
<td>UI3 I have been increasingly using BIS</td>
<td>0</td>
<td>10</td>
<td>31</td>
<td>48</td>
<td>10</td>
</tr>
<tr>
<td>I use BIS to serve internal/external customers</td>
<td>0</td>
<td>6</td>
<td>30</td>
<td>48</td>
<td>15</td>
</tr>
<tr>
<td>UI4 I use BIS to improve the quality of customer service</td>
<td>0</td>
<td>6</td>
<td>30</td>
<td>61</td>
<td>2</td>
</tr>
<tr>
<td>UI5 I use BIS to more creatively serve customers</td>
<td>2</td>
<td>8</td>
<td>32</td>
<td>44</td>
<td>13</td>
</tr>
<tr>
<td>UI6 I use BIS to predict opportunities that come in the future</td>
<td>8</td>
<td>0</td>
<td>42</td>
<td>43</td>
<td>6</td>
</tr>
<tr>
<td>UI7 I use BIS to predict consumer behavior in my market niche</td>
<td>0</td>
<td>12</td>
<td>43</td>
<td>38</td>
<td>7</td>
</tr>
<tr>
<td>UI8 I have been using BIS to create and retain consumers</td>
<td>0</td>
<td>10</td>
<td>39</td>
<td>44</td>
<td>7</td>
</tr>
</tbody>
</table>

**4.3.2 Extent of Use of BIS**

The research wanted to establish the extent of use of BIS in achieving customer satisfaction in higher education institutions in Kenya. The findings are illustrated in table 4.3. Majority 59% of the respondents used BIS greatly to help them think through problems. 48% used BIS greatly to make sure the data matches my analysis of problems. 43% used BIS greatly to check their thinking against the data. 42% used BIS averagely to help them justify their decisions. 40% of the respondents used BIS greatly to help them make explicit the reasons for their decisions. 39% used BIS greatly to rationalize their decisions. Majority 59% used BIS greatly to control or shape the decision process. 42% of the respondents used BIS greatly to improve the effectiveness and efficiency of the decision process. 48% of the respondents used BIS greatly to make the decision process more rational. 53% agreed that their work group used BIS greatly to coordinate our activities. 53% used BIS greatly to coordinate activities with others in their work group. 31% used BIS greatly to exchange...
information with people in their work group. 48% used BIS to help them manage their work. 44% used BIS greatly to monitor their own performance. 34% used BIS greatly to get feedback on job performance. 55% used BIS greatly to communicate with people who report to them. 52% used BIS greatly to communicate with people they report to and majority of the respondents use BIS greatly to keep their supervisor informed.

Table 4. 3 Extent of Use of BIS

<table>
<thead>
<tr>
<th>Code</th>
<th>Business intelligence system</th>
<th>Extent of use</th>
<th>Do not use (%)</th>
<th>Slightly used (%)</th>
<th>Used averagely (%)</th>
<th>Used greatly (%)</th>
<th>Used fully (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU1</td>
<td>I use BIS to help me think through problems.</td>
<td></td>
<td>0</td>
<td>8</td>
<td>31</td>
<td>59</td>
<td>2</td>
</tr>
<tr>
<td>EU2</td>
<td>I use BIS to make sure the data matches my analysis of problems.</td>
<td></td>
<td>0</td>
<td>8</td>
<td>39</td>
<td>48</td>
<td>5</td>
</tr>
<tr>
<td>EU3</td>
<td>I use BIS to check my thinking against the data.</td>
<td></td>
<td>0</td>
<td>13</td>
<td>37</td>
<td>43</td>
<td>6</td>
</tr>
<tr>
<td>EU4</td>
<td>I use BIS to help me justify my decisions.</td>
<td></td>
<td>0</td>
<td>13</td>
<td>42</td>
<td>32</td>
<td>13</td>
</tr>
<tr>
<td>EU5</td>
<td>I use BIS to help me make explicit the reasons for my decisions.</td>
<td></td>
<td>0</td>
<td>8</td>
<td>32</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>EU6</td>
<td>I use BIS to rationalize my decisions</td>
<td></td>
<td>2</td>
<td>11</td>
<td>32</td>
<td>39</td>
<td>16</td>
</tr>
<tr>
<td>EU7</td>
<td>I use BIS to control or shape the decision process.</td>
<td></td>
<td>2</td>
<td>6</td>
<td>31</td>
<td>59</td>
<td>2</td>
</tr>
<tr>
<td>EU8</td>
<td>I use BIS to improve the effectiveness and efficiency of the decision process.</td>
<td></td>
<td>0</td>
<td>8</td>
<td>36</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>EU9</td>
<td>I use BIS to make the decision process more rational.</td>
<td></td>
<td>0</td>
<td>10</td>
<td>29</td>
<td>48</td>
<td>13</td>
</tr>
<tr>
<td>EU10</td>
<td>My work group and I use BIS to coordinate our activities.</td>
<td></td>
<td>2</td>
<td>6</td>
<td>37</td>
<td>53</td>
<td>2</td>
</tr>
<tr>
<td>EU11</td>
<td>I use BIS to coordinate activities with others in my work group.</td>
<td></td>
<td>2</td>
<td>0</td>
<td>43</td>
<td>53</td>
<td>2</td>
</tr>
<tr>
<td>EU12</td>
<td>I use BIS to exchange information with people in my work group.</td>
<td></td>
<td>2</td>
<td>11</td>
<td>37</td>
<td>31</td>
<td>19</td>
</tr>
<tr>
<td>EU13</td>
<td>I use BIS to help me manage my work.</td>
<td></td>
<td>2</td>
<td>6</td>
<td>40</td>
<td>48</td>
<td>4</td>
</tr>
<tr>
<td>EU14</td>
<td>I use BIS to monitor my own performance.</td>
<td></td>
<td>2</td>
<td>10</td>
<td>34</td>
<td>44</td>
<td>10</td>
</tr>
<tr>
<td>EU15</td>
<td>I use BIS to get feedback on job performance.</td>
<td></td>
<td>2</td>
<td>20</td>
<td>32</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>EU16</td>
<td>I use BIS to communicate with people who report to me.</td>
<td></td>
<td>2</td>
<td>6</td>
<td>37</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>EU17</td>
<td>I use BIS to communicate with people I report to.</td>
<td></td>
<td>2</td>
<td>0</td>
<td>44</td>
<td>52</td>
<td>2</td>
</tr>
<tr>
<td>EU18</td>
<td>I use BIS to keep my supervisor informed.</td>
<td></td>
<td>2</td>
<td>6</td>
<td>27</td>
<td>62</td>
<td>2</td>
</tr>
</tbody>
</table>

