

**STRATEGIC BUSINESS SERVICES AND  
PERFORMANCE OF FIRMS SPONSORED BY  
UNIVERSITY BUSINESS INCUBATORS IN KENYA**

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**(Business Administration)**

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**Strategic Business Services and Performance of Firms Sponsored By  
University Business Incubators in Kenya**

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**A Thesis Submitted in Partial Fulfillment for the Degree of Doctor  
of Philosophy in Business Administration (Strategic Management) in  
the Jomo Kenyatta University of Agriculture and Technology**

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## DECLARATION

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

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This thesis has been submitted for examination with our approval as University supervisors.

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## **DEDICATION**

To

My late dad: Wilfred Muiruri Waithanje.

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## **ACRONYMS AND ABBREVIATIONS**

<b>AFDB</b>	African Development Bank
<b>ATPS</b>	African Technology Policy Studies Network
<b>BIs</b>	Business Incubators
<b>BIIC</b>	Business innovation and Incubation centre
<b>C4D</b>	Computing for Development
<b>EC</b>	European Commission
<b>GoK</b>	Government of Kenya
<b>InfoDev</b>	Information for Development
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>KOSGEB</b>	Small and medium enterprises development organization
<b>Kshs</b>	Kenya Shillings
<b>LDCs</b>	Least Developed Countries
<b>NACOSTI</b>	National Council for Science, Technology & Innovation
<b>NBIA</b>	National Business Incubation Association
<b>NSD</b>	New Support Development
<b>NSTED</b>	National Science and Technology Entrepreneurship Development Board
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>RBT</b>	Resource Based Theory

<b>R &amp; D</b>	Research & Development
<b>RDT</b>	Resource Dependence Theory
<b>STI</b>	Science, Technology and Innovation
<b>SPSS</b>	Statistical Package for Social Sciences
<b>TBIs</b>	Technology business incubators
<b>TTOs</b>	Technology Transfer Offices
<b>UBIINDEX</b>	University Business Incubation Index
<b>UBIs</b>	University Business Incubators
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>UNDP</b>	United Nations Development Programme
<b>UNOSAA</b>	United Nations Office of the Special Adviser on Africa
<b>USA</b>	United States of America

## DEFINITION OF OPERATIONAL TERMS

- Business Advisory Services** Refers to crucial management processes and routines that help start-ups cope with sudden environmental changes which contributes to lower failure rate in early developmental stages hence aid in accelerating their growth which results into higher firm performance (Al Mubarak & Busler, 2015). Business incubation advisory services include training, coaching and or mentorship, provision of enabling infrastructure, subsidies and business planning support (Al Mubarak & Busler, 2017).
- Business Incubation** Defined as a business support program which provides a wide range of resources and services that aids successful growth and development of start-ups and fledgling companies (NBIA, 2014).
- Business Incubator** A Business Incubator is an economic and social development entity designed to offer an array of advisory services to potential companies by helping them establish, and accelerate their performance through a comprehensive business assistance program (Ogutu & Kehonge, 2016).
- Business Networking Services** Refers to a process whereby incubates have access to professional business services networks of professional contacts such as business angel networks and venture capital firms commonly out of reach for new young firms at embryonic phase (Bollingtoft, 2012; Gerlach & Brem, 2015).

**Commercialization of Innovation** African Technology policy Studies Network (ATPS, 2012) defines commercialization of innovation as the act or activities required to introduce products of innovation into the market. It is a process that identifies market needs and fills the gaps by satisfying the users (Haven & Candace, 2016).

**Firm Performance** It refers to an organization's accomplishment of set goals and objectives measured against an implementation matrix comprising of indices agreed upon over a given accounting period of time (Ayatse *et al*, 2017).

**Strategic Business Services** A combination of resources which include: place, people and processes that assist firms and /or companies survive and thrive from the time of their conceptualization to their launch as successful graduate companies that can contribute positively to a country's sustainable growth (Mohammed *et al*. 2017).

**Strategic** Identification of long-term or overall aims and or interests and means of achieving them (Al Mubaraki & Busler, 2015).

**Technological Support Services** Defined as professional services designed to facilitate the use of technology by organizations and end users by providing need specific technology oriented solutions whereby processes and functions of software, hardware, networks, telecommunications and electronics are combined (Kinoti & Mieme, 2011).

## **Technology Transfer**

It is the process of transforming or translating acquired skills and knowledge, through manufacturing , product design and development engaging governments, universities and industry so as to ensure that technological developments are accessible to a wider range of users who can then further produce and develop new products, processes, applications, materials or services (ATPS, 2012).

## ABSTRACT

The overall objective of the study was to examine the effect of strategic business services on performance of firms sponsored by university business incubators in Kenya. University business incubators provide a unique opportunity for firms to benefit from the talent and resources located in the university, particularly in development of products that require higher level of technology and sophistication. The specific objectives under study were business advisory, business networking, technological support, technology transfer and commercialization of innovation skills. Incubates managerial skills was studied as a mediating variable on the relationship between strategic business services and performance of firms sponsored by university business incubators in Kenya. The study adopted a descriptive survey research design where qualitative and quantitative data was collected from a random sample of university sponsored graduate incubates over the period 2011 to 2016. The study collected primary data from a sample size of 189 from a population of 372. A semi-structured questionnaire was used to collect data where closed-ended questions covering all the variables of the study with allowances for open comments. This yielded both qualitative and quantitative data. Data was analyzed using descriptive statistics which yielded measures of central tendency and dispersion. Qualitative data from the questionnaires was organized along themes as per the research hypotheses to establish relationship between data and key patterns that emerged from the study. Descriptive and inferential statistics were used to analyze quantitative data which aided distribution of scores using indices and statistics. Regression analysis was used to test the relationship between the dependent and independent variables in the study using SPSS version 21. The study findings indicated a significant relationship between business advisory, networking, technological support, technology transfer services and commercialization of innovation skills on the performance of startup firms sponsored by university incubators in Kenya. Incubates managerial skills had a significant mediating effect. Multiple regression results indicated that business networking services scored the highest of all the variables at 0.542.  $R^2$  value was at 88.8% which implies that the total variation of performance of firms sponsored by university business incubators in Kenya is accounted for by corresponding change in business advisory, networking, technological support, technology transfer services and commercialization of innovation skills. The study recommends first, robust adoption of university business incubation strategy to commercialize knowledge generated and disseminated within the institutions of higher learning. Secondly, the incubation centres need to improve their delivery of commercialization of innovation skills strategy and support for acquisition of intellectual property rights for their client firms. Lastly, there is need to improve post incubation services of the firms upon exit.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the Study**

The researcher in this study sought to examine the effect of strategic business services offered by university business incubators in Kenya in equipping them with the necessary skills, capability and knowledge required to set and manage firms that are competitive and sustainable after a successful incubation process. The chapter discusses background of business incubation services, firm performance, university sponsored business incubators, statement of the problem, general and specific research objectives and hypotheses, justification of the study and its scope. The limitations of the study are stated at the end of the chapter.

##### **1.1.1 Strategic Business Services**

National Business Incubation Association (NBIA, 2014) defines strategic business services as long-term business support processes that accelerate the successful development of firms and fledgling companies. The ultimate firms' outcomes are jobs creation, technology transfer, commercialization of new technologies and creation of wealth for economies (Ogutu & Kehonge, 2016; Al Mubarak & Busler, 2015). The business incubation and innovation centres achieve this by providing incubates with an array of targeted resources and services. Ayatse *et al.* (2017) posits that strategic business incubation services are usually developed and implemented by business incubator management through the incubator's established networks. The NBIA (2014) report further posits that strategic business incubation enables incubates translate their ideas into workable and sustainable firms whereby they equip them with expertise, networks and tools that they need to make their ventures successful. In the long-term business incubation graduates have the potential to manage their firms, revitalize economies of their localities, market new technologies, strengthen country economies and create wealth (Al Mubarak & Busler, 2011; 2014).

Ruhiu (2014), found out that over the past five decades, business incubators have evolved in various ways whereby in 1959 in Batavia, New York in the United States, the first incubator established. From the time BIs were founded in late 1970s and early 1980s, their main objective has been and still is to nurture firms growth and development so that they can contribute to global development (UKBI, 2012). Al Mubarak and Busler (2013), argue that incubators provide an attractive framework to practitioners in dealing with the difficulties in the process of entrepreneurship. Strategic business incubation can be viewed as a mechanism to support regional development through economy growth, new high technology venture creation, commercialization, and transfer of technology dealing with market failures relating to knowledge and other inputs of innovative process (Al Mubarak & Busler, 2012; 2014).

In a study by Chandra and Chao (2011), in Brazil, incubator movement took off in the 1980s with the collapse of the military regime. The first incubator was established in 1986 and within 10 years this number increased to 40 whereby growth of the incubation business was rather slow in the first decade mainly due to inconsistencies between the national programs and the commitments to grow (Chandra & Chao, 2011; Chandra *et al*, 2012). According to a study on early assessment of BIs by Gerlach and Brem 2015, most incubators were located in universities or research institutes whereby more than 80 per cent of the tenants were spin-offs from academia and companies. Business incubation centres in Brazil are generally linked to universities and financed by various governmental and non-governmental sources, such as the National Incubation Support Program that supports the creation of new incubators alongside their expansion (Chandra & Chao, 2011).

A study by Gerlach and Brem (2015) states that first incubators in China were established in the late 1980s and the growth of the industry has been on the increase. The china government has continued to display outstanding success regarding the expansion of the incubation programme (Chandra *et al*, 2012). Incubators in China offer services such as low cost office space, business support services and networking opportunities. An average incubator shelters 60 to 70 firms and some



with more than 150 new ventures (Mobegi *et al*, 2012). Incubators in China are financially supported by the government via the Torch High Technology Industry Development Center, under the Ministry of Science and Technology (Al Mubarak & Busler, 2014; Gerlach & Brem 2015).

According to Chandra and Chao (2011), the incubator movement in India took off in the late 1980s as a complementary policy tool aiming at promoting and stimulating new venture creation. The take-off in the 1980s was slow because the first incubators were financed by the United Nations (UN) but lacked government support (NBIA, 2014). In 1982, Indian government initiated several programs and policies to leverage its talent, such as establishing prominent universities and research institutes, providing tax exemptions to new ventures, improving financial and venture capital markets, and the establishment of National Science and Technology Entrepreneurship Development Board (Chandra & Chao 2011). In Turkey according to (Semih, 2009), 99 % of all firms are small in size thus possess an important place in the Turkish economy. Due to this fact, the government authorities employed various policy tools to assist firms such as direct financial support, research and development (R&D) subsidies, and tax allowances (Salem, 2014; Meru & Struwig, 2015). Incubators in Turkey are established by KOSGEB, which is a non-profit, semi-autonomous organization under the Ministry of Industry and Trade with the objective of improving the conditions of start-up firms or ventures and enhancing their competitive capacity (Semih, 2009; Gerlach & Brem 2015).

Business incubation and innovation programs in the Sub-Saharan Africa are still in their infancy stage compared to other regions in the world with a longer history of incubation (Meru & Struwig, 2015). In a study carried by Ruhui (2014), approximately twenty one countries from the African continent have been setting up and establishing business incubators whereby many are providing business development services with Kenya rated at 6%, Nigeria at 13% and South Africa the highest at 27%. According to the study done by the Economic Commission for Africa in selected 17 countries of North and Southern Africa, a total of 18 incubators and 40 business incubators have been created (OECD & EU, 2013). The majority of the BIs are located in North Africa comprising Tunisia, Morocco and Egypt where

networks of incubators have been created (Joshua *et al.*, 2010; Ruhiu, 2014; Meru & Struwig, 2015).

