

**CORPORATE ENTREPRENEURSHIP, INNOVATION AND PERFORMANCE OF
RESEARCH INSTITUTES IN KENYA**

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DECLARATION

This research study is my own work and has never been submitted to any university for a degree.

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Declaration by the Supervisor

With my approval as the university supervisor, this research project has been submitted for review.

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Supervisor

DEDICATION

This research project is dedicated to the members of my family for their understanding and continued support as I carried out this research project. To my wife and children, I would like to take this opportunity to thank them for their continued inspiration, love and encouragement that has enabled me in accomplishment of this task.

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I would like to express my gratitude to Almighty God for providing me with vitality, strength and knowledge that enabled the development of this research project. In addition, I appreciate my supervisor, for the great encouragement, guidance and patience in reading, correcting and refining this research project.

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LIST OF ABBREVIATIONS AND ACRONYMS

AATF:	African Agricultural Research Foundation
AMPATH:	Academic Model Providing Access to Healthcare
AMREF:	African Medical and Research Foundation
CE:	Corporate Entrepreneurship
CIP:	International Potato Center
ICIPE:	International Centre for Insect Physiology and Ecology
ICIPE:	International Centre of Insect Physiology and Ecology
ICRISAT:	International Crops Research Institute for the Semi-Arid Tropics
ILRI:	International Livestock Research Institution
IPAR:	Institute of Policy Analysis and Research
IPGRI:	International Plant Genetic Resource Institute
KALRO:	Kenya Agricultural and Livestock Research Organization
KEFRI:	Kenya Forestry Research Institute
KEMRI:	Kenya Medical Research Institute
KIPPRA:	Kenya Institute of Public Policy Research and Analysis
KIRDI:	Kenya Industrial Research and Development Institute
KMFRI:	Kenya Marine and Fisheries Research Institute
KRI:	Kenya Research Institute
PAUSTI:	Pan African University Institute for Basic Sciences, Technology and Innovation
US:	United States

ABSTRACT

Over the years, research institutes in Kenya have been getting funding from international organizations and donors to finance their research work. However, as a result of alleged misuse of funds, the government of Kenya as well as donors has reduced their financial support to these institutions. To ensure sustainability and survival in today's world characterized by rapid technological changes, increasing public demand and increasing human resource demands, research institutes in Kenya need to adopt corporate entrepreneurship so as to start generating considerable revenue to finance their programs. This study therefore examines the relationship between innovation, corporate entrepreneurship and performance of Kenya Research Institutes. The study also seeks to determine the relationship between corporate entrepreneurship, innovation and performance of Kenya Research Institutes. This study used an explanatory research design. The target population of this study was 32 Research institutes in Kenya. Since the population is not too large, this was a census study. The semi structured questionnaires were used to collect data from heads of enterprise departments/general managers in the 32 Research institutes in Kenya. The research instrument (questionnaire) provides both quantitative and qualitative data. Qualitative data obtained from open ended questions were analysed by use of thematic content analysis. Quantitative data obtained from closed ended questions was analysed by use of inferential and descriptive statistics with assistance of SPSS version 22. Correlation analysis was employed to examine existence of the relationship while the regression analysis was used to examine the weight of the relationship between in the independent variables and the dependent variable. The study found that research institutes in Kenya had adopted innovation as a strategy to ensure sustainability. The number of products or services and number of patented products in research institutes in Kenya has been increasing for the last five years. The study established that research institutes in Kenya were using corporate entrepreneurship to ensure their sustainability. The study found that research institutes had invested in some high risk projects. In addition, some research institutes had invested in opportunities unrelated to their organization's vision and mission. The study revealed that the number of untested technologies, new technologies, new business processes, features added in products and services as well as the amount of money invested in research and development by research institutes in Kenya has been increasing for the last five years. The study found that innovation as well as corporate entrepreneurship has a positive and significant effect on the performance of research institutes in Kenya. The study recommends that the government of Kenya through policymakers should develop policies to necessitate the use of innovations to improve performance. In addition, more policies should be developed to enhance the adoption and utilization of corporate entrepreneurship in research institutes. In addition, research institutes in Kenya should seek to increase their number or products of services as well as develop and adopt new technologies. Further, research institutions in Kenya should adopt a risk taking characteristics of corporate entrepreneurship as a way of improving performance. In addition, the research institutes should also invest in new technologies and other opportunities even if they unrelated to an organizations mission and vision.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The current global market environment is highly competitive and turbulent situation, and businesses are competing against big, highly efficient rivals from all over the world (Bwonya, 2014). As a result, if companies want to compete in today's global market, they must use modern business concepts and methods to continue to develop and grow. As a result, incorporating entrepreneurial practices into the day-to-day operations of businesses should be a must in order to achieve the desired improvement or creation of new business solutions, manufacturing processes, and goods. Buşra and Zehir (2012) indicate that corporate entrepreneurship can be an effective strategy in the improvement of an organization's performance in terms of both profitability and growth. Therefore, managers need to create supportive environments in their organizations that attract, retain and support entrepreneurs as well as instill an innovation culture where employees are inspired to follow their goals and fail without fear of retaliation.. Innovation in organizational processes, structures, products and services plays a major role in enhancing organizational competitiveness (Tuan, Nhan & Giang, 2016).

This study is anchored on the Drucker's opportunity-based theory and Schumpeter's innovation theory. Opportunity-based theory indicates that entrepreneurs succeed by identifying and taking advantage of opportunities created technological, cultural and social changes (Buşra & Zehir, 2012). The necessary conditions for entrepreneurship include opportunities' existence, individual differences' existence, risk gearing, organizing and

innovation. Schumpeter's innovation theory indicates that anyone seeking profits must adopt innovation.

Research institutes perform scientific research and offer technological services to the public. They play major function in increasing knowledgeable society in production of inventions and innovations necessary in ensuring social and economic development. In addition, public research institutes are considered to be a hub of a national innovation system as they are significantly involved in research and development. However, in the light of diminishing funds from the government and from donors, research institutes in Kenya have been having poor financial performance. In addition, research institutes in Kenya have not considerably adopted the concept of corporate entrepreneurship. Other countries such as Malaysia that have used corporate entrepreneurship in public research institutes have reported an improvement in performance and sustainability. Therefore, the study seeks to examine the level of corporate entrepreneurship as well as the relationship between corporate entrepreneurship, innovation and performance of research institutes.

1.1.1 Corporate Entrepreneurship

Corporate entrepreneurship is a method of creating new firms, goods, services, or processes within an established company in order to add value and generate additional revenue via entrepreneurial thinking as well as action (Nkosi, 2011). Corporate entrepreneurship, according to Eze (2018), is the amount of a company's efforts aimed at creativity, proactiveness, and risk taking. Corporate entrepreneurship is described by Abosede, Fayose, and Eze (2018) as activities that improve a company's ability to innovate, create new products, take risks, and capture market opportunities. Innovation, risk-taking, proactiveness,

new product growth, new company venturing, autonomy, competitive aggressiveness, self-renewal, and strategic renewal are all aspects of corporate entrepreneurship. In public research institutes, corporate entrepreneurship is essential in ensuring success of the organization in long term. Entrepreneurship is the practice of building worth by using unique resources that are brought together by combining various resources (Chelimo & Ombui, 2018). The general belief regarding the corporate entrepreneurship (CE) is that it is the development of new ideas within large organizations that enable the organization to be profitable and improve its competitive position. It is possible to create value using CE by putting together the creativity and efforts of members of an organization.

Through corporate entrepreneurship, value creation is possible in public research institutes by harnessing the creativity and efforts of the members of the organization. Corporate entrepreneurship takes into consideration the unique operational context the organization because there is no time that the environment that a business operating environment is static (Nkosi, 2011). This change is global and companies are expected to change with the times, adapt and become more innovative. Research institutes have turned to corporate entrepreneurship to combat the lack of growth, uncertainties in source of funds, sustainability as well as the lethargy and bureaucracy that sometimes accompany size. The reduction in bureaucracies and emphasis on creativity and innovation necessitate the adoption of new management structures that are flexible.

1.1.2 Concept of Innovation

One of core characteristics of entrepreneurial activity that has been strongly related to research institutes is innovation. The ability to innovate is the single most important factor in

improving and maintaining competitiveness, and it is regarded as a major determinant of a company's competitiveness.. Porter (1998) defines innovation as business activity that allows companies to accomplish their goals by implementing more efficient methods and processes (Kadir, 2017). As a result, there is more pressure than ever for all companies to continue to evolve by creating and introducing new products and services.

Innovations is categorized into: product innovation, (which is concerned with the improvement of original goods, modification in design of recognized goods, or exercising of fresh supplies in the construct of recognized goods), Process innovation (which is described as new or improved tools, equipment, materials, and other technologies that have a direct impact on the firms practicing innovations; these firms produce products that are then sold and organizational innovation (implementation of a novel organizational technique in industry organization routines, workplace business, or external relations) (Suhang, et al 2017).While each type of innovation has its own set of determinants, attributes, and contributions to performance of the business, implementing innovations without a holistic perspective is unlikely to be effective.