41
4.3.3 Embeddedness of Use of BIS
The research wanted to establish the embeddedness of BIS and its influence in achieving superior customer satisfaction in higher education institutions in Kenya. The results are indicated in table 4.4. Majority 50% of the population greatly integrate BIS with its business process execution. Majority 54% of the population greatly embed BIS into decision making routines across the organization. 48% of the respondents concurred that BIS are embedded in their business strategy formulation process leading to alignment of BIS and overall corporate strategy and 47% of the population agreed that the process of information for analytical decision making is carried without interruption due the use of BIS greatly.

Table 4.4 Embeddedness of Use of BIS

<table>
<thead>
<tr>
<th>Code</th>
<th>Embeddedness of Business intelligence Systems</th>
<th>Do not use (%)</th>
<th>Slightly used (%)</th>
<th>Used averagely (%)</th>
<th>Used greatly (%)</th>
<th>Used fully (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM1</td>
<td>Use of BIS is seamlessly integrated with business process execution in the institution  BIS is embedded into the decision-making routines of decision-makers across the organization The importance and use of insights from BIS are embedded within the business strategy formulation process, leading to alignment of the BIS and the overall corporate strategy Processes in which there is an information need for analytical decision making are carried out without interruption due to the use of BIS.</td>
<td>0</td>
<td>8</td>
<td>25</td>
<td>50</td>
<td>17</td>
</tr>
<tr>
<td>EM2</td>
<td></td>
<td>0</td>
<td>8</td>
<td>20</td>
<td>54</td>
<td>19</td>
</tr>
<tr>
<td>EM3</td>
<td></td>
<td>0</td>
<td>8</td>
<td>30</td>
<td>48</td>
<td>14</td>
</tr>
<tr>
<td>EM4</td>
<td></td>
<td>0</td>
<td>8</td>
<td>31</td>
<td>47</td>
<td>14</td>
</tr>
</tbody>
</table>

4.3.4 Customer Satisfaction
The research ought to find out the level of customer satisfaction in higher education institutions in Kenya. The results are shown in table 4.5. Majority 83% of the respondents agreed that Overall, they are very satisfied with the way the university is handling its customers. 76% of the respondents agreed that they often come to university because of excellent customer services. Majority 78% agreed that Customer service, have resolved all their problems to their complete satisfaction. 80% agreed that the university is one of the best that they have ever visited. 85% agreed that based on their experience, they would
come to the university again. Majority 90% agreed that based on their experience, they would highly recommend a friend to join this university. 87% disagreed that they are satisfied with their decision to join this university. 87% disagreed that they feel bad about their decision to enroll in this university and 80% agreed that they are not happy that they came to this University.

### Table 4.5 Customer Satisfaction

<table>
<thead>
<tr>
<th>Code</th>
<th>Customer Satisfaction</th>
<th>Strongly Disagree (%)</th>
<th>Disagree (%)</th>
<th>Neutral (%)</th>
<th>Agree (%)</th>
<th>Strongly Agree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS1</td>
<td>Overall, I am very satisfied with the way the university is handling its customers</td>
<td>0</td>
<td>3</td>
<td>14</td>
<td>72</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I often come to university because of Excellent customer services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customer service, have resolved all my problems to my complete satisfaction</td>
<td>0</td>
<td>3</td>
<td>19</td>
<td>61</td>
</tr>
<tr>
<td>CS2</td>
<td></td>
<td>This is one of the best universities</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I have ever visited</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>70</td>
</tr>
<tr>
<td>CS3</td>
<td></td>
<td>Based on my experience, I will come to the university again</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Based on my experience, I would highly recommend a friend to join this university</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>58</td>
</tr>
<tr>
<td>CS6</td>
<td></td>
<td>I am satisfied with my decision to join this university</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I feel bad about my decision to enroll in this university</td>
<td>85</td>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>CS8</td>
<td></td>
<td>I am not happy that I came to this University</td>
<td>85</td>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I Think that the institution know what I want and delivers it</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>65</td>
</tr>
<tr>
<td>CS10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.4 Confirmatory Measurement Model

Confirmatory factor analysis (CFA) was used to evaluate the measurement model on multiple criteria such as internal reliability, convergent, and discriminant validity. Prior to this was the exploratory factor analysis (EFA) was conducted through key steps that included the computation of factor loading matrix, communalities and principal components analysis (PCA).
4.4.1 Exploratory Factor Analysis

Constructs were refined using exploratory factor analysis (EFA). To assess the factorability of the data, Kaiser Meyer-Olin (KMO) Measure of Sampling Adequacy, Bartlett’s Test of Sphericity and communalities was used. Table 4.6 indicated that KMO value was 0.788 which was above the threshold 0.6. The Bartlett’s test of Sphericity was significant (chi-square =8218.152, DF=231, sig=0.00 <0.05) indicating that the data was appropriate for the factor analysis.

Table 4.6 KMO and Bartlett's Test

<table>
<thead>
<tr>
<th>KMO and Bartlett's Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
<td>.788</td>
</tr>
<tr>
<td>Approx. Chi-Square</td>
<td>8218.152</td>
</tr>
<tr>
<td>Bartlett's Test of Sphericity</td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td>231</td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

4.4.2 Total Variance Explained

Factor analysis was assessed using Principal component analysis (PCA). Based on Kaiser’s criterion four factors, out of a total 22 factors were imputed. Table 4.7 indicated that the four factors had an Eigen value of greater than 1.0 and the factors were able to explain 84.203% of the total variance in the data.