The government of Kenya policy intervention plan is to use science, technology and innovation (ST&I) with the objective to foster innovation so as to transform the country into a knowledge-led economy by year 2030 (GoK, 2010, 2017; KIPPRA, 2014). GoK, (2017) further alleges that strategic goals to achieve this objective include strengthening business incubation, enabling funding for commercialization of research, implementing the policy on institutional framework for funding and commercialization of research, and enhance collaboration between institutions of higher learning, research institutions and industry. In Kenya's Vision 2030 (GoK, 2013; 2017), the government projects to have set up 70 incubators by 2030 and 20 by 2020 under Research Innovation and Technology sector in an effort to transform the country into a knowledge-led community.

### **1.1.2 Strategic Business Services and Firm Performance**

According to Al Mubarak and Busler (2015), business incubation services play a key role in providing support to emerging firms, predominantly in the initial stages of their firm's lifecycle between six and forty two months. Mohammed *et al.* (2017) explains further that they provide a range of services such as shared offices, access to research labs, access to knowledge and network pools to startup companies. In an earlier research (Al Mubarak *et al.*, 2010), the authors argue that these business services are highly valuable in enabling development of countries wealth, aid transformation of knowledge into user products and introduce new technologies into the market. Business incubation has positive end results when analyzed along start-up firms' survival and higher employment rate hence increased likelihood of survival, lower failure rate and higher level of sustainability upon exit (Claudia, 2013).

Majority of new firms to approximately 50% hardly survive the first five years in business although incubated firms outperform their peers to an approximated survival rate of 80% (Amezcu, 2011; Claudia, 2013). Business incubation and innovation in the information for Development network reported that 75% of

graduated ideas are still in operation three years after exit whereby Brazil posts an 80% survival rate (NBIA, 2014). The challenges cited for failure rate include lack of information awareness and resources to access business opportunities, business exposure, networking, business support and advisory services, awareness and use of emerging technologies, liberalization, globalization, cultural and regional factors that affect business start-up specifically in Africa continent (AFDB, 2014).

### **1.1.3 University Sponsored Business Incubators**

Universities contribute significantly towards sustainable economic growth of any country due to one of their major objective in research and development in pursuit of their visions (Jamil *et al.*, 2015). UBIs have a recorded success trend in provision of shared space services, financing and human resources along with commercialization of innovation (Chandra & Chao, 2011; Chandra *et al.*, 2012). UBIs provide a unique opportunity for emerging firms to benefit from the talent and resources readily available within host institutions, particularly in product design and development which require high levels of skills and knowledge (Hanoku *et al.*, 2013). Salem (2014) argues that UBIs are considered critical because institutions for higher learning research continues to emphasize the nexus between underlying research and business performance effort aimed at commercializing the outcome of research and development (R&D).

OECD and EC (2013) posits that policy makers continuously emphasize the need to stimulate abstract thinking among university students such that technology, knowledge, and capital to leverage various talents brought on board in the context of UBIs in an effort to speed commercialization. UBIs envision supporting transfer of research knowledge to industry, commercializing research and facilitating university industry and government collaboration hence support graduate start-ups initiatives (Sungur, 2015). Kenya has 30 public and 18 private chartered universities ([www.cue.or.ke](http://www.cue.or.ke)). Out of these only 3 have fully operational UBIs namely Kenyatta University (KU), University of Nairobi (UoN) and Strathmore University with KU voted as the most promising in 2014 (UBI Index, 2014) whereas UoN's best in 2015 due to its ability to provide higher value to their start-up clients than their regional

peers (UBI Index, 2015). Daystar university business incubator emerged the best in the category of top challenger UBIs in Kenya in 2018 (UBI Index, 2018).

## **1.2 Statement of the Problem**

The failure rate of business performance of firms is estimated at 75% in developing and least developed countries within the first three years of operation (AFDB, 2014; Ruhii, 2014 Ogutu & Kehonge; 2016). Africa accounts for only 30% survival rate, compared to 77% in Australia, 71.3% in the UK and 69% in the US whereas less than 40% has been reported in Kenya (Ogutu & Kehonge, 2016; Rajeev *et al*, 2012). Some of the major highlighted challenges are lack of an enabling environment that would result in a thriving ecosystem for small firms to grow, develop and mature (Rajeev *et al*, 2012). Many potential firms have poor business planning skills, suggesting that even if they obtained funding, they would also face management, operations and marketing challenges (AFDB, 2014).

University business incubators have the unique opportunity to bridge and broker the academic and business worlds (UBIINDEX, 2018). The success of business incubation services is measured against certain key factors and highly dependent on stakeholder(s) expectations (NBIA, 2014). These include among others: the clarity of mission and objectives, monitoring of the performance of business incubation, research and development, incubates selection process, exit processes, proximity to a major university, the level and quality of management support, the extent of access to potential internal/external networks, and the competency of the incubation management to configure hard and soft elements of the business incubation environment (UKBI, 2012; NBIA, 2014). Kenya is considered a promising place to do business, with growing markets whereby private sector contributes 97% of GDP (GoK, 2017). According to the World Bank report (2018) on the ease of doing business, Kenya ranked position 80 out of 190 countries having improved 12 slots compared with 2017 report with a 65.15% performance based on the country's measures and regulations throughout the small and medium size firms' life cycles. The Sub-Saharan Africa has the highest percentage of emerging firms with low

growth expectations at 85.5% and the lowest percentage with high growth expectations at 3.9% (Kew *et al*, 2013).

Strategic business incubation services are an effective method to foster new business ideas turning them into successfully commercialized and competitive innovative products globally (Al Mubarak & Busler, 2013; Ogutu & Kehonge, 2016). Business incubators (BIs) play a key role in providing support to emerging firms predominantly in the initial stages of their firm performance lifecycles (Al Mubarak & Busler, 2013). Ruhu (2014) findings report of disconnect between business incubation in Kenya and government's policy framework whereas Riunge (2014) reports resources inadequacy in the BIs in Kenya. Meru and Struwig (2015) report that incubates in Kenya highlighted challenges in the short fall of their expectations while in the incubation process. It is against this background that the study sought to establish the effect of strategic business incubation services on performance of firms sponsored by university business incubators in Kenya. The study variables were guided by the constructs of the third generation of evolution of business incubators which focuses mainly on value proposition in economies of scale, business support, networking, learning, knowledge and legitimacy, technology, commercialization of innovation and exit policy (Bruneel *et al*, 2012).

### **1.3 Research Objectives**

#### **1.3.1 General Objective**

The general objective of the study was to examine the effect of strategic business services on performance of firms sponsored by university business incubators in Kenya.

#### **1.3.2 Specific Objectives**

1. To establish the effect of business advisory services on performance of firms sponsored by university business incubators in Kenya.
2. To find out how business networking services influence performance of firms sponsored by university business incubators in Kenya.

3. To explore the effect of technological support services on performance of firms sponsored by university business incubators in Kenya.
4. To find out how technology transfer services affects performance of firms sponsored by university business incubators in Kenya.
5. To establish the effect of commercialization of innovation skills on performance of firms sponsored by university business incubators in Kenya.
6. To determine the mediating effect of managerial skills on the relationship between strategic business services and performance of firms sponsored by university business incubators in Kenya.

#### **1.4 Research Hypotheses**

**H<sub>A1</sub>:** There is a significant relationship between business advisory services and performance of firms sponsored by university business incubators in Kenya.

**H<sub>0</sub>:** There is no significant relationship between business advisory services and performance of firms sponsored by university business incubators in Kenya.

**H<sub>A2</sub>:** There is a significant relationship between business networking services and performance of firms sponsored by university business incubators in Kenya.

**H<sub>0</sub>:** There is no significant relationship between business networking services and performance of firms sponsored by university incubators in Kenya.

**H<sub>A3</sub>:** There is a significant relationship between technological support services and performance of firms sponsored by university business incubators in Kenya.

**H<sub>0</sub>:** There is no significant relationship between technological support services and performance of firms sponsored by university business incubators in Kenya.

**H<sub>A4</sub>:** There is a significant relationship between technology transfer services and performance of firms sponsored by university business incubators in Kenya.

**H<sub>0</sub>:** There is no significant relationship between technology transfer services and performance of firms sponsored by university incubators in Kenya.

**H<sub>A5</sub>:** There is a significant relationship between commercialization of innovation skills and performance of firms sponsored by university business incubators in Kenya.

**H<sub>0</sub>:** There is no significant relationship between commercialization of innovation skills and performance of firms sponsored by university incubators in Kenya.

**H<sub>A6</sub>:** There is a significant mediating effect between managerial skills and strategic business services on performance of firms sponsored by university business incubators in Kenya.

**H<sub>0</sub>:** There is no significant mediating effect between managerial skills and strategic business services on performance of firms sponsored by university business incubators in Kenya.

### **1.5 Justification of the Study**

The aim of the study was to generate new knowledge that would be of significance to various stakeholders in the strategic business services and university business incubation in relation to firm performance. Innovation is a precondition for all organizations seeking to acquire competitive advantage. Meanwhile, firms and academic spin-offs which bring the research and development results to the markets are cited to have become major drivers of continuous and sustainable economic growth (Freeman, 2010).

University business incubators have the unique opportunity to bridge and broker the academic world with the business the world (UBI Index, 2018) .University business

incubation centres as hybrid organizations are situated at the overlays between industry, the university, and government and are one of the responses to the worldwide demand for universities to engage in a third mission by playing a more prominent role in wealth creation, social and economic development hence sustainable firm performance (Etzkowitz, 2008; Gerlach & Brem, 2015).

The development of science, technology innovation and technical skills are key prerequisites to the transformation of Kenya into a knowledge-based society (GoK, 2013; GoK, 2017). Specifically the research findings will benefit firstly; policy makers in the government and related stakeholders who include the universities to develop strategic policies to guide business incubation especially in Kenyan universities. These will help mitigate the challenge of documented low success rate of firm performance. Secondly; researchers and scholars who will seek to find answers for the identified gaps.

### **1.6 Scope of the Study**

The study was limited the university sponsored business incubators which are under the global university business incubators index in Kenya during the period between 2011 and 2016. In 2011 Kenyatta University and Strathmore launched Chandaria BIIC and iBizafrica incubation centres respectively with University of Nairobi launching C4D BI at the school of Computing and Informatics. The study concentrated on business advisory, networking, and technological support, technology transfer and commercialization of innovation skills as the specific variables.

### **1.7 Limitations of the Study**

The study mainly used primary data which was collected using a questionnaire. Great effort was made to ensure data quality both at the collection and validation phases. Respondents were not required to disclose their names to mitigate the fear of uncertainty and thus gave reliable responses. The conclusion of the study was limited within unique factors associated with university sponsored business incubators. Consequently it may have affected the generalization of the findings as it may not be



the same as commercial business incubators in Kenya thus requiring further longitudinal studies replicated in different contexts of strategic business services.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Zikmund (2010) highlights various reasons why it is important to carry out literature review. These include pointing out what has been done and what is lacking, ability to develop variables relevant to the topic of interest, synthesizing and gaining a new perspective, identifying relationships between ideas and practices, establishing the context of the topic and the problem, rationalizing the significance of the problem, enhancing and acquiring the subject vocabulary, understanding the structure of the subject, relating ideas and theory to applications. The areas discussed include; theoretical and empirical reviews of business incubation, variables that affect start-up firms performance of universities sponsored incubators in Kenya, conceptual framework, a critique of literature reviewed and a summary of research gaps identified that justify the study.

#### **2.2 Theoretical Review**

A theory is a coherent set of general propositions used as principles of explanation of the apparent relationships of certain observed phenomena (Zikmund, 2010). This definition agrees with Creswell (2013) who defines a theory as an interrelated set of constructs formed into propositions or hypotheses that specify the relationship among variables. Both scholars posit that theories are analytical tools for understanding, explaining, and making predictions about a given subject matter or phenomena that occur in the world. Various scholars have highlighted different theories to explain strategic business services and firms' performance.