Businesses' strategies would be more sufficient if they used innovation effectively. Innovation is made up of a series of steps. The development of new ideas in creativity is aided by inspiration and imagination. The process of innovation does not end with the discovery of an idea; it also includes the actualization of that idea. Businesses may work with existing capabilities or develop new capabilities to meet consumer needs as a result of innovation. To come under the category of creativity, an invention or concept must have a commercial value. In a nutshell, it is deemed appropriate for an innovation to be introduced to the market as a consumer product or to be used in a new manufacturing process. Products

and services aren't the only areas where innovation occurs. Apart from goods and services, company methods, marketing strategies, supply forms, and organizational fields are all being innovated (Altuntaş & Dönmez, 2010). Product, process, managerial, marketing, and institutional was all discussed by as categories of innovation Karacaoglu, Bayrakdarolu, and San (2013).

1.1.3 Organizational Performance

Organizational efficiency, a recurring theme in management science, remains a divisive topic among researchers in terms of meaning and measurement. According to Nkosi (2011), a specific activity's success is equal to its economy, productivity, and effectiveness. Organizational efficiency, according to Ghosh and Wu (2012), is described as “the capability of an entity to achieve its objectives by employing its resources in an efficient manner.” These concepts and recommendations assess organizational success as an organization's ability to exploit its strengths, resolve its vulnerabilities, and neutralize its challenges in order to get opportunities. The objectives approach, resource approach, and system approach have all been used to define performance of an organization.

Organizational performance is described as the difference between an organization's actual outputs and its planned outputs (goals and objectives). Ochieng (2013) defines organizational success as (a) financial performance (ROA, profits and ROI); (b) product market performance (market share, sales); and (c) shareholder return (economic value added and total shareholder return). According to Laua and Sholihin (2011) Organizational success is based on a multidimensional conceptualization that is primarily concerned with stakeholders, business conditions, and time. Tuan et al. (2016) present various perspectives on success

assessment where financial performance measures include profit, return of investment, return on equity, ROA while non-financial performance measures include growth, market share, customer satisfaction and public relationship.

Studies on the performance of research institutes used different measures of performance. For instance, Bwonya (2014) measured the performance of government research institutes in Kenya in terms of efficiency, effectiveness, profitability, quality of products and services, market share and market survival. Chelimo and Ombui (2018) measures performance of research institutes in Kenya by use of measures such as efficiency, effectiveness, quality and sustainability. Other measures of the performance of public research institutes include patented products, research papers published and new products development.

1.1.4 Research institutes in Kenya

This study was conducted among the Research institutes in Kenya. Research institutes in Kenya do not focus on profitmaking and hence depend on government and donors funding. In Kenya, government funded research institutes are 6. However, the country hosts 32 research institutes. Scientific research and technical services are carried out by Kenya Research Institutes. They play a critical role in the production of inventions and technologies required for the creation of a successful industrial system in an increasingly knowledge-based society.

Research institutes in Kenya have in the last one decade begun to focus primarily on commercializing technologies stemming from their respective research agendas. The Kenyan government has been developing a growing interest in evaluating the performance of research institutes so as to manage them efficiently and effectively in the light of diminishing

funds. In Kenya, research institutes in Kenya are facing a challenge to improve their performance. It has become trendy for policymakers to expect universities and research institutes to commercialize some of the knowledge they produce over the last few decades. For example, by forming spin-off companies or at the very least seeking intellectual property rights protection, such as licensing, in order to profit from their knowledge.

In Kenya, the performance of public research institutes has been poor, thus affecting their sustainability negatively. Mwilu (2013) indicates that with an increasingly knowledgeable population, in Kenya, research institutes are under the pressure to demonstrate transparency and provide high-quality services. Although operating under budgetary constraints, research organizations must fulfill their core mandates. In order to meet this challenge, research organizations must re-evaluate their activities and pursue greater efficiencies in order to save money.1.2 Research Problem

Globalization as well the changes in trend of global business environment, today, are posing a challenge to both private institutions and government parastatals all over the world. As a result, firms have begun focusing on their performance and strategies that can be used to improve it (Laua & Sholihin, 2011). Among other strategies, corporate entrepreneurship in terms of innovation, pro-activeness, risk taking and competitive aggressiveness, has been identified as a key source of competitive advantage in an organization (Mokaya, 2013). As a result, managers are encouraging workers to be more creative and come up with goods and services that distinguish their companies by increasing corporate entrepreneurship.

The government of Kenya has over the years been funding the 6 research institutes in Kenya. In addition, these organizations have been getting funding from international organizations

and donors to finance their research work. However, as a result of alleged misuse of funds, the government of Kenya as well as donors has reduced their financial support to these institutions. For instance, in 2015, the US government froze direct funding to KEMRI threatening key research projects and putting more than 1,000 employees at risk of losing their jobs (KEMRI, 2017). In April 2018, the United States threatened to further cut its budget is supporting KEMRI programmes after the organization failed to account for up to Sh300 million. Kenya National Audit Office (2017) report indicates that Kenta Agricultural Research Institute risked losing its top scientists due to lack of funds. To ensure sustainability and survival in today's world characterized by rapid technological changes, increasing public demand and increasing human resource demands, research institutes in Kenya need to adopt corporate entrepreneurship so as to start generating considerable revenue to finance their programs.

Various researches have been performed globally and locally on corporate entrepreneurship and organizational performance. Globally, Nafie, Tjambolang and Pane (2016) assessed the association between corporate entrepreneurship and firms' performance in Indonesia and established that corporate entrepreneurship dimensions including taking risks, being proactive, and being creative have an effect on performance of SMEs. In Malaysia, Nabila, Ambad and Wahab (2016) examined the influence of corporate entrepreneurship on firm performance among large enterprises and established that entrepreneurial orientation as well as corporate venturing has positive impact on firm performance among firms in Malaysia. In South Africa, Nkosi (2011) evaluated the influence of corporate entrepreneurship on the organizational performance in ICT industry and noted that dimensions of corporate entrepreneurship level such as pro-activeness, innovation, taking risk and entrepreneurial

culture has a positive effect on company performance. Abosedo, Fayose and Eze (2018) conducted a research on association between corporate entrepreneurship and international performance of Nigerian banks and established that individual and combined affects of corporate entrepreneurship elements (innovation, proactiveness, risk taking, strategic renewal, and corporate venturing) on results were positive.

In Kenya, Njoroge (2015) assessed the effect corporate entrepreneurship on financial performance of banking industry in Kenya and discovered that innovation, competitive aggressiveness, pro-activeness, risk taking, and autonomy had positive impact on financial performance. In Kenya, Mokaya (2013) studied the effect of corporate entrepreneurship on the performance of edible oil manufacturing firms. The results indicated that corporate entrepreneurship in terms of individual motivation, proactiveness, risk taking and innovativeness had a positive impact on organizational performance Ndungi (2016) examined impact of corporate entrepreneurship on insurance companies' performance in Nairobi and established that corporate entrepreneurship positively affects performance of insurance companies. However, studies done on corporate entrepreneurship and organizational performance have been limited to private and profitmaking institutions in Kenya. Due to differences in the source of funds, regulatory framework and organizational structures between public and private institutions, the findings of private institutions cannot be generalized to public institutions including parastatals such as research institutes. To cover this gap, this research examined the relationship between corporate entrepreneurship and performance of KRIs

1.3 Research Objective

To evaluate the relationship between corporate entrepreneurship, innovation and performance of Kenya Research Institutes

1.4 Value of the Study

This research makes contributions to the theory as well as benefit, policy makes, management of Kenya Research Institutes as well as other researchers and academicians. The study adopts two theories: opportunity-based theory and Schumpeter's innovation theory. The Opportunity-based theory looks at the identification and taking advantage of opportunities. Schumpeter's innovation theory looks at the use of innovation in the achievement of a competitive advantage. However, these studies were developed for profit making organization, and hence not specific to public institutions. This study therefore shows how the two theories can be utilized in public institutions including research institutes.

The research contributes to body of knowledge on association between corporate entrepreneurship, innovation, and public-institution performance. Results of this research can be used as research material and to identify research gaps by other researchers and academicians. In addition, the study serves as a foundation for future research on corporate entrepreneurship, innovation and performance.

The study provides information to Kenyan policymakers and the government on how corporate entrepreneurship and innovation affect the performance of Kenya Research Institutes that can be employed to formulate policies on utilization of corporate entrepreneurship. Additionally, findings can be employed to develop or review policies on

the adoption and utilization of the concept of corporate entrepreneurship in public institutions in an effort to improve performance of public institutions.

To management of research institutes in Kenya, the study provides information on how the adoption of the corporate entrepreneurship concept influences their organizational performance. With the reduction in funding from the government and donors, the findings of this study provide information on how corporate entrepreneurship can be used to ensure the profitability and sustainability of research institutes.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter sets out a review of related literature on association between corporate entrepreneurship, innovation and performance of organizations. Specifically it covers a theoretical review, empirical literature on entrepreneurship, corporate entrepreneurship, research institutes as well as corporate entrepreneurship and performance. In addition, the chapter covers summary and knowledge gaps.

2.2 Theoretical Review

This section presents and discusses theories relation to corporate entrepreneurship, innovation and performance of Kenya Research Institutes. Specifically, the study looks at Drucker's opportunity-based theory and Schumpeter's innovation theory.