Table 4.7 Total Variance Explained

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings^2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>1</td>
<td>12.934</td>
<td>58.790</td>
<td>58.790</td>
</tr>
<tr>
<td>2</td>
<td>3.298</td>
<td>14.993</td>
<td>73.783</td>
</tr>
<tr>
<td>3</td>
<td>1.288</td>
<td>5.855</td>
<td>79.638</td>
</tr>
<tr>
<td>4</td>
<td>1.004</td>
<td>4.565</td>
<td>84.203</td>
</tr>
<tr>
<td>5</td>
<td>.647</td>
<td>2.939</td>
<td>87.142</td>
</tr>
<tr>
<td>6</td>
<td>.610</td>
<td>2.773</td>
<td>89.915</td>
</tr>
<tr>
<td>7</td>
<td>.467</td>
<td>2.125</td>
<td>92.040</td>
</tr>
<tr>
<td>8</td>
<td>.321</td>
<td>1.458</td>
<td>93.499</td>
</tr>
<tr>
<td>9</td>
<td>.292</td>
<td>1.325</td>
<td>94.824</td>
</tr>
<tr>
<td>10</td>
<td>.243</td>
<td>1.103</td>
<td>95.926</td>
</tr>
<tr>
<td>11</td>
<td>.209</td>
<td>.952</td>
<td>96.878</td>
</tr>
<tr>
<td>12</td>
<td>.174</td>
<td>.792</td>
<td>97.670</td>
</tr>
<tr>
<td>13</td>
<td>.158</td>
<td>.716</td>
<td>98.387</td>
</tr>
<tr>
<td>14</td>
<td>.099</td>
<td>.452</td>
<td>98.838</td>
</tr>
<tr>
<td>15</td>
<td>.093</td>
<td>.421</td>
<td>99.259</td>
</tr>
<tr>
<td>16</td>
<td>.060</td>
<td>.271</td>
<td>99.531</td>
</tr>
<tr>
<td>17</td>
<td>.048</td>
<td>.219</td>
<td>99.750</td>
</tr>
<tr>
<td>18</td>
<td>.022</td>
<td>.100</td>
<td>99.850</td>
</tr>
<tr>
<td>19</td>
<td>.015</td>
<td>.069</td>
<td>99.918</td>
</tr>
<tr>
<td>20</td>
<td>.010</td>
<td>.044</td>
<td>99.962</td>
</tr>
<tr>
<td>21</td>
<td>.008</td>
<td>.035</td>
<td>99.997</td>
</tr>
<tr>
<td>22</td>
<td>.001</td>
<td>.003</td>
<td>100.000</td>
</tr>
</tbody>
</table>
4.4.3 Communality and Pattern Matrix
The variability of each observed variable that could be explained by the extracted factors were checked by extracting the communality values. The extracted communalities were found to be greater than 0.5 which indicated that the variables fitted well other variables in their factor. In this study, the pattern matrix coefficients ranged from 0.671 to 0.982 as indicated in table 4.8, thus showing variables are almost perfectly related to a factor pattern.

Table 4. 8 Communalities and Pattern Matrixa

<table>
<thead>
<tr>
<th>Item</th>
<th>Extent of use</th>
<th>Component intensity of use</th>
<th>Embeddedness</th>
<th>Customer satisfaction</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>UI1</td>
<td></td>
<td>.830</td>
<td></td>
<td></td>
<td>.877</td>
</tr>
<tr>
<td>UI2</td>
<td></td>
<td>.805</td>
<td></td>
<td></td>
<td>.883</td>
</tr>
<tr>
<td>UI3</td>
<td></td>
<td>.859</td>
<td></td>
<td></td>
<td>.824</td>
</tr>
<tr>
<td>UI4</td>
<td></td>
<td>.852</td>
<td></td>
<td></td>
<td>.869</td>
</tr>
<tr>
<td>UI5</td>
<td></td>
<td>.697</td>
<td></td>
<td></td>
<td>.756</td>
</tr>
<tr>
<td>UI9</td>
<td></td>
<td>.824</td>
<td></td>
<td></td>
<td>.813</td>
</tr>
<tr>
<td>EU1</td>
<td></td>
<td>.713</td>
<td></td>
<td></td>
<td>.816</td>
</tr>
<tr>
<td>EU7</td>
<td></td>
<td>.823</td>
<td></td>
<td></td>
<td>.856</td>
</tr>
<tr>
<td>EU12</td>
<td></td>
<td>.671</td>
<td></td>
<td></td>
<td>.675</td>
</tr>
<tr>
<td>EU13</td>
<td></td>
<td>.863</td>
<td></td>
<td></td>
<td>.813</td>
</tr>
<tr>
<td>EU14</td>
<td></td>
<td>.759</td>
<td></td>
<td></td>
<td>.812</td>
</tr>
<tr>
<td>EU15</td>
<td></td>
<td>.807</td>
<td></td>
<td></td>
<td>.734</td>
</tr>
<tr>
<td>EU16</td>
<td></td>
<td>.872</td>
<td></td>
<td></td>
<td>.848</td>
</tr>
<tr>
<td>EU18</td>
<td></td>
<td>.819</td>
<td></td>
<td></td>
<td>.875</td>
</tr>
<tr>
<td>EM1</td>
<td></td>
<td>.831</td>
<td></td>
<td></td>
<td>.923</td>
</tr>
<tr>
<td>EM2</td>
<td></td>
<td>.824</td>
<td></td>
<td></td>
<td>.884</td>
</tr>
<tr>
<td>EM3</td>
<td></td>
<td>.982</td>
<td></td>
<td></td>
<td>.975</td>
</tr>
<tr>
<td>EM4</td>
<td></td>
<td>.840</td>
<td></td>
<td></td>
<td>.919</td>
</tr>
<tr>
<td>CS1</td>
<td></td>
<td></td>
<td>.911</td>
<td></td>
<td>.800</td>
</tr>
<tr>
<td>CS3</td>
<td></td>
<td></td>
<td>.960</td>
<td></td>
<td>.939</td>
</tr>
<tr>
<td>CS4</td>
<td></td>
<td></td>
<td>.881</td>
<td></td>
<td>.825</td>
</tr>
<tr>
<td>CS7</td>
<td></td>
<td></td>
<td>.780</td>
<td></td>
<td>.809</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 5 iterations.
4.4.4 Confirmatory Factor Analysis.
Confirmatory factor analysis (CFA) was then performed using IBM AMOS software to assess the reliability and validity of the measures before using them in the research model (Anderson and Gerbing (1988)).

\[ \chi^2 = 320.7 \; \text{;} \; \text{df} = 203 \; \text{;} \; \chi^2 / \text{df} = 1.580 \; \text{;} \; \text{CFI} = .943 \; \text{;} \; \text{GFI} = .956 \; \text{;} \; \text{RMSEA} = 0.035 \]
The CFA fit statistics of the overall measurement model for study variables was then extracted as shown in Figure 4.7. The CFA model fit the data adequately since the fit indices were within an acceptable range (Gold et al., 2001).

