INNOVATIONS AND SERVICE QUALITY IN KENYAS' HIGHER EDUCATION

BY

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DECLARATION

The project is a product of my own work and is not the result of anything done in collaboration. It has not been previously presented to any other university for a degree.

Signature …….

Martin Munune Mbuchi …….. DATE……

The research project has been submitted for examination with our approvals as university supervisors.

SUPERVISOR'S SIGNATURE

Dr. XN Iraki …….. DATE……..

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DEDICATION

This research project is dedicated to my mother Muthoni Mbuchi for her moral support in needs and deeds throughout the study and my posterity. I specifically dedicate this project to my late dad Mbuchi Mwathi who was so strict on my studies and that's why I'm doing education research today.

ABSTRACT

Innovations and service quality in higher education has been important for decades. In Kenya quality in higher education was embraced some years back by facilitating vigorous process and standards such as enterprise resource planning (ERP), international organization for standardization (ISO). The study sought to determine the relationship between innovations and service quality in Kenya's' higher education. Descriptive design was adopted with fourteen universities considered for the sample. Simple random sampling was used and a total of 42 questionnaires were administered. All the 42 questionnaires were returned. Analysis and various tests were done using varied statistical tools.

Research findings indicate that innovation in universities remains the biggest challenge to quality. Some of the innovation types like services are poor. The applicability of innovation in driving university service quality such as internet based financial services is critical.

The findings also indicated weak relationships between innovation and service quality in universities. The innovations constraints in both the established universities and the constituent colleges continue to be felt.

The need to address innovation and service quality gaps as well encourage continuous professional development of the staff is therefore urgent in this area. Universities need to set aside proportional amount of funds for staff development, so as to encourage staff to continuously undertake research on innovations.

Of importance also is embracing e-leaning as a model for knowledge dissemination at universities. E-content development is a clear driver that will facilitate greater outreach for university education in Kenya, and attend to the long-term innovations and service quality gaps that cannot be adequately addressed with the growth in demand for higher education in Kenya.

TABLE OF CONTENTS

CHAPTER THREE

CHAPTER FOUR

List of Abbreviations

BBC	British Broadcasting Corporation
BET	Break even time
CUE	Commission for university Education
CHE	Commission for University Education
EDS	Education Specialist
EDX	Electronic Data Inter
GIS	Geographic Information System
GDPS	gross national products
HEDPERF	Higher education performance
IEKS	Initial Vocational Training
IPA	Importance-performance analysis
MOOC	Massive Open Online Courses
IP	Internet protocol
PH.D.	Degrees or Doctor of Philosophy
PLC	Product Lifecycle
KENET	Kenya education network
R&D	Research and Design
RFID	Radio Frequency Identification
SDP	service delivery protocol
SPSS	Statistical Package for Social Sciences

STEPP	Student e-rent Pilot Project Programme
UDL	Universal Design for Learning
UK	United Kingdom
US	United States
USA	United States of America

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

In the past decade, innovation has become vital for universities, besides their core mission in education, training and research. Innovation is about growing knowledge which is often scientific and high-tech, but not exclusively so. As long as an institution is creating knowledge at a faster rate and to a higher level than its competitors, then it is opening up opportunities for innovation with the eventual potential of improving the society by creating jobs and wealth (Prendergast, 2013).

Michael (2004) observes that because of higher education the world has been catapulted the into the information age in which knowledge is the only enduring asset of any society. Knowledge has not only become an agent for societal change but also for societal progress. Therefore, with a capacity toward societal destruction at the macro level; it can be deduced how important higher education is from the close relationship in the Gross National or Domestic Products (GDPs), the rates of participation in, and how much is spent expenditures on higher education. Higher education is of great economic importance and this can be seen on a micro level by critically looking at the earning power that is often pegged on educational attainment. Currently, most economies are operating under knowledge economies within which knowledge serves is the driving force that's spurs economic development. Under these economies, higher education becomes a precious asset to anyone who attains it.

While there are many and certainly daunting challenges, management of institutions of higher education does not have to struggle in the dark to address these challenges. Globalization has resulted to the free flow of information and therefore exposes plenty of successful and failed reforms around the world from which these institutions can learn. Successful institutions are actually products of the unfaltering efforts of management teams that are well informed, futuristic minded; full of insight, thoughtful, progressive and true to their situations. Great institutions of higher education are founded by management teams that are wise to allocate adequate resources that enable their systems counted among the best in the world, and in

societies that understand the role played by higher education in their civilization, and are therefore courageous enough to risk investing and get involved fully affairs of their higher education (Michael, 2004).

Higher education has been a center of attention in recent as universities seek more effective systems to deal with the increasing dissatisfaction with the performance of higher education systems. Therefore, new approaches and practices in management and industry have continued to appeal to the stakeholders of higher education in response to the necessity for forming higher education systems that are in line with the needs and expectations of the community and the business sector (Mizikaci, 2006).

White and Glickman (2007), point out that in institutions of higher learning, information technology not only affects the delivery of academic content but also the auxiliary operations involved. They argue that if the present day crop of students is more tech-savvy than the majority of the faculty, the implications for the academy without doubt include a wide range of opportunities to leverage the fruits of new hardware and software tools in ways that truly augment the learning experience. This will however require flexibility on the part of the Faculty to accept such technological implications. Consequently, as universities get more conscious of ratings on the global arena, new ways of Innovation in the delivery of supporting services will emerge; and the institutions whose operating processes are most adaptive to change will reap the most benefits.

Higher education has therefore become a major consumer of innovations. For example Zeff (2007) raises the issue of making higher education fully available to people with different learning styles and learning disabilities. For this purpose, Universal Design for Learning (UDL) can be used to offer guidance for implementing new technologies, coupled with innovations in the ways in which content is reconstructed, represented for delivery to these different groups of people. As institutions of higher learning recognize the implications of accessibility as advocated by UDL, they will find room for improvement in academic and auxiliary services.

Kinser and Robin (2007) point out to curricular innovations as exhibited by Western Governors University and the Leadership Foundation for Higher Education in the United Kingdom as good

examples of innovation and flexibility within academia. Kinser and Robin (2007) cite these two as initiatives that have effected change beyond the confines of one institution in the United States and United Kingdom respectively. Consequently, program development, curricular reform, and other similar or less similar innovations can help institutions meet Standards dictated by accrediting agencies or drive changes in the accrediting processes themselves.

In 2009, Intel Global Innovation Survey, Aspen Institute and Newsweek conducted an interview with 4,800 adults in the United Kingdom, Germany, United States, and China. In this survey, two-thirds of respondents believed that innovation would become more important than ever to the U.S. economy over the next 30 years (West, 2011). The interviewees agreed that innovation has been key to past economic success and development, and will remain vital for moving forward. Some interesting differences between Americans and the Chinese were also discovered in what they thought was important to future advances. For example, the Americans were found to be more concerned with improving education in math and science, while Chinese were more focused on developing skills for creative problem-solving and business. From this survey, it could be evident that people from different nations have different concerns about their current training in innovation and what they though would be important for future innovation.

According to National Science Board of USA (2010), in conditions of economic scarcity, institutions of higher learning no longer have the comfort of being passive and reactive, but must instead become proactive and forward-looking, and come with ways of how to create the foundation for sustainable economic recoveries. Universities represent a pivotal point of this paradigm shift in efforts to build innovation economies around the world. They are treasured generators of knowledge, and must thereof establish appropriate ways to transfer technology and commercialize knowledge. In this respect, it is crucial for University licensing offices to fast pace their review processes in order to spur the founding of businesses for higher education while thinking more seriously about innovation metrics so that they allocate resources efficiently and offer the appropriate incentives.

Delivering quality service is considered my many entities an essential plan for success and continued existence in today's competitive business environment. In the 1980s, the primary focus of both academic and managerial effort was on determining what service quality meant to

customers and developing strategies to meet customer expectations (Parasuraman, 1985 & Zeithaml, 1988). In the years that followed, many organizations even those whose main offerings involve physical goods such as automobiles or computers have put in place measures and management approaches that serve to enhance their service and product delivery. The service-quality agenda has consequently moved and reconfigured to bring on board other issues which are of top most priority today such as understanding the impact that service quality has on profit and other financial outcomes of the organization, (Greising, 1994; Rust, Zahorik, & Keiningham1995).

Abouchedid and Nasser (2002) argued that the service quality concept in higher education is linked to and cannot be separated from the competitive service and success of an institution. Service quality serves to meet the basic objective of enrolment and retention of students at the institutions of higher education (Maringe and Gibbs, 2009). Abouchedid and Nasser (2002) further ascertain the value of providing acceptable services to students helps to maintain the stature and academic reputation of an institution.

Furthering on this argument, Abdullah (2006) also states "service quality has emerged as a pervasive strategic force and a key strategic issue on management's agenda." Since economic forces resulting from the development of global education markets and the reduction of government funds that forces tertiary institutions to seek funds from other sources (Ivy, 2008) higher education in recent times is fast being driven towards very stiff commercial competition. The emerging scenario drives the conclusions that higher education should henceforth not only be concerned about society's perception of the skills and the abilities offered to their graduates but also about the perception of students about their educational experience. This also calls attention to a specific management process which suggests a shift from the traditional areas like accreditation and performance indicators of teaching and research to putting more emphasis perhaps on focusing on students as customers (Hemsley–Brown & Oplatka, 2006).

The nature of services may explain the limited research that has explored innovation and its implementation. According to Fitzsimmons &Fitzsimmons (2004) and Johnston and Clark (2008), it is the "labor intensity, high variability of delivery, coproduction with the consumer, intangibility, and the perishability or time sensitivity of services" that makes "innovation in

services substantially different in type and in adoption processes from the innovations in traditional manufacturing settings."

1.1.1 Innovations

The notion of Service Innovation was first discussed by Miles (1993) and has been worked on and developed in the past two decades. This concept is used in reference to many things which include but not limited to; services and service products (whether new or improved service products that include commodities or public services). Although service products can have technological elements, service innovation is often contrasted with 'technological innovation'. In this sense service innovation is closely linked to service design and 'new service development'; Innovation in service processes on new or improved ways of designing and producing services. This may comprise innovation in service delivery systems, though often it will be viewed instead as a service product innovation. This kind of innovation may be technological, technique- or expertise-based, or a simple matter of work re-organization (e.g. restructuring work between professionals and paraprofessionals); Innovation in service firms, organizations, and industries – organizational innovations, as well as service product and process innovations, and the management of innovation processes, within service organizations.

According to Theodore (2007), innovation in higher education may refer simply to some new way of accomplishing things, or a resulting change that enhances administrative or scholarly performance, or a transformational experience based on a new line of thought. Theodore (2007) continues to state that:

"…Today's higher education administrators, who must balance the fiscal pressures of running a large organization influenced by external forces such as rankings and increased competition for students and faculty and internal stresses produced by boards and accrediting agencies who are demanding more transparency, accountability, and tangible evidence of success, are best served by seeking continued innovation in curricular programs, delivery mechanisms, support services, and operations. These, and more, are crucial to the continued success of institutions of higher learning…"

Susan et.al (2007), also points out those leaders in higher education ought to understand that multi-dimensionality of technology accelerates innovation in an area such as education and

social networking. Therefore when combined with organizational changes, digital technology, innovation can generate potent new efficiencies and economies of scale. Public opinion surveys bring out interesting results in how people view innovation despite the importance of the connection between technology innovation and economic prosperity. While focusing on technology, Kevin et.al (2007) discuss how it can drive innovations in operations and offer opportunities for the delivery of academic programs in new ways. The flexibility afforded by such new technologies can facilitate gains in many facets of an institution's operations, so long as these institutions are willing and able to accept the technologies.

1.1.2 Service Quality

Zeithaml and Bitner (1996) pointed out the increasingly important role that Service industries are playing an in many economies of the world. In the present world of global cut throat competition, delivering quality service is a key for success, and many experts agree that service quality is the most powerful competitive trend currently shaping marketing and business strategy. Since the 1980s service quality has been linked with increased profitability, and it is seen as providing an important competitive edge by generating repeat sales, customer loyalty, positive word-of-mouth feedback, and competitive product differentiation. Service quality has therefore come out as an all-encompassing strategic force and a key strategic issue on management's agenda. This has resulted into great interest by practitioners and academics alike to accurately measure and determine levels of service quality in order to understand better its essential antecedents and consequences, and ultimately, establish methods for improving quality to achieve competitive advantage and build customer loyalty. The measurement of service quality and its subsequent management has become of utmost importance due to the pressures driving successful organizations toward top quality services, thus creating an understandably high interest in the measurement of service quality. However, the intrinsic problem in the implementation of such a strategy has been compounded by the indefinable nature of service quality construct, making it quite difficult to define and measure. Although much research has been done to address service quality, there are still some unresolved issues that have not been well addressed; the most contentious of which refers to the measurement instrument (Abdullah, 2005).

Yildiz and Kara (2009) argue that there have been increased interests in the study of service quality in the environment of higher education. They however observed that one could argue that since institutions of higher education do not operate directly in the competitive market environment that the commercial businesses operate in; they have to be more concerned about the perceived service quality that results from the ever fundamentally changing nature of higher education across the world. Using the same logic to conceptualize of the role of service quality for service industry, it can be hypothesized that institutions of higher education that do not offer high quality services will be phased out the market and their effectiveness in achieving organizational goals will be hindered (Kotler & Fox, 1995). Accordingly, there have been attempts to design measurement instruments of service quality for institutions of higher education.