##### **2.2.1 Dynamic Capability Theory (DCT)**

The dynamic capability theory (DCT) was initially introduced by David Teece and Gary Pisano in 1994. They define the term dynamic as the capacity to renew competences so as to achieve congruence with the changing business environment which is relevant in situations where time to market is critical and the nature of

competition is difficult to determine (Teece & Pisano, 1994 as cited by Nabil, 2014; Van *et al*, 2014). Capabilities are referred to as the key role of strategic management in appropriately adapting, integrating and reconfiguring, internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment (Teece, 2014).

According to Teece *et al.* (1997) as cited by Vlatka *et al.*, (2014) dynamic capabilities are organizational and strategic routines by which managers alter firm's resource base and renew competencies in order to generate new sources of competitive advantage. According to Beske *et al.* (2014), DCT was first introduced to explain firm performance in dynamic business environments, focusing on the capabilities that firms employ to reach competitive advantage. DC Approach assumes that successful firms are able to demonstrate timely responsiveness to market dynamics (Nabil, 2014; Teece *et al.*, 1997). Successful firms in the global market place are able to demonstrate timely responsiveness to market dynamics and speedy product innovation (Teece *et al.*, 1997). According to Teece *et al.* (1997) as cited by Nabil (2014) the DCT expands on two fundamental issues where the first is the firm's ability to renew competences so as to adapt to changes in the business environment and the second the ability of strategic management to use these competences to match the requirements of the environment.

### **2.2.2 Human Capital Theory**

Human capital theory can be traced from 18<sup>th</sup> Century through Adam Smith which explains how human capability increases productivity resulting into high firm performance (Leroy, 2011). The essence of human capital theory is that investments are made in human resources so as to improve their productivity hence earnings (Claudia, 2014; Bernarda, 2007). The term human capital has traditionally been applied to achievement of education which includes knowledge and skills that the labour force accumulates through formal instruction, training and experience (Becker, 1993 as cited by Ruhui, 2014).

Human capital plays the vital role of creating, developing and sharing new ideas and knowledge through internal relationships (Mahoney & Kor, 2015). According to

Barney and Hesterly (2012), the human capital theory regards people as assets and proposes that investment by organizations in people will generate positive returns. It proposes that sustainable competitive advantage is attained when the firm has a human resource pool that cannot be imitated or substituted by its rivals. Human capital theory proposes that the level of education, area of education, previous business experience and skills influence the type of venture started (Barney *et al*, 2011). Claudia (2014) explains how the training component of human capital equips workers after schooling with skills useful with a particular set of technologies.

### **2.2.3 Pecking Order Theory of Capital Structure**

Effective financial management is a significant factor towards firms operational and overall performance. Firms financing is one of the most fundamental questions frequently raised in research (Hedia & Habib, 2013). The essence of the Pecking order theory is that a firm follows an order of preference on making decisions on sources of capital (Donaldson, 1961 & 1969 as cited by Zheng & Jolan, 1997). New firms do not have either historical or reputational information which makes external financing unavailable at start-up phase. Internally generated funds are the most preferred followed by debt if external financing is required (Donaldson, 1969) which comprises personal savings, short-term, then long-term debt and external financing being the least preferred.

According to Fama and French (2002) as cited by Hedia and Habib (2013) the pecking order theory does not take an optimal capital structure as a starting point, but instead asserts the empirical fact that firms show a distinct preference for using internal finance as retained earnings or excess liquid assets over external financing. According to Li Ju. *et al*, the capacity to finance an increasing firms growth depends on internal finance. Internal funds solely may inhibit projected growth whereas external financing increases risks pushing firms towards more risk. If internal funds are not enough to finance investment opportunities, firms may or may not acquire external financing, and if they do, they will choose among the different external finance sources in such a way as to minimize additional costs of asymmetric information (Donaldson, 1969; Zheng & Jolan, 1997; Hedia & Habib, 2013).

#### **2.2.4 Network Theory**

Network theory describes business networks as organizational forms between markets and hierarchy providing a comprehensive description mode of design areas of a network and considers the business unit or networked organization as the primary unit for reference (Bergek & Norman, 2008; Kajikawa *et al*, 2010; Sungur, 2015). A network consists of interconnected dyadic relationships where the nodes may be roles, individuals or organizations (Johannisson 2002 as cited by sungur 2015). According to Bollingtoft (2012) as cited by sungur (2015), incubates can utilize both internal and external networks. Internal networks are particularly useful to social capital building in as much as they enable multiple companies to share all kinds of resources. Sungur (2015) further argues how an incubator's external network of potential customers, suppliers, specialist service providers who include lawyers, accountants, tax specialists, financial institutions, venture capitalists, public and private research organizations and political institutions is of benefit to firm owners.

#### **2.2.5 Social Capital Theory**

Social capital theory represents the productive benefits of sociability through shared values, norms, trust and belonging that aid social exchange (Mohammed *et al.*, 2017). Social capital is composed of individual and collective social networks, ties and structures that help the individual get access to information and know-how (Allen, 2012). Mc Adam and Marlow (2011) posits that social ties connecting business actors to resource providers, other stakeholders and knowledgeable individuals facilitate the acquisition of resources and the exploitation of opportunities. Sullivan and Marvel (2011) argue that an individual's social capital consists of all the social relationships and social structures used to achieve his or her goals hence the result of a dynamic interaction.

Social capital theory contends that social relationships are resources that can lead to the development and accumulation of human capital. Mahoney and Kor (2017) posits that social capital broadly refers to those factors of effectively functioning social groups that include such things as interpersonal relationships, a shared sense of

identity, a shared understanding, shared norms, shared values, trust, cooperation, and reciprocity. An incubator may help build social capital whereby the tenants are given the opportunity to get to know each other and to work together in a variety of processes within the network (Zahra, 2005; Wang *et al*, 2010).

### **2.2.6 Social Network Theory**

The social network theory mainly focuses on building social relationships that promotes trust and not opportunism (Hogan, 2001 as cited by Ruhiu, 2014). This theory has its roots in the sociological world that speaks of human's social capital, which has been defined as the interweaving of interpersonal relationships and values among human beings. (Ruhiu, 2014). Social networks are a rich source of information that permits the individual to identify different combinations of the means and ends deriving in the creation of new goods or services for particular identified markets (Sullivan & Marvel, 2011). According to Stuart and Sorenson (2005), social networks are important in business start-up process at universities because they include graduate students, postdoctoral researchers, current and former colleagues and associates. As argued by sungur (2015), it is certain that they provide advice, expertise, moral support and possibly access to financial capital.

### **2.2.7 Schumpeterian Theory of Innovation**

Schumpeter's (1934) theory of innovative profits as cited by Feenbarg (2005), emphasize the role of growth and development. As explained by Bula (2012) and Hackett and Dilts (2008), the theory seeks out opportunities for noble value and generating activities which would expand and transform sustainable flow of income. The process involves risk taking, pro activity by the organizational leadership and innovation which aims at fostering identification of opportunities through intellectual capital of graduate incubates to maximize potential profit and growth (Herbert & Link, 1989 as cited by Bula, 2012).

Rosenberger (2003) posits that the theory underpins that technological progress comes from innovations carried out by firms motivated by the pursuit of profits, hence it involving Schumpeter's ideology of creative destruction. According to

Luehrman (1998), each innovation is aimed at creating a new process or product that gives its creator a competitive advantage over its business rivals. This is done by rendering obsolete or improving some previous innovation which is in turn destined to be rendered obsolete by future innovations.

### **2.2.8 Instrumental Theory**

Instrumentalization theory offers the most widely accepted view of technology (Feenberg, 1988; 2005). According to Feenberg (2005) and Arthur (1989), the theory is based on the common belief that technologies are tools on hold ready to serve the purposes of their users. According to this theory, technology is deemed neutral, without valuative content of its own. In this notion of neutrality within the context of the study, the concept usually implies firstly: technology as pure instrumentality which is indifferent to the variety of ends it can be employed to achieve (Arthur, 1989).

The neutrality of technology is a special case of the neutrality of instrumental means, which are only contingently related to the substantive values they serve hence conception of neutrality nature, is familiar and self-evident. Secondly, the universality of technology also means that the same standards of measurement can be applied in different settings thus technology is routinely said to increase the productivity of labor in different countries, different eras and different civilizations. Therefore, technologies are neutral because they stand essentially under the very same norm of efficiency in any and every context (Paul, 1983; Feenberg, 1988; 2005).

### **2.2.9 Substantive Theory**

Substantive theory which is best known through the writings of Ellul (1964) and Heidegger (1977) as cited by Feenberg (2005), argues that technology constitutes a new type of cultural system that restructures the entire social world as an object of control. Feenberg, (2005) observes that the system is characterized by an expansive dynamic which ultimately overtakes every pre-technological enclave and shapes the whole of social life. As argued by Paul (1983), the instrumentalization of society is

thus a destiny from which there is no escape other than retreat. Ellul (1964) argues that the technical phenomenon has become the defining characteristic of all modern societies regardless of political ideology asserting that it has become autonomous.

Heidegger (1977) agrees that technology is relentlessly overtaking us and claims that people are engaged in the transformation of the entire world into standing reserves where raw materials are mobilized in technical processes. The substantive theory of technology attempts to make us aware of the arbitrariness of this construction and of its cultural character. The choosing machines for instance make many unwitting cultural choices hence technology is not simply a means but has become an environment and a way of life (Heidegger, 1977; Feenberg, 2005).

#### **2.2.10 Resource Dependence Theory (RDT)**

The Resource Dependence Theory (RDT) was developed by Pfeffer and Salancik in the year 1978 at the Stanford University first published in their work on the external control of organizations, a resource dependence perspective. The authors had the intention to provoke additional thoughts, research attention, and concerns for three different ideas which includes the concept of resource interdependence, external social constraint, and organizational adaptation. As alleged by Davis and Cobb (2010), the intentions of Pfeffer and Salancik led to the development of the RDT, providing an alternative perspective to economic theories of mergers and board interlocks in order to understand precisely the type of the inter-organizational relations. RDT leads to the basic concept that an organization can be characterized as an open system, dependent on contingencies in the external environment. Drees and Heugens (2013) posit that since the introduction in 1978, the RDT is used as a premier perspective in understanding organizational environmental relationships.

#### **2.2.11 Stakeholder Theory**

According to Gry *et al.* (2011), stakeholder theory helps to understand the environment and the different constituents' managers should satisfy in order to effectively manage the organization. Stakeholders possess attributes like their power to influence the firm, the legitimacy of the stakeholder's relationship with the firm



and the urgency of the stakeholder's claim on the firm. Several stakeholders are involved in incubators and have different goals and expectations (Gry *et al*, 2011). Stakeholder theory approach helps to analyze how BIs adapt the behaviour of the organization to the stakeholders' demands (Plaza-U *et al*, 2010). Pfeffer and Salancik (1978) as cited by Gry *et al* (2011), argue that to survive, an organization needs to focus on those stakeholders who provide the resources and support necessary for it to continue the activities desired by the stakeholders. Incubators are influenced by their owners, their client firms, and various sets of governmental actors supporting or regulating incubators. Some incubators are connected to universities or larger firms in order to commercialize business opportunities or technology spinning out from the organizations.

#### **2.2.12 Agency Theory**

In the writings of Hill and Jones (2001) on stakeholder-agency theory the authors define agency relationship as one in which one or more persons who is the principal engages another person who is the agent to perform some service on their behalf. The cornerstone of agency theory is the assumption that the interests of the principal and the agent diverge (Gomez & Wiseman, 2007). According to the theory, the principal can limit divergence from his or her interests by establishing appropriate incentives for the agent, and by incurring monitoring costs designed to limit opportunistic action by the agent.