2.2.1 Drucker's Opportunity-Based Theory

Opportunity based- theory was developed by Peter Drucker in the year 1985. Opportunity-based theory indicates that entrepreneurs succeed by identifying and taking advantage of opportunities created technological, cultural and social changes (Buşra&Zehir, 2012). The theory also indicates that entrepreneurs often exploit opportunities that are transitional in nature such as technological innovation, consumer preferences among others. This indicates the relationship between entrepreneurs and entrepreneurship as the entrepreneurs often search for change, appropriately respond to the change and exploit it as an opportunity. Moreover, what is evident in this theory is that most entrepreneurs tend to identify any possibility created by change rather than the problem (Kwabena, 2011).

Opportunities are linked to particular goals and conditions. Every opportunity and every position serves a particular function. People are required to meet specific needs or demands. Furthermore, taking opportunities entails taking risks. In this context, risk refers to a deliberate shift from the known to the unknown (Oganisjana & Laizans, 2015). The person gives up what he or she has in the hopes of receiving a better one in the future. Furthermore, abuse of opportunity necessitates caution, which is linked to a sense of denial and power. People are subjected to a non-negotiable and uncompromising demand when it comes to discipline. By practicing discipline, one reacts to life's problems not as he or she wishes or prefers, but as they are needed or required to be done. In order to face the realities of life, one refuses to react to emotions.

In this study, opportunity based- theory was used to show how corporate entrepreneurship influences performance of research institutes. Over the years, research institutes in Kenya have been depending on the government and donors for funding. As such they have been operating without focusing on their profitability. Reduction in funding by the government and donors in the last three years has triggered a debate on the profitability and sustainability of research institutes. This implies that research institutes have to start taking advantage of available opportunities and even take risks like entrepreneurs in order to improve their performance and sustainability.

2.2.2 Schumpeter's Innovation Theory

Schumpeter's innovation theory was developed by Joseph Schumpeter in the year 1942. Trade cycles, according to Joseph Schumpeter, are the product of entrepreneurial creativity in a dynamic economy. Trade cycles, according to his theory, are an inextricable part of a

capitalist society's economic growth mechanism. The trade cycle, according to Schumpeter, is divided into two phases (Buşra&Zehir, 2012).

The first stage is concerned with the immediate effect of the innovation that entrepreneurs implement in their manufacturing processes. The second stage is triggered by competitor reactions to the initial impact of the invention. The primary role of an entrepreneur, according to Schumpeter's innovation theory, is innovation activity, which provides him with real "benefit" (Nkosi, 2011). By an innovation the theory implies such changes in goods production as cannot be influenced by infinitesimal variations or steps on the margin. According to Schumpeter's innovation theory, an entrepreneur is not a man of ordinary ability, in that; he introduces in his business something which is entirely 'new' to the existing economic system. He is not a capitalist but an organizer who can mobilize the needed cash for introducing his innovation (Tuan, Nhan&Giang, 2016).The innovator-entrepreneur requires two things to perform his function; one, technical knowledge for the introduction of innovations, and two finance for the completion of his task. In Schumpeter's view, a reservoir of untapped technical knowledge exists in a capitalist society on which he can draw for shaping his innovation. Regarding funds, Schumpeter believes that an entrepreneur can attract bank credit easily (Mokaya, 2013).

In this study, the theory was used to explain the importance of innovation in the performance of Research Institutes. Among other things, research institutes in Kenya are required to invest a lot in new product creation and innovation. The continuous innovation and new products creation in these institutes can lead to an increase in sales and hence increase profitability. For instance, Kenya Agricultural Research Institute has introduced products such as

KenbroKienyeji chicken, Rainbow Rooster chicken and Kuroiler improved Kienyeji Chicken to the market.

2.3 Corporate Entrepreneurship and Innovation

Product innovation is critical for a company to capture market share, and business capacity to deliver a continuous flow of product developments is critical to run the business, boost the efficiency of the business, or expand the business, and product innovation is essential for a business to survive in the market and capture market share due to huge competition and day by day competition rises in the market. (Karacaoglu, Bayrakdaroglu & San, 2011). Due to high competition level as well as product innovation, product's life expectancy decreases. As a result, most companies' primary emphasis is on product innovation, either to enhance existing products or to create new ones.

The interrelationship between corporate entrepreneurship and innovation is that corporate entrepreneurship sets Innovation context. It entails the innovation process. Corporate entrepreneurship necessitates a systems-based, holistic approach to innovation. It serves as a foundation. It's a complicated process that involves strategy, structure, policies and procedures, processes, citizens, and customers, among other things. Corporate entrepreneurship, unlike other business processes that might follow a conventional work procedure, is less formal and more organic. It's a mindset, a skill set, and a way of thinking and behaving. It necessitates resolving the inherent conflict between maximization of economic value and human capital development (Altuntaş & Dönmez, 2010). According to Karakaş, Yaşar, and Yıldız (2017), innovation is a unique tool for entrepreneurs that give them a new capacity to build wealth by allowing them to use capital more efficiently. Instead of being viewed as a science or technology, innovation should be viewed as a value.

Innovation efforts cannot be carried out solely inside or outside the company. When developing an innovation, it is important to think about it as a whole, taking into account both internal and external influences.

Corporate entrepreneurship and innovation capability enable firms to accomplish a high competitiveness level in global and national market. As a result, top executives' primary emphasis should be on how to foster and maintain enhanced innovation capability (Cakar and Erturk 2010). Innovation, according to Lwamba, Bwisa, and Sakwa (2013), is at the center of corporate entrepreneurship. Only by establishing viable creative undertakings can organizational-broad entrepreneurial spirit be able to deal with and also benefit from fast evolving market situations. When these organizational strategies are promoted and organized within the company, the result is a long-term competitive advantage in the form of new goods, services, or a combination of these.

2.4 Corporate Entrepreneurship, Innovation and Performance

Future profit sources from current activities are unpredictable in a world of rapid change and shortened product and service lifecycles, and companies must actively search out new opportunities (Eze, 2018). As a result, firms must embrace and embed Corporate Entrepreneurship. Corporate entrepreneurship is used in Indonesia to help companies develop their workers' ability to innovate while also expanding the company's growth by venturing into new fields (Nafie, Tjambolang & Pane, 2016). Firms that encourage entrepreneurship have a higher rate of growth. In Malaysia, Nabila, Ambad and Wahab (2016) indicate that The practice of entrepreneurship produces creativity, which has direct impact on organization's performance. Further, the greater a company's willingness to experiment and

take risks, the better its chances of succeeding. Corporate entrepreneurship entails a company's offering of innovative goods that keep consumers excited and as a result keep them buying. According to Karacaoglu, Bayrakdarolu, and San (2013), corporate entrepreneurship improves profitability and development, which leads to improved firm performance. Corporate Entrepreneurship, in particular, is a remarkable feature of prosperous and growing businesses. According to Altuntaş & Dönmez (2010), companies that place a higher value on corporate entrepreneurship activities perform better than other firms. According to Otachea and Mahmood (2015), corporate entrepreneurship's organisation, innovation, risk taking, pro-activeness, competitive aggressiveness, and autonomous behaviors are measured and used as a method for gaining competitive advantage, and it is unique to the firm and cannot be imitated. Companies that wish to foster corporate entrepreneurship and innovation, according to Makoya (2012), must give entrepreneurs the freedom and support they need to grow their ideas. Setting specific objectives that are mutually agreed upon by staff and management, establishing a system of feedback and positive reinforcement, stressing on individual accountability, and rewarding based on performance are the four main steps to create such an environment.

The extent to which an organization innovates, takes risks, and acts proactively can be used to determine its level of entrepreneurship. The entrepreneurially oriented business is seen as engaging in corporate entrepreneurship, which involves the aforementioned characteristics. Redefinition of a company's vision, mission, and business concept; reorganization of operations; and the induction of system-wide improvements for innovation are all examples of self-renewal activities (Nkosi, 2011). The articulation of the vision and strategic direction by management at all levels of the organization, according to Huse, Neubaum, and

Gabrielsson (2016), is critical, particularly when the company implements any changes to their way of doing business. According to Tuan et al. (2016), one of the most important components for a company's survival and growth is innovation, which includes product, method, marketing, and organizational innovation. For effective firms, these innovation practices build value and competitive advantages; thus, understanding organization's general innovation is the initial and most important step in understanding the role of innovation in firm performance.

2.5 Empirical Review of Literature

Various researches have been performed on corporate entrepreneurship, innovation and performance. In Pakistan, Haque (2017) indicates that by use of corporate entrepreneurship, companies retain and improve their long-term competitive capacities, which are aided by various aspects of organizational efficiency. Studies on corporate entrepreneurship and organizational performance show that there exists positive relationship. In Indonesia, Nafie, Tjambolang and Pane (2016) studied the relationship between corporate entrepreneurship and firm performance. The data was obtained from 36 SMEs in South Sulawesi using a descriptive research design. The results indicated that corporate entrepreneurship dimensions including taking risk, pro-activeness as well as innovativeness have an effect on performance of SMEs. However, having been conducted in Indonesia, a country with different economic environment, business environment and legal framework, the findings of this study are not applicable to Kenya.

In South Africa, Nkosi (2011) studied influence of corporate entrepreneurship on the organizational performance in ICT industry. The study used a survey research design. Results

indicated that the dimensions level of corporate entrepreneurship such as pro-activeness, innovation, taking risk and entrepreneurial culture has positive effect on company performance. In Nigeria, Eze (2018) studied the impact of corporate entrepreneurship on manufacturing firms' performance. The study used a descriptive research design and target population was eight manufacturing firms. The results indicated that corporate entrepreneurship in terms of strategic renewal, corporate venturing, pro-activeness, risk taking and innovation had an effect on financial (profitability) and non-financial performance (employees' satisfaction as well as market share) of manufacturing firms. In South Africa, Nkosi (2011) found that elements of corporate entrepreneurship including risk taking, entrepreneurial culture, pro activeness, and innovation had positive effect on organizational performance.