Angell et. al. (2008) came up with an 18-item Importance-Performance Analysis (IPA) scale whose particular target were postgraduate students. These authors concluded that IPA was more suitable because it had ability to decipher strategic matters of higher education. Another recent measurement instrument called HEdPERF (Higher Education PERFormance) as advanced by Firdaus (2006c) has also been developed specifically to measure service quality in higher education. Although it includes statements designed to measure service quality at a university level, HEdPERF captures the determinants of service quality in a higher education sector at a macro level, and it is not specific enough to capture the unique characteristics of institutions of higher learning developing countries such as Kenya.

1.1.3 Evolution and Structure of Higher Education in Kenya

The Kenyan higher education system has its roots from Uganda's Makerere Technical College (now Makerere University) which from its inception in 1922 served the education needs of the three East African countries namely: Kenya, Uganda and Tanganyika (now called Tanzania). Makerere was made a University College of the University of London in 1949 based on the recommendation of the Asquith Commission on Higher Education. The Royal Technical College was set up in 1956 as Kenya's first higher education institution with the primary goal of providing students with an avenue of enrolling for engineering and commercial courses not offered by Makerere. The programmes offered here led to a higher certification at the University

of London, Britain. In 1958, upon the recommendation of a working party it was renamed the royal college of Nairobi and upgraded into a university college offering university of London degrees. In 1963 when Kenya attained her independence the royal college was renamed the university college of Nairobi and together with Makerere and Dar-es-salaam colleges in Uganda and Tanzania respectively formed the federal University of East Africa (UAE) which later disbanded in 1970. Each of the east African countries thereafter concentrated in developing their own national universities (Ngome, 2006).

The Asquith model involved the mentoring of institutions in the colonies, consequently new Institutions were linked to established universities as university colleges. This colonial model was created to guide university expansion through apprenticeship. It was arguably successful in that the University College of Nairobi (later renamed University of Nairobi through an Act of Parliament in 1970) was responsible for the conception of the Kenyatta University College which became autonomous in 1985. The latter was then responsible for the mentoring of the Jomo Kenyatta University College of Agriculture and Technology into a fully fledged university. The name college was subsequently dropped from the universities titles (Davis & Eisemon, 1993).

Higher education in Kenya is currently run by the Commission for University Education (CUE) formerly known as the Commission for Higher Education (CHE) which was established in 1995 under provisions of the university act. Some of the major functions pegged to the mandate of CUE include: accreditation of universities; promotion of university education objectives (development, processing, storage and dissemination of knowledge for the benefit of mankind); playing an advisory role to the minister in charge of education on matters concerning the development of university education and also the examination and approval of all proposed courses of study and course regulations submitted to it by private universities (a mandate which now extends to public universities alike) (Sifuna, 1998).

Although all these functions are fundamental for CUE to run university education, a number of criticisms have been leveled to the operations of the commission. Sifuna (1998) critics that the Commission's has been preoccupied with only one of its statutory functions, since its secretariat

became operational in 1986: The accreditation of private universities. The unfortunate politicization of planning and development of university education in the country has effectively hindered the commission from carrying out its roles. The government's hand in decision making has also made it difficult for the commission to play an active role in the management of public university funds and other budgetary matters. The Commission was also charged with the creation of the Vice-Chancellors' Joint Admission Board (JAB) to look into the selection of persons seeking enrollment in public universities, as well as maintenance of standards for causes and examinations. Sifuna also observed that planning in university education had slackened for a considerable length of time, and notes that the last attempt to plan was before rapid expansion and clamor for higher education started. Sifuna's study revealed that rapid expansion of university education was spontaneous response to the high demand for the same which kept on increasing as more and more people have put a lot of hope in higher education; a situation which according to Sifuna (1998) appears unique in the countries of this region.

The term higher education may be considered all encompassing and its definition varies depending on the systemic issues in different countries. The term higher education within the Kenyan context includes: public and private universities, polytechnics, technical training institutes, teacher training institutes, institutes of technology and other professional training institutions which could be government owned or commercial. All these constitute the tertiary education sub-sector (Afeti et al. 2008).

Therefore, innovation and service quality cannot be confined. Universities in Kenya must realize education system should be innovative be able to achieve service quality. Universities especially ones in Kenya would like to know the above mentioned purposes are giving them increased professional and operational efficiency hence this study.

1.2 Statement of the Research problem

In a paper, entitled *"universities and economic development in Africa; a case study of Kenya and the University of Nairobi,"* Bailey et.al (1998) identified a number of factors that determine the role of higher education in economic development. These factors were: relationship between the universities, political authorities and the society at large; the nature size and continuity of the

university's academic core and as well as the level of coordination and the effectiveness of implementation and connectedness into the larger context policy of universities. They concluded that innovation inputs from universities remained critical in a knowledge economy.

White and Glickman (2007), in their paper entitled "*Innovation in higher education: Implications for the future,*" looked into potential directions and implications of future innovation in higher education while focusing on innovation to address the adaptability, maturity, cost structure, and efficiency of the institution of higher learning; all these being the critical issues that administrators face today:

In her paper entitled "*Higher education in Kenya: an assessment of its rapid expansion and future prospect,*" Gathitu (2010) found out that the government actually had a long term policy designed to provide framework for sustainable competitive and autonomous national university education system as contained in Sessional paper No. 1 of Government of Kenya of 2005. Such a policy would take into account the comparative strengths of private and public institutions of higher learning with an aim to reducing wastage through unnecessary duplication of course/programmes especially at the university level.

More recently, Sultan (2012) in his paper "*Service quality in a higher education context: an integrated model,*" points out that, improving service quality within a higher education context is often mentioned as an internal goal without any explicit references to what is meant by service quality in higher education. It is therefore of little or no value to discussing better quality without defining what it is, or how it is perceived by students, and what the antecedents and consequences of quality improvements are, or how it can be improved and enhanced.

Although much research has been done on higher education, none that the researcher is aware of has focused on innovations and service quality in higher education in Kenya. The researcher strongly believes that Innovation and service quality in education has a crucial role to play for the effectiveness of learning/teaching, equity, and the cost efficiency of education systems. Thus, the aim of this study is to understand the relationship between innovations and service quality from the Kenyan context of higher education. More specifically, this study seeks to establish the extent of main innovation in the context of a university, as one of the consequences of service

quality evaluation mediated through student satisfaction and student trust. In this paper the researcher intends to answer two research questions: (i) to what extent are there innovations in Kenya's' higher education? (ii)What is the relationship between innovations and service quality in Kenya's higher education?

1.3 Objectives of the Study

1.3.1 General Objective

To determine the relationship between innovation and service quality in higher education in Kenya

1.3.2 Specific Objectives

i. To establish the extent of innovations in Kenya's higher education.

ii. To determine the relationship between innovation and service quality in Kenya's' higher education.

1.4 Significance of the study

The study is considered to be of use to the following interest groups and organizations.

Government

The findings of this study are of significance to the Government of Kenya as regulating authority that provides an enabling and conducive business environment. The study will help the government to appreciate the essence of formulating an adequate education system that is well blended to boost innovations and service quality in higher education.

Similarly the research will enable the government as regulator to evaluate institutions of higher learning viability through continued innovations and service quality to inspire learners and employers confidence.

Commission for University Education

Since the CUE is vested with the role of ensuring and given considerable statutory powers to run university education by promoting knowledge, planning , budgeting and financing of public universities, accreditation of private universities, staff development, scholarships and physical development of university education, standardization, equation and recognition of qualifications and course regulations; higher education can use the findings in the development of standards to be used while evaluating innovations and service quality in institutions of higher learning.

University Managers

To the university managers, the study will serve to enlighten them on how to detect changes in technology and take advantage of them to boost innovations and service quality.

Industry

Given that most companies are approaching institutions of higher learning for partnership on various course programme, the study will serves to enlighten them on how to gauge and benchmark their innovations and service quality ability and relevance in the industry.

Academicians

The study will provide a reference material for future researchers and scholars who would want to venture into this area of study.

1.5 Scope of the Study

The study consisted of institutions of higher education across Kenya. This research focused on universities in Kenya.

1.6 Chapter summary

In this chapter one there are five subsections, introduction, background, innovations, service quality, evolution and structure of higher education in Kenya, statement of the research problem,

objectives of the study, general objective, and specific objectives significance of the study and scope of the study. It introduces the next chapter for literature review for the problem under study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 The Nature and Meaning of Innovations

There are different definitions of innovations. For example, it is "the quest for finding new ways of doing things" according to Garcia & Calantone (2002). Porter & Ketel's (2003) definition of innovation as 'the successful exploitation of new ideas,' is much similar to that of Garcia & Calantone (2002). In both definitions, much focus is put on innovation as a way by which organizations can secure a competitive edge over their rivals in globally competitive environments by either exploring new ideas or by finding new ways to accomplish tasks. Tidd et.al (2001) broadly defined innovation as 'change' that includes 'the creation and commercialization of new knowledge'. Furthermore, in terms of a firm's generic innovation strategies (Porter, 1980) pointed out the importance of relating innovation directly with cost leadership strategies. In this regard, innovation can either lead to reduction in unit cost (cost leadership) or encourage the customers' willingness to pay a higher price (differentiation).

It is necessary to consider two basic concepts in order to understand the concept of innovation better. Tushman and Nadler (1986) suggested that "innovation is the creation of any product, service or process that is new to the business unit". From this definition, the first dimension of innovation can be identified as that regarding 'what is being changed' i.e., the types of innovation (Tidd et. al., 2001). Four types of innovation namely: product/service, process, organization and market innovation are thereof discussed from this dimension.

Innovation that related to changes in an organization's product/service offerings is one of most commonly identified. In this case Romaine (2004) singles out the British Broadcasting Corporation (BBC) as an organization renowned worldwide for coming up with new and innovative television series. The second type of innovation i.e., process innovation, is associated with changes in the way the products/services are made and delivered, for example, a new way

of piecing together car parts at an automobile plant would constitute such an innovation. Thirdly, Organizational innovation refers to innovation at the level of the firm rather than a technological change. Shell's Game Changer initiative, which has revolutionized Shell's oil exploration and discovery division, is singled out as a good example of this type of innovation.

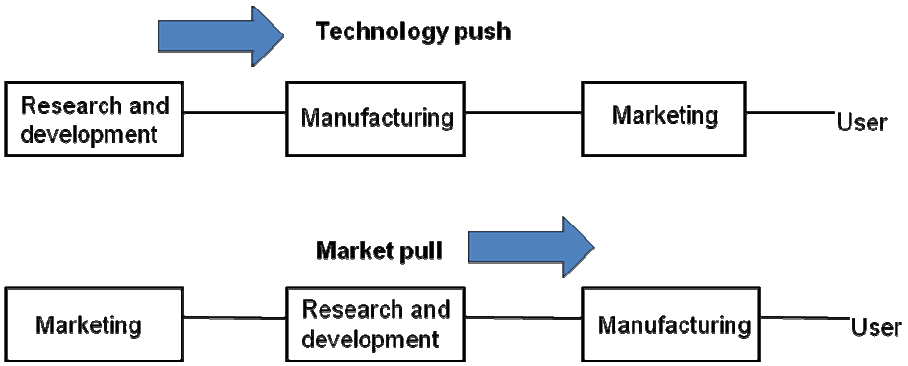
There are also other types of innovations that not only change the basis for competition but also redefine the industry they play in. Fuller and Stopford (1996) described these as strategic innovations in established industries, and are the causes of change to markets and market segments. Thus, such market innovation has potential to combine product/service and process innovations, resulting in a total redefinition of the business environment within which an organization exists. Swatch (the Swiss watch company) which arguably redefined the low-end market segment of the global watch industry and in the process brought back to life the entire Swiss watch industry, is an example of such an innovation, (Pitt, 1996). From the above definitions therefore, the study adopted Tushman and Nadler's concept of innovations to showcase higher education service innovations.

2.1.1 Models of Innovations

The discipline of innovation management, in contrast, has a long tradition of analyzing and structuring innovation processes. The first concepts that assumed a linear "technology push" of innovations were propagated in the middle of the 20th century. These were followed by a period of "market pull" based innovation process models in the late 1960s (Rothwell, 1994). However, later studies revealed that innovation processes in their true sense are seldom linear in nature but are rather characterized by discontinuities (Tushman & Anderson, 1986).

2.1.2 Linear Models of Innovation

Figure 1.