Sachs and Maurer (2007) highlight two important elements into the governance-setting system: socialization of both principals and agents prior to joining the organization and the subsequent interaction of those prior beliefs and experiences with what they experience in the new environment. According to (Hedia & Habib, 2013), this argues for an evolving set of incentives and mechanisms, as well as a coevolution of participants' attitudes which is affected by national background institutions and formal institutions place regulatory constraints on the governance structures. Huang *et al* (2009), posit that provision of a loan fund by an investor to the entrepreneur creates an agency relationship between the entrepreneur who is the agent and the investor, who is the principal. The sharing in capital with the venture

capitalists involves establishing a cooperative relationship between the investor and the emerging firm.

### **2.2.13 Commercialization Theory**

The commercialization theory was developed by Teece (1996) as cited by Scott (2005). Successful commercialization of innovation is of strategic importance to firms so as to remain competitive (Nerkar & Shane, 2007; McKinsey, 2010). It improves a firm's market penetration and dominance which contributes to the attainment of sustained leadership and firm longevity. Commercialization of innovation is often operationalized as the first sale of the target product or service. However, when an innovation is introduced in the market, only technology enthusiasts procure, and such enthusiasts comprise less than three percent of the market (Moore, 1991; Nerkar & Shane, 2007).

The larger mainstream market is comprised of pragmatists and conservatives, and so a successful commercialization is one that captures this mainstream market in which case the innovation is diffused across technology enthusiasts as well as pragmatists and conservatives (Moore, 1991; 2000). Successful commercialization of an innovation mostly lies between two extremes which are single sale on one hand and saturating the mainstream of a market on the other. Converting technical innovations to products and services entails the development of manufacturing and marketing capabilities, and assets such as manufacturing facilities and service and distribution networks (Mitchell, 1989; Teece, 1996; Teece *et al*, 1997; Ahuja, 2000).

### **2.2.14 Economic Theory of Patents**

Patents are justified in the standard economic theory when innovators must incur substantial sunk costs that need not be incurred by imitators (Alexander, 2002; Henderson, 2002). The theory suggests that the relative cost of innovation to imitation should be a key consideration in deciding what particular products or what sorts of products deserve patent protection. An often repeated argument for patents is that by giving inventors a limited monopoly in their inventions, the progress of

Science and useful Arts is promoted (Cole, 2001; Alexander, 2002) meaning that the prospect of monopoly profits increases the incentive to innovate.

Economic theory, however, provides an argument for why patents could improve the allocation of resources. The economic theory dates back to at least Jeremy Bentham, who argues that the protection against imitators is necessary because people who have no hope that they shall reap would not take the trouble to sow (Bessen & Maskin, 1999; Cole, 2001; Alexander, 2002). Original research and development is usually more costly than imitation. A firm will not be able to recoup its sunk costs if the results of its research are quickly imitated by rivals (Henderson, 2002) hence recognizing this, firms will have little incentive to invest in innovation. The standard economic rationale for patents is to protect potential innovators from imitation and thereby give them the incentive to incur the costs of innovation. Patents and other forms of intellectual property increase the incentive to innovate by delaying the arrival of imitators thus giving pioneer firms time to recoup their sunk costs through monopoly pricing (Bessen & Maskin, 1999; Alexander, 2002).

### **2.2.15 Reward Theory of Patents**

Reward theory focuses on the non-exclusive nature of technological knowledge and states that the function of the patent system is to remunerate successful innovators so as to encourage research and development effort (Bessen & Maskin, 1999; Henderson, 2002). The theory is premised on a view that the government should first provide targeted incentives for specific, creative individuals to solve the public goods problem associated with intellectual works and then step in to mitigate the monopoly distortion and transaction costs associated with the Intellectual Property right (Alexander, 2005; Scott, 2005).

The concern driving this perspective is that the subject matter protected by Intellectual Property will be under-produced because it has public good qualities. The reward theory owns the blame for historical misunderstandings of the nature of patents whereby attacks have allowed legally on patents based on the reasoning that if an invention did not merit a reward, the patent should be invalidated (Bessen & Maskin, 1999; Cole 2001; Scott, 2005). Under the reward theory, there is a

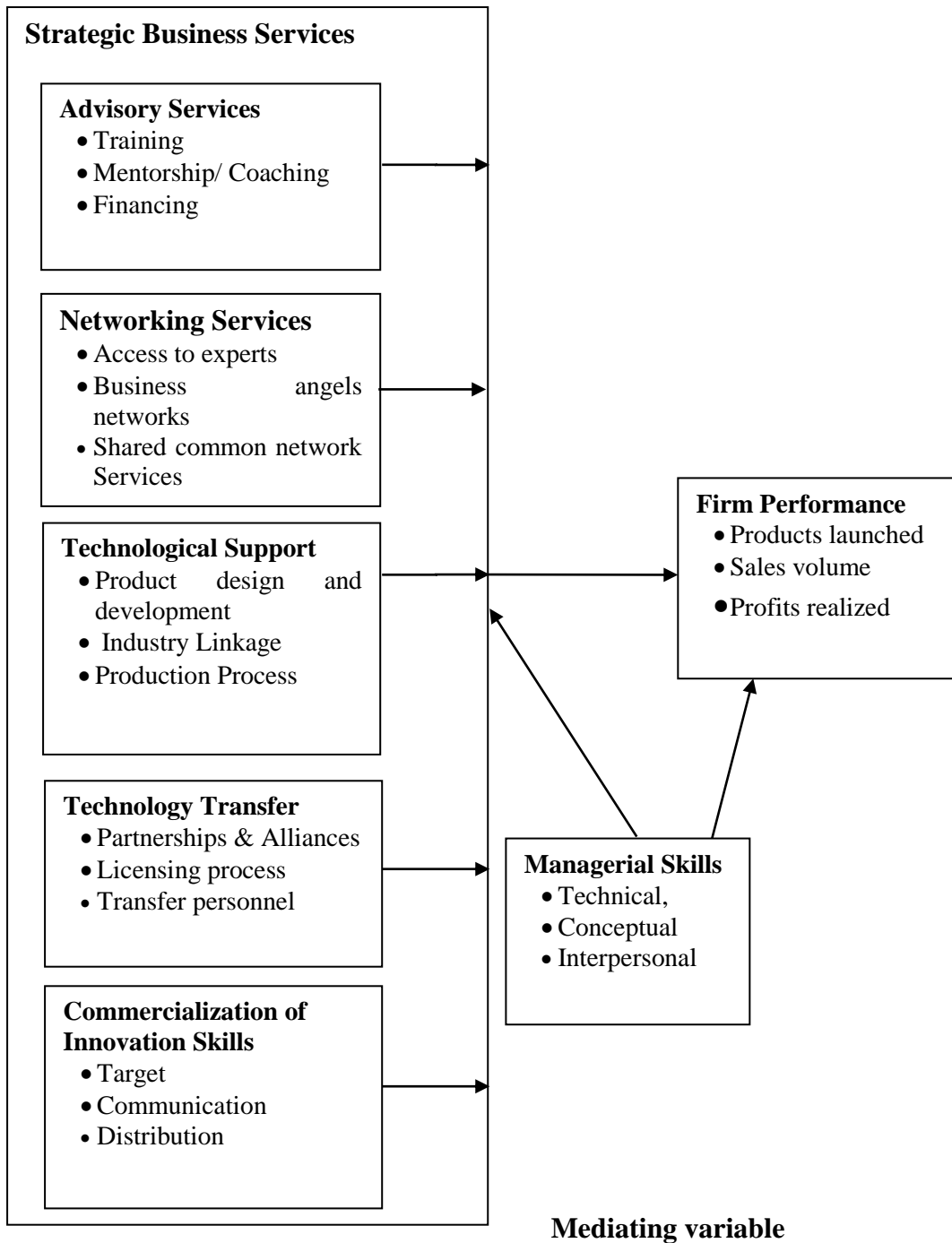
presumption that technological innovation is inevitable and that the patent reward of exclusivity is merited only by technological achievement (Alexander, 2005).

### **2.3 Conceptual Framework**

According to Mugenda (2012), a conceptual framework is a clear description accompanied by a graphical or visual depiction of the major concepts of the study and the hypothesized relationships and linkages amongst them. It refers to a structure that provides the links between research objectives, research design, and literature reviewed along conceptualizing the problem. Figure 2.1 provides a structure within which to organize the content of the study variables and conclusions within the context.

**Independent Variables**

**Dependent Variable**



**Figure 2.1: Conceptual Framework**

### **2.3.1 Advisory Services**

Al Mubarak *et al.* (2013) defines strategic advisory services as the prerequisite management processes and routines that help cope with sudden environmental changes among firms resulting in lower death propensity rates in early stages hence accelerates the new firm's growth curve. The advisory services offered by the incubators include capacity building in business planning, financial management, coaching and mentorship programmes, access to financing and subsidies (Alagbaoso *et al.*, 2014). The advisory services help to fill the void found in many areas whereby not everyone is able to spend time and money in a school of business (Oni & Daniya, 2012).

### **2.3.2 Networking Services**

According to Gerlach and Brem (2015), business incubators link incubates with professional business networks which usually comprise venture capital firms and established business practitioners commonly referred to as business angels who invest in the graduate incubates' ideas. Business networks are used to access resources and capabilities lying beyond a firm's boundary whereby it becomes critical as the sources of competitive capabilities by bridging ties and linkages to regional institutions (Oni & Daniya, 2012).

### **2.3.3 Technological Support Services**

Technological support services are professional services which facilitate the use of technology by incubates participating in business incubators programs (Mieme & Meru, 2011). They provide specialized technology oriented solutions by combining the processes and functions of software, hardware, networks, telecommunications and electronics (Kinoti & Mieme, 2011). Strategic technology support services help incubates in effective and efficient product design and production which boosts their competitive advantage (Ruhui, 2014; Meru & Struwig, 2015). According to Allen (2012), technological innovation and diffusion of knowledge play a crucial role in the process that links knowledge production and use.

### **2.3.4 Technology Transfer Services**

The process of transferring skills, knowledge, technologies through manufacturing, product design and development among governments, universities and the industry to ensure that scientific, technology and innovation are accessible to a wide range of users in form of new products, processes, applications, materials or services (ATPS, 2012). Knowledge is a unique commodity in that while it can be created, it cannot be destroyed and can be transferred while the source retains all of the knowledge it transfers to the recipient (Mc Adam & Marlow, 2011).

### **2.3.5 Commercialization of Innovation Skills**

African Technology policy Studies Network (ATPS, 2012) defines commercialization of innovation as the act or activities required for introducing an innovation into the market. It is a process that converts ideas, research or prototypes into viable products that retain the desired functionality. Lee *et al.* (2011) defines commercialization as a process of connected steps to bring a product to market which embraces integration, concurrence, and or overlap with the development process to ensure proper downstream execution. Fukagawa (2013) posits that the ability to commercialize innovations refers to a firm's capacity to introduce a product into a market and reach the mainstream of the market beyond the initial adopters. The ability to commercialize innovations primarily lies in an organization's ability to recognize current and emerging markets for current technological innovations and secondly depends on the firm's ability to manufacture and sell the product either by itself or by subcontracting (Anderson *et al.*, 2010).

### **2.3.6 Managerial Skills**

Managerial skills refer to the knowledge and capability of people in leadership positions with an ultimate goal of carrying out outlined specific activities towards their accomplishment (Syed *et al.*, 2016). Effective implementation of management skills are a crucial requirement for sustainable growth and development of any organization (Ruhui, 2014). Firms sponsored by UBIs are on a day to day basis managed and run by the owners who are also the founders (Wulung *et al.*, 2014),

therefore, lack of or inadequate knowledge and management skills hinder growth and development resulting in low rates of the success rates (Olorisade, 2011). The rapid global complex growth has continuously forced organizations to strive to enhance their effectiveness though focused attention on managerial effectiveness aimed at helping managers achieve the best from their firms and their teams (Al Mubarak & Busler, 2015).