### 4.4.5 Construct Reliability
Construct reliability was assessed by computing the composite reliability and the Cronbach alpha of the constructs. The Cronbach alphas were all above the 0.6 threshold as specified for PLS analysis. Composite reliability of reflective items were all above the acceptable 0.7 threshold which means all the variables in the study exhibited construct reliability as indicated in Table 4.9.

#### Table 4.9 Reliability of constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Number of items retained</th>
<th>Composite Reliability &gt; 0.7</th>
<th>Cronbach's Alpha &gt; 0.6</th>
<th>Items removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embeddedness</td>
<td>4</td>
<td>0.973</td>
<td>0.971</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0.957</td>
<td>0.952</td>
<td>EU2, EU3, EU4, EU5, EU6, EU8, EU9, EU10, EU11, EU17</td>
</tr>
<tr>
<td>Extent of Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity of Use</td>
<td>6</td>
<td>0.949</td>
<td>0.955</td>
<td>UI6, UI7, UI8</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>4</td>
<td>0.919</td>
<td>0.914</td>
<td>CS2, CS5, CS6, CS8, CS9, CS10</td>
</tr>
</tbody>
</table>

#### 4.4.6 Assessment of normality
The normality of data distribution was assessed by examining its skewness and kurtosis. The results in Table 4.10 show that the variables are normally distributed with skewness and kurtosis values ranging between -2.0 and +2.0. This implies that the study items are normally distributed and hence further tests can be carried out on the data.
4.4.7 Convergent Validity.
Convergent validity was assessed using average variance extracted (AVE). Table 4.11 indicates that AVE of all constructs were above the 0.5 threshold indicating that the latent constructs account for at least fifty percent of the variance in the items. This indicates that the measurement scales exhibited adequate measurement validity (Hair et al., 2006).

4.4.8 Discriminant Validity.
In correlation matrix table 4.11, the diagonal elements in bold are the square root of the average variance extracted (AVE) of all the latent constructs. The discriminant validity is assumed if the diagonal elements are higher than other off-diagonal elements in their rows and columns. Discriminant validity was confirmed for the measurement model.
### Table 4.11 Correlation Matrix

<table>
<thead>
<tr>
<th>Constructs</th>
<th>AVE</th>
<th>Embeddedness</th>
<th>Extent of Use</th>
<th>Intensity of Use</th>
<th>Customer Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embeddedness</td>
<td>0.900</td>
<td>0.949</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent of Use</td>
<td>0.738</td>
<td>0.760***</td>
<td>0.859</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity of Use</td>
<td>0.779</td>
<td>0.704***</td>
<td>0.854***</td>
<td>0.883</td>
<td></td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>0.740</td>
<td>0.203**</td>
<td>0.314**</td>
<td>0.347**</td>
<td>0.860</td>
</tr>
</tbody>
</table>

*** P< 0.010, ** p < 0.050

#### 4.4.9 Correlation Analysis

Table 4.11 indicates that there exist a positive and significant correlation coefficient between Intensity of Use and Customer Satisfaction (r=0.347, p<0.05). The correlation coefficient for the relationship between Extent of Use and Customer Satisfaction was positive and significant (r=0.314, p<0.05). The correlation coefficient for the relationship between embeddedness and Customer Satisfaction was positive and significant (r=0.203, p<0.05).

#### 4.5 Structural Model Estimation

![Figure 4.8 Structural model for study variables](image-url)

Figure 4. 8 Structural model for study variables
\[ \chi^2 = 327.140 \; ; \; df = 206 \; ; \; \chi^2/df = 1.588 \; ; \; CFI = .938 \; ; \; GFI = .936 \; ; \; RMSEA = 0.041 \]

The structural model fit statistics of the overall structural model for study variables was then extracted as shown in Figure 4.8. The structural model fit the data adequately since the fit indices were within an acceptable range (Gold et al., 2001).

4.5.1 Intensity of Use on Customer Satisfaction
Intensity of Use was found to have a positive and statistically significant relationship with Customer Satisfaction. The path coefficient was positive and significant at the 0.05 level (β=0.388, T-value =6.779 p<0.05) as indicated in table 4.12 and figure 4.8. The positive relationship means if, Intensity of Use increases by 1, Customer Satisfaction of the respondents will increase by 0.388.

4.5.2 Extent of Use on Customer Satisfaction
Extent of Use was found to have a positive and statistically significant relationship with Customer Satisfaction. The path coefficient was positive and significant at the 0.05 level (β=0.320, T-value =5.172 p<0.05) as indicated in table 4.12 and figure 4.8. The positive relationship means if, Extent of Use increases by 1, Customer Satisfaction of the respondents will increase by 0.320.

4.5.3 Embeddedness on Customer Satisfaction
Embeddedness was found to have a positive and statistically significant relationship with Customer Satisfaction. The path coefficient was positive and significant at the 0.05 level (β=0.211, T-value =6.302 p<0.05) as indicated in table 4.12 and figure 4.8. The positive relationship means if, Embeddedness increases by 1, Customer Satisfaction of the respondents will increase by 0.211.