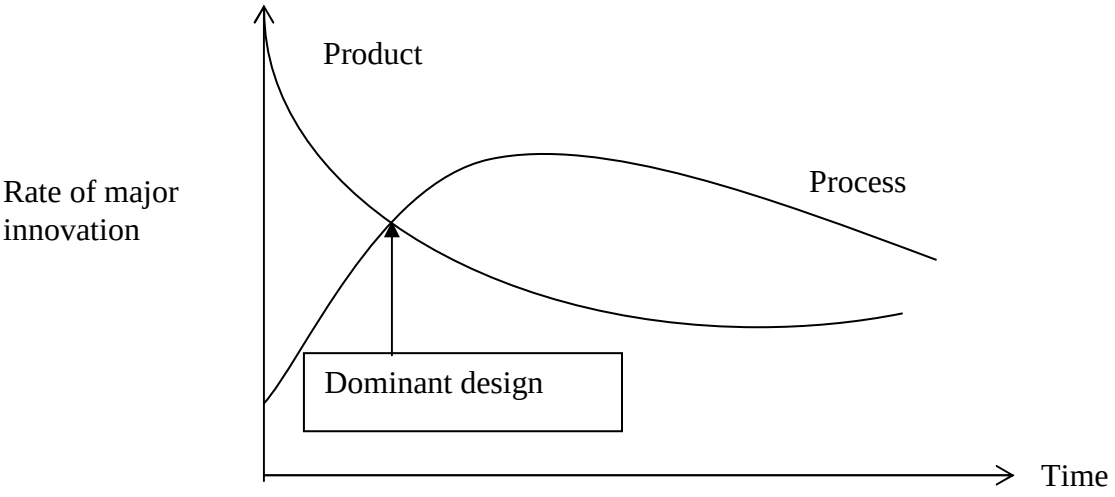
Source: Trott (2008)

2.1.3 Product Life Cycle

Abernathy and Utterback (1978) developed perhaps what could be considered the most significant conceptual framework for understanding how institutions manage the innovation process. This was called The 'Product Life Cycle' (PLC) model of innovation. The PLC model in Figure 2 below shows the innovation dynamics in an industry by focusing on the rate of innovation against time in physical products and processes. Three major stages of innovation in the life cycle of a product are described in this figure (from birth to maturity).

2.1.3.1 Product life cycle

Figure 2



Fluid phase	Transition phase	Specific phrase
• Product: high variety • Low volume process • Organic management • Many small firms with customized products	• Standard products • High volume process mechanistic management • Low skilled work force • Oligopoly of large forum with similar	

Source: Adapted from Utterback (1994)

Fluid phase: This is majorly a product innovation phase characterized by competition between many small businesses offering competing product designs.

Transitional phase: This phase signals a shakeout when an industry becomes dominated by a few big firms which emphasize on process innovation and the production of standardized products in high-volumes and was initiated by the emergence of a ‘dominant design’.

Specific phase: This phase applies when there is a reduction in the rate of product and process innovation. The model shows how products just like living organisms assume a life cycle of growth from birth to maturity. The focal point of innovation in this model changes over time from innovation in products, as a great variety of alternative designs get supplied many different smaller entrepreneurial firms. In the transitional phase, a standardized or ‘dominant design’ replaces product variety and the rate of innovation in processes speeds up. When a dominant design emerges, it indicates a shakeout where small a number of large corporations that have vertically-integrated structures begin to dominate the industry. After the design of the product is agreed upon, these large firms gain increasing market shares by producing a limited range of products at much lower cost. This characteristic pattern of evolution is from time to time interrupted by waves of radical innovation, which compel firms that are tied to the existing technologies to take on the new innovations or risk being downgraded to a minor role in the industry.

The model is used to illustrate how the innovation focus, management types, structures and competencies of the firm must transform as an industry transforms from low-end production and high-variety in products to high-end production and standardized products; from skilled labour and general purpose machinery to low-skilled labour and specialized equipment; from organic structures of management used by small, entrepreneurial firms to mechanistic structures used by large, hierarchical corporations (with few rewards for radical innovation) (Burns and Stalker, 1961)

Well thought out predictions about the changes that are likely to occur within a particular industry by firms to make and to develop a better-off set of strategies that help respond to such changes can be made using the PLC model. According to Barras (1986), early that in the phase of product innovation 'technology push' is the main driving force, but in the later stages as the process of innovation increases, the 'demand pull' pressures of users of technology and products increasingly become central. Service firms and industries are the major consumers of innovations supplied by capital goods industries. In the 'reverse product life cycle' model developed by Barras (1986), there are three Phases of innovation in services with particular emphasis on user industries that adopt technology. These phases are the improved efficiency phase, the improved quality phase and the new services phase.

Improved efficiency phase relies on improving processes so as to increase the efficiency in the delivery of existing services. In the improved quality phase, process innovations which improve the quality of services become central while the new services phase relies on product innovations to generate new variety in services. By conducting a study on how three service sectors (insurance, accountancy and local government) adopted Information Technology, Barras (1986) showed how the impact of new technology influenced organizations on labour change during the life cycle. The intent of process innovations during the first phase is basically to save on labour, therefore resulting to restructuring of organizations to achieve cost savings and increased efficiency.

The impact of innovation on labour utilization is neutral in the second phase, while the tendency of the third phase of product innovation is towards capital-saving technical change in which competition shifts to service variety in order to venture into and capture and new markets. As the already established firms undergo make over to enhance diversification, new firms and industries come up to supply the growing range of services that result from all these transformations.

Barras (1990) further developed the reverse product life model that emphasized on the interactive nature of the innovation process as a response to opportunities availed by technology, conditions of the market and industry characteristics. The reverse product life cycle has also been critiqued because it cannot be applied to all types of service industries just like the PLC model. It best applicable for high volume sectors such as insurance, banking, or hotels where the 'back office' activities are susceptible to extensive process innovation – and have been significantly affected by IT-based process innovations in recent years.

2.1.3.2 Open Innovation Model

In distinguishing between two contrasting models of innovation, Chesbrough (2003) asserts that the traditional 'closed innovation model' describes a process that is controlled by a single firm. In this case, the focus by Firms is on internal Research and Development (R&D) projects to create breakthrough ideas, and then develop the ideas into products and services to market, distribute and service them as well. However, in last few years, several factors have begun to challenge the traditional approach. These factors include the growing mobility of skilled people who take with them new ideas to a new employer, the rapid increase in time to market for products and services, entrepreneurial scientists, engineers and managers who on their own establish start-up firms to pursue breakthroughs.

The traditional model is therefore fast being replaced by a new 'open innovation approach' in which firms source for knowledge internally and externally to transform new ideas into products and services that find their routes into internal and external markets. This model thus illustrates how firms can start internal projects, while sourcing for new ideas from outside the firm and vice versa. It also shows how internal or external channels of distribution can be used by firms to venture into new markets. Cisco-the giant telecommunications equipment supplier is an example

of a manufacturing firm that has adopted this approach. In stead of allocating its own resources to internal R&D projects, Cisco invested in, joined with and/or bought many new start-up companies. This move strategically allowed Cisco to keep pace with the innovation output of some of the major R&D organizations such as Lucent Technologies, without carrying out much internal R&D.

The approach by Chesbrough (2003) placed the main concern with manufacturing firms that exploit open innovation to develop and commercialize new products; an approach that can be equally applied for useful gain to develop and commercialize new services. For example, the emergence of new digital media posses new challenges and makes it difficult even for established providers like the BBC to 'second guess' the ever fragmenting market they operate in. This means that it may not be sufficient to rely on traditional R&D, but rather open up to other options. An alternative that may be explored in such a situation is to try and bring on board a rich variety of players in those spaces that come up through a series of experiments in 'open innovation'. Such a move towards open innovation also supports the emergence of specialized service suppliers. "Innovation activities such as R&D, engineering, marketing, sales and distribution may be performed as functions within an integrated firm or supplied as 'services' by a separate firm" (Quinn, 1992).

2.1.3.3: Rothwell's Five Generations of Innovations Model; Progress in Conceptualizing Innovations

Table 1

Generations of innovations	**Key features**
First and second	The linear models-need pull and technology push
Third	Interaction between different elements and feedback loops between them-the coupling model
Fourth	The parallel lines model ,integration within the firm, upstream with key suppliers and

	downstream with demanding and active customers, emphasis on linkages and alliances
Fifth	Systems integration and extensive networking, flexible and customized response, continuous innovation

Source: adopted from Tidd, Beasant and Pavitt, (2005).

The model in figure on above provides a historical perspective on innovation management from an uncomplicated linear model to increasingly complex interactive models. Rothwell's 'fifth-generation innovation' approach looks at innovation as a process with many actors, and therefore needs high intra- and inter-firm levels of integration, that is increasingly enabled by adopting IT-based networking solutions.

The linear innovations model, PLC model, open innovations model and five generations innovations models are of significant impact in innovations higher education today and are therefore important in carrying out this study.

2.2 Measures of Innovations

Kaplan & Winby (2005) argue that while it obvious to start with financial metrics, there are also other measures that provide valuable additional insight. But defining the correct and best metrics for an individual business can be challenging. There's generally no one correct way and determining what, exactly, to measure comes out more of an art than a science. In 2005, an article published by Innovation Point (UK) argued that at the core of the problem is the fact that the present day's competitive environment is fundamentally different from the industrial environment in which traditional innovation metrics were born. Since most discussions of metrics are of benchmarked on industry leaders, they always have a propensity to go back to traditional measures of R&D investment and effectiveness. The most prevalent metrics possessed by such industry leaders include: Annual R&D budget as a percentage of annual sales; Number of patents filed in the past year; total R&D headcount or budget as a percentage of sales; number of active projects; number of ideas submitted by employees; percentage of sales from products introduced in the past X year(s).

Such metrics are of great value in driving investment in innovation and evaluating results, but they in some cases provide a limited view. For example, some of these metrics hinder strategic innovation in the present day environment in which looking for and obtaining ideas and technology from outside the company (open innovation) can create differentiation and competitive advantage. Consequently, in an environment characterized by disruptive innovation and constant introduction of new products and services that eat the former; new types of behaviors are needed and subsequently new structures and related metrics to enhance such behaviors ought to be adopted wholeheartedly as a core strategy.

'Metrics Overload' often poses a challenge to business leaders interested in defining metrics. An article published in Business Week (2009) took note of the many companies that had too many metrics trying to measure everything using different criteria. These overloads often make company executives look at their metrics as missing the 'core matter' and result to a dissatisfaction with their existing approach to measuring innovation. Using too many metrics leads to many activities that add little value and thus drive behavior in cross-purposes. Since innovation is undoubtedly identified as a central requirement for almost all companies across all industries, the metrics imperative can no longer be ignored. Leaders are forced to institute a new crop of metrics that move beyond traditional measures in order to create a conducive environment in the organization to support and drive strategic innovation; establish significant capabilities tuned to the emerging competitive business setting; assess efforts of innovation to ensure both return on investment and support feedback loops of learning and improvement.

2.2.1 Kaplan & Winby innovation metrics framework.

The innovation metrics framework developed by Kaplan & Winby tries to simplify the complex challenge of metrics for companies. The framework assumes that successful innovation is as a result of the synergies between several complementary success factors. This model brings on board two core principles: building a "family" of metrics that are essential for ensuring a well-rounded portfolio of measures, including both "input metrics" and "output metrics." According to Kaplan and Winby (2000), this is essential for ensuring that determinants that spearhead resource allocation while building capability as well as return on investment assessment creating

a “family of metrics,” ensures a well rounded portfolio of measures that cover the most important innovation drivers for your specific organization.

2.2.2 Key Input and Output Categories

The following are the key input and output metrics for each category. These illustrations are not meant to be exhaustive but rather provide an initial list of options for those looking to instill metrics within their own organizations .**Return on Investment Metrics**

2.2.3 Input Metrics and Output Metrics

These comprise: Percentage of capital devoted to innovation activities such as submitting and reviewing ideas for new products and services and mounting ideas through an innovation pipeline, Percentage of “outside” vs. “inside” inputs to the innovation process (open innovation), Number of new products, services, and businesses launched in new markets in the past year, Actual vs. targeted breakeven time (BET), percentage of revenue/profit from products or services introduced in the past X years, Royalty and licensing income from patents/ intellectual property, percentage of employees who have received training and tools for innovation e.g. , instruction in estimating market potential of an idea, Existence of formal structures & processes that support innovation, Number of new competencies (distinctive skills and knowledge domains that spawn innovation), Number of innovations that significantly advance existing business, Number of new-to company opportunities in new market, Percentage of executives’ time spent on strategic innovation versus day-today operations, percentage of managers with training in the concepts and tools of innovation, percentage of product/service or strategic innovation projects with assigned executive sponsors, Number of managers that become leaders of new category businesses.

The study therefore focused on such metrics in higher education throughout the research.

2.3 Innovation in Services

Scholars have given a lot of attention to innovation and product development in the past decade. In this time a number of authoritative explanations have come out including the theories of

architectural innovation (Handerson.et.al, 1990); disruptive innovation (Christensen, 1996 &1997) and product/process and technology lifecycle innovation (Utterbuck eta.al, 1975).

2.3.1 Theory of Architectural Innovation.

Architectural innovation theory is explicitly focused on products. It is defined "Innovations that change the way in which components of products are linked together while leaving the core design concepts (and thus the basic knowledge underlying the components) untouched," (Henderson et.al, 1990). While there is no direct mention of the theories applicability to services, the authors do summarize the underlying logic of architectural innovation in terms applicable to services: "The essence of an architectural innovation is the reconfiguration of an established system to link together existing component in a new way," (Henderson et.al, 1990). Many service offerings can be broken down into components, thereby facilitating a link between architectural innovation and service companies. Thus the theory of architectural innovation is broad enough to cover service innovations, especially when one considers subservices as comparable to components of product systems.