In Kenya, Moige, Mukulu and Orwa (2016) examined the association between corporate entrepreneurship and performance of food fortification companies. Moreover, the study utilized descriptive research design. Results noted that corporate entrepreneurship led to an increase the performance of food fortification companies. As such, food fortification companies should focus on corporate entrepreneurship management. However, the study was limited to food fortification companies hence, the findings are not generalizable to research institutes. Mokaya (2013) studied the association between corporate entrepreneurship and the performance of edible oil manufacturing companies in Kenya. Moreover, the study utilized descripto-explanatory research design. Findings revealed that taking risk, innovativeness, pro-activeness and individual motivation were significantly affecting organizational performance. Nonetheless, the study was limited to two edible oil manufacturing companies in Kenya and hence results are not applicable to research institutes in the country.

2.6 Summary and Knowledge Gaps

This study will be anchored on Drucker's opportunity-based theory and Schumpeter's innovation theory. Opportunity-based theory indicates that entrepreneurs succeed by identifying and taking advantage of opportunities created technological, cultural and social changes. Schumpeter's innovation theory indicates that anyone seeking profits must adopt innovation. The empirical literature shows that corporate entrepreneurship measure in terms of innovation, taking risk and pro-activeness have an effect on performance. However, studies conducted on association corporate entrepreneurship and performance has been limited to specific countries. Different countries around the world are characterized by diverse economic and business environments and hence findings from one country are not generalizable to another country. In addition, studies conducted in Kenya have been limited to the private sector including the banking industry and the manufacturing sector. The structure, source of funds and legal frameworks governing research institutes in Kenya are different from those of the private sector. This study therefore sought to examine relationship between corporate entrepreneurship and performance of Kenya Research Institutes.

2.7 Conceptual Framework

Figure 2.1 shows the diagrammatic representations of the association between independent and dependent variable. The independent variables were corporate entrepreneurship and innovation. The dependent variable was performance of research institutes in Kenya.

Independent Variables

Dependent Variable

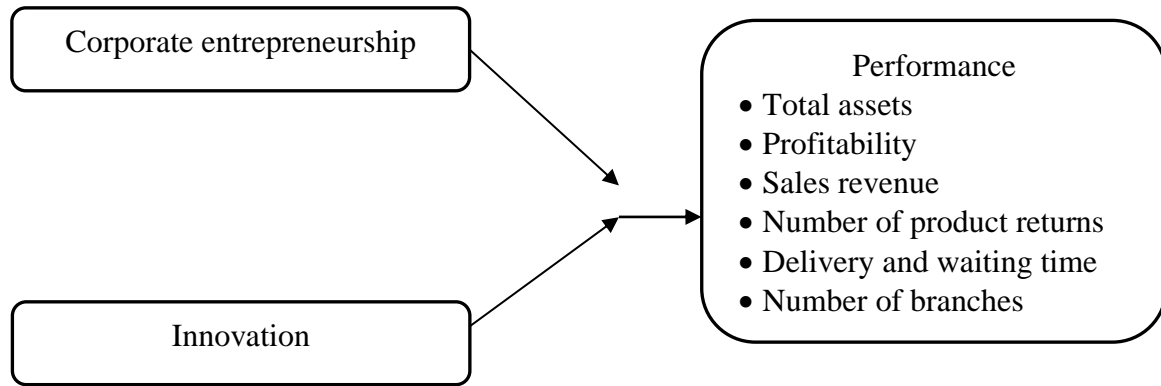


Figure 2. 1: Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Research methodology outlines the methods used in identification of study population, selection of a sample size, collection of data and data analysis. Specifically, this chapter covers research design, study population, sample size and sampling technique, data collection and data analysis as well as presentation.

3.2 Research Design

This researcher used an explanatory research design. As indicated by Bhattacharjee (2012) this research design is normally conducted to measure the nature and the extent of a cause effect relationship. An explanatory research seeks to analysis a phenomenon, situation or problem so as to explain patterns of the associations between the variables used. This researcher seeks to examine association between corporate entrepreneurship and performance of KRIs and hence descriptive explanatory design was the best research design.

3.3 Target Population

A target population is a collection of people, or things that share certain common characteristics and are identified by the study's sampling criteria (Bhattacharjee, 2012). Target population also refers to as a group of occurrences, items or people, group of households' similar attributes that a researcher seeks to investigate (Wilson, 2017). The unit of analysis in this study was Research institutes in Kenya and the unit of observation was heads of enterprise departments/general managers in the Research institutes in Kenya. The study population was 32 Research institutes in Kenya (Appendix II).

Since the population was not too large, this was a census study. A census is the process of systematically enumerating, collecting, and documenting information on the members of a community. Under the census or enumeration method, the statistician collects the data for each and every unit of the population. A census is desirable for small populations. According to Metsamuuronen (2017), censuses are preferable for smaller communities because they minimize sampling errors and provide information on group members.

3.4 Data Collection

Primary and secondary data were used by the researcher. Secondary data on the performance of Kenya Research Institutes were obtained from yearly reports of the research institutes. Primary data was obtained from the heads of enterprise departments/general managers by use of semi structured questionnaire, which comprised of open-ended and also closed-ended questions. The data was collected using semi-structured questionnaires from heads of enterprise departments/general managers in the 32 Research institutes in Kenya. Generally, questionnaires are considered to be cost-effective in the collection of data, especially in cases where the population is large and anonymity is a necessity. Prior to the data collection, a pilot test was carried out to examine the reliability and the validity of research tool which in this case was the questionnaire. The questionnaires were distributed to the participants by use of drop-off and pick-up later method so as to increase the response rate. Before going to the field, introduction letter was obtained from the Nairobi University. It was estimated that data collection process would take two weeks.

3.5 Data Analysis and Presentation

The research instrument (questionnaire) provides quantitative and qualitative data. Qualitative data obtained from open ended questions were analysed by use of thematic content analysis. Moreover, thematic content analysis involves pinpointing, recording and examination of patterns within a data set. Quantitative data was analysed by use of inferential and descriptive statistics with support of SPSS version 22.

The first objective and the second objectives sought to analyze the state of corporate entrepreneurship in research institutes in Kenya and to analyze the state of innovation in research institutes in Kenya, respectively. The two objectives were analysed by use of descriptive statistics such as frequency distribution, percentages, standard deviation and means. The third objective seeks to examine association between corporate entrepreneurship, innovation and performance of KRI. The study utilized correlation analysis as well as regression analysis to examine the correlation between corporate entrepreneurship and performance of Research institutes. Correlation analysis was employed to examine existence of relationship whereas the regression analysis was used to examine the weight of relationship between independent and dependent variable.

Regression model took the below form;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Whereby: Y= Performance; β_0 = Constant; $\beta_1 - \beta_2$ = Beta coefficients; X_1 = Corporate Entrepreneurship; X_2 = Innovation; ε = Error term

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATIONS AND PRESENTATION

4.1 Introduction

This section analyses, interprets and also presents the findings of the study as per main objective of the study; to examine the association between corporate entrepreneurship, innovation and performance of KRIs. The chapter begins with the background information followed by innovation, corporate entrepreneurship, performance of research institutes as well as association between corporate entrepreneurship, innovation and performance of KRI represented by correlation as well as regression analysis.

4.2 Response Rate

The study targeted the heads of enterprise departments/general managers in the 32 Research institutes in Kenya. Out of 32 questionnaires, 31 questionnaires were dully filled in and returned. The DOPU method yielded the high response rate of 96.87%. Nulty (2011) suggests that a 75 per cent response rate is good for analysis, making conclusions as well as inferences concerning a population. Further, According to Kothari (2012), a response rate of 50 percent should be considered average, 60 percent to 70 percent should be considered adequate, and more than 70 percent should be considered excellent. This means that the 96.87 percent response rate was suitable for analysis, drawing conclusions, and reporting.

4.3 Innovation

The first objective in on-going study was to assess the state of innovation in research institutes in Kenya.

4.3.1 Number of Products or Services

The participants were asked to indicate how many products or services their organizations developed or introduced between the year 2014 and 2018. Table 4.1 summarizes the results.

Table 4. 1: Number of Products or Services

Number of products of services	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
1 to 7	8	25.8	8	25.8	8	25.8	5	16.1	5	16.1
8 to 14	11	35.5	11	35.5	2	6.5	7	22.6	5	16.1
15 to 21	8	25.8			9	29.0	9	29.0	9	29.0
22 to 28	1	3.2	9	29.0	8	25.8	6	19.4	2	6.5
29 to 35	0	0.0	0	0.0	1	3.2	1	3.2	6	19.4
36 to 42	3	9.7	2	6.5	0	0.0	0	0.0	1	3.2
43 to 49	0	0.0	1	3.2	3	9.7	3	9.7	3	9.7
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	15		17		18		18		22	
SD	10.17		11.22		11.73		11.78		12.55	

From the findings in Table 4.1, research institutes in Kenya had an average of 15 products or services (SD=10.17) in the year 2014, which increased to 17 products or services (SD=11.22) in 2015 and 18 products or services (SD=11.73) in the year 2016. In the year 2017, the average number of products or services in research institutes in Kenya remained constant at 18 (SD=11.78). In the year 2018, the average number of products and services in research instruments in Kenya was 22 (12.55). This implies that the number of products or services in research institutes in Kenya has been increasing for the last five years. This shows that innovation in the research institutes has been improving over the years from the year 2014 to 2018. This is shown by the increasing number of products developed every year.