4.5.4 Predictive Relevance of the Model
The quality of the structural model can be assessed by \( R^2 \) which shows the variance in the endogenous variable that is explained by the exogenous variables. Based on the results reported in figure 4.8, the \( R^2 \) was found to be 0.613 indicating that Embeddedness, Extent of Use and Intensity of Use can account for 61.3% of the variance in the Customer Satisfaction.
Table 4. 12 Path Coefficients

<table>
<thead>
<tr>
<th>Path</th>
<th>Unstandardized Estimate</th>
<th>Standardised Estimate</th>
<th>Standard Error</th>
<th>T Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Satisfaction</td>
<td>&lt;- Intensity of Use</td>
<td>0.332</td>
<td>0.388</td>
<td>0.049</td>
<td>6.776</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>&lt;- Extent of Use</td>
<td>0.300</td>
<td>0.320</td>
<td>0.058</td>
<td>5.172</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>&lt;- Embeddedness</td>
<td>0.271</td>
<td>0.211</td>
<td>0.043</td>
<td>6.302</td>
</tr>
</tbody>
</table>

4.6 Chapter Summary

This chapter has presented the results and findings of the study. Findings were presented in frequency tables and graphs/figures. Normality tests, reliability tests and correlation analysis were also conducted. The presentation was aligned to the research objectives and covered reports of the extent to which intensity of using BIS has influenced customer satisfaction, analysis of the extent to which extent of using BIS has influenced customer satisfaction, the analysis and how the embeddedness of BIS influences customer satisfaction. The next chapter will present discussions conclusions and recommendations.
CHAPTER FIVE

5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of the findings, discussion on key findings, conclusion drawn from the findings highlighted and recommendation made there-to. The conclusions and recommendations drawn were focused on addressing the purpose of the study.

5.2 Summary

The purpose of this study was to investigate the role of business intelligence in achieving customer satisfaction in higher education institutions in Kenya. The primary focus of this research is to investigate the extent of business intelligence system use to shape a collective judgement in respect to customer satisfaction. In this context, the research was establishing the intensity business intelligence system use, identify the extent of business intelligence system use and Establish Embeddedness of Business intelligence systems in delivering customer care services and ensuring customer satisfaction in higher education institutions in Kenya.

This study used descriptive research design. The target populations of this study was 8200 that included students, members of staff and faculty of United States International University. This study adopted random sampling method. This involved the selection of 269 women using simple random sampling. The sample size of this study was therefore 269 respondents. This study used primary data that was collected using semi-structured questionnaires. Content analysis was used to analyze qualitative data and the findings were then presented in a prose form. On the other hand, inferential and descriptive statistics were used to analyze the quantitative data using Statistical Package for Social Sciences (SPSS version 20). Descriptive statistics included mean, standard deviation, frequency and percentages. In relation to inferential statistics, the study used correlation analysis to establish the relationship between the independent and the dependent variables. The results were then presented in tables.

The research sought to find out the intensity of use of business intelligence system and its influence in customer satisfaction in higher education institutions in Kenya. The findings are illustrated in table 4.2. Majority of the respondents 64% of the population used BIS greatly as a routine part of their jobs. Majority 54% of the population greatly used business
intelligence systems at every opportunity. Majority 48% of the respondents have greatly increased the use of BIS. Majority 48% use greatly the BIS to server its internal and external customers. Majority of the population, 61% used greatly BIS to improve the quality of customer service. 42% of the population, either used greatly or on average, BIS to predict the opportunities that come in the future. Majority 43% of the population use on average, BISs to predict the behavior of its customers in the market niche. 43% of the population greatly use BIS to create and retain customers.

Moreover, the study wanted to establish the extent of use of BIS in achieving customer satisfaction in higher education institutions in Kenya. The findings are illustrated in table 4.3. Majority 59% of the respondents used BIS greatly to help them think through problems. 48% used BIS greatly to make sure the data matches my analysis of problems. 43% used BIS greatly to check their thinking against the data. 42% used BIS averagely to help them justify their decisions. 40% of the respondents used BIS greatly to help them make explicit the reasons for their decisions. 39% used BIS greatly to rationalize their decisions. Majority 59% used BIS greatly to control or shape the decision process. 42% of the respondents used BIS greatly to improve the effectiveness and efficiency of the decision process. 48% of the respondents used BIS greatly to make the decision process more rational. 53% agreed that their work group used BIS greatly to coordinate our activities. 53% used BIS greatly to coordinate activities with others in their work group. 31% used BIS greatly to exchange information with people in their work group. 48% used BIS to help them manage their work. 44% used BIS greatly to monitor their own performance. 34% used BIS greatly to get feedback on job performance. 55% used BIS greatly to communicate with people who report to them. 52% used BIS greatly to communicate with people they report to and majority of the respondents use BIS greatly to keep their supervisor informed.

Regarding the embeddedness of BIS and its influence in achieving superior customer satisfaction in higher education institutions in Kenya, the results are indicated in table 4.4. Majority 50 % of the population greatly integrate BIS with its business process execution. Majority 54% of the population greatly embed BIS into decision making routines across the organization. 48% of the respondents concurred that BIS are embedded in their business strategy formulation process leading to alignment of BIS and overall corporate strategy and 47 % of the population agreed that the process of information for analytical decision making is carried without interruption due the use of BIS greatly.
5.3 Discussion

5.3.1 Effect of Intensity of Use of Business Intelligence Systems on Customer Satisfaction

The information provided by BI systems is both strategic and operational and are deployed to help improve decision making and attain enhanced operational competitive advantage (Werner & Abramson 2003). With the challenges of technical implementation overcome by business organizations, the focus is now shifting towards its business value. Successful adoption and effective use of any IT innovation is expected to impact organizational performance. The findings agree with Mishra and Agarwal (2010) that IT innovations in general offer the potential to change organizational processes, routines and management controls and BI systems are no different. Some firms investing in BI systems and implementing best practices have seen increased revenues and significant cost savings and reduction in stock return volatility, while others have not seen the promised benefits. BI systems are considered risky as they require collaboration among IT and business managers, and among operational personnel (Mishra & Agarwal 2010).

While the extent of use of BI systems drives the value generated by the organization in terms of its improved performance and decision making, studies, the use of BI systems are limited. Various components of enterprise performance systems such as BI systems were often studied in isolation with strategic execution discussed at strategic level decision support at the IT department level, and process efficiency at the operational level. Business intelligence (BI) empowers organizations with business insights that lead to better, faster, more relevant decisions. This ensures the right information is gotten at the right time, and in the right format. BI systems enable banks to anticipate future behaviour of the customers 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.

Some of the notable areas where BI is applied in banks are analytical customer relationship management. The findings agree to Porter (1998), work that technology intelligence exerts a significant influence on the ability to innovate and is viewed both as a major source of competitive advantage and of new product innovation. This strategy enables the banks to provide considerable insulation from competition. It also forms a basis of measuring the strategic value. Organizations put in place a set of activities, methods, best practices, policies, and automated tools that stakeholders use to develop and continuously improve
information systems and software. Business Intelligence (BI) maturity model describes the stages that most organizations follow when evolving their BI infrastructure from a low value, cost-center operation, to a high value, strategic function that drives market share.