2.3.2 Disruptive Innovation Theory

This Disruptive innovation theory is espoused by (Christensen et.al, 1996). In particular, it's about the power of customers to mislead their suppliers into overshooting (in terms of performance) the needs for which customers are willing to pay. Eventually, the customers who faithfully informed the vendors of their demand switch to lower cost "down-market" providers of similar offerings. These innovators which attack from below with initially less capable offerings eventually achieve "offering performance" demand by customers at costs lower than the incumbent provider. Often, initial markets of the innovator do not overlap with the incumbent's market. Given that disruption is a theory about markets there is no reason to believe that it's not applicable to services innovation such as in higher education.

2.3.3 Product/process and Technology lifecycle Innovation

The primary model of product innovations argues that major innovations appear during period of heightened innovation activity an era labeled by some scholars as "the era of ferment." This heightened level of activity drops dramatically following the adoption of a dominant design. At

this point innovation again begins to pick, but focused upon incremental (versus major product innovations) that increase quality and reduce cost rather than enhance features or performance (Utterbuck eta.al, 1975).

Anderson et.al (1990) also expanded Utterbuck's early work to advance the product/process lifecycle model by introducing technological discontinuities, innovations that punctuate relatively long periods of incremental change. The cycle begins with an era of ferment (in which numerous possible designs exist) and continues until a prevailing design surfaces. At this point, the cycle enters a period of incremental change and is punctuated by a discontinuity that leads to another era of ferment. The concepts of supply side and demand side that are presented are heavily based upon and influenced by process and product innovation.

2.3.4 Service Innovation Theory.

Despite the differences noted in the above framework, Britran and Loja (1993), says that many scholars have concluded traditional, product focused theories of innovations are applicable to services. Barras (1986, 1990), describes services innovations as a "reverse product cycle". He argues that constantly increasing innovations precede an era of ferment that is punctuated with a discontinuity through a new service offering. In particular, improving efficiency in the delivery of existing services leads to improvement in quality, eventually yielding to new service offerings. The model boils down to the question of timing. If the reverse product life cycle theory holds, periods following incremental innovations (i.e. after adoption of a standard subservice) should lead to a level of subservice variation, which in return should result to a new service offering.

2.3.4.1 Areas of Innovation - Den Hertog's model

Hertog (2000), identifies four "dimensions" of service innovation and takes quite a different direction to much standard innovation theorizing. The Service Concept: which refers to a service concept that is new to its particular market – a new service in effect, or in Edvardsson's (1996, 1997) terminology, a "new value proposition". Many service innovations involve fairly intangible characteristics of the service, and others involve new ways of organizing solutions to problems (be these new or familiar ones), The Client Interface: which refers to innovation in the

interface between the service provider and its customers. Clients are often highly involved in service production, and changes in the way in which they play their roles and are related to suppliers can be major innovations for many services. Examples might include a greater amount of self-service for clients visiting service organizations. There is a French literature on service innovation that focuses especially on this type of innovation, identifying it as innovation in "servuction", The Service Delivery System: also often relates to the linkage between the service provider and its client, since delivery does involve an interaction across this interface. However, there are also internal organizational arrangements that relate to the ways in which service workers perform their job so as to deliver the critical services. Much innovation concerns the electronic delivery of services, but industries can also think of, for instance, transport and packaging innovations (e.g. pizza delivery!). An emerging concept of SDP is the idea of taking a "factory" approach to Service Innovation. A "service factory" approach is a standardized and industrialized environment for more effective service innovation, development and operations for the IP era and Technological Options which mostly resemble familiar process innovation in manufacturing sectors. New information technology is especially important to services, since it allows for greater efficiency and effectiveness in the information-processing elements that are, as we have seen, prevalent to a great extent in services sectors. We also often see physical products accompanying services, such as customer loyalty cards and "smart" RFID cards for transactions, and a wide range of devices for communication services.

An elaboration of this model to suggest six dimensions of innovation was developed in the course of work on creative sectors, by Green et.al (2000). As well as Technology and Production process, four dimensions were specified whose linkages are very strong in creative sectors like videogames, advertising and design: Cultural Product, Cultural Concept, Delivery and User Interface.

Johne and Storey (1998), on reviewed numerous New Service Development studies ,argued that the service innovation literature is surprisingly poorly related to the literature on new product development, which has spawned a line of study on new service development. This often focuses on the managerially important issue of what makes for successful service innovation. The

services innovations theories are critical to innovations in higher education today and therefore the study highly depended on them in carrying out the research.

2.4 Higher Education

According to the Kenya Education Network (KENET), a National Research and Education Network charged with promoting the use of ICTs for Teaching, Learning and Research in Higher Education Institutions in Kenya, higher education is the stage of learning offered in institutions of post-secondary, tertiary, or third level education such as universities, academies, colleges, seminaries, and institutes of technology, and also other college-level institutions, such as vocational schools, trade schools, and career colleges that award academic degrees or certifications. This level of education follows a completion of a school providing a secondary education, such as a high school or a secondary school, and the institutions that are mandated to provide this kind of education are sometimes collectively referred to as tertiary institutions.

Examples of institutions that provide post-secondary education across the world include vocational schools, community colleges, independent colleges (e.g. institutes of technology), and universities in the United States; the institutes of technical and further education in Australia; pre-university colleges in Quebec, and the IEKs in Greece. Successful completion of a tertiary education program of study is usually acknowledged by the award of certificates, diplomas, or academic degrees.

Education at this level consists of teaching, research, practical work (e.g. in medical schools and dental schools), and social services activities of the respective institutions. The area of teaching is made up of the undergraduate level and graduate-level (or postgraduate level). Many developed countries have capacity for a high proportion of their population (up to 50%) to access higher education. Higher education has become very important to the economies of many nations, as a spring from which trained and educated personnel that serve the economy are drawn and also as a significant industry in its own right. Workers who graduate from college are most likely assured of employment that also attracts a significant wage premium than less educated workers who often remain unemployed.

Interesting to note are the types of higher education that exist in different countries. There are two types in the United Kingdom; higher academic education, and higher vocational education. In the United States and Canada, higher education is specifically mentioned in reference to post-secondary institutions that offer degrees (Bachelor, Master, Associate, Education Specialist or Doctor of Philosophy (Ph.D.)), or those considered equal to those already mentioned. Other high professional degrees in areas such as medicine, law, dentistry and optometry are also considered under higher education these countries. Contrary to the norm in other countries, tertiary education does not refer to post-secondary institutions in the United States or Canada.

Institutions of higher learning may offer certificates that are not related to any degree programme to acknowledge successful completion of training offered for a body of knowledge on a certain subject. However, the award of such certificates is not the main purpose for the existence of the institutions. This study only concentrated on universities in Kenya to find out about innovations in higher education as well as in service quality.

2.4.1 Innovations in Higher Education.

Harvard's Massive Open Online Courses (MOOCs) that are offered using the electronic data exchange (edX) that was made possible through partnering with Massachusetts Institute of Technology is cited as a perfect example of innovation, realizing that a radical change might be in the pipeline (Kolowich, 2013). With each passing day, faculty members and administrators in higher education are forced to make carefully consideration of how the world of post-secondary education is transforming and the possibilities and challenges that are posed by emerging technologies. Policy decisions on education abounding with debates of access and completion, instructional formats tailored to meet ambitious goals and also meet student demand, will remain centers of attention from a wide range of stakeholders (political, governmental, and corporate). What cannot be sacrificed with these experiments and demands, however, are thorough experiences that provide students with an education of high quality.

According to Bond (2009), the president of Tech America, people are now enabled to take advantage of new digital tools whenever they access to faster and bigger broadband and wireless speeds. Tools such as GIS virtual reality, mapping, supercomputing, online games, video on

demand, and video conferencing are now accessible for use by many who have access to the internet. New information technology developments such as distance learning, emailing, civic engagement, and smart energy grids require high-speed broadband and sufficient bandwidth which often indicates innovation in higher education. With high-speed broadband, scholars are able to share all forms of digital information with colleagues in other geographic areas. Schools are also able to reach out to under-served populations through distance learning. Greater efficiency in monitoring energy consumption is achieved using smart electric grids and contributes to more environment-friendly policies. Governments and businesses are able to save large sums of money on their travel budgets by opting for Video conferencing facilities instead. New digital platforms across a variety of policy domains spur utilization and innovation, and bring additional people, businesses, and services into the digital revolution.

In the area of education, enhanced technological infrastructure facilitates personalized learning and real-time assessment. With such infrastructure in place, it possible to have schools where learners master fundamental critical thinking skills in an individualized and collaborative manner; where teachers assess learners in real-time and social media; and where digital libraries act as a gateway to a wide range of informational resources for users. This therefore allows teachers take on the role of coaches as students learn at their own pace. Technology is then used to track student progress, and to judge schools on the basis of the outcomes they produce. This kind of education overcomes the learning system limited to six hours a day for half the year, and moves toward a 24 hour 7day engagement and learning fulltime (Bond, 2010).

Kelly (2000) observes that the emergence of e-commerce is the main reason for this change. He argues that unlike in the traditional world, where suppliers pushed their products through retailers and ultimately to consumers, the current world has transformed into a world in which end-users pull desired products and services through the system to themselves. Kelly (2000) also envisages that this change will merge with globalization in an explosive way, resulting in “the convergence of once independence flow of goods, information, and finance”.

In the view of Rosenblan et.al (2011), the best technologies in higher education enable teachers to achieve a lot more even with limited resources. For example, dynamic communication with students is made possible on social communication platforms like Twitter, Face book, or Tumbr.

Other technologies that can empower teachers to do much more include mobile phone apps that grade written student work and provide lesson plan databases. This therefore presents a great need for school systems to aggressively track what works for their teachers and put all other unworkable technologies aside.

One area in which technology has really changed things is in publishing. The digital representation of a print text as electronic textbooks and electronic journals (commonly referred to as e-books and e-journals respectively) has enhanced accessibility to a whole new level. In this development, text is no longer an unchangeable object; it can be uploaded on or downloaded from the internet; it can be increased or decreased according to the needs of students. It is now possible to read images aloud by the use of tagging tools; online access to formerly print-dependant page images allows students to follow lectures in class by scrolling page after page. Simultaneously, access to text representation (suited to screen readers and text-to-speech software) means students can adjust their e-textbook according to their needs.

Learning is not only becoming enjoyable but also increasingly flexible through technology. Technology can now move learning beyond the walls of a lecture hall, remotely to podcasts, and across devices, transcending both space and time barriers. According to The Higher Education Academy this flexibility has enabled institutions of higher learning to cater even for students with disabilities. Students neither have to carry around heavy textbooks nor visit the library or bookshop physically to access learning materials.

The access to and use of electronic resources (e-books and e-journals) has really picked up in the recent past, even in third world countries such as Kenya. In the United States, the Student E-rent Pilot Project (STEPP) programme offers e-books specifically modified for accessibility, in support of the Americans with Disabilities Act and the Rehabilitation Act of 1973, Section 504. In a survey conducted on 1,185 students, 77% of them reported having saved money by renting their textbooks, and 80% who needed an accessible textbook were satisfied with the effectiveness and efficiency of accessibility.

Kinser and Dodd (2004) while focusing on technology discuss how it can drive innovations in operations and offer opportunities for the delivery of academic programs in novel ways. The

flexibility brought about by new technologies enables gains in many aspects of an institution's operations, provided that it is willing and able to adopt the technologies. Kinser and Dodd (2004) still cite the curricular innovation exhibited by Western Governors University and the Leadership Foundation for Higher Education in the United Kingdom as great examples of innovation and flexibility within the higher education. They also discuss initiatives in the United States and United Kingdom that have brought about change beyond the confines of one institution. In addition to program development and curricular reform, innovations such as these can allow institutions to attain standards dictated by accrediting agencies and drive changes in the accrediting processes themselves (Kinser et.al, 2006).

According to Zeff (1998), innovations are the key ingredients in attempts by institutions to address the issue of increasing the accessibility of higher education to people with different learning styles and learning disabilities. For example, Universal Design for Learning (UDL) offers a road map for implementing new technologies, coupled with innovations in the ways in which content is reconstructed, represented, and delivered. As institutions recognize the broader implications of accessibility as supported by UDL, they will find room for improvements in academic and supplementary services.

2.4.2 Service Quality in Higher Education

Oldfield and Baron (2000) write of three major factors of higher education service quality. These are: The requisite elements (encounters which are essential to enable students to fulfill their study obligations); the acceptable elements (which are desirable but not essential to students); and the functional elements (which are of a practical or utilitarian nature). Cheng and Tam (1997) came to the conclusion various people may use diverse indicators to assess education quality and miscellaneous strategies to achieve education quality basing on different conceptions of education quality and the different concerns about achievement of education quality. It may result in not including all aspects of the input, process and outcome of an education institution. If higher education is to be considered a service, then it should exhibit all the classical features of services, which make the measurement of quality a complex issue (Hill, 1995).

Sohail et al. (2003) point out that the implementation of quality practices, such as TQM is seen in the context of higher education many college administrators as a way to ensure that institutions of higher education perform well and that their customers are served well. Oliveira-Brochado & Marques (2007) compared five measures of service quality in higher education in terms of uni-dimensionality, reliability, validity and explained variance. These authors were of the view that the service quality literature in education suggests that it is imperative for institutions of higher education to take stock of the quality of the services they provide in order to commit themselves to continuous improvements. This consequently necessitates the use reliable and valid instruments to measure service quality in higher education. I can be argued that such instruments would benefit from the confinement of country specifics as there are significant country-specific implications arising from the context in which the institution is domiciled.