### **2.3.7 Firm Performance**

Firm performance is a relevant construct in strategic management research and frequently used as a dependent variable (Ebrahim & Faudziah, 2014). Performance at the firm level is measured in various different ways such as accounting measures of profitability, the Lerner index, sales per input, and total factor productivity (Ceptureanu, 2015). Kaplan (2010) and Ceptureanu (2015) define firm performance as a set of financial and nonfinancial indicators which provide information on the degree of achievement of set goals and objectives. In theory, the concept of performance forms the core of strategic management and empirically, most strategic management studies make use of the construct of business performance in their attempt to examine various strategies and processes (Kaplan, 2010). In management, the significance of performance is clear through various arrays provided for performance enhancement (Ebrahim & Faudziah, 2014).

### **2.4 Empirical Review**

This section examines previous studies on the strategic business services. It identifies and examines the gaps and shortcomings in the extant literature. It establishes the foundation for developing the research hypotheses and conceptual framework upon which this study is based on by exploring the variables and their relationships. It helps to identify workable methodology for the study and provides information for formulation of the survey instrument.



### **2.4.1 Business Advisory Services**

According to a study by Al Mubarak and Busler (2012), business incubators are programs created to accelerate the successful growth and development of start-up companies through an array of business support resources and services. They are developed and managed by incubator management and offered through its network of contacts as asserted by Rajeev *et al* (2012). AFDB (2014) argues that the ultimate goal of a business incubator service program is to encourage the development of new businesses within the local environment. A study by Al Mubarak and Busler (2014) posits that by assisting graduate incubates to put up startup firms, the community is likely to benefit from an increase in the number of available opportunities in the area and additional revenue that is brought to the locality as a result of the new business activities. Both elements help to revitalize local economies thus enhance the quality of life for everyone through sustainable growth of the firms (Al Mubarak & Busler, 2015).

In a study by Greene (2012), business incubation advisory services aim to assist incubates with business start-up skills. In a study by Oni and Daniya (2012), the advisory services help to fill a void which is found in many areas whereby not everyone is able to spend the time or money necessary to attend college and obtain a business administration degree. Fukagawa (2013) further argues that, not everyone has access to resources that can fund a new business effort until it becomes profitable thus business incubation programs help to fill the gap by providing rudimentary training to incubates, a space to launch the business, and in some cases contacts between the new business owner with others who are in a position to invest in the future of the company (Greene, 2012; Al Mubarak & Busler, 2013; 2014).

Al Mubarak and Busler (2013; 2014; 2015) and Alagbaoso *et al.* (2014) observe that most common business incubator support services help with business basics, networking activities, marketing assistance, help with accounting and financial management, access to bank loans, low interest loans and guarantee programs. Al Mubarak and Busler (2015) further lists access to angel investors, help with presentation skills, links to higher education resources, links to strategic partners,

help with comprehensive business training programs, advisory boards and mentors and technology commercialization assistance. Bergh *et al.* (2011) allege that although most incubators offer their graduate incubates office space and shared administrative services, the most significant role of business incubation programs are the services they offer to start-up firms which ensures sustainable performance upon exit.

Fukagawa (2013) highlights basic resources required to provide incubation services whereby the most fundamental is the provision of land in form of a technology park with flexible prestigious infrastructure with access to business support services and equipment including affordable rent a space arrangement, management and accounting assistance, and communications facilities. Al mubarak and Busler (2013; 2014) highlight further resources which include services involving government grants and loans, general counseling and mentorship, access to external information and resources, and access to external business people.

#### **2.4.2 Business Networking Services**

Kajikawa *et al* (2010) defines business networks as relationships between two or more firms that interact with each other. According to Bollingtoft (2012) as cited by Gerlach & Brem, (2015), incubates can utilize both internal and external networks. Internal networks are particularly useful to social capital building in as much as they enable multiple companies to share all kinds of resources. Bergh *et al* (2011) further posits that an incubator's external network is composed of potential customers and suppliers, specialist service providers who include lawyers, accountants, tax specialists; financial institutions like banks, venture capitalists, public and private research organizations and political institutions.

A study by Oni and Daniya (2012) suggests that networks are used to access resources and capabilities lying beyond a firm's boundary, with the network becoming critical as the sources of competitive capabilities can be embedded externally in firms' network resources, their network of bridging ties and linkages to regional institutions. This is affirmed in a study by Salem, (2014) who argues that membership of networks and the role and relative location of the focal firm in the

network are also important. This has led to the relational view where network routines and processes, capabilities, and knowledge sharing in the network play increasingly important roles (Al Mubarak & Busler, 2013). Bergh *et al.* (2011) further concludes that full benefit from networks may require specialized training in understanding the cognitive, emotional, and social learning dimensions building on cognitive elements whereby cognition acts as an enabler for effective resource combination.

Bergh *et al.* (2011) continue and posits that incubates participation in networks may enhance learning, yet many incubates perceive risks in interactions with other entrepreneurs, risks that incubators are able to reduce. According to Oni and Daniya (2012), greater network interactions lead to formation of improved incubate social capital creating substantial value and improving start-ups performance. According to Adkins (2011), resource networks allow incubators to integrate resource gathering activities over their networks with the intention of becoming a single point of access for incubates where knowledge and resources can be located. Chandra and Chao (2011) further observe networks comprise general business networks in local communities such as specialized consulting or advisory services that provide direct support required by incubates seeking to construct a solid operational platform.

In a study by Lee *et al.* (2011), the authors argue that providing value through a resource network requires two key processes which are gathering and aggregating of resources that are resource seeking behaviour and the promotion of a strategic network that is knowledge seeking behaviour. Value creation perspective depends on strong interactions through the network where new organizational forms are emerging that assist incubators to succeed in the development and provision of new networks (Al Mubarak & Busler, 2015). In a study by Claudia (2013) on the impact of business incubation on startups, an incubator can assemble and integrate knowledge and resources from networks and combine these with coaching for incubates. Training can improve incubates' development and growth orientation and should focus on dimensions that are weakest in their countries to maximize the opportunities for success in venture creation (Al mubarak & Busler, 2013; 2015). According to a study by Gerlach and Brem (2015), culture specific challenges at

times guide formulation of specific curricula items supported by external resources whereby tailored training may be particularly necessary in regions for example China, where confucianism is a dominant part of the culture. Chandra and (Chao 2011) argue that the ability of the incubator to develop strong networks while aggregating and gathering resources, allowing reassembly for NSD (new support for development), is an important operating and networking capability for incubators.

Greene (2012), argues that appropriate infrastructure allows the incubator to develop new methods of supporting incubates and provides opportunities to expand the incubator's network. Wang *et al* (2010) argues that to attain acceleration in growth of their client firms, incubators offer targeted service packages which comes close to turn-key infrastructure support with the objective of giving incubates competitive advantages. According to (Allen, 2012; Mazzucato, 2013), funding is particularly an important concern during development and growth for start-up firms so the knowledge of and ability to access information on how to secure funding becomes a critical resource to an incubator. A study by Salem (2014) concludes that assistance to gain government grants or/ and loans was perceived as being the most important counseling-related incubation service and also the service incubates perceived as being significant but poorly delivered by the incubator.

### **2.4.3 Technological Support Services**

In a study by Allen (2012) on technology commercialization, technological innovation and the diffusion of knowledge play a crucial role in the process that links between knowledge production and use. Gerlach and Brem (2015) posit that application of science and technology is the main agent of industrial, economic and social development whereby with the increasing globalization and recognition of the importance of the knowledge society, cooperation between knowledge producers in universities and research centres is vital for research and development. According to Kamoun *et al* (2009), the primary function of a technology business incubator is to provide advice and support to innovators in business establishment and development. Kew *et al* (2013), further argue that Science, Technology and Innovation activities have been one of the driving forces of economic and social change for many decades

and even centuries. The STI activities have accelerated growth and brought about social change through the movement of people, goods and services and an increased capacity to generate, transmit and use knowledge generated (Allen, 2012; Kinoti & Mieme, 2011). Rajeev *et al* (2012) allege that incubators offer effective technology support services and financial assistance necessary for start-ups growth and development. The authors highlight technical deficiencies as one of the major causes of failure among the few reported cases.

According to Kinoti and Mieme (2011) business incubators offer technology support services which are identified as internet services, technology transfer, patent and copyright protection, production and operations equipment. A study by Ruhui (2014) on business incubation and growth of small and micro enterprises found out that incubator technology development improved incubates' product design and process. Availability of equipment and tools increased their production efficiency while patenting and copyrights services influence competitive advantage of their business performance (Mieme & Meru, 2011). Ruhui (2014) alleges that assistance in product design by the incubators highly guides in production methods along patenting and copyrights assistance.

According to research findings by Chandra *et al*, (2012) on the role of Technology business incubators (TBI's) in helping the new technology-based firms' innovation capacity, new technology-based firms are significant in catalyzing technology and knowledge accumulation. The findings of Meru and Struwig (2015) further posits that majority of the entrants to incubation have inventions and innovations for the purpose of commercialisation and therefore are skilled and at times advanced in their technological undertakings. This well agrees with Chandra and Chao (2011) findings which reports that incubates trained in certain specific business areas are more likely to start new ventures in the specific areas of training and thus graduate incubates who have undergone training in high technology and received an additional business education are more likely to recognize business opportunities in the sectors associated with technology.

#### **2.4.4 Technology Transfer Services**

According to Al Mubarak and Busler (2015), technology transfer translates new knowledge into marketable products, processes and services to satisfy identified existing unmet needs. According to Mc Adam and Marlow (2011), knowledge is a unique commodity in that it can be generated and cannot be destroyed and similarly can be transferred but the source retains all of the knowledge it transfers to the recipient. Mc Adam and Marlow (2011) allege that universities are major sponsors of technology transfer programs. Their motivation to do so is an extension of their basic mission, namely to teach, generate new knowledge, and be of service to society (Mansano & Pereira, 2016). In a study by Millar *et al* (2009), the authors argue that university technology transfer offices (TTOs) are relied upon to identify and manage new discoveries in the best interest of the public. According to Wang *et al* (2010), TTOs specifically seek to preserve intellectual property rights, facilitate partnerships, generate revenue and institutional recognition, and protect academic research enterprises as a source of future innovations. Although the priority given to each of these factors may vary from university to university, the technology transfer they promote enables the public to enjoy a broad array of new products and processes (Mansano & Pereira, 2016).

According to Angelsoft (2010), state governments sponsor a wide variety of fiscal and tax incentives programs that have implications for the commercialization of research produced technologies. Al Mubarak and Busler (2015) posit that although majority of these programs are focused on state interests in economic development generally, some are designed to directly enhance the investment climate for the commercialization of new technologies resulting from research. According to infodev (2009), state tax credits focused on angel investors are an example and the purpose is to reduce the risk and cost of angel investing in order to encourage more robust activity in high growth of start-up firms. As argued by Auerswald and kulkarni (2008), the theory is that if successful, these programs can attract investment finances, create jobs, and contribute to the economic growth of a country. Tax credits represent firm's financial income reduction of the investor's tax liability and can be structured as refundable or nonrefundable credits (NBIA, 2014).

A study by Allen (2012) identifies five types of technology transfer vehicles as spin-offs, licensing, meetings, publications, and cooperative research and development arrangements. The study posits that of these the greatest commercialization value comes from spin-offs and licensing. Economic Development Administration (2010) highlights examples such as high net-worth individuals that seek healthy returns on their investments or private equity firms that manage investments on behalf of individuals or groups of individuals like pension funds, endowments and foundations among others. The security offered by various local, state and federal government programs can also be a source of support for start-up companies (UBI Index, 2017). In some cases, the advancement of new technologies is promoted by a combination of public and private support, as is often the case with business incubators (AngelSoft, 2010).