4.3.2 Number of Patented products

The respondents were required to specify number of products their organizations patented during the period between the year 2014 and 2018. Table 4.2 depicts the findings.

Table 4. 2: Number of Patented products

Number of Patented products	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
1 to 3	20	64.5	17	54.8	17	54.8	14	45.2	13	41.9
4 to 7	4	12.9	7	22.6	6	19.4	9	29.0	7	22.6
8 to 11	6	19.4	6	19.4	4	12.9	4	12.9	5	16.1
12 to 15	1	3.2	1	3.2	4	12.9	4	12.9	5	16.1
16 to 19	0	0.0	0	0.0	0	0.0	0	0.0	1	3.2
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	3		4		5		5		6	
SD	3.49		3.61		4.03		4.25		4.85	

According to the findings in Table 4.2, the average number of patented products in research institutes in Kenya was 3 (SD=4.29) in the year 2014, which increased to 4 in the year 2015 (SD=3.61). The number of patented products in research institutes in Kenya was increased to 5 (SD=4.03) in the year 2016. The number of patented products remained constant at 5 (SD=4.25) year 2017, which later increased to 7 (SD=4.85) in the year 2018. These findings imply that the average number of patented products in research institutes in Kenya has been increasing for the last five years. Further, it implies that product patenting increased from 2014 to 2015 and then remained constant in 2016 after which it increased in the year 2017 and 2018.

4.3.3 New Technologies Developed or Adopted for the Period between 2014 And 2018

The participants were requested to list the new technologies that their research institutes had developed or adopted during the period between 2014 and 2018. From the findings, KIPPRA had developed Kippra Tertiary Micro Modeling (KTMM), Cumulative General Equilibrium Model (CGE) and Threshold Model for Agriculture commodities (T21). ILRI had developed and adopted GENE BANK and Forage Collection Technology. National Crime Research Centre has developed a Mobile Phone Crime Reporting Application. KALRO had developed bean varieties, maize varieties and green grams. The study found that Kenya Marine and Fisheries Research Institute had adopted Cage culture proposal of trials in the marine sector and freshwater fisheries.

4.4 Corporate Entrepreneurship

The second objective of the study was to determine the state of innovation in research institutes in Kenya.

4.4.1 High Risk Projects in Research Institutes

Projects that are high-risk are those that are highly visible, have a broad effect both within and outside the company, and pose major risks to the project team's ability to deliver. The respondents were asked to list high risk projects that their research institutes organization has been involved in the last five years. The study found that ILRI high risk projects included Malignant catarrhal fever vaccination trial, development of sustainable livestock systems, The Mazingira Centre. High risk projects in KALRO include control or army worms. The National Crime Research Institute was undertaking a National Crime Mapping Survey in 47 counties.

4.4.2 Opportunities Unrelated to Organization’s Vision and Mission

The participants were required to point out opportunities unrelated to their organization’s vision and mission their research institutes had responded to in the last five years. The study found that Kenya Agricultural & Livestock Research Organization (KALRO) had invested in hospitality services, resilient crops other than maize and water bottling.

4.4.3 Number of Untested Technologies

The respondents were requested to state the number of untested technologies that their organizations had invested in, in the last five years. Table 4.3 summarizes the findings.

Table 4. 3: Number of Untested Technologies

Number of untested technologies	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
1 to 3	19	61.3	13	41.9	13	41.9	14	45.2	14	45.2
4 to 7	10	32.3	11	35.5	11	35.5	10	32.3	10	32.3
8 to 11	2	6.5	7	22.6	5	16.1	5	16.1	3	9.7
12 to 15					2	6.5	2	6.5	2	6.5
16 to 19									2	6.5
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	4		4		5		5		6	
SD	2.55		2.97		3.07		3.92		4.72	

From the findings in Table 4.3, the average number of untested technologies that research institutes in Kenya had invested in was 4 (SD=2.55) in 2014, which remained stagnant at 4 (SD=2.97) in 2014. In the year 2016, the average number of untested technologies that research institutes in Kenya had invested in was 5 (SD=3.07), which remained stagnant at 5

(SD=3.92). The results also show that the number of untested technologies that research institutes in Kenya had invested increased to 6 (SD=4.72). These results imply that the average number of untested technologies that research institutes in Kenya have invested in increased from 4 to 6. Some of these technologies include Cumulative General Equilibrium Model (CGE) in KIPPRA. The Cumulative General Equilibrium Model technology is characterized by different constraints. These constraints include domestic saving constraints which are solved by linear-programming.

4.4.4 Number of New Technologies

The respondents further were requested to specify number of new technologies that their research institutes had introduced in past 5 years. Table 4.4 shows the results.

Table 4. 4: Number of New Technologies

Number of new technologies	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
Zero	0	0.0	1	3.2	1	3.2	1	3.2	0	0.0
1 to 3	9	29.0	9	29.0	5	16.1	2	6.5	3	9.7
4 to 7	7	22.6	11	35.5	6	19.4	9	29.0	7	22.6
8 to 11	13	41.9	3	9.7	11	35.5	6	19.4	8	25.8
12 to 15	2	6.5	2	6.5	6	19.4	8	25.8	7	22.6
16 to 19	0	0.0	5	16.1	2	6.5	3	9.7	4	12.9
20 to 23	0	0.0	0	0.0	0	0.0	2	6.5	2	6.5
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	7		8		8		9		11	
SD	3.21		4.39		4.84		5.30		6.35	

The results, as shown in Table 4.4, average number of new technologies in research institutes in Kenya was 7 (SD=3.21), which increased to 8 in 2015 (SD=4.39). In the year 2016, the

average number of new technologies remained stagnant at 8 in the year 2016 (SD=4.84). In the year 2017, the number of new technologies in research institutes in Kenya increased to 9 (SD=5.30), which later increased to 11 (SD=6.35) in 2018. These findings imply that the average number of new technologies in research institutes in Kenya increased considerably between the year 2014 and 2018. The new technologies included Kippra Tertiary Micro Modeling (KTMM) and Cumulative General Equilibrium Model (CGE).

4.4.5 Number of New Business Processes

The participants were asked to indicate the new business processes in their research institutes for the period between 2014 and 2018 to keep up with current technology. Table 4.5 summarizes the results.

Table 4. 5: Number of New Business Processes

Number of new business processes	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
1 to 3	25	80.6	28	90.3	23	74.2	20	64.5	11	35.5
4 to 7	5	16.1	2	6.5	7	22.6	10	32.3	16	51.6
8 to 11	0	0.0	0	0.0	0	0.0	0	0.0	3	9.7
12 to 15	1	3.2	0	0.0	0	0.0	0	0.0	0	0.0
16 to 19	0	0.0	1	3.2	1	3.2	1	3.2	0	0.0
20 to 23	0	0.0	0	0.0	0	0.0	0	0.0	1	3.2
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	2.80		2.80		3.38		3.61		4.51	
SD	2.42		2.67		2.83		3.07		3.66	

According to the findings in Table 4.5, the average number of new business processes in research institutes in Kenya in the year 2014 was 2.80 (SD=2.42), which remained stagnant at 2.80 (SD=2.67) in the year 2015. In the year 2016, the average number of new business

processes in research institutes in Kenya was 3.38 (SD=2.83), which increased to 3.61 (SD=3.07) in 2017 and 4.51 (SD=3.66) in 2018. These findings imply that the average number of new business processes in research institutes in Kenya has been increasing for the last five years (2014 to 2018). These new business processes relate to KTMM, T21 model, CGE, NAVISON 2015. This information shows that through corporate entrepreneurship, the research institutes in Kenya have been in a position to introduce new business processes for a period of 5 years from 2013 to 2017.

4.4.6 Number of New Features in Products

The respondents were requested to specify the number of new features their research institutes had added in the current products in the past five years. Table 4.6 summarizes the findings.

Table 4. 6: Number of New Features in Products

Number of new features in products	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
1 to 2	26	83.9	23	74.2	14	45.2	10	32.3	10	32.3
3 to 4	3	9.7	3	9.7	12	38.7	16	51.6	16	51.6
5 to 6	2	6.5	5	16.1	5	16.1				
7 to 8							5	16.1	3	9.7
9 to 10									2	6.5
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	2.06		2.51		2.83		3.32		3.64	
SD	1.15		1.38		1.41		1.81		2.12	

The results, as shown in Table 4.6, show that average number of features in research institutes in the year 2014 was 2.06 (SD=1.15), which increased to 2.51 (SD=1.38) in 2015. In the year 2016, the average number of features in research institutes in Kenya was 2.83

(SD=1.41), which increased to 3.32 (SD=1.81) in 2017 and 3.64 (SD=2.12) in 2018. These findings imply that the average number of features added in products and services in research institutes has been increasing for the last five years. This is due to improvement in corporate entrepreneurship and innovation in the research institutes in Kenya.