The conceptual model developed by Parasuraman et al. (1985) uses service quality as the key outcome variable. They argued that the service quality perceptions of the consumers are influenced by a number of gaps, which mirror the difference between performance perceptions and expected levels of service quality. From this perspective, the size and direction of the gap between expected and perceived service is what determines perceptions of service quality. These perceptions will be favorable if the service delivery exceeds the expectations of the customer or will be unfavorable when the same expectations are not met. Parasuraman et al. (1985) conducted extensive exploratory research which resulted in ten overlapping dimensions in attempt to measure perceived service quality. These dimensions included: competence, reliability, credibility, communication, responsiveness, security, tangibles, courtesy, understanding/knowing customer, and finally access to assess the service quality. They later reduced them to five, as follows: Tangibles (physical facilities, equipments, and staff appearance); Reliability (ability to perform the promised service dependably and accurately); Responsiveness (willingness to help customers and provide prompt service); Assurance knowledge and courtesy of employees and their ability to inspire trust and confidence); Empathy (caring, individual attention the firm provides its customers) (Parasuraman et al., 1988).

2.5 Literature Review Summary

It is evident from the foregoing that the concepts related to innovation and service quality occupy centre stage in modern higher education. Christensen is the leading proponent of innovation theories but other scholars have also provided alternative lenses through which innovations and service quality can be realized. Singled out examples of innovation in all educational subsectors using the Oslo Manual definition of innovation include product (learning object, curriculum, textbook, educational software, etc.); process (assessment, pedagogy, stakeholder engagement, etc.); organization (organization of work, administration, student admission, etc.); marketing (pricing, advertisement, etc) service innovations, production and management. This study adopted the following five dimensions as measures of service quality in higher education: reliability, tangibles, assurance, responsiveness and empathy to assess the service quality as advanced by Parasuraman et al., (1988). The researcher therefore reviewed primary and secondary data from the universities and use the findings to make recommendations.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1Introduction

The chapter introduces the research methodology used in the study, research design, target population, sampling frame, data collection and data analysis.

3.2 Research Design

This study employed descriptive survey to assist the researcher in an in –depth analysis of the main innovations and service quality identified to be adopted by the higher education sector in the country. The decision is propagated by the descriptive nature of typical qualitative and quantitative data to be collected which will be cross sectional and may not favor the study. It was be the easiest for the researcher to use, convenient and also due to time limitation.

3.3Target Population

The population comprised of all universities in Kenya. The researcher surveyed a sample of all accredited universities with campuses in Nairobi central business district. According to Kothari (2004) a representative sample is one which is at least 10% of the population thus the fourteen universities represented the population for this study. This is also because the targeted respondents have vast information on the area under study.

3.5 Data Collection

The study used both primary and secondary data. The former was collected via the use of a structured open and closed ended questionnaire while the latter through existing university records plus other sources such as books, journal articles and other electronic resources available on the internet. Data was collected as guided by the structured questionnaire in appendix 1 of the research. Data was collected by drop and pick questionnaire from respondents, that is, administrators/management, lecturers and students on a five-point Likert scale. There were forty two questionnaires filled three for each universities.

3.6 Data Analysis

This data was used to gain a more in-depth understanding of innovation and service quality for universities across the country. The process of data analysis involved two stages by addressing the two objectives, namely; establishment of the extent of innovations in higher education in

Kenya, and determination of the relationship between innovations and service quality in Kenya's higher education.

Regression analysis was utilized to analyze the observations as guided by objectives, and show various relationships. Tables, charts, mean and percentages were used to summarize the data. Subsequently the data was translated into specific categories in line with the objectives of the study as guided by the research questions. Qualititative data was analyzed through content analysis. In this research, content analysis was used to determine the presence of certain words or concepts within texts or sets of tests. The researcher quantified and analyze the presence-meanings and relationships of such words and concepts then made inferences about the messages within the texts, the writers(s), the audience, and even the culture and time of these are a part (Mugenda and Mugenda 1999).Statistical package for social sciences and excel through coding questionnaires for ease of analyzing data and show various relationships as well as carry out comparisons.

3.6.1 Model Specification

Seviqual model = β_0 + β_1 (product) + β_2 (process) +β_3 (organization) + β_4 (production) +β_5 (management) + β_6 (marketing) + β_7 (services) + E_i

β_0 – where is a constant β_1 – β_7 represents respective correlation coefficients of the independent variables, E_i – represents error rate respectively.

3.6.1.1 Dependent Variable

The dependent variable was the serviqual model composite index for the nighteen questions of the five types of service quality in universities which included tangibility, reliability, responsiveness, assurance and empathy respectively as shown in appendix 1.

3.5.1.2 Independent Variables

Products; in this study the product innovation was measured by a composite index for the four types of product innovations as shown in appendix 1. The product innovations were expected to drive service quality.

Process; in this study the products was measured by a composite index for the three types of process innovations as shown in appendix 1. The process innovations were expected to drive service quality

Organization; in this study the products was measured by a composite index for the four types of organization innovations as shown in appendix 1. The organization innovations were expected to drive service quality

Production; in this study the products was measured by a composite index for the two types of product innovations as shown in appendix 1. The production innovations were expected to drive service quality**.**

Management; in this study the management was measured by a composite index for the two types of management innovations as shown in appendix 1. The management innovations were expected to drive service quality.

Marketing; in this study the marketing was measured by a composite index for the five types of marketing innovations as shown in appendix 1. The marketing innovations were expected to drive service quality.

Services innovation; in this study the service was measured by a composite index for the two types of management innovations as shown in appendix 1. The product innovations were expected to drive service quality.

CHAPTER FOUR

4.0 RESEARH FINDINGS INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction

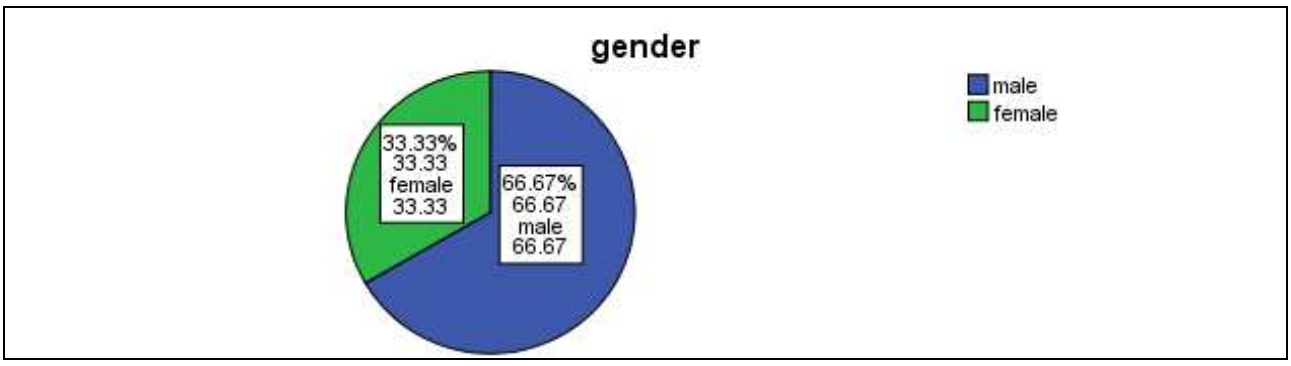
The chapter summarizes data collected which is presented through tables, graphs, means and descriptive statistics from forty two questionnaires in sections a ,b ,c and d .

4.2 General Description of the Respondent

4.2.1 Distribution of Respondent by Gender

In this project, a total of 42 questionnaires were responded to and consisted of 66.7% male and 33.3% female respondents from sampled universities as shown in figure 4.1.Due to personal administration and follow up by the researcher the response rate was a 100 percent.

Figure 4.1 Response by gender



Source: Research data, 2013

4.2.2 Distribution of Respondent by level of Education

High responses were received from bachelors degree holders with 35.7%, followed by masters' degree holders with 31%, PhD holders with 23.8% and others formed 9.5% respectively (table4.2.1) which shown a systematic inclusion of all levels of education from respondents for this research as expected and targeted. This meant that the objectives were measured as expected for this research project.

Table 4.2.2 level of Education

		Frequency	Percent
Valid	phd	10	23.8
	masters	13	31.0
	undergraduate	15	35.7
	others	4	9.5
	Total	42	100.0

Source: Research data, 2013

4.2.3 Distribution of Respondent by Role

A descriptive analysis by role shows that a large number of respondents are administrators or managers at 35.7%, followed by lecturers at 33.3% and 31% from students respectively (table4.2.5).This measured the general feelings and attitude of all the respondents from sampled universities based on their roles and understanding of the two objectives.

Table 4.2.3 Role Played in the University

	Frequency	Percent
a/manager	15	35.7
Lecturer	14	33.3
Student	13	31.0
Total	42	100.0

Source: Research data, 2013

4.2.4 Distribution of Response by University

In this research 42 questionnaires were received, that is, 25 from public universities and 17 from private universities formulating 59.5% and 40.5% respectively as shown in table 4.2.5 below. This indicates that both public and private universities as target sample on the topic under study responded proportionately in relations to the selected sample and proper measure of the objectives.

Table 4.2.5 Distribution of response by universities

	Frequency	Percent
Public	25	59.5
Private	17	40.5

Saurce: Research data, 2013

4.3 The main types of innovation in Kenyas' higher education

Table 4.3.1 Total Innovations Types in Universities in Kenya

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Grand mean
Product :curriculum	42	3	5	174	4.14	.683	
Product: learning	42	2	5	161	3.83	.853	
Product: textbook	42	1	5	160	3.81	.890	
Product: education software	42	2	5	159	3.79	.842	**3.89**
Process: pedagogy	42	2	5	169	4.02	.749	
Process: assessment	42	2	5	173	4.12	.832	
Process: stake holder engagement	42	1	5	137	3.26	1.231	**3.80**
Organization: admission	42	1	5	175	4.17	.961	
Orgnization:administration	42	2	5	161	3.83	.730	
Oganisation:organization	42	2	5	160	3.81	.804	
Organization:regestration	42	1	5	165	3.93	.921	
Organization: assessment	42	1	5	165	3.93	1.135	**3.93**
Management: strategy	42	1	5	164	3.90	.878	
Management: decentralization	42	1	5	156	3.71	1.019	**3.81**
Production: new production	42	1	5	157	3.74	1.014	
Productio:new inspection	42	1	5	144	3.43	.831	**3.58**
Marketing: promotion	42	2	5	165	3.93	.808	
Marketing: pricing	42	2	5	155	3.69	.811	

Marketing: people	42	3	5	164	3.90	.692	
Marketing: place	42	1	5	163	3.88	.889	
Marketing: new financing	42	1	5	149	3.55	1.041	**3.79**
Servace:internet	42	2	5	164	3.90	.932	
Service- e-learning	41	1	5	146	3.56	1.074	**3.73**

Source: Research data, 2013

There are various innovations in Kenya's higher education sector since respondents shown that the universities are innovative in most areas to a large extent as shown by table 4.3.1 above. Under product curriculum was highly ranked with the most mean of 4.14, learning at 3.83, text book at 3.81 and education with the least at 3.79 respectively. Under process assessment was highly ranked with the most mean of 4.12, assessment at 4.02 and stakeholder engagement at the least with 3.26 respectively. Under organization admission was highly ranked with the most mean of 4.17, registration and assessment at 3.93, pedagogy at 3.83, organization of work at 3.83 and administration with the least at 3.81 respectively. Under management decentralization was highly ranked with the most mean of 3.90 and strategy with the least at 3.70 respectively. Under production new production software was highly ranked with the most mean of 3.70, and new inspection with the least at 3.43 respectively. Under marketing promotion was highly ranked with the most mean of 3.93, people at 3.90, place at 3.88, pricing at 3.69 and new financing with the least at 3.55 respectively. Under service innovations internet was highly ranked at 3.90 e-learning at 3.56 respectively.

Organization innovations had the highest grand mean of 3.93 while production innovation had the lowest mean of 3.58. This proved the theory of innovations as summarized in literature review which shows their importance as drivers of service quality in higher education sector.

4.4 The relationship between innovation and service quality in Kenya's higher education

4.4.1 Regression relationship between Innovations and Tangible service Quality

$$\text{Tangibility}=\beta_0 + \beta_{1+} \beta_2 +\beta_3 + \beta_4+\beta_5 + \beta_6 + \beta_7 + E_i$$

The result for regression shows a strong relationship between innovations and service quality types as predicted by the model. An R coefficient 0.540 and an R squared of 0.291 at a p-value of 0.084 which is more than 0.05 significance level for two tails indicated in table 4.4.1 below shows little significance to the model. R squared proves that the model only explains more than 54% of service quality is driven by innovations. The results of standard coefficient beta, individual innovations are not very significant to service quality because it has larger absolute standardized coefficient compared to all others types.