BIS greatly used as a routine part of everyday jobs. Members of many organizations greatly used business intelligence systems at every opportunity and most organizations have greatly increased the use of BIS with the use of BIS to server their internal and external customers. The intensity of use is the most commonly used dimension of measuring the use of IS in the literature. This dimension of use has most commonly been conceptualized and operationalized as the frequency or duration, based on users’ self-assessment of time spent in using a system or the duration of their usage via system logs.

5.3.2 The Extent of Use and its Effect in Customer Satisfaction in Higher Education Institutions in Kenya

The extent of BIS use should capture the “extent to which the user employs the system to carry out the task. In the post-adoption context, more use is not always considered desirable. There is a plethora of social and economic impacts at the level of the individual, the work group, and the organization which are not only captured by the intensity of use measure (Sharma, 2011). The value of BIS is not solely generated by the use of BIS, but by activities based on the information provided by BIS that are going in the right direction to achieve successful business performance management (Popovič et al., 2012). Therefore, it is important for BIS use whether users are acting on the basis of the information provided by BIS.

In the BIS context there is a need for multi-dimensional measures of how extensively a BIS is utilized in an organizational context for different tasks. The research therefore agrees with Sharma (2011), by capturing the utilization of BIS for decision support (problem-solving and decision rationalization), work integration (horizontal and vertical integration), and customer service functions. The decision support function relates to improving the decision-making process, and making sense of the data.

Thus amplifying creative judgment in problem-solving. The horizontal and vertical integration function captures the communication and coordination of work activities with others in the organization. Finally, the customer service function involves creating value for customers by improving customer service. This multi-dimensional concept of system use “identifies key performance-related usage behaviours” capturing the social and
economic impacts of BIS in the organizational work environment. Sharma (2011), state that how extensively IT is used to perform these functions defines how effectively it is used in the organizational context”. In relation to this was the introduction of the term “extended use” that refers to using several of the complex system’s features to support an individual’s task performance.

A business intelligence system is usually not a single application but consists of different components closely related to each other, enabling users to select and analyses data, make aggregations and display the results in a form that is easy to use and understand. Business intelligence technology enables users to quickly understand complex information so that they can make better and faster decisions and thereby efficiently achieve business goals. Key benefits that business intelligence aims to create are the increased efficiency and effectiveness of the organization. Some business intelligence solutions enable a faster flow of and easier access to information within the organization (for example, by facilitating the means of creating, modifying and distributing standard reports). Some other, more recent solutions are based on a more aggressive approach that in certain cases requires a redefinition of existing processes and their optimization, which can create new, previously unknown possibilities and opportunities these systems have become an almost indispensable part of the success of an organization. With the help of business intelligence, managers can quickly and effectively detect important trends, analyses the behaviour of customers and facilitate expedient decision-making.

Business Intelligence is a broad concept which includes the appropriate orientation of the entire organization. It deals with the acquisition, management and analysis of large amounts of data about business partners, products, services, customers and suppliers, activities, and transactions between them (Lu & Zhou, 2000). In other words, it is an organized and systematic process by which an organization acquires, analyses and circulates information from internal and external sources which is relevant to its business activities and decision-making (Lönnqvist & Pirttimäki, 2006). It is a comprehensive concept, whereby an entire organization is committed to use the available information systems (including business intelligence) in the most effective way with the aim of obtaining quality and timely information for decision-making, thereby creating competitive advantages. Such a concept must be supported by the senior management of a company and extended throughout the organization (Ubiparipović, 2011)
5.3.3 Embeddedness of Business Intelligence Systems and its Influence on Customer Satisfaction in Higher Education Institutions in Kenya

The technology diffusion perspective in the post-adoption phase of the stage model of IT implementation, use should evolve from initial acceptance through the routinization phase to infusion. Popovič et al., (2012), says the fusion of BIS evolves when the BIS and business correspond to the “oneness-with-environment property”. In the context of BIS, according to Shanks et al. (2012) fusion involves deeply embedding BIS within the business to create “BI-driven decision-making routines and BI-enabled organizational processes that take managerial decision making to new levels of understanding and foresight”. The dimension of deep structure usage as exploitive system usage, which can occur in the way a person restructures information or in any other way that evokes interesting new ways of seeing. In connection to this, post-adoptive behaviour or continuing IT use is likely to reflect a “habitualization of action, where the decision to use the IT application feature occurs more or less automatically via a sub conscious response to a work situation” and Ortiz de Guinea and Markus (2009) support this habitual and automatic use. More comprehensive usage of BIS is more likely to become habitual and that habitual IS usage is also less prone to discontinuance.

All these conceptualizations imply that after having successfully integrated IS within the organizational environment, the breadth and depth of BIS use can create synergies, leading to gained competence, the creation of a competitive advantage and ultimately an organization’s better performance. Since BIS provide innovative and competitive information usage that is deeply embedded into the routines of workers can enhance these organizational goals.

The findings of this study provide proof supporting the conceptualizing of the three different dimensions of BIS use. The researcher particularly introduce a dimension of embeddedness of BIS, which has not been included and studied in acceptance models previously. This provides a significant addition for understanding deep structural use of BIS that contributes to the success of BIS. Embeddedness of BIS into the routines of workers should lead to improvements of business processes, improve firm performance and create competitive advantage. The rich measurement of different types of usage is a response to the observation. In general, findings thus provide novel insights regarding the importance of established predictors of use behaviour in BIS use context, emphasizing the
prominence of organizational factors such as social influence, result demonstrability, management support and governance mechanisms for BIS renewal aligned with business strategy that should be constantly evolving for continued and effective BIS use.