4.4.7 Investment in Research and Development

The respondents were required to indicate amount of capital their organizations had invested in research and development for the period between 2014 and 2018. The results obtained were as depicted in Table 4.7.

Table 4. 7: Investment in Research and Development

Investment in Research and Development in millions	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
100 and Below	17	54.8	17	54.8	15	48.4	15	48.4	15	48.4
101 to 200	5	16.1	4	12.9	6	19.4	6	19.4	6	19.4
201 to 300	1	3.2	2	6.5	2	6.5	2	6.5	2	6.5
301 to 400	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2
401 to 500	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2
501 to 600	5	16.1	2	6.5	5	16.1	5	16.1	2	6.5
601 to 700	0	0.0	3	9.7	0	0.0	0	0.0	3	9.7
701 to 800	1	3.2	0	0.0	0	0.0	0	0.0	0	0.0
801 to 900	0	0.0	1	3.2	1	3.2	1	3.2	1	3.2
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	194.12		207.06		218.35		222.58		235.16	
SD	229.34		245.86		251.68		255.97		266.98	

From the findings in Table 4.7, the average amount of money invested in research and development by research institutes in Kenya in the year 2014 was Ksh. 194.12 million. This

figure increased to Ksh. 207.06 million in 2015 and Ksh. 218.35 million in 2016. In the year 2017, the average amount of money invested in research and development by research institutes in Kenya was Ksh. 222.58 million, which increased to Ksh. 235.16 million. These findings imply that the average amount of money invested in research and development by research institutes in Kenya has been increasing for the period between 2014 and 2018. This is due to upward trend of the products developed by the research institutes which require more financial resources to make the development processes successful.

4.4 Performance of Research Institutes

The measures of performance in research instruments included profitability (surplus/deficit), sales revenue, total assets, number of product returns and average delivery time.

4.4.1 Profitability of the Research Institutes

The respondents were required to indicate profitability of their organizations (surplus/deficit) for the last five years (2014-2018). The findings obtained were as summarized in Table 4.8.

Table 4. 8: Profitability of the Research Institutes

Surplus/deficit in millions	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
100 and Below	25	80.6	23	74.2	25	80.6	25	80.6	25	80.6
101 to 200	3	9.7	3	9.7	3	9.7	3	9.7	3	9.7
201 to 300	3	9.7	3	9.7	1	3.2	1	3.2	1	3.2
301 to 400	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
401 to 500	0	0.0	0	0.0	2	6.5	2	6.5	0	0.0
501 to 600	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
601 to 700	0	0.0	0	0.0	0	0.0	0	0.0	2	6.5
701 to 800	0	0.0	2	6.5	0	0.0	0	0.0	0	0.0
801 to 900	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	67.03		116.93		85.52		90.65		105.49	
SD	71.96		185.10		112.67		121.47		157.70	

From the findings in Table 4.8, the average profitability of the research institutes in Kenya in the year 2014 was Ksh. 67.03 million, which increased to Ksh. 116.93 million in 2015. However, the profitability the research institutes in Kenya in the year 2016 decreased to Ksh. 85.52 million. In the year 2017, the average profitability of the research institutes in Kenya increased to Ksh. 90.65 million, which later increased to Ksh. 105.49 million in 2018. These findings show that, generally, the profitability of research institutes in Kenya increased for the period between 2014 and 2018. This is due to increase in sales of the new products developed hence leading to the upward trend in profitability of the research institutes.

4.4.2 Sale Revenue of the Research Institutes

The participants were requested to indicate the sale revenue of their organizations (research institutes) for the last five years (2014-2018). Table 4.9 shows the results.

Table 4. 9: Sale Revenue of Research Institutes for the Last Five Years

Sales Revenue in millions	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
100 and Below	22	71.0	22	71.0	22	71.0	20	64.5	22	71.0
101 to 200	6	19.4	6	19.4	6	19.4	8	25.8	6	19.4
201 to 300	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2
301 to 400	2	6.5	0	0.0	0	0.0	0	0.0	0	0.0
401 to 500	0	0.0	2	6.5	0	0.0	0	0.0	0	0.0
501 to 600	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
601 to 700	0	0.0	0	0.0	2	6.5	0	0.0	0	0.0
701 to 800	0	0.0	0	0.0	0	0.0	2	6.5	0	0.0
801 to 900	0	0.0	0	0.0	0	0.0	0	0.0	2	6.5
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	96.58		110.83		124.66		137.90		142.22	
SD	84.95		116.68		163.23		184.63		196.53	

From the findings in Table 4.9, the average sale revenue in research institutes in Kenya in the year 2014 was Ksh. 96.58 million, which increased to Ksh. 110.83 million in 2015. In the year 2016, the average sale revenue in research institutes in Kenya increased to Ksh. 124.66 million, which later increased to Ksh. 137.90 million in 2017 and Ksh. 142.22 million in 2018. These findings imply that the average sale revenue in research institutes in Kenya has been increasing for the last five years (2014 to 2018). This is as a result of increased variety of products developed by these research institutes hence increasing the total sales.

4.4.3 Total assets of the Research Institutes

The respondents were asked to specify the total assets in their organizations for the five years (2014-2018). The results were as shown in Table 4.10.

Table 4. 10: Total assets of the Research Institutes

Total assets in millions	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
100 and Below	10	32.3	7	22.6	10	32.3	10	32.3	10	32.3
101 to 200	13	41.9	15	48.4	12	38.7	12	38.7	11	35.5
201 to 300	2	6.5	3	9.7	2	6.5	2	6.5	3	9.7
301 to 400	2	6.5	2	6.5	2	6.5	2	6.5	1	3.2
401 to 500	3	9.7	0	0.0	1	3.2	1	3.2	2	6.5
501 to 600	0	0.0	3	9.7	0	0.0	0	0.0	0	0.0
601 to 700	0	0.0	0	0.0	3	9.7	0	0.0	0	0.0
701 to 800	0	0.0	0	0.0	0	0.0	3	9.7	0	0.0
801 to 900	0	0.0	0	0.0	0	0.0	0	0.0	3	9.7
901 to 1000	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1001 to 1200	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	191.25		210.03		222.83		241.41		255.61	
SD	215.53		229.06		240.48		262.95		275.26	

According to the findings in Table 4.10, the average total assets in research institutes in Kenya in the year 2014 was Ksh. 191.25 million, which increased to Ksh. 210.03 million in 2015 and Ksh. 222.83 million in 2016. In the year 2017, the average total assets in research institutes in Kenya was Ksh. 241.41 million, which increased to Ksh. 255.61 million in 2018. These findings imply that the average total assets in research institutes in Kenya have been

increasing for the period between 2014 and 2018. This is because of improved innovation which has led to development of new products hence leading to increase in total assets.

4.4.4 Number of Product Returns

The respondents were requested to indicate the number of product returns in their organizations for the last five years (2014-2018). Results obtained were as summarized in Table 4.11.

Table 4. 11: Number of Product Returns

Number of Product Returns	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
Zero	3	9.7	2	6.5	2	6.5	2	6.5	4	12.9
1 to 4	24	77.4	22	71.0	22	71.0	24	77.4	20	64.5
5 to 8	3	9.7	5	16.1	4	12.9	2	6.5	1	3.2
9 to 12	1	3.2	1	3.2	2	6.5	2	6.5	5	16.1
13 to 16	0	0.0	0	0.0	1	3.2	1	3.2	1	3.2
17 to 20	0	0.0	1	3.2	0	0.0	0	0.0	0	0.0
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	3.35		3.48		3.19		2.77		3.16	
SD	3.88		3.48		3.45		3.37		4.17	

From the findings in Table 4.11, average number of product returned in research institutes in Kenya in the year 2014 was 3.35 (SD=3.88), which increased to 3.48 (SD=3.48) in 2015 before decreasing to 3.19 (SD=3.45) in 2016. In the year 2017, the average number of products returned in research institutes in Kenya was 2.77 (SD=3.37), which increased to 3.16 (SD=4.17) in 2018. This shows that the number of products with defects returned by consumers to the research institutes in Kenya has been fluctuating.

4.4.5 Average Delivery Time in the Research Institutes

The participants were asked to indicate that the average delivery time in their organization in days. The results were as presented in Table 4.12.

Table 4. 12: Average Delivery Time in the Research Institutes

Average delivery time	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
1 to 20	12	38.7	12	38.7	15	48.4	18	58.1	18	58.1
21 to 40	9	29.0	9	29.0	7	22.6	6	19.4	8	25.8
41 to 60	3	9.7	4	12.9	7	22.6	5	16.1	4	12.9
61 to 80	2	6.5	1	3.2	0	0.0	0	0.0	0	0.0
81 to 100	4	12.9	4	12.9	1	3.2	2	6.5	1	3.2
101 to 120	1	3.2	1	3.2	1	3.2	0	0.0	0	0.0
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	36.12		34.45		30.00		27.06		23.74	
SD	32.70		30.72		26.12		24.76		21.76	

From the findings in Table 4.12, the average delivery time in research institutes in Kenya was 36.12 days (SD=32.70) in 2014, which decreased to 34.45 days (SD=30.72) in 2015 and 30.00 days (SD=26.12) in 2016. In addition, the average delivery time in the research institutes in 2017 was 27.06 days (24.76), which decreased to 23.74 days (21.76). These findings imply that the average delivery time in KRI has been diminishing. This shows an improvement in time taken to serve clients hence improving the level of client satisfaction.