Table 4.4.1: Regression between Innovations and Tangible Service Quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.540[a]	.291	.146	11.449

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1833.635	7	261.948	1.998	.084[b]
	Residual	4456.841	34	131.084		
	Total	6290.476	41			

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	44.425	15.538		2.859	.007
	Index _ Product innovation	.252	.209	.224	1.206	.236
	Index Process Innovation	-.151	.146	-.182	-1.032	.309
	index organization innovation	.076	.167	.082	.452	.654
	index management innovation	-.193	.132	-.257	-1.458	.154
	index production innovation	.104	.130	.144	.803	.427
	index marketing innovation	.392	.229	.373	1.708	.097
	index service innovation	.038	.124	.059	.305	.762

a. Dependent Variable: index tangibility

b. Predictors: (Constant), index service innovation, index organization innovation, index production innovation, Index Process Innovation, index management innovation , Index _ Product innovation, index marketing innovation

Source: Research data, 2013

4.4.2 Regression between Innovations and reliability Service Quality

Reliability=$\beta_0 + \beta_{1+} \beta_2 + \beta_3 + \beta_4 + \beta_5 + \beta_6 + \beta_7 + E_i$

The result for regression shows a strong relationship between innovations and service quality types as predicted by the model. An R coefficient 0.519 and an R squared of 0.201 at a p-value of 0.316 which is more than 0.05 significance level for two tails indicated in table 4.4.2 below shows little significance to the model. R squared proves that the model only explains more than 44.9% of service quality is driven by innovations. The results of standard coefficient beta, individual innovations are not very significant to service quality because it has larger absolute standardized coefficient compared to all others types.

Table 4.4.2: Regression relationship between innovations and reliability service quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.449[a]	.201	.037	15.06133

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1946.144	7	278.021	1.226	.316[b]
	Residual	7712.685	34	226.844		
	Total	9658.830	41			

Coefficients [a]

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.026	20.440		.588	.560
	Index _ Product innovation	.272	.275	.195	.987	.331
	Index Process Innovation	.055	.193	.054	.287	.776
	index organization innovation	.137	.220	.120	.624	.537
	index management innovation	.092	.174	.099	.530	.600
	index production innovation	-.059	.171	-.066	-.345	.732
	index marketing innovation	.339	.302	.260	1.125	.269
	index service innovation	-.076	.163	-.095	-.464	.646

a. Dependent Variable: index reliability

b. Predictors: (Constant), index service innovation, index organization innovation, index production innovation, Index Process Innovation, index management innovation , Index _ Product innovation, index marketing innovation

Source: Research data, 2013

4.4.3 Regression between Innovations and Responsive Service Quality

$$\text{Responsiveness}=\beta_0 + \beta_{1+} \beta_2 +\beta_3 + \beta_4+\beta_5 + \beta_6 + \beta_7 + E_i$$

The result for regression shows a strong relationship between innovations and service quality types as predicted by the model. An R coefficient 0.253 and an R squared of 0.064 at a p-value of 0.934 which is more than 0.05 significance level for two tails indicated in table 4.4.6 below shows little significance to the model. R squared proves that the model only explains more than 25.3% of service quality is driven by innovations. The results of standard coefficient beta, individual innovations are not very significant to service quality because it has larger absolute standardized coefficient compared to all others types.

Table 4.4.3: Regression relationship between Innovations and Responsive Service Quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.253[a]	.064	-.129	13.65575

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	434.102	7	62.015	.333	.934[b]
	Residual	6340.302	34	186.479		
	Total	6774.405	41			

Coefficients [a]

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	57.826	18.532		3.120	.004
	Index _ Product innovation	.043	.250	.037	.174	.863
	Index Process Innovation	.068	.175	.078	.388	.700
	index organization innovation	.025	.200	.026	.126	.901
	index management innovation	.064	.158	.083	.408	.686
	index production innovation	-.109	.155	-.145	-.703	.487
	index marketing innovation	.104	.273	.095	.380	.706
	index service innovation	.070	.148	.104	.471	.640

a. Dependent Variable: index responsiveness
b. Predictors: (Constant), index service innovation, index organization innovation, index production innovation, Index Process Innovation, index management innovation , Index _ Product innovation, index marketing innovation
Source: Research data, 2013

4.4.4 Regression between Innovations and Assurance Service Quality

$$\text{Assurance}=\beta_0 + \beta_{1+}\beta_2 +\beta_3 + \beta_4+\beta_5 + \beta_6 + \beta_7 + E_i$$

The result for regression shows a strong relationship between innovations and service quality types as predicted by the model. An R coefficient 0.547 and an R squared of 0.299 at a p-value of 0.074 which is more than 0.05 significance level for two tails indicated in table 4.4.4 below shows little significance to the model. R squared proves that the model only explains more than 51.9% of service quality is driven by innovations. The results of standard coefficient beta, process innovations contribute more to service quality because it has larger absolute standardized coefficient compared to all others types.

Table 4.4.4: Regression between innovations and Assurance service quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.547[a]	.299	.155	14.333

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2984.650	7	426.379	2.075	.074[b]
	Residual	6984.993	34	205.441		
	Total	9969.643	41			

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	44.638	19.452		2.295	.028
	Index _ Product innovation	.246	.262	.174	.940	.354
	Index Process Innovation	-.401	.183	-.382	-2.186	.036
	index organization innovation	.393	.209	.336	1.875	.069
	index management innovation	-.009	.166	-.009	-.052	.959
	index production innovation	.211	.163	.231	1.294	.204
	index marketing innovation	-.161	.287	-.122	-.562	.578
	index service innovation	.189	.155	.233	1.214	.233

a. Dependent Variable: index assurance

b. Predictors: (Constant), index service innovation, index organization innovation, index production innovation, Index Process Innovation, index management innovation , Index _ Product innovation, index marketing innovation

Source: Research data, 2013

4.4.5 Regression between Innovations and Empathy Service Quality Types

$$\text{Empathy}=\beta_0 + \beta_{1+}\beta_2 +\beta_3 + \beta_4+\beta_5 + \beta_6 + \beta_7 + E_i$$

The result for regression shows a strong relationship between innovations and service quality types as predicted by the model. An R coefficient 0.544 and an R squared of 0.295 at a p-value of 0.079 which is more than 0.05 significance level for two tails indicated in table 4.4.5 below shows little significance to the model. R squared proves that the model only explains more than 54.4% of service quality is driven by innovations. The results of standard coefficient beta, individual innovations are not very significant to service quality because it has larger absolute standardized coefficient compared to all others types.

Table 4.4.5: Regression between innovation and Empathy service quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.544[a]	.295	.150	14.872

ANOVA [a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3153.994	7	450.571	2.037	.079[b]
	Residual	7520.411	34	221.189		
	Total	10674.405	41			

Coefficients [a]

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	25.323	20.184		1.255	.218
	Index _ Product innovation	-.132	.272	-.090	-.486	.630
	Index Process Innovation	-.127	.190	-.118	-.670	.507
	index organization innovation	.410	.217	.340	1.887	.068
	index management innovation	-.105	.172	-.108	-.612	.545
	index production innovation	.325	.169	.344	1.923	.063
	index marketing innovation	.376	.298	.274	1.262	.216
	index service innovation	-.084	.161	-.101	-.523	.604

a. Dependent Variable: index empathy

b. Predictors: (Constant), index service innovation, index organization innovation, index production innovation, Index Process Innovation, index management innovation , Index _ Product innovation, index marketing innovation

Source: Research data, 2013

4.4.6 Regression between Overall innovation and overall service quality

Service quality $=\beta_0 + \beta_{1+}\beta_2 + \beta_3 + \beta_4 + \beta_5 + \beta_6 + \beta_7 + E_i$

The result for regression shows a strong relationship between innovations and service quality types as predicted by the model. An R coefficient 0.519 and an R squared of 0.269 at a p-value of 0.122 which is more than 0.05 significance level for two tails as indicated in table 4.4.6 below shows little significance to the model. R squared proves that the model only explains more than 51.9% of service quality is driven by innovations. The results of standard coefficient beta, individual innovations are not very significant to service quality because it has larger absolute standardized coefficient compared to all others types.

Tables 4.4.6 .Regression between overall innovation and overall service quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.519[a]	.269	.119	10.011

ANOVA [a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1253.883	7	179.126	1.787	.122[b]
	Residual	3407.380	34	100.217		
	Total	4661.263	41			

Coefficients [a]

Model		Un standardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	38.149	13.586		2.808	.008
	Index _ Product innovation	.129	.183	.133	.706	.485
	Index Process Innovation	-.120	.128	-.167	-.937	.355
	index organization innovation	.212	.146	.266	1.449	.157
	index management innovation	-.036	.116	-.057	-.315	.754
	index production innovation	.102	.114	.164	.900	.374

	index marketing innovation	.203	.200	.224	1.013	.318
	index service innovation	.033	.108	.059	.301	.765

a. Dependent Variable: SQ Index

b. Predictors: (Constant), index service innovation, index organization innovation, index production innovation, Index Process Innovation, index management innovation , Index _ Product innovation, index marketing innovation

Source: Research data, 2013

CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATION

5.1Introduction

This chapter provides a summary of the key elements of the study, the conclusions reached based on the information gathered and recommendations for ensuring quality of teaching staff at universities in Kenya as well as recommendations for further research.

5.2 Summary

The purpose of this study was to establish the the extent of innovation types in kenyas' higher education and to establish the relationship between innovations and service quality in kenyas' higher education with an emphasis on universities.

In this research, a descriptive study in form of a survey describing a phenomenon associated with subject population or estimating proportions of the populations with certain characteristics was undertaken. The target population was all universities in Kenya both all the public and private universities in Kenya totaling to 65. Simple random sampling was used so as to achieve desired representation from various sub-groups in the population generating a sample of 14 universities with campuses within central business district and a total of 42 questionnaires were received.

Data was analyzed using quantitative techniques including reliability tests, descriptive statistics, and regression tests. From the analysis, Tables, Figures, frequencies, charts, representing various research questions were drawn. Qualitative data was also analyzed and summarized based on frequency of responses to the various items in the questionnaire.

There are a lot of innovations from universities in Kenya to a large extent in many areas such as product, process, production, organization, management, marketing although there is room for improvement in them and especially service innovation areas. From the results of the research, universities are not seriously innovating and they need to continue doing that to meet its obligations as required to the institutions of higher learning. For example, even with the increasing completion and expansion through innovations, the universities are not prompt. This implies that in most scenarios, universities are not being able to meet their obligations through providing service quality. Such things as increased admission have trickled down effects on

quality delivery student as enough attention is not given to them and thus providing a window for student to think beyond or without a the box.

The revolution associated with innovation has impacted service quality at Universities as the relationship between innovations and service quality tends to move towards right direction positively despite the fact that it's very weak.

5.3 Conclusions

The findings and results of this study proved that there are a lot of innovations in higher education in Kenya which met objective one. However, Innovation as a major factor that contributes to service quality for universities need to be addressed to a very large extent and it requires more focus. Adopting innovative practices to a very large extent the universities achieves high performance and creating opportunities for continuous service quality.

The study also set out to establish the relationship between innovations and service quality in Kenyas' higher education as a second objective. The findings and results of this study indicated a very strong relationship exists between innovations and service quality in universities in Kenya. Most of the R coefficients shown above fifty percent strength from the regression model and R squared were below thirty for the relationships; therefore service quality is driven by innovations.

While there is no best way to "learn", it helps to be innovative as institutions of higher learning since this drives service quality and improves performance.

5.4 Recommendation

From this research, innovation and service quality is still a challenge that must be addressed by all the players, and in particular, ensuring that proper innovation and service quality practices are in place as well encouraging continuous professional development of the responsible stakeholders such as staff. With the increased demand for higher education, universities need to set aside proportional amount of funds for staff development. This will encourage staff to continuously undertake research so as to be able to present relevant papers in international conferences and seminars. Also, the need to therefore address the working conditions of teaching staff is necessary.

At most universities, up to two-thirds of university lecturers have had no initial pedagogical training. Most of these institutions are relying on individuals who have not acquired their highest level of academic training as lecturers. To improve their efficiency and effectiveness in delivering their services, the academic staff must be trained continuously in relevant areas. The universities must therefore, have clear training policies, outlining their strategy for human resource development, instead of the ad- hoc procedures currently followed in most of these institutions.

The need to recognize all stakeholders as important resource in the university set-up is also important. It is also recommended to review the appraisal system to enhance objectivity and enrich acceptability by the staff.

Expansion of teaching facilities is also necessary to enhance quality. The existing physical teaching facilities as well as their status were a point of reference by the respondents. With growth in student numbers, increase in provision for capital projects is necessary to cater for expanded library facilities, lecture halls, recreational facilities, catering and accommodation facilities, modern laboratory equipments, modern teaching aids and increased access to internet facilities. It is therefore recommended that the Government and the various university council boards to increase budget for facility expansion.

5.5 Suggestions for Further Research

Need to design ICT based curricula rather than treating ICT as a separate education Product. With the trend towards embracing ICT and e-content for universities, this area will also require further research so as to balance e-content as a model for knowledge delivery, an innovation and service quality quality improvement.

A research on tools for quality management such as ISO certification should be carried to assess their impact on innovations and service quality in higher education institutions.

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APPENDICES

APPENDIX 1: QUESTIONNIARE.

Letter of Request to the Respondent

18th / 09 / 2013

Dear Respondents

I'm a student at the University of Nairobi, carrying out a research on innovations and service quality in kenyas' higher education.

In this regard, I would like to ask you assistance by answering the attached questionnaire.