Klenk and Hickey (2010) allege that regardless of the source of support for a fledgling company hoping to be a success must plead its case for assistance of financial, managerial or legal protection if its promising but risky product of research is to successfully move into a viable place in a market environment. Millar *et al* (2009) posits that successful partnerships are characterized by clear objectives, cost-sharing, industry leadership, limited but well-defined public commitments, measurable outcomes, and learning through sustained evaluations. Link and Link (2009) argue that although partnerships are an important strategic tool, they are not a guarantee of successful technology transfer, therefore, acknowledging the risks associated with new technologies is significant.

Al Mubarak and Busler (2014) and InfoDev (2009) argue that venture capitalists typically assist during four stages in a company's development, namely idea generation, start-up, ramp up, and exit. Al Mubarak and Busler (2013) further argue that since there are no public exchanges listing their securities, private companies meet venture capital firms and other private equity investors in several ways. These include client referrals from an investor's trusted business sources, investor conferences and symposia, and summits where start-up companies pitch directly to investor groups in face-to-face meetings (Al Mubarak & Busler, 2014; 2015).

#### **2.4.5 Commercialization of Innovation Skills**

Lee *et al*, (2011) defines commercialization as a process of connected steps to bring a product to market. Progressive commercialization techniques embrace integration, concurrence, and/or overlap with the development process to ensure proper downstream execution. Nerkar and Shane (2007) explain two organizational forms which commercialization can be executed namely corporations and startups. The main focus of the team in a start-up is to develop quality product that meets the identified market specifications. Allen (2012) argues that although there are numerous commercialization processes and philosophies, they all contain a common series of steps and reviews often referred to as gates. Fukagawa (2013) and Lee *et al* (2011) explains that the gate process starts with screening of development ideas whereby a business case is documented and a prototype developed which is then tested and validated at a point the product is launched.

According to Nerkar and Shane (2007) as cited by Fukagawa (2013), the ability to commercialize innovations refers to a firm's capacity to bring a product into a market and reach the mainstream of the market beyond the initial adopters. According to Chandra *et al* (2012), the ability to commercialize innovations primarily lies in an organization's ability to recognize current and emerging markets for current technological innovations and secondarily it depends on the firm's ability to manufacture and sell the product either by itself or by subcontracting. NBIA (2014) argues that successful startup ventures are led by those who have lived in the industry whereby the domain experience is intuitive considering the fact that the first step in product development requires a thorough understanding of the voice of the customer and the customer problem is being solved.

Fukugawa (2013) argues that at the introduction stage of the product lifecycle, the product is initiated to the market and the priority at this time is to create awareness via promotional efforts with few or non-existent competitors. This is also highlighted in a study done by Salvador (2011). Salem (2014) observes that in the presence of competitors, promotional efforts are oriented towards growing the category to the benefit of all versus competitive attacks. According to Fukagawa (2013), the growth



stage is characterized by sales generally escalating due to product unawareness which attracts competitors. Allen (2012) further argues how incumbent companies re-invest their cash windfalls to maintain position and hold off competitors. Angelsoft (2010) further posits that opportunities for moving the products of research from ideas and concepts to commercialization can be fraught with difficulties which range from inadequate financial resources to uncertainty over marketability of the technology, and from exceptionally high risk of product or process failure to exceptionally long horizons before a financial payout.

A study by Anderson *et al* (2011) found out that successful commercialization requires alignment with the target market lifecycle whereby innovation tends to be successful when matching the appropriate strategy with the appropriate product lifecycle. Allen (2012) observes that different tactics are deployed at each phase to affect change. Fukagawa (2013) explains the four stages of the product lifecycle as introduction, growth, maturity and decline. Salem (2014) posit that at maturity stage the market is established and tends to take over the weaker competitors struggling for market share and ultimately leave the market and remaining players intensely compete for market share. Chandra *et al* (2012) argues that at this point, large cash profits are available for investors as product re-investment is not attractive. According to Fukagawa (2013), the decline stage is marked by decrease in sales and few market players hence as demand falls, companies either eliminate product lines or seek to extend life spans through new product line extensions or repositioning the products to new markets.

#### **2.4.6 Managerial Skills**

Managerial skills and firm performance are positively correlated resulting in higher productivity and profitability (Salem, 2014; Panayiotis *et al*, 2017). The rapid global complex growth is continuously forcing organizations to strive to enhance their performance though focused attention on managerial effectiveness aimed at helping managers get the best out of themselves and their teams (NBIA, 2014). Managerial skills refer to the knowledge and ability of people in managerial positions with an ultimate goal of carrying out specific activities towards their accomplishment

(Robert *et al*, 2015; Syed *et al*, 2016). Effective management knowledge is a crucial requirement during the embryonic phase of any organization especially firms at their embryonic phase which are managed and run on a day to day basis by the owners who are also the founders (Wulung *et al*, 2014). Lack or inadequate knowledge and management skills of start-ups managers hinder their growth and development resulting in low rates of the survival rates (Olorisade, 2011). These skills enable managers execute their roles and duties towards accomplishment of organizational set goals and objectives (Salem, 2014; OECD & EU, 2013).

Robert *et al* (2015) and Ruhiu (2014) highlight three different types of managerial skills identified in early years by Robert Katz that are essential for a successful management process. These are technical skills which give the managers knowledge and ability to use different techniques to achieve what they want to achieve not only in production but also in sales and marketing perspective. Secondly, conceptual skills which refers to the ability of a manager to think in the abstract enabling them to analyze and diagnose issues facing an organization comprising of education which is acquired through an education process and experience which is acquired through practice. Thirdly, human and interpersonal skills which equip managers with the ability and knowledge to work effectively with people (Robert *et al*, 2015; Ruhiu, 2014; Salem, 2014; OECD & EU, 2013).

According to Ruhiu (2014), lack of professional managerial skills contributes for approximately 90 percent of failure of start-up firms. While these skills deficiencies are ever present in new businesses at embryonic stage, graduate incubates have the opportunity to overcome the challenges through participating in business incubator programs (NBIA, 2014). Technical, human/interpersonal and conceptual skills offered by business incubators have been found to be significantly positive in the day to day operations of startup firms hence contributing towards their successful performance (Haven & Candace, 2016). Syed *et al*, (2016) and Gerlach and Brem, (2015) elaborates on how ensuring teamwork spirit, ability to make decisions after careful analysis of issues arising, maintaining and use of business processes, ability to delegate, conflict avoidance, employee motivation, emphasis on individual and organizational goals, keeping up with global trends through research and

development and effective communication among all stakeholders highly enable startup firms managers offer an effective leadership style that ensures achievement of their goals and objectives.

#### **2.4.7 Strategic Business Services and Firm Performance**

Firm performance is a relevant construct in strategic management research and often studied as a dependent variable. Kaplan (2010) and Ceptureanu (2015) define performance as a set of financial and nonfinancial indicators which offer information on the degree of achievement of objectives set by an organization. According to al Mubarak and Busler (2013), an incubator's ultimate goal should be incubate success and growth organized in such a way that firm success and growth rates are enhanced. OECD and EC (2013) agrees with the statement arguing that the purpose of a BI is to increase the chances of an incubated firm to survive at the beginning while adding value by maximizing the firms' growth potential. In a study by Mobegi *et al* (2012) findings show that in china, university incubators among others have played a crucial role in technological commercialization, job and wealth creation, and economic growth. According to Al Mubarak (2015), UBIs have demonstrated superior abilities to link readily available faculty with students to incubated firms performance assistance, accelerating development of innovative high-tech firms and facilitation of commercialization process of innovations.

The objective of measuring firm performance is to ascertain the effectiveness and efficiency of organizations' management using a set of criteria and standards (Ayatse *et al.*, 2017). In a study findings by Claudia (2013), business incubators in the information for development (infoDev) network reported that 75 % of incubated firms were still in operation three years after graduation while in Brazil, the firm success rate of incubates is about 80 %, compared to 50% of all companies that do not survive the first year. Vanderstraeten *et al* (2012) proposed a measure of a firm growth using measures such as sales growth, cash flow growth, assets growth and growth in the number of employees as the most relevant. Ayatse *et al* (2017) further posits that the performance of incubated firms can be measured against level of networking activities, sales growth, profitability, patents registered, knowledge

transfer and research and development productivity. Hackett and Dilts (2008) as cited by Ceptureanu (2015) also proposed a measure of business incubation performance in terms of both tenant growth and financial performance using success and failure as demonstrated in table 2.1.

**Table 2.1: Firm Performance**

<b>Category</b>	<b>Success/ Failure</b>	<b>Incubate Outcome State</b>
1	Success	The incubate is surviving and growing profitably
2	Success	The incubate is surviving and growing and is on a path toward profitability
3	Success	Incubate operations were terminated while still in the incubator, but losses were minimized
4	Failure	The incubate is surviving but is not growing and is not profitable or is only marginally profitable
5	Failure	Incubate operations were terminated while still in the incubator, and the losses were large

NBIA (2014) estimates that North American incubators assisted about 49,000 start-up companies that provided full-time employment for nearly 200,000 workers and generated annual revenue of almost \$15 billion whereas in EU approximately 900 BIs helped to create 40,000 new jobs. According to Claudia (2013), World Bank Information for Development Program Business Incubation Network consists of nearly 300 incubators in over 80 developing countries assisting 20,000 enterprises, which have created more than 220,000 jobs. A collection of information for development success stories demonstrate start-ups that have graduated from developing country business incubators and reached their break-even point whereby the fledgling firms and start-ups were enrolled by the business incubators having not yet made their first sale (Kew *et al.*, 2013; NBIA, 2014). According to NBIA (2014)

study conducted Brazil has 384 incubators in operation providing home to 2,640 companies, generating 16,394 jobs.

Ceptureanu (2015) identified factors that mainly contribute to failure for start-up firms as incompetence risk, lack of or and inadequate capability, ineffective marketing, managerial incompetence, lack of or poor intelligence with the target market, insufficient uniqueness of product/service relative to competitor, and inadequate product protection. In a study by Gerlach and Brem (2015), persistence is generally considered one of the most important attributes of successful graduate incubates. According to Liane *et al* (2014), graduate incubates make the decision to start a business a single time but they must make the decision to persist with the venture many times. However, according to Kaplan (2010), when performance feedback is frequently and consistently more negative than expectations, individuals may make a more conscious cognitive assessment of the likelihood of a future successful outcome. Al Mubarak and Busler (2013) posit that the persistence decision is fundamentally different than the start-up decision in that the owner is choosing whether to continue with a decision that has been previously made. Chandra and Chao (2011) argues that although it appears that start-up firms seek to maximize utility when choosing whether or not to start a new venture, they may not seek utility maximization when making the decision to persist with a venture.

## **2.5 Critique of the Literature Review**

A study by Al Mubarak and Busler (2013) on the effect of Business incubation in developing countries found out that incubation provides mixed support for incubates through startup consulting and business planning all areas important for business development and growth. Studies by Al mubarak and Busler (2014) and infoDev (2009) conclude that business incubation helps companies expand into the market with positive impact on the economic development due to positive performance of graduated startups and diversify economic growth. The studies, however, cites weaknesses such as lack of creativity in problem solving and lack of sufficient training.