4.4.6 Number of Branches in the Research Institutes

The participants were asked to indicate number of branches in their organizations for the past 5 years (2014-2018). Results were as shown in Table 4.13.

Table 4. 13: Number of Branches in the Research Institutes

Number of Branches	2014		2015		2016		2017		2018	
	n	%	n	%	n	%	n	%	n	%
1 to 4	18	58.1	18	58.1	18	58.1	18	58.1	18	58.1
5 to 8	8	25.8	8	25.8	7	22.6	6	19.4	6	19.4
9 to 12	4	12.9	4	12.9	4	12.9	5	16.1	5	16.1
13 to 16	1	3.2	1	3.2	2	6.5	2	6.5	2	6.5
Total	31	100.0	31	100.0	31	100.0	31	100.0	31	100.0
Mean	5		5		5		5		5	
SD	3		3		3		3		3	

According to the findings in Table 4.13, the number of branches in the research institutes in Kenya remained stagnant for the period between 2014 and 2018. This implies that the number of branches in the research institutes in Kenya have not been decreasing or increasing during the study period. This is as a result of ensuring average consistency in innovation and corporate entrepreneurship in the research institutes.

4.5 Inferential Statistics

Inferential statistics were used to assess the correlation between independent variables (corporate entrepreneurship and innovation) and dependent variable (performance of research institutes). They included correlation analysis and multiple regression analysis.

4.5.1 Correlation Analysis

The on-going research used Pearson product-moment correlation analysis to assess strength association between dependent variable (performance of research institutes) and independent variables (corporate entrepreneurship and innovation). The results were as depicted in Table 4.14.

Table 4. 14: Correlation Coefficients

		Performance of Research Institutes	Innovation	Corporate Entrepreneurship
Performance of Research Institutes	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	31		
Innovation	Pearson Correlation	.542**	1	
	Sig. (2-tailed)	.002		
	N	31	31	
Corporate Entrepreneurship	Pearson Correlation	.623**	.316	1
	Sig. (2-tailed)	.000	.084	
	N	31	31	31

** . Correlation is significant at 0.01 level (2-tailed).

From the findings Table 4.14, there is positive correlation between innovation and Performance of Research Institutes in Kenya ($r=0.542$, $p\text{-value}=0.000$). In addition, the results indicated that there exists positive relationship between corporate entrepreneurship and performance of KRIs ($r=0.623$, $p\text{-value}=0.000$).

4.5.2 Regression Analysis

Table 4. 15: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.722 ^a	.521	.487	2.87241

a. Predictors: (Constant), Corporate Entrepreneurship, Innovation

Table 4. 16: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	251.375	2	125.687	15.234	.000 ^b
	Residual	231.020	28	8.251		
	Total	482.395	30			

a. Dependent Variable: Performance of Research Institutes

b. Predictors: (Constant), Corporate Entrepreneurship, Innovation

Table 4. 17: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
		1	(Constant)	.108		
	Innovation	.135	.049	.384	2.786	.009
	Corporate Entrepreneurship	.705	.194	.502	3.643	.001

a. Dependent Variable: Performance of Research Institutes

Regression analysis was employed to examine the weight of correlation between independent and dependent variable.

Regression model took the below form;

$$Y = 0.108 + 0.135X_1 + 0.705X_2 + \varepsilon$$

The R-Squared tend to depict the variation in dependent study variable that can be explained by independent variables: the greater the value of R-squared the greater the effect of independent variable. The R Squared can range between 0.000 and 1.000, with 1.000 indicating a perfect match and each point being on the axis.

As indicated in table 4.15, r-squared for association between corporate entrepreneurship, innovation and performance of KRIs was 0.521. This shows that corporate entrepreneurship and innovation can explain 52.1% of the research institutes in Kenya. This implies that 47.9% of the performance of the research institutes in Kenya is taken into account by other factors not considered in this model.

The ANOVA is used to assess if the regression model suits the data well. It also provides the F-test statistic; the linear regression F-test has the null hypothesis that the two variables do not have a linear relationship. F-calculated (15.234) was greater than F-critical (3.84) in table 4.16, and p-value (0.000) was less than significance level (0.05), indicating that the model is good fit for the data and can be used to forecast the impact of corporate entrepreneurship and innovation on research institute performance in Kenya.

Discussions are based on unstandardized coefficients. The results show that innovation has positive significant influence on performance of KRIs ($\beta_1=0.135$, p-value=0.009). Results also show that corporate entrepreneurship has positive significant influence on performance of KRIs ($\beta_2=0.705$, p-value=0.009).

4.6 Discussion of the Findings

The first objective was to assess state of innovation in research institutes in Kenya. The study found that the number of products or services in research institutes in Kenya has been increasing for the period between the year 2014 and 2018. In addition, the number of patented products in research institutes in Kenya has been increasing for the last five years (2014 - 2018). These findings conform to Tuan, Nhan and Giang (2016) arguments that innovation in organizational processes, structures, products and services plays a major role in enhancing organizational competitiveness. In addition, the findings concur with Chelimo and Ombui (2018) that corporate entrepreneurship (CE) is that it is the development of new ideas within large organizations that enable the organization to be profitable and improve its competitive position.

The research institutes had developed or adopted new technologies during the period between 2014 and 2018. KIPPRA had developed Kippra Tertiary Micro Modeling (KTMM), Cumulative General Equilibrium Model (CGE) and Threshold Model for Agriculture commodities (T21). ILRI had developed and adopted GENE BANK and Forage Collection Technology. National Crime Research Centre has developed a Mobile Phone Crime Reporting Application. KALRO had developed bean varieties, maize varieties and green grams. These findings conform to Buşra and Zehir (2012) discoveries that public research institutes are considered to be a hub of a national innovation system as they are significantly involved in research and development.

The study found that research institutions in Kenya have adopted corporate entrepreneurship to improve performance. These findings conform to Tuan, Nhan and Giang (2016)

suggestions that research institutes in Kenya have not considerably adopted the concept of corporate entrepreneurship. The study found that research institutes had invested in some high risk projects. For instance, ILRI high risk projects included malignant catarrhal fever vaccination trial, development of sustainable livestock systems, The Mazingira Centre. High risk projects in KALRO include control of army worms. The National Crime Research Institute was undertaking a National Crime Mapping Survey in 47 counties. These findings agree with Ambad and Wahab (2016) findings that risk taking influences the performance of the organization. The study also found that some research institutes had invested in opportunities unrelated to their organization's vision and mission. For instance, Kenya Agricultural & Livestock Research Organization (KALRO) had invested in hospitality services and water bottling.

The study revealed that the number of untested technologies that research institutes in Kenya have invested in increased for the period between 2014 and 2018. Some of these technologies include Cumulative General Equilibrium Model (CGE) in KIPPRA. Further, the number of new technologies in research institutes in Kenya increased considerably between the year 2014 and 2018. The new technologies included KIPPRA Tertiary Micro Modeling (KTMM) and Cumulative General Equilibrium Model (CGE). These findings agree with Mokaya (2013) argument that managers are employing corporate entrepreneurship through increase to encourage employees to be highly innovative and provide products and services that differentiate their organizations.

In addition, the number of new business processes in research institutes in Kenya has been increasing for the last five years (2014 to 2018). These new business processes relate to KTMM, T21 model, CGE, NAVISON 2015. The findings showed that average number of

features added in products and services in research institutes has been increasing for the last five years (2014 to 2018). The researcher noted that average amount of money invested in research and development by research institutes in Kenya has been increasing for the period between 2014 and 2018. These findings conform to Nafie, Tjambolang and Pane (2016) discoveries that improvement of product features and investment in research and development has an improvement on performance.

The researcher found that innovation has positive significant influence on performance of research institutes in Kenya. The findings agree with Nkosi (2011) argument that innovation had positive effect on organizational performance in South Africa. Findings also agree with Nabila, Ambad and Wahab (2016) findings that in Malaysia, innovation is a direct product of entrepreneurship and has a direct impact on the success of organizations. Additionally, the study found that corporate entrepreneurship has positive significant impact on performance of research institutes in Kenya. Moreover, the findings conform to Eze (2018) discoveries that corporate entrepreneurship in terms of strategic renewal, corporate venturing, pro-activeness, risk taking and innovation had an effect on financial (profitability) and non-financial performance (employees' satisfaction as well as market share) of manufacturing firms. Further, the findings concur with Moige, Mukulu and Orwa (2016) findings that corporate entrepreneurship led to an increase the performance of Kenyan food fortification companies. The findings also agree with Mokaya (2013) argument that corporate entrepreneurship in terms of risk taking, innovativeness, pro-activeness and individual motivation were significantly affecting organizational performance in Kenya.

The study finding revealed that research institutions in Kenya have adopted corporate entrepreneurship to improve performance. These findings concur with Nkosi (2011)

discoveries that research institutes in South Africa have adopted the latest technology to ensure better performance. In addition, Buşra and Zehir (2012) revealed that adoption of the latest technology has improved performance of research institute in Kenya. These results are in line with drucker's opportunity-based theory which indicates that entrepreneurs succeed by identifying and taking advantage of opportunities created technological, cultural and social changes. In addition, the theory argues that entrepreneurs often exploit opportunities that are transitional in nature such as technological innovation, consumer preferences among others. This indicates the relationship between entrepreneurs and entrepreneurship as the entrepreneurs often search for change, appropriately respond to the change and exploit it as an opportunity (Kwabena, 2011). The study also found that the research institutes have developed or adopted new technologies during the period between 2014 and 2018. These findings are in agreement with the arguments of Schumpeter's innovation theory that trade innovation cycles are inherent part of economic growth process (performance) of capitalist society. According to the theory consist of two stages. The first stage is concerned with the immediate effect of the innovation that entrepreneurs implement in their manufacturing processes. The second stage is triggered by competitor responses to the initial impact of the innovation (Buşra&Zehir, 2012).