Rest assured that all your responses will be kept confidential.

Thank you so much for your cooperation.

Respectfully yours

Martin Munene Mbuchi

SECTION A: GENERAL INFORMATION

1) Gender Male [ ] Female [ ]
2) What is your highest level of education?

PhD	[ ]	Masters	[ ]
Undergraduate	[ ]	college diploma	[ ]

Others (specify……) [ ]

3) What is your role at the university?(tick as appropriate)

a) An Administrator/manager [ ]
b) A Lecturer [ ]
c) A student [ ]

SECTION B: ORGANIZATION PROFILE

4) Name of the university…….
5) Ownership type

i. Public ☐
ii. Private ☐

6) Number of university campuses (please indicate)……....
7) Year the university was established ……

SECTION C: TYPES OF INNOVATION

8) (A) To what extent does your university initiate innovations in the following areas, use a scale of 1 to 5. (Tick once inside the boxes given for rating).

5. To a very large extent, 4.Large extent, 3.Moderate extent, 2.Small extent, 1.Very small extent

Type of innovation	Example	Rating				
		1	2	3	4	5
Product innovation	Curriculum					
	Learning object					
	Textbook					
	Educational software					
	Others (1)…….					
	(2)……..					
	(3)……..					
Process innovation	Pedagogy					
	Assessment					
	Stakeholder engagement					
	Others (1)…….					
	(2)……..					
	(3)……..					
Organization innovation	Student admission					
	Administration					
	Organization of work					
	Registration					
	Assessment					
	Others (1)…….					
	(2)……..					
	(3)……..					

Management innovation	Strategy					
	Decentralization 2					
	Others (1)…….					
	(2)……..					
	(3)……..					
Production innovation	New production planning software e.g.					
	(ERP)					
	New inspection system					
	Others (1)…….					
	(2)……..					
	(3)……..					
Commercial/Marketing innovation	Promotion					
	Pricing					
	People					
	Place					
	New financing arrangements					
	Others (1)…….					
	(2)……..					
	(3)……..					
Service innovation	Internet based financial services					
	E –learning					
	Others (1)…….					
	(2)……..					
	(3)……..					

SECTION D: MEASURES OF SERVICE QUALITY

9) Please tick in the box matrix the extent to which you agree the following are terms used for dimensions of service quality in your university for each question. (Tick once for each question)

Use a scale of 1 to 5 (where 1.Very small extent 2.Small extent 3.Moderate extent, 4.Large extent, 5. To a very large extent) in section D for question 1to 19 respectively.

Section D	Service quality measures	5	4	3	2	1
Tangibility	1. The university physical features are visually appealing e.g. physical facilities					
	2. The university has modern equipments e.g. projectors.					
	3. The university employees and teachers are neat appearing e.g. dressing					
	4. The material associated with the service provided in your university such as journals, printed material, has a good visual appearance and is up to date					
Reliability	5. When the university promises to do something in a certain time, it does so.					
	6. When you have a problem, the university demonstrates sincere interest in solving it.					
	7. The university will do the job right the first time and will persist in doing it without error					
Responsiveness	8. The university Employees and professors promise you the services within deadlines they are able to meet.					
	9. The university employees and teachers are willing and available during service providing.					
	10. The university employees and teachers always show good will in helping.					
	11. The university employees and teachers at are always willing to explain your doubts.					
Assurance	12. The behavior of employees and teachers at your university inspire confidence.					
	13. You feel safe in your transactions with your university					
	14. The employees and teachers at your university are polite.					
	15. The employees and teachers at your university have the knowledge needed to answer your questions.					
Empathy	16. Your university has convenient business hours for all students					
	17. Your university has employees and teachers who provide individual attention to each student.					
	18. Your university is focused on the best service for its students					
	19. Your university understands the specific needs of its students.					

APPENDIX 2: (LIST OF UNIVERSITIES IN KENYA)

Public Universities

1. University of Nairobi (UoN) – established 1970 and chartered 2013
2. Moi University (MU) - established 1984 and chartered 2013
3. Kenyatta University (KU) - established 1985 and chartered 2013
4. Egerton University (EU) - established 1987 and chartered 2013
5. Jomo Kenyatta University of Agriculture and Technology (JKUAT) - established 1994 and chartered 2013
6. Maseno University (MSU) - established 2001 and chartered 2013
7. Masinde Muliro University of Science and Technology (MMUST) - established 2007 and chartered 2013
8. Dedan Kimathi University of Technology (DKUT) - 2012
9. Chuka University (CU) – 2013
10. Technical University of Kenya (TUK) - 2013
11. Technical University of Mombasa (TUM) - 2013
12. Pwani University (PU) - 2013
13. Kisii University (EU) - 2013
14. University of Eldoret - 2013
15. Maasai Mara University - 2013
16. Jaramogi Oginga Odinga University of Science and Technology - 2013
17. Laikipia University - 2013
18. South Eastern Kenya University – 2013
19. Meru University of Science and Technology – 2013
20. Multimedia University of Kenya - 2013
21. University of Kabianga - 2013
22. Karatina University – 2013

Public University Constituent Colleges

1. Murang'a University College (JKUAT) - 2011
2. Machakos University College (UoN) - 2011
3. The Co-operative University College of Kenya (JKUAT) - 2011
4. Embu University College (UoN) - 2011
5. Kirinyaga University College (KU) - 2011
6. Rongo University College (MU) - 2011
7. Kibabii Universtity College (MMUST) - 2011
8. Garissa University College (EU) - 2011
9. Taita Taveta University College (JKUAT) - 2011

Chartered Private Universities

1. University of Eastern Africa, Baraton - 1991
2. Catholic University of Eastern Africa (CUEA) - 1992
3. Scott Theological College - 1992
4. Daystar University - 1994
5. United States International University - 1999
6. Africa Nazarene University - 2002
7. Kenya Methodist University - 2006
8. St. Paul's University - 2007
9. Pan Africa Christian University - 2008
10. Strathmore University - 2008
11. Kabarak University - 2008
12. Mount Kenya University - 2011
13. Africa International University - 2011
14. Kenya Highlands Evangelical University - 2011
15. Great Lakes University of Kisumu (GLUK) - 2012
16. KCA University, 2013
17. Adventist University of Africa, 2013

Private University Constituent Colleges

8) Hekima University College (CUEA)
9) Tangaza University College (CUEA)
10) Marist International University College (CUEA)
11) Regina Pacis University College (CUEA)
12) Uzima University College (CUEA)

Private Universities with Letter of Interim Authority (LIA)

1. Kiriri Women's University of Science and Technology -2002
2. Aga Khan University - 2002
3. Gretsa University - 2006
4. UMMA University - 2013
5. Presbyterian University of East Africa - 2008
6. Adventist University - 2009
7. Inoorero University - 2009
8. The East African University - 2010
9. GENCO University - 2010
10. Management University of Africa - 2011
11. Riara University - 2012
12. Pioneer International University - 2012

Source (CUE 2013)

APPENDIX3: COMPOSITE INDEXES

TABLE: TANGIBILITY INDEX

T_1	T_2	T_3	T_4	total	max	Index
3	5	4	3	15	20	75.0
3	3	3	3	12	20	60.0
3	4	3	3	13	20	65.0
4	4	3	5	16	20	80.0
3	5	5	4	17	20	85.0
4	3	4	5	16	20	80.0
4	4	4	5	17	20	85.0
4	5	5	4	18	20	90.0
4	5	5	4	18	20	90.0
1	5	3	2	11	20	55.0
4	5	2	4	15	20	75.0
4	4	4	3	15	20	75.0
3	4	4	3	14	20	70.0
4	4	4	4	16	20	80.0
4	5	5	5	19	20	95.0
4	4	4	3	15	20	75.0
4	4	1	2	11	20	55.0
5	5	5	5	20	20	100.0
4	5	5	4	18	20	90.0
4	4	4	4	16	20	80.0
4	5	4	2	15	20	75.0
5	5	5	5	20	20	100.0
5	4	3	3	15	20	75.0
5	5	5	5	20	20	100.0
3	4	4	4	15	20	75.0
5	5	5	5	20	20	100.0
5	5	4	4	18	20	90.0
5	5	5	5	20	20	100.0
5	5	5	5	20	20	100.0
5	5	5	5	20	20	100.0
5	4	4	4	17	20	85.0
4	3	3	4	14	20	70.0
4	5	5	4	18	20	90.0
5	5	5	5	20	20	100.0
5	5	3	5	18	20	90.0
4	5	3	5	17	20	85.0
3	5	4	5	17	20	85.0
4	4	5	3	16	20	80.0
4	5	5	5	19	20	95.0
4	3	5	5	17	20	85.0
5	4	3	5	17	20	85.0
5	5	5	4	19	20	95.0

TABLE: RELIABILITY INDEX

R_1	**R_2**	**R_3**	total	max	Index
3	5	4	12	15	80.00
3	3	3	9	15	60.00
2	1	1	4	15	26.67
2	2	2	6	15	40.00
4	4	4	12	15	80.00
4	4	5	13	15	86.67
3	4	3	10	15	66.67
4	3	2	9	15	60.00
3	4	4	11	15	73.33
5	4	3	12	15	80.00
4	5	4	13	15	86.67
3	4	3	10	15	66.67
3	3	3	9	15	60.00
4	4	3	11	15	73.33
4	4	4	12	15	80.00
4	4	4	12	15	80.00
5	1	1	7	15	46.67
4	4	4	12	15	80.00
4	4	4	12	15	80.00
4	4	3	11	15	73.33
4	2	1	7	15	46.67
3	4	3	10	15	66.67
3	3	3	9	15	60.00
3	4	4	11	15	73.33
4	4	2	10	15	66.67
3	3	4	10	15	66.67
4	4	5	13	15	86.67
5	5	3	13	15	86.67
5	4	4	13	15	86.67
3	3	3	9	15	60.00
2	5	3	10	15	66.67
4	3	4	11	15	73.33
2	3	4	9	15	60.00
5	5	4	14	15	93.33
3	3	4	10	15	66.67
2	4	3	9	15	60.00
3	3	3	9	15	60.00
1	3	5	9	15	60.00
4	4	5	13	15	86.67
4	4	4	12	15	80.00
5	5	5	15	15	100.00
5	5	5	15	15	100.00

TABLE: RESPONSIVENESS INDEX

Res_1	**Res_2**	**Res_3**	**R_4**	total	max	Index
4	4	5	5	18	20	90
3	3	3	3	12	20	60
3	4	4	3	14	20	70
2	3	3	3	11	20	55
4	5	5	5	19	20	95
5	5	3	4	17	20	85
4	4	4	4	16	20	80
3	4	4	3	14	20	70
3	4	4	4	15	20	75
4	5	5	3	17	20	85
4	5	5	4	18	20	90
4	4	4	3	15	20	75
4	4	4	4	16	20	80
4	5	4	4	17	20	85
4	5	4	4	17	20	85
4	4	4	3	15	20	75
1	5	4	4	14	20	70
4	4	4	4	16	20	80
4	5	5	5	19	20	95
3	3	5	2	13	20	65
3	2	4	1	10	20	50
4	5	5	4	18	20	90
3	3	4	3	13	20	65
4	4	4	4	16	20	80
2	2	4	4	12	20	60
5	5	5	5	20	20	100
5	4	5	5	19	20	95
4	5	5	5	19	20	95
5	1	1	3	10	20	50
3	4	4	3	14	20	70
3	3	4	5	15	20	75
3	3	3	4	13	20	65
2	3	5	5	15	20	75
4	4	4	5	17	20	85
4	4	4	5	17	20	85
4	4	2	5	15	20	75
3	3	3	5	14	20	70
4	5	5	5	19	20	95
4	4	5	5	18	20	90
4	4	4	5	17	20	85
4	3	4	5	16	20	80
5	5	5	4	19	20	95

TABLE: ASSURANCE INDEX

A_1	**A_2**	**A_3**	A_4	total	max	Index
4	4	4	5	17	20	85.00
3	3	3	3	12	20	60.00
3	2	4	3	12	20	60.00
3	2	4	4	13	20	65.00
5	5	5	5	20	20	100.00
4	2	2	4	12	20	60.00
4	4	4	5	17	20	85.00
5	3	3	4	15	20	75.00
4	3	5	5	17	20	85.00
3	5	5	4	17	20	85.00
4	5	5	4	18	20	90.00
4	4	4	4	16	20	80.00
3	4	4	4	15	20	75.00
4	4	4	4	16	20	80.00
4	4	3	3	14	20	70.00
4	3	4	4	15	20	75.00
5	5	3	4	17	20	85.00
4	4	4	4	16	20	80.00
5	5	5	5	20	20	100.00
4	4	1	3	12	20	60.00
1	1	3	1	6	20	30.00
5	5	4	5	19	20	95.00
3	3	2	4	12	20	60.00
5	5	4	4	18	20	90.00
5	5	5	4	19	20	95.00
4	4	4	5	17	20	85.00
5	5	5	5	20	20	100.00
4	5	2	5	16	20	80.00
5	5	2	4	16	20	80.00
3	3	4	4	14	20	70.00
5	4	4	4	17	20	85.00
4	5	5	4	18	20	90.00
3	3	5	4	15	20	75.00
5	5	5	5	20	20	100.00
5	5	4	4	18	20	90.00
5	5	3	5	18	20	90.00
5	5	3	5	18	20	90.00
4	2	1	2	9	20	45.00
4	5	2	5	16	20	80.00
4	5	4	5	18	20	90.00
5	5	5	5	20	20	100.00
5	5	5	5	20	20	100.00