These can only be developed in the long term or constantly and can be classified as trans-implémental measures. Overall, the findings enrich us understanding of the phenomena of post adoption BIS use behaviour in the BIS context social influence and result demonstrability seem to impact on behavioural intention to use BIS. Since use of BIS is primarily voluntary and benefits of use are more indirect and long termed as compared with operational IS, individual’s intentions to use BIS are more influenced by their beliefs about how others will view them as a result of using BIS. Therefore, if users perceive benefits particularly on their image, corresponding with potential social status gains and that the results of use are visible, the use of BIS will become more embedded into their routines. This is consistent with the findings of Sharma (2011) who argue that in voluntary settings the mechanism of “internalization” comes to fore, which refers to the process “by which, when one perceives that an important referent thinks one should use the system, one incorporates the referent’s belief into one’s own belief structure”. Furthermore, internalization explains why direct impact of performance perceptions on intention appears not to play a significant role, but is rather incorporated in social influence and result demonstrability. As Sharma (2011) say “if a superior or co-worker suggests that a particular system might be useful, a person may come to believe that it actually is useful, and in turn form an intention to use it”. The perceived tangible and demonstrable recognition of benefits, captured by result demonstrability, seems to impact on users’ intentions to use BIS. Therefore, intention to use BIS is thus not driven by direct performance perceptions, i.e. perceptions of faster and easier access to information, but by perceptions that they can contribute and improve business performance, based on the information provided by BIS, which presents the added value of BIS.

5.4 Conclusions

5.4.1 Effect of Intensity Use Business Intelligence Systems on Customer Satisfaction

The findings show that Business Intelligence (BI) systems add strategic value at university. The finding of the study also shows that university through BI systems is able to improve service delivery by properly managing the organization information and using it in
improving decisions made by the organization. Therefore, BI systems have strategy value given that it has improved decision making, managing customer’s issues and innovation.

The study indicates that Business Intelligence (BI) systems made contribution to value networks and not merely financial benefits, but also knowledge, among other benefits. The study confirmed that BI systems are important investment that institutions need to consider to remain competitive. It is however important to ensure that institutions that choose to invest in the BI systems consider the challenges involved.

The study also revealed training and education as core to the operation of Business Intelligence (BI) systems and for that reason the study concluded that adequate and relevant training of staff is necessary in running of the BI systems. To address the challenges arising from use of BI systems the study concludes that it is important to consider system integration; it is important to ensure the adopted system is compatible with the existing system and software. Finally, the study concludes that it is important to have correct budgetary allocations to overcome the challenges of cost overrun.

5.4.2 Effect of Extent Use Business Intelligence Systems on Customer Satisfaction

Although this study provides new and valuable results, it also has some limitations that should encourage future related research. A limitation of this study is that it examined a cross-section of interviewees’ perceptions of different dimensions of use. It would be beneficial to perform a longitudinal study that would capture different understandings of BIS use as they evolve over time. Future research should also study the antecedents that drive each dimension of use in order to understand how to induce and enhance them. A study of how the embeddedness of BIS actually impacts organizational performance would also be beneficial. Meaningful BIS use requires capturing both quantitative and particularly qualitative measures that lead to greater and effective BIS utilization. The model estimation provides sound support for the conceptualization of the three dimensions of use, namely intensity, extent and embeddedness as different constructs. Over-all, the findings enrich our understanding of the phenomena of post-adoption BIS use behavior, leading towards the embeddedness of BIS in an organization’s work system and strategy.
5.4.3 Embeddedness of Business Intelligence Systems and its Influence on Customer Satisfaction

The study provide proof supporting the conceptualizing of the three different dimensions of BIS use. We particularly introduce a dimension of embeddedness of BIS, which has not been included and studied in acceptance models previously. This provides a significant addition for understanding deep structural use of BIS that contributes to the success of BIS. Embeddedness of BIS into the routines of workers should lead to improvements of business processes, improve firm performance and create competitive advantage. The rich measurement of different types of usage is a response to the observation of Jaspers et al. who encourage researchers to move beyond simplistic views of use (measured only by frequency) in order to “expose the sufficiently rich depictions of use history” and “understand the path-dependent episodes of use leading to routinized or habitual use of an IT application.

5.5 Recommendation

5.5.1 Recommendation for Improvement

5.5.1.1 Effect of Intensity Use Business Intelligence Systems on Customer Satisfaction

The study recommended that there should be more awareness on the use and Business Intelligence (BI) systems in Universities. As much as extent of use is concerned, there is need for the Universities to explore what other ways it can leverage more on these systems. There is also need for the organization to train its staff in the best use of Business Intelligence systems in order to ensure that there is proper use for maximum benefit of the concept and to benefit more on the value that the organization may get from Business Intelligence. Universities need to evaluate whether there has been proper investment in human resource and systems as an integral part of the different resources that exist in the organization and on whether the organization is maximizing on the benefits that are associated with the use of BI systems as a strategic plan meant to add value to the operations of the organization.

5.5.1.2 Effect of the Extent Use Business Intelligence Systems on Customer Satisfaction

The findings revealed that, indeed, BI systems adoption impacted the organizational performance of universities positively as the four dimensions of the BSC, i.e. learning and
growth, internal business process, customer and finance were all found to be significant with BI Systems adoption. BI systems adoption were found to have a direct positive significant relationship with learning and growth, internal business process and customer performances. However, the findings showed that BI systems adoption does not have a direct significant relationship with finance performance but rather through an indirect positive significant relationship with learning and growth, internal business process and customer performances.

5.5.1.3 Embeddedness of Business Intelligence Systems and its Influence on Customer Satisfaction

The findings thus provide novel insights regarding the importance of established predictors of use behavior in BIS use context, emphasizing the prominence of organizational factors such as social influence, result demonstrability, management support and governance mechanisms for BIS renewal aligned with business strategy that should be constantly evolving for continued and effective BIS use. These can only be developed in the long term or constantly and can be classified as trans-implémental measures. Overall, the findings enrich our understanding of the phenomena of post-adoption BIS use behavior.