In another study by Mc Adam and Marlow (2011) on the relationship between the start-up's lifecycle progression and use of the incubator's resources, researchers conclude that access to specialized networks is critical for the development of tenant companies. Connections with business angel networks and venture capital firms are important means of providing financial resources during early stages of tenants' development (Bergh *et al*, 2011). Therefore, access to networks stimulates external collaborations and constitutes an important source of resources (Salem, 2014). Bergek and Norrman (2008) allege that lack of effective and efficient technological support services challenge start-ups' creativity in designing and developing products in start-ups. This fact raises the question on how start-up firms could be helped out in order to overcome the challenge. In another study by Kinoti and Mieme (2011) on perception of Business-Incubation Services in Kenya, respondents seem to have received less than they anticipated with technology support rating second poorest although the authors did not relate their findings with performance.

In a study carried out by Bozemann *et al* (2008), partnering with other organizations offers the opportunity to acquire new knowledge and develop new capabilities. Building knowledge and capabilities through inter-organizational relationships is faster than if the firm were to develop the knowledge and capabilities internally. Mansano and Pereira (2016) argue that promoting a culture of technology innovation is vital and not confined to research and development (R&D) considerations but includes investment policies, education, market dynamics, and strategic public-private partnerships. Therefore, universities must be seen as part of the innovation system and promoters of innovative projects.

A study by Liane *et al* (2014) on new era of rapid innovation found out that new firms tend to be more focused on business ideas and gaining the resources needed to build a productive and commercial base, while more established firms focus on value creation and capture the opportunities. However, in developing nations institutional lenders are major actors and play a crucial role in financing and supporting innovation and commercialization of new technologies (Al Mubarak & Busler, 2014). The study findings do not reflect how commercialization of innovation skills influences performance of firms sponsored by UBIs.

The literature reviewed so far on business incubation in Kenya shows that research has been done to establish their contribution towards the growth of micro and small enterprises (Ruhii, 2014). In another study by Mobegi *et al* (2012) on development of entrepreneurship in developed economies; a case of china, findings show that UBIs among others have played a crucial role in technology transfer, commercialization, job creation and economic growth. The paper further explains that UBIs are established within university campuses mainly to take of advantage of knowledge bank available. The UBIs have demonstrated superior abilities to link readily available faculty and students to business performance assistance and facilitating commercialization process of technical innovations. This study seeks to explore further how specifically strategic business services influence performance of firms sponsored by university business incubators in Kenya.

In a study by Ogutu and Kihonge (2016) on the impact of business incubators on economic growth and development, findings show that there is a strong relationship between economic development and the number of incubators in a country measured in terms of employment creation, income distribution and poverty reduction. Hence the need to find out how specifically strategic business services influence performance of firms sponsored by University business Incubators in Kenya on the basis of the triple helix of government-university-industry relationships.

## **2.6 Research Gaps Identified**

Al Mubarak and Busler (2013; 2014) and Claudia (2013) findings on the effect and impact of business incubation respectively are generalized across different types of incubators and do not measure specifically firm performance. Further Mohammed *et al* (2017) found out there is a positive correlation between strategic incubation services and success of incubated firms in Jordan. The study seeks to fill this gap specifically focusing on performance of firms sponsored by University business incubators from a Kenyan perspective.

Mc Adam and Marlow (2011) and Salem (2014) findings confirm that access to networks to incubated firms stimulates external collaborations and constitutes an important source of resources. The studies do not further measure how networking

services influence performance of firms sponsored by UBIs initiated by graduate incubates. This study intends to fill this gap by establishing how strategic business networking services influence these firms' performance of graduate incubates sponsored by university business incubators in a Kenyan perspective.

Bergek and Norrman (2008) found out that lack of effective and efficient technological support services challenge start-ups' creativity in designing and developing products in start-ups whereas Kinoti and Mieme (2011) on perception of Business-Incubation Services in Kenya technological support rated second poorest. The authors did not relate their findings with firms' performance. This study seeks to fill this gap by exploring if there is any significant relationship specifically between technological support services and start-up firms performance sponsored by university incubators in Kenya.

Bozemann *et al* (2008) found out that partnering with other organizations offers the opportunity to acquire new knowledge and develop new capabilities. The acquisition of knowledge and real-time information is especially important in high velocity markets where knowledge is advancing rapidly. The findings do not show any evidence of how technology transfer services offered in incubators influence start-up firms performance which the study seeks to find out. Haven and Candace (2016) found out that Brazil, Chile and United States of America supports business incubation through financing programs and close interaction with universities and industry to meet the objectives of technology and social development. The interaction is credited with generating several innovative new firms. The study does not reflect performance of these new firms financially and non-financially which the researcher intends to find out from a Kenyan perspective.

A study by Liane *et al* (2014) on new era of rapid innovation found out that new firms tend to be more focused on business ideas and gaining the resources needed to build a productive and commercial base, while more established firms focus on value creation and capture the opportunities. Therefore, this study seeks to find out if there is any significant relationship between commercialization of innovation skills and performance of firms sponsored by university business incubators in Kenya.



## **2.7 Summary of the Literature Review**

The success rate of firms sponsored by UBIs has been highly linked to the role played by business incubation program globally. University business incubators help incubates translate their ideas into workable and sustainable businesses by providing them with expertise, networks and tools that they need to make their ventures successful. In the long-term business incubator graduates have the potential to create jobs, revitalize local environment, commercialize new technologies, strengthen local and national economies and create wealth. More than 50% of new firms exit the market within the first five years of operations although incubated firms outperform their peers in terms of employment and sales growth to an approximated success rate of 80%. University business incubators provide a unique opportunity for these firms to benefit from the talent and resources located in the university, particularly in development of products that require higher level of technology and sophistication.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter discussed the methodology used in population sampling, techniques used to gather, process, and analyse data. It is divided into the following sections: Research design; Target Population; Sample and Sampling technique; Data collection methods; Pilot study; Validity and Reliability of research instruments and Data analysis. In addition the chapter discussed the procedure for carrying out the research and handling the findings.

#### **3.2 Research Design**

A research design constitutes the blue print for the collection, measurement, and analysis of data. Cooper and Schindler (2011) define research design as the plan and structure of investigation conceived so as to obtain answers to research questions. A research design is a master plan that specifies methods and procedures for collecting and analyzing the needed information (Kothari & Gaurav, 2014). This study adopted a descriptive survey research design which yielded both qualitative and quantitative data in order to interpret the relationship of business incubation to the performance of startup firms sponsored by university based incubators. Descriptive surveys can be used when collecting information about people's attitude, opinions, habits or any of the variety of education or social issues (Kombo & Tromp 2009). The aim of a survey is to explore and describe a phenomenon and is more efficient and economical (Kothari & Gaurav, 2014). They help the researcher to understand more about opinions, and attitudes of the respondents. Mugenda (2008) observe that a survey attempts to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. Quantitative approach was used to quantify the hypothesized relationship between the dependent and independent variables. Qualitative approach was adopted to provide in-depth understanding of the situation about strategic business services and performance of firms sponsored by university business incubators. Open-ended

questions were designed to meet the criteria described by Cooper and Schindler (2011) about qualitative research.

### **3.3 Research Philosophy**

Research philosophy relates to the development of knowledge, the nature of that knowledge and contains important assumptions about the way in which researchers view the world. The study adopted the positivism approach which is one of the three epistemology considerations. It advocates the application of the methods of the natural sciences to the study on social reality and beyond (Saunders, *et al* 2009). According to Cooper and Shindler, 2011, positivism is founded on three principles. The first principle is phenomenalism which implies that only that which is observable and measurable is regarded as knowledge whereas the second one refers to deductivism which explains that a theory should generate a hypothesis which can be tested and use results to draw inferences. The third principle is inductivism which draws knowledge from particular facts and observational evidence. Crowther and Lancaster (2008) inform that as a general rule, positivist studies usually adopt a deductive approach, whereas inductive research approach is usually associated with a phenomenology philosophy.

The researcher in the study played the role of an objective analyst by evaluating the collected data from graduate incubates managing firms sponsored by university incubators to produce appropriate results so as to generalize business incubation among universities in Kenya. The use of a highly structured methodology enabled generalization and evaluation of the results with the help of statistical methods. Data collected was interpreted through objective approach making the research findings applicable and quantifiable.

### **3.4 Target Population**

According to Kothari and Gaurav (2014), population is the average of all that conforms to a given set of specifications. All items in the field of inquiry constitute a universe or population. The study population included all graduate incubates who have gone through incubation services offered by university business incubators in

Kenya between years 2011 and 2016 which totals to 372. Target population comprises all list of items on which the researcher wishes to generalize the study findings (Mugenda, 2012; Kothari & Gaurav, 2014). The study used simple random sampling of all firms managed by graduate incubates from the three university sponsored incubators. The institutions include: Kenyatta University, Strathmore University and University of Nairobi. The researcher contacted the university business incubators managers through the institutions research and development directorates who oversee day to day business at the centers for contact details of the respondents.

### **3.5 Sample and Sampling Technique**

A sample is a subgroup which is carefully selected to be a representative of the whole population with the certain characteristics (Ngugi, 2012). Samples are collected and statistics calculated so that one can make inferences from the sample of the population (Mugenda, 2008). Sampling involves drawing of a target population for observation. The study applied probability simple random sampling technique. This allowed equal representation of all individuals in the defined population to be selected as a member of the sample (Kombo & Tromp, 2009). This is important as it helped in reducing biases that could arise. The sample of the study was selected using purposive sampling method which is a non-probability technique used to pick items with the required characteristics (Kothari & Gaurav, 2014). Sample size determination formula recommended by Kothari and Gaurav (2014) was used to select 189 startups for intensive study. The following formula was used to calculate the sample size.

$$\begin{aligned}
 n &= z^2 \cdot p \cdot q \cdot N / e^2 (N-1) + z^2 \cdot p \cdot q \\
 &= 1.962 \times 0.7 \times 0.3 \times 454 / 0.12 (454-1) + 1.962 \times 0.7 \times 0.3 \\
 &= 366.2581 / 1.9392 = 189
 \end{aligned}$$

Where: n = sample size

z = confidence level at 95% (Standard value of 1.96)

$p$  = proportion in the target population with a probability of success

$q$  = proportion in the target population with a probability of failure

$N$  = size of target population

$e$  = margin of error in the 95% confidence interval

**Table 3.1: Sample Distribution**

Incubator/ University	Population	Calculation	51% Sample
Strathmore	300	$(187/372) \times 300$	152
Kenyatta	48	$(189/372) \times 48$	25
UoN	24	$(189/372) \times 24$	12
Total	372		189

The sample size represented more than the 10% of the accessible population that is generally recommended by social researchers required for statistical data analysis and at least 100 cases as suggested by Kombo and Trump (2009) as cited by Ngugi (2012).

### 3.6 Data Collection Procedure

Primary data was obtained from graduate incubates as key informants assumed to have received various services and support that constitute the objectives of the study. This was obtained by use of a semi-structured self administered 5- scale Likert questionnaire. Closed-ended questions detailing all the variables of the study with open spaces for comments was used for this study. The questionnaires yielded both qualitative and quantitative data in the following sections: Section one- General and demographic information; Section two- Business advisory services; Section three- Business networking services; Section four- Technological support services; Section five- technology transfer; Section six commercialization of innovation skills; Section

seven –the mediating incubates managerial skills; Section eight- start-up firms performance. Secondary data sources included books, documented research, journal articles, and electronically stored information.

Data collection exercise using questionnaires was administered to the graduate incubates with the help of research assistants. This was after training the research assistants, pre-testing the instruments, and obtaining research permits from the NACOSTI and department of commerce and economic studies and research ethics committee at the Jomo Kenyatta University of Agriculture and Technology. The researcher closely supervised the assistants and held feedback meetings to collect completed data and ensure that the data collection process was implemented well.