TABLE: EMPATHY

E_1	**E_2**	**E_3**	E_4	total	max	Index
5	2	4	4	15	20	75.00
3	3	3	3	12	20	60.00
3	2	3	3	11	20	55.00
3	3	3	3	12	20	60.00
4	4	5	5	18	20	90.00
2	2	2	3	9	20	45.00
5	4	4	4	17	20	85.00
4	3	4	3	14	20	70.00
5	4	5	4	18	20	90.00
4	4	2	4	14	20	70.00
4	4	4	5	17	20	85.00
4	4	4	4	16	20	80.00
5	4	5	4	18	20	90.00
4	4	4	4	16	20	80.00
3	4	4	3	14	20	70.00
4	4	4	4	16	20	80.00
2	2	2	2	8	20	40.00
4	3	4	4	15	20	75.00
3	4	5	3	15	20	75.00
4	1	4	4	13	20	65.00
5	4	3	2	14	20	70.00
5	5	5	5	20	20	100.00
3	3	3	3	12	20	60.00
3	4	4	4	15	20	75.00
4	3	4	5	16	20	80.00
4	4	5	5	18	20	90.00
5	5	5	4	19	20	95.00
3	2	5	4	14	20	70.00
3	1	4	4	12	20	60.00
2	3	4	4	13	20	65.00
4	2	4	3	13	20	65.00
4	3	4	3	14	20	70.00
5	5	5	3	18	20	90.00
5	5	5	5	20	20	100.00
5	4	5	4	18	20	90.00
4	3	5	4	16	20	80.00
4	3	5	5	17	20	85.00
1	1	2	2	6	20	30.00
5	4	4	4	17	20	85.00
4	5	5	5	19	20	95.00
3	3	3	3	12	20	60.00
5	5	5	5	20	20	100.00

TABLE: PRODUCT INNOVATIONS INDEX

P_1	**P_2**	**P_3**	P_4	total	max	Index
3	2	3	4	12	20	60.00
3	3	3	3	12	20	60.00
3	3	3	4	13	20	65.00
3	3	4	3	13	20	65.00
3	3	4	4	14	20	70.00
3	3	4	4	14	20	70.00
3	4	4	3	14	20	70.00
4	2	3	2	11	20	55.00
4	2	4	5	15	20	75.00
4	3	2	3	12	20	60.00
4	3	4	3	14	20	70.00
4	3	4	5	16	20	80.00
4	4	3	3	14	20	70.00
4	4	3	4	15	20	75.00
4	4	3	4	15	20	75.00
4	4	3	4	15	20	75.00
4	4	3	5	16	20	80.00
4	4	4	3	15	20	75.00
4	4	4	3	15	20	75.00
4	4	4	3	15	20	75.00
4	4	4	3	15	20	75.00
4	4	4	4	16	20	80.00
4	4	4	4	16	20	80.00
4	4	4	4	16	20	80.00
4	4	5	3	16	20	80.00
4	5	3	3	15	20	75.00
4	5	3	3	15	20	75.00
4	5	4	4	17	20	85.00
4	5	5	4	18	20	90.00
5	3	1	5	14	20	70.00
5	3	4	2	14	20	70.00
5	4	4	4	17	20	85.00
5	4	4	5	18	20	90.00
5	4	5	3	17	20	85.00
5	4	5	4	18	20	90.00
5	4	5	4	18	20	90.00
5	4	5	4	18	20	90.00
5	5	3	5	18	20	90.00
5	5	4	5	19	20	95.00
5	5	5	4	19	20	95.00
5	5	5	5	20	20	100.00
5	5	5	5	20	20	100.00

TABLE: PROCESS INNOVATION INDEX

PR_1	**PR_2**	**PR_3**	total	max	Index
5	4	2	11	15	73.33
3	3	3	9	15	60.00
5	5	4	14	15	93.33
4	4	3	11	15	73.33
4	4	3	11	15	73.33
3	4	4	11	15	73.33
4	4	3	11	15	73.33
4	2	1	7	15	46.67
4	4	4	12	15	80.00
5	4	4	13	15	86.67
4	4	4	12	15	80.00
3	5	3	11	15	73.33
4	3	3	10	15	66.67
4	4	3	11	15	73.33
4	5	4	13	15	86.67
4	4	4	12	15	80.00
3	3	2	8	15	53.33
4	4	5	13	15	86.67
2	5	1	8	15	53.33
5	5	5	15	15	100.00
4	5	3	12	15	80.00
3	4	3	10	15	66.67
4	2	1	7	15	46.67
3	3	3	9	15	60.00
5	4	2	11	15	73.33
5	5	3	13	15	86.67
3	4	1	8	15	53.33
4	4	2	10	15	66.67
4	5	4	13	15	86.67
4	4	1	9	15	60.00
3	4	2	9	15	60.00
4	3	3	10	15	66.67
4	4	5	13	15	86.67
5	5	4	14	15	93.33
4	5	4	13	15	86.67
4	3	4	11	15	73.33
4	4	3	11	15	73.33
5	5	5	15	15	100.00
5	5	5	15	15	100.00
5	5	5	15	15	100.00
5	5	4	14	15	93.33
4	5	5	14	15	93.33

Table: ORGANIZATION INNOVATIONS INDEX

O_1	**O_2**	**O_3**	**O_4**	**O_5**	total	maximum	Index
4	4	4	3	4	17	25	68
5	3	3	4	4	15	25	60
5	4	4	5	5	19	25	76
4	4	4	4	3	19	25	76
3	4	4	1	4	23	25	92
4	3	3	3	1	19	25	76
5	4	4	4	4	16	25	64
5	5	5	4	4	14	25	56
4	3	3	4	5	21	25	84
1	4	3	4	4	23	25	92
3	3	4	4	4	19	25	76
4	4	4	4	4	16	25	64
3	4	2	3	3	18	25	72
3	4	4	4	4	20	25	80
5	5	3	3	4	15	25	60
4	4	4	4	4	19	25	76
4	4	5	5	5	20	25	80
5	5	5	2	1	20	25	80.00
3	4	4	4	5	23	25	92.00
4	3	3	4	3	18	25	72.00
4	3	4	4	5	20	25	80.00
2	2	2	2	2	17	25	68.00
4	4	4	5	5	20	25	80.00
5	4	4	4	5	10	25	40.00
5	4	3	4	4	22	25	88.00
4	4	4	4	4	22	25	88.00
5	5	5	5	5	20	25	80.00
5	3	3	4	4	20	25	80.00
4	3	4	3	3	25	25	100.00
4	3	3	4	3	19	25	76.00
5	4	5	4	5	17	25	68.00
5	5	5	5	5	17	25	68.00
5	4	4	5	5	23	25	92.00
5	4	4	5	5	25	25	100.00
5	4	4	5	3	23	25	92.00
5	3	3	3	1	23	25	92.00
5	5	5	5	5	21	25	84.00
4	4	4	5	5	15	25	60.00
5	4	4	4	4	25	25	100.00
5	5	5	5	5	22	25	88.00
4	4	4	3	4	21	25	84.00
5	3	3	4	4	25	25	100.00

TABLE: MANAGEMENT INNOVATION INDEX

M_1	**M_1**	total	maximum	index
5	4	9	10	90.00
3	3	6	10	60.00
3	4	7	10	70.00
4	2	6	10	60.00
4	4	8	10	80.00
4	3	7	10	70.00
3	4	7	10	70.00
4	5	9	10	90.00
4	1	5	10	50.00
5	4	9	10	90.00
4	3	7	10	70.00
4	2	6	10	60.00
3	3	6	10	60.00
4	5	9	10	90.00
3	4	7	10	70.00
4	4	8	10	80.00
4	5	9	10	90.00
3	3	6	10	60.00
4	4	8	10	80.00
4	5	9	10	90.00
4	4	8	10	80.00
4	4	8	10	80.00
4	5	9	10	90.00
3	3	6	10	60.00
1	2	3	10	30.00
4	5	9	10	90.00
5	4	9	10	90.00
3	2	5	10	50.00
5	4	9	10	90.00
3	3	6	10	60.00
4	3	7	10	70.00
4	4	8	10	80.00
5	4	9	10	90.00
4	4	8	10	80.00
4	4	8	10	80.00
5	4	9	10	90.00
5	4	9	10	90.00
2	2	4	10	40.00
5	5	10	10	100.00
4	4	8	10	80.00
5	5	10	10	100.00
5	5	10	10	100.00

TABLE: PRODUCTION INDEX

PDN_1	**PDN_2**	total	maximum	index
5	4	9	10	90.00
3	3	6	10	60.00
3	4	7	10	70.00
1	2	3	10	30.00
3	3	6	10	60.00
2	2	4	10	40.00
4	4	8	10	80.00
4	3	7	10	70.00
4	4	8	10	80.00
2	1	3	10	30.00
4	4	8	10	80.00
5	4	9	10	90.00
3	3	6	10	60.00
4	4	8	10	80.00
4	3	7	10	70.00
3	3	6	10	60.00
4	3	7	10	70.00
4	3	7	10	70.00
3	3	6	10	60.00
5	5	10	10	100.00
3	4	7	10	70.00
5	3	8	10	80.00
3	4	7	10	70.00
3	3	6	10	60.00
4	3	7	10	70.00
4	4	8	10	80.00
4	3	7	10	70.00
2	3	5	10	50.00
4	4	8	10	80.00
4	4	8	10	80.00
4	3	7	10	70.00
3	3	6	10	60.00
4	3	7	10	70.00
5	5	10	10	100.00
5	4	9	10	90.00
5	4	9	10	90.00
5	4	9	10	90.00
2	2	4	10	40.00
5	5	10	10	100.00
4	3	7	10	70.00
5	4	9	10	90.00
4	4	8	10	80.00

TABLE: MARKETING INNOVATIONS INDEX

MKT_1	MKT_2	MKT_3	MKT_4	MKT_5	total	maximum	index
3	3	4	4	3	22	25	88.00
5	2	4	2	1	15	25	60.00
3	4	4	4	3	14	25	56.00
3	3	4	4	3	15	25	60.00
5	5	5	5	5	18	25	72.00
4	4	4	4	4	18	25	72.00
4	5	5	4	3	18	25	72.00
4	4	4	4	1	17	25	68.00
4	3	3	3	5	17	25	68.00
5	3	4	3	4	18	25	72.00
5	4	4	4	4	14	25	56.00
4	3	4	4	3	18	25	72.00
2	3	5	5	4	17	25	68.00
4	4	4	4	4	20	25	80.00
5	2	4	4	3	25	25	100.00
4	3	4	4	2	17	25	68.00
4	3	3	4	4	14	25	56.00
3	3	4	5	3	18	25	72.00
4	4	3	4	5	17	25	68.00
5	4	4	5	4	25	25	100.00
5	4	5	5	5	20	25	80.00
5	5	5	5	5	21	25	84.00
5	3	3	3	3	17	25	68.00
5	5	4	5	5	18	25	72.00
4	4	4	4	4	19	25	76.00
4	4	4	4	4	21	25	84.00
4	4	5	5	5	18	25	72.00
3	3	4	4	3	19	25	76.00
5	2	4	2	1	20	25	80.00
3	4	4	4	3	18	25	72.00
3	3	4	4	3	17	25	68.00
5	5	5	5	5	18	25	72.00
4	4	4	4	4	18	25	72.00
4	5	5	4	3	20	25	80.00
4	4	4	4	1	22	25	88.00
4	3	3	3	5	24	25	96.00
5	3	4	3	4	25	25	100.00
5	4	4	4	4	17	25	68.00
4	3	4	4	3	24	25	96.00
2	3	5	5	4	20	25	80.00
4	4	4	4	4	20	25	80.00

TABLE: SERVICES INNOVATION INDEX

S_1	**S_2**	total	maximum	index
5	5	10	10	100.00
3	3	6	10	60.00
3	3	6	10	60.00
3	3	6	10	60.00
4	4	8	10	80.00
4	3	7	10	70.00
3	3	6	10	60.00
3	4	7	10	70.00
3	3	6	10	60.00
3	2	5	10	50.00
2	2	4	10	40.00
2	2	4	10	40.00
4	4	8	10	80.00
4	4	8	10	80.00
4	3	7	10	70.00
4	3	7	10	70.00
3	3	6	10	60.00
3	2	5	10	50.00
5	3	8	10	80.00
5	5	10	10	100.00
3	3	6	10	60.00
5	5	10	10	100.00
3		3	10	30.00
4	4	8	10	80.00
4	4	8	10	80.00
4	4	8	10	80.00
3	4	7	10	70.00
3	2	5	10	50.00
5	5	10	10	100.00
5	1	6	10	60.00
4	3	7	10	70.00
3	3	6	10	60.00
4	3	7	10	70.00
5	3	8	10	80.00
5	5	10	10	100.00
5	5	10	10	100.00
5	5	10	10	100.00
5	5	10	10	100.00
5	5	10	10	100.00
5	4	9	10	90.00
5	5	10	10	100.00
4	4	8	10	80.00