5.5.2 Recommendation for Further Research

Future researchers should consider investigating the influence of factors such as government regulations and industry policies on business intelligence systems or other factors either as independent or moderating variables that can influence the decision of Mobile Telecommunication firms when making a decision on the kind of business intelligence system that a firm should adopt. A comparative study should be conducted in another country both in the sub-region, the developed and developing world to ascertain the business intelligence systems used by Mobile Telecommunications and whether they impact on customer service management. Then, the results can be compared and a plausible conclusion can be drawn based on facts. A similar study should be carried out in another industry such as the banking sector to ascertain the relationship that exists between business intelligence systems and customer service management. This will enable the researchers to compare findings after which a more reliable and accurate conclusion can be drawn.
REFERENCES


Cherono, C.B (2014) Competitive Strategies used by Standard Group Ltd to Sustain Competitive Advantage in the Media Industry, Unpublished MBA Research project, University of Nairobi


Sharma R.S. and Dijaw V. (2011) Realising the strategic impact of business intelligence tools, VINE: The journal of information and knowledge management systems, 41,(2),113-131


Dear Sir/Madam,

RE: RESEARCH PROJECT

The undersigned researcher is an MBA student in USIU pursuing a Master’s in Business Management (Strategic Management option). The researcher would like to investigate the relationship between business intelligence and customer satisfaction in higher education institutions in Kenya. Your organization has been selected to be part of this study. You are kindly requested to assist by responding to the questions posed as truthfully as possible. The information obtained will be treated with the utmost confidentiality and used for the purpose of the study only.

Thanks in advance for your cooperation

Yours Faithfully,

Collins M Kibiwott | Student ID 646274
APPENDIX II: QUESTIONNAIRE

My name is Collins M. Kibiwott, a student in United States international university, pursuing a master’s degree in business administration. This questionnaire is distributed in order to gather information regarding the relationship between business intelligence and customer satisfaction in higher education institutions in Kenya. Through your participation, the study will be able to make possible recommendations that will highlight the intensity and extent of use of business intelligent systems in achieving customer satisfaction. Further, it will isolate embeddedness of business intelligence systems in delivering superior customer satisfaction. The information you provide will be treated with confidentiality and will solemnly be used for the purpose of this study.

SECTION A: DEMOGRAPHIC INFORMATION

1. Gender of the respondent?
   Male ( ) Female ( )

2. Indicate your Age Bracket?
   18-30 years [   ] 31 to 40 years [   ] 41 to 50 years [   ] above 50 years [   ]

3. What is your highest level of education?
   PhD [   ]
   Master’s Degree [   ]
   Degree [   ]
   Diploma [   ]

4. How long have worked in United States International University, Africa?
   Less than 1 year [   ] (1-5) years [   ] (5-10) years [   ] (above 10 years) [   ]

5. Which is your area of operation?
   Finance and accounting Department [   ] Operations Department [   ]
   Sales and marketing Department [   ] ICT Department [   ]
   Risk Management Department [   ] Customer Care Service Department [   ]

6. What is your level of management?
   Top management [   ]
   Middle management [   ]
   Cadre staff [   ]
SECTION B: INTENSITY OF USE

In a scale of 1 to 5 indicate your opinion in the level you agree with then following statements in your organization regarding intensity of use of business intelligence systems in your organization.

<table>
<thead>
<tr>
<th>Business intelligence system intensity of use</th>
<th>Do not use</th>
<th>Slightly used</th>
<th>Used averagely</th>
<th>Used greatly</th>
<th>Used fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU1 I use BIS as a routine part of my job</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU2 I use BIS at every opportunity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU3 I have been increasingly using BIS</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU4 I use BIS to serve internal and/or external customers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU5 I use BIS to improve the quality of customer service.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU6 I use BIS to more creatively serve customers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU7 I use BIS to predict opportunities that come in the future</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU8 I use BIS to predict consumer behavior in my market niche</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>IU9 I have been suing BIS to create and retain Consumers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>


SECTION C: EXTENT OF USE

In a scale of 1 to 5 indicate your opinion in the level you agree with then following statements in your organization regarding extent of use of business intelligence systems in your organization.

<table>
<thead>
<tr>
<th>Business intelligence system Extent of use</th>
<th>Do not use</th>
<th>Slightly used</th>
<th>Used averagely</th>
<th>Used greatly</th>
<th>Used fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU1 I use BIS to help me think through problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU2 I use BIS to make sure the data matches my analysis of problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU3 I use BIS to check my thinking against the data.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU4 I use BIS to help me justify my decisions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU5 I use BIS to help me make explicit the reasons for my decisions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU6 I use BIS to rationalize my decisions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU7 I use BIS to control or shape the decision process.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU8 I use BIS to improve the effectiveness and efficiency of the decision process.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU9 I use BIS to make the decision process more rational.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU10 My work group and I use BIS to coordinate our activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU11 I use BIS to coordinate activities with others in my work group.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU12 I use BIS to exchange information with people in my work group.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU13 I use BIS to help me manage my work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU14 I use BIS to monitor my own performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU15 I use BIS to get feedback on job performance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU16 I use BIS to communicate with people who report to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU17 I use BIS to communicate with people I report to.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EU18 I use BIS to keep my supervisor informed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
SECTION D: EMBEDDEDNESS OF BUSINESS INTELLIGENCE SYSTEM

In a scale of 1 to 5 indicate your opinion in the level you agree with then following statements in your organization regarding embeddedness of business intelligence systems in your organization

<table>
<thead>
<tr>
<th>Embeddedness of Business intelligence Systems</th>
<th>Do not use</th>
<th>Slightly used</th>
<th>Used averagely</th>
<th>Used greatly</th>
<th>Used fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM1 Use of BIS is seamlessly integrated with business process execution in the institution</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EM2 BIS is embedded into the decision-making routines of decision-makers across the organization</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EM3 The importance and use of insights from BIS are embedded within the business strategy formulation process, leading to alignment of the BIS and the overall corporate strategy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>EM4 Processes in which there is an information need for analytical decision making are carried out without interruption due to the use of BIS.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
SECTION E: CUSTOMER SATISFACTION

In a scale of 1 to 5 indicate your opinion in the level you agree with the following statements in your organization regarding customer satisfaction.

<table>
<thead>
<tr>
<th>Customer satisfaction</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS1 Overall, I am very satisfied with the way the university is handling its customers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS2 I often come to university because of Excellent customer services</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS3 Customer service, have resolved all my problems to my complete satisfaction</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS4 This is one of the best universities I have ever visited</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS5 Based on my experience, I will come to the university again</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS6 Based on my experience, I would highly recommend a friend to join this university</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS7 I am satisfied with my decision to join this university</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS8 I feel bad about my decision to enroll in this university</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS9 I am not happy that I came to this University</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CS10 I Think that the institution know what I want and delivers it</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

THANK YOU FOR YOUR RESPONSE