### **3.7 Pilot Study**

According to Saunders *et al* (2009), pilot testing refines the questionnaire making it easy for the respondents when answering the questions. Ambiguity and sensitivity of the items and other issues related to data collection are noted and the tools and procedures revised and refined before the main study (Mugenda, 2012). Pre-testing enables a researcher to correct and improve the research instruments thus performance of data collection. According to Baker (1994 as cited by Ruhui, 2014), a sample of 5% to 10% of the sample size is a reasonable number of participants to consider enrolling in a pilot. In this study, 10 percent of 189 incubates participated in the pilot study which was 20 graduate incubates' start-ups who were not included in the main study.

#### **3.7.1 Validity**

Validity is the accuracy, truthfulness and meaningfulness of the data and all inferences made from the data (Mugenda, 2012). Validity exists if the instruments measure what they are supposed to measure. There are three types of validity; content validity, construct validity and criterion related validity. The study utilized content and construct validities. Content validity also known as face is the extent to which a measuring instrument provides adequate coverage of the topic under study. Its measure is primarily judgemental based on how much the instrument represents

the concept under study (Kothari & Gaurav, 2014). Content validity was tested and achieved through expert input, and also through adoption of questionnaires used in prior studies including Ruhii (2014), and Riunge (2014). Construct validity is a measure of the degree to which an instrument results conform to predicted correlations and other theoretical propositions (Kothari & Gaurav, 2014). This was ensured by anchoring the study to theoretical expectations.

### 3.7.2 Reliability of the Instrument

Data is said to be reliable for a decision when data collection method and the instruments used to collect the data produce similar results when applied repeatedly over time (Mugenda, 2012). To enhance reliability of research instrument, a pilot test on 10 percent of the population frame who qualifies but excluded from the final study was carried out to pre-test the research questionnaire. According to Lancaster *et al*, (2010) for high precision pilot studies, 1% to 10% of the sample should constitute the pilot test size. This researcher used Cronbach's Alpha ( $\alpha$ ) scale of 0.7 as an internal consistency measure computed as a coefficient ranging from 0 and 1. This indicates the extent to which a set of items can be treated as measuring a single latent variable (Cronbach, 2004). Cronbach's Alpha is a general form of the Kuder-Richardson (K-R) 20 formulas used to assess internal consistency of an instrument based on split-half reliabilities of data from all possible halves of the instrument (Cronbach, 1971). The Kuder-Richardson (K-R) 20 formula is as below:

$$KR_{20} = \frac{(K) (S^2 - \sum s^2)}{(S^2) (K - 1)}$$

Where

*KR<sub>20</sub>*- Reliability Coefficient of internal Consistency

*K*- Number of items used to measure the concept

*S<sup>2</sup>*-Variance of all scores

*s<sup>2</sup>* - Variance of individual items

Factor analysis was performed to identify the patterns in data and to reduce data to manageable levels. Ledsema and Valero-Mora (2007) as cited by Ngugi (2012) asserts that factor analysis has advantages that both objective and subjective attributes can be used to provide the subjective attributes and be converted into scores. It can also be used to identify hidden dimensions or constructs which may not be apparent from direct analysis. It is also easy and inexpensive to carry out.

### **3.8 Data Analysis**

Data analysis is the processing of data to make meaningful information (Saunders *et al*, 2009). The questionnaires were examined, cleaned and sorted to ensure that all the relevant data was coded, categorized and stored for analysis using statistical package for social science (SPSS) Version 21 computer software. Data on variables was analyzed using descriptive statistics which included measures of central tendency, measures of dispersion and measures of association. Qualitative data from the questionnaires was organized along themes as guided by the research hypotheses to establish links between data and key patterns that emerges from the study. Quantitative data was analyzed through descriptive and inferential statistics to enable meaningful distribution of scores using indices and statistics. The results were tabulated and frequencies used to calculate percentages and presented in tables to explain the phenomena. Analysis was explained using mean and standard deviation to indicate the average score and variability of the scores of the sample.

Relationships between the dependent and independent variables were established through multiple regression analysis. Multiple regression analysis was used to develop a self-weighting estimating equation by which to predict values for a criterion valuable from the values for several independent variables. The underlying assumptions of multiple linear regressions such as heteroscedasticity, multicollinearity and autocorrelation were tested and remedied. The study used SPSS version 21 to generate the tests. The following statistical model where start-up firms' performance was the dependent variable [Y] was used in the study. The coefficients of the independent variables  $X_1$ ,  $X_2$ ,  $X_3$ ,  $X_4$ ,  $X_5$  were significant in showing the relationship of independent variables on the dependent variable.



$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e \dots \dots \text{Optimal model}$$

Where:

Y = Start-up firms performance

$\beta_0$  = Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  = Coefficients of independent variables

$X_1$  = Business Advisory Services

$X_2$  = Business Networking Services

$X_3$  = Technological Support Services

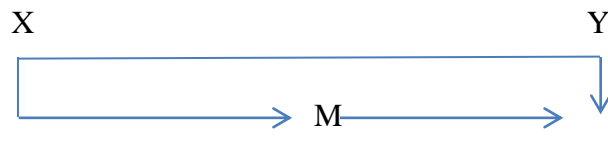
$X_4$  = Technology Transfer Services

$X_5$  = Commercialization of Innovation Skills

e = Error term which captures the unexplained variations in the model.

The t – test was used to test the individual strength and significance level of each independent variable. If the p-value is less than 0.05, the relationship between independent variables and dependent variable is significant and vice versa (Gujarati & Porter, 2010). The model coefficients were used to assess the magnitude, direction and significance of the relationship. The SPSS output which presents the sample analysis was used to generate inference about the population.

Mediating variables explains the influence of the relationship between the independent variables and the dependent variable (Ruhio, 2014). The mediating variable in this study was managerial skills, operationalized by technical, conceptual and interpersonal/human skills. Bivariate regression analyses were carried out to explain mediation effect on all independent variables on performance of start-up firms.



$$Y = \beta_0 + \beta_1 X_i + e \dots \text{Bivariate regression analysis}$$

$$Y = \beta_0 + \beta_1 X_i + \beta_6 X_6 + e \dots \text{Regression analysis including the mediating variable}$$

Where:

$X_i, \dots, X_k$  = Independent variable

$X_6$  = Mediating variable which is the incubates managerial skills

$\beta_0$  = Intercept

$e$  = Error term.

The coefficient  $\beta_1$  from the first equation is the total effect of variable  $X_i, \dots, X_k$  on performance without the mediating effect.  $B_6$  is the effect of  $X_i$  on performance following mediation. The mediating effect was tested by calculating the  $R^2$  and testing the hypotheses. Mediating variables have a direct or indirect influence on the relationship between an independent and a dependent variable (Mugenda, 2012). Hypothesis is a formal question that the researcher intends to resolve (Kothari & Gaurav, 2014).

The study tested six hypotheses based on the six study variables. From the regression results, the  $t$  values and the corresponding  $p$  values were used to test the statistical significance of the independent variables, based on 5 percent level of significance (95 percent confidence level;  $\alpha = 0.05$ ). When the  $p$  value is less than the level of significance, the null hypothesis ( $H_0$  - that the variable has no effect) is rejected and if equal or greater, do not reject  $H_0$ . Reject  $H_0$ , and if  $p > \alpha$ : Do not reject  $H_0$ . Once the decision to reject or not reject null hypothesis was made, inference was drawn on the relationship and statistical significance.

## CHAPTER FOUR

### RESEARCH FINDINGS AND DISCUSSION

#### 4.1 Introduction

This chapter presents the analyzed responses from the graduate business incubates running firms who formed the sample of the study where the general objective was to examine the effect of strategic business services on the performance of firms sponsored by university incubators in Kenya. The data was analyzed through descriptive statistics and presented using tables, charts and graphs. The study also made valid replicable inferences on the data in various contexts. Analysis was conducted to statistically determine whether the independent variables had an effect on the dependent variable.

#### 4.2 Response Rate

The number of questionnaires that were administered was 189. Out of these 150 were properly filled, returned and found suitable for analysis. This represented an overall response rate of 79.37% as shown on Table 4.1. According to Cooper and Schindler (2011), return rate of above 50% is acceptable to analyze and publish, whereas 60% is good, 70% is very good while above 80% is excellent. A response rate of 50% is adequate for analysis and reporting (Mugenda, 2008).

**Table 4.1: Response Rate**

<b>Response rate</b>	<b>Frequency</b>	<b>Percentage %</b>
Response	150	79.37
Non response	39	20.63
<b>Total</b>	<b>189</b>	<b>100</b>

### 4.3 Results of the Pilot Study

From the findings of the study as shown in table 4.2, all the variables had a Cronbach alpha above 0.7 and thus were accepted. This represented high level of reliability and on this basis it was supposed that scales used in this study is reliable to capture the internal consistency of the items being measured.

**Table 4.2: Reliability Coefficients**

		<b>Reliability Cronbach's Alpha</b>	<b>No. of Items</b>	<b>Comment</b>
Business services	networking	.776	7	Reliable
Technological Services	Support	.815	7	Reliable
Technology Services	Transfer	.838	6	Reliable
Commercialization innovation skills	of	.801	7	Reliable
Incubates managerial skills		.707	7	Reliable
<b>Overall score</b>		<b>.859</b>	<b>32</b>	<b>Reliable</b>

The validity of the questionnaire was determined using construct validity method. According to Mugenda (2008), this is the degree to which a test measures an intended hypothetical construct. Using a panel of experts familiar with the construct is a way in which this type of validity can be assessed. The experts can examine the items and decide what that specific item is intended to measure (Kothari & Gaurav, 2014). To ensure validity of the research instrument further, the questionnaire was pre-tested on 20 respondents. All the issues raised by the pilot study were

incorporated in the final questionnaire, taking caution not to lose the intended information.

#### **4.3.1 Factor Analysis**

Factor analysis identifies the patterns in data reducing it to manageable levels. It can be used to identify hidden dimensions or constructs which may not be apparent from direct analysis (Ngugi, 2012). Factor loading assumes values between zero and one of which loadings of below 0.3 are considered weak and unacceptable (Ruhui, 2014). All the predictor variables in the test had a factor loading greater than 0.5.

Business Advisory Services- All the 7 items were retained.

Business Networking services- All the 7 items were retained.

Technological Support Services- All the 7 items were retained.

Technology Transfer services- 6 items were retained and one was excluded.

Commercialization of Innovation Skills- All the 7 items were retained.

Incubates managerial skills- 7 items were retained and 2 excluded.

#### **4.4 Test for Multicollinearity**

Multicollinearity refers to a high degree of association between independent variables resulting into large standard errors of coefficients of the affected variables (Mugenda, 2012). Table 4.3 shows the diagnostic results whereby all the values of the variables under study had VIF values ranging between 1 and 4 and hence indicating no multicollinearity. In the moderated relationship, all the variables Business advisory services, Business networking services, technological support services, technology transfer services and Commercialization of innovation had VIF values ranging between 1 and 4 when mediated by the government policy indicating no multicollinearity.

**Table 4.3: Test of Multiple Correlations. Use of VIF and Tolerance**

<b>Direct relationship : Between strategic business incubation and performance of start-ups</b>		
Variable	Tolerance	VIF
Business Advisory Services	.618	1.372
Business Networking Services	.816	1.225
Technological Support Services	.688	1.454
Technology Transfer Services	.477	2.098
Commercialization of innovation	.635	1.576
<b>Mediated relationship: Between strategic business incubation, managerial skills</b>		
Variables	Tolerance	VIF
Business Advisory Services	.586	1.438
Business networking services	.810	1.235
Technological Support Services	.679	1.472
Technology Transfer Services	.458	2.182
Commercialization of innovation	.627	1.595
Acquired Managerial Skills	.912	1.097

## **4.5 Preliminary Analysis**

### **4.5.1 Gender of the Respondents**

The study aimed to establish the gender of the respondents who participated in the study. As presented in Table 4.4, 76.2% and (n =115) of the respondents were male, and 23.8% and (n=36) were female. The male graduate incubates dominated the study