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter sets out a summary of the results, conclusions, and recommendations for practice and further study on the research problem. The main study objective was to examine the association between corporate entrepreneurship, innovation and performance of KRIs.

5.2 Summary of the Key Findings

The first study objective was to determine the state of innovation in research institutes in Kenya. The study noted that number of services or products in research institutes in Kenya has been increasing for the period between the year 2014 and 2018. In addition, the number of patented products in research institutes in Kenya has been increasing for the last five years (2014 - 2018). Also, the research institutes had developed or adopted new technologies during the period between 2014 and 2018. KIPPRA had developed Kippira Tertiary Micro Modeling (KTMM), Cumulative General Equilibrium Model (CGE) and Threshold Model for Agriculture commodities (T21). ILRI had developed and adopted GENE BANK and Forage Collection Technology. National Crime Research Centre has developed a Mobile Phone Crime Reporting Application. KALRO has developed bean varieties, maize varieties and green grams.

The second study objective was to determine state of innovation in research institutes in Kenya. The study found that research institutes had invested in some high risk projects. For instance, ILRI high risk projects included malignant catarrhal fever vaccination trial, development of sustainable livestock systems, The Mazingira Centre. High risk projects in

KALRO include control of army worms. The National Crime Research Institute was undertaking a National Crime Mapping Survey in 47 counties. In addition, some research institutes had invested in opportunities unrelated to their organization's vision and mission. For instance, Kenya Agricultural & Livestock Research Organization (KALRO) had invested in hospitality services and water bottling.

The study established that the number of untested technologies that research institutes in Kenya have invested in increased for the period between 2014 and 2018. Some of these technologies include Cumulative General Equilibrium Model (CGE) in KIPPRA. Further, the number of new technologies in research institutes in Kenya increased considerably between the year 2014 and 2018. The new technologies included Kippra Tertiary Micro Modeling (KTMM) and Cumulative General Equilibrium Model (CGE). The study found that the number of new business processes, the number of features added in products and services and the amount of money invested in research and development by research institutes in Kenya has been increasing for the period between 2014 and 2018.

The study found that innovation has positive significant influence on performance of research institutes in Kenya. In addition, corporate entrepreneurship has positive significant impact on performance of KRIs.

5.3 Conclusion

The study concludes that research institutes in Kenya had adopted innovation as a strategy to ensure sustainability. The study revealed that number of services or products and number of patented products in research institutes in Kenya has been increasing for the last five years

(2014 - 2018). In addition, the research institutes had developed or adopted new technologies during the period between 2014 and 2018.

The study also concludes that research institutes in Kenya were using corporate entrepreneurship to ensure their sustainability. The study found that research institutes had invested in some high risk projects. In addition, some research institutes had invested in opportunities unrelated to their organization's vision and mission. The study revealed that the number of untested technologies, new technologies, new business processes, features added in products and services as well as the amount of money invested in research and development by research institutes in Kenya has been increasing for the period between 2014 and 2018. The study concludes that innovation has positive significant impact on performance of KRIs. In addition, corporate entrepreneurship has a positive and significant effect on performance of research institutes in Kenya.

5.4 Recommendations

The study recommends that government of Kenya through policymakers should develop policies to necessitate the use of innovations to improve performance. In addition, more policies should be developed to enhance the adoption and utilization of corporate entrepreneurship in research institutes.

The study found that increase in number of products and also services as well as patented products has an influence on performance. The study recommends that research institutes in Kenya should seek to increase their number or products of services as well as develop and adopt new technologies. Also, they should seek to increase the number of their patented products.

The study found that investment in high risk projects has an influence on performance of research instruments. This study therefore recommends that research institutions in Kenya should adopt a risk taking characteristics of corporate entrepreneurship as a way of improving performance. In addition, the research institutes should also invest in new technologies and other opportunities even if they unrelated to an organizations mission and vision.

The study established that new business processes, new features in products and investment in research and development have an influence on performance. The study recommends that research institutes ought to invest considerably in research and development. In addition, research institutes should invest in new business processes in their services deliver as well as add new features in their products.

5.5 Areas for Further Studies

This study was limited to research institutes in Kenya hence, results are not generalizable to organizations in other sectors of the economy in Kenya. The study therefore suggests further studies on association between corporate entrepreneurship and the performance of Kenya state corporations. In addition, the study suggests further studies on association between corporate entrepreneurship and innovation and performance of private institutions (both large and small). The study found that corporate entrepreneurship and innovation could only explain 52.1% of the performance of Kenya Research Institutes. This study thus suggests for more studies on other factors influencing performance of Kenya Research Institutes.

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APPENDICES

Appendix I: Questionnaire

The aim of this research is to evaluate how corporate entrepreneurship affects the success of Kenyan research institutes. Please answer all of the questions honestly as precisely as possible. The information given will be handled with strict confidentiality and anonymity.

Please mark the appropriate boxes based on the type of research question.

SECTION A: Background Information

1. Name your research institute.....

SECTION B: INNOVATION

2. How many products or services has your organization developed or introduced in the following years?

Year	2016	2015	2014	2013	2012
Number of products or services					

3. How many products has your organization patented in the following years?

Year	2016	2015	2014	2013	2012
Patented products					

4. List the new technologies that your business has developed or adopted in the years stated above?

.....

5. List any other measure of innovation that you use in your organization?

.....

SECTION C: Corporate Entrepreneurship

6. List 3 high risk projects that your organization has been involved in the last five years?

.....

7. Which opportunities unrelated to your organization’s vision and mission has your organization responded to in the last five years?

.....

8. How many untested technologies has your organization invested in, in the last five years

Year	2013	2014	2015	2016	2017
Number of untested technologies					

Kindly specify

9. How many new technologies has your organization introduced in the last five years?

Year	2013	2014	2015	2016	2017
Number of new technologies					

Kindly specify

10. How many new business processes has your organization introduced in the last five years to keep up with current technology?

Year	2013	2014	2015	2016	2017
Number of new business processes					

Kindly specify

11. How many new features has your organization added in the current products in the last five years?

Year	2013	2014	2015	2016	2017
Number of new features in products					

Kindly specify

12. How do you measure corporate entrepreneurship in your organization?

.....
.....

PERFORMANCE OF RESEARCH INSTITUTES

13. What has been the profitability of your organization (surplus/deficit) for the last five years?

Year	2013	2014	2015	2016	2017
Profitability					

14. What has been the sale revenue of your organization for the last five years?

Year	2013	2014	2015	2016	2017
Sales Revenue					

15. What the total assets of your organization for the five years?

Year	2013	2014	2015	2016	2017
Total Assets					

16. What has been the number of product returns in your organization for the last five years?

Year	2013	2014	2015	2016	2017
Number of product returns					

17. What is the average delivery time in your organization in days?

Year	2013	2014	2015	2016	2017
Average delivery time					

18. What is the average waiting time in your organization in days?

Year	2013	2014	2015	2016	2017
Average waiting time					

19. Please point out number of branches in your organization for last five years?

Year	2013	2014	2015	2016	2017
Number of Branches					

Appendix II: List of Research Institutes in Kenya

1. Academic Model Providing Access to Healthcare (AMPATH)
2. Africa Institute for Capacity Development
3. Agricultural Information Resource Centre
4. International Livestock Research Institution (ILRI)
5. KEMRI - Wellcome Trust
6. Kenya Agricultural and Livestock Research Organization (KALRO)
7. Kenya Agricultural Research Institute (KARI)
8. Kenya Forestry Research Institute (KEFRI)
9. Kenya Marine and Fisheries Research Institute (KMFRI)
10. Kenya Industrial Research and Development Institute (KIRDI)
11. Kenya Institute of Public Policy Research and Analysis (KIPPRA)
12. Kenya Medical Research Institute (KEMRI)
13. Kenya Veterinary Vaccines Production Institute
14. National Crime Research Centre
15. Pan African University Institute for Basic Sciences, Technology and Innovation (PAUSTI)
16. Tegemeo Institute of Agricultural Policy and Development
17. The World Agroforestry Centre (ICRAF)
18. Centre For Microbiology Research, Nairobi
19. Institute of Policy Analysis and Research-IPAR, Nairobi
20. Kenya Institute Of Curriculum Development
21. Coffee Research Foundation, Nairobi
22. FAO Epidemiology Project, Nairobi
23. African Medical and Research Foundation (AMREF), Nairobi
24. African Agricultural Research Foundation(AATF), Nairobi
25. Kenya Sugar Research Foundation
26. Tea Research Foundation of Kenya
27. United States Army Medical Research Unit-Kenya
28. Rift Valley Institute
29. International Centre for Insect Physiology and Ecology (ICIPE)
30. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
31. The International Plant Genetic Resource Institute (IPGRI)
32. International Potato Center (CIP)

Source: Kenya Education Network (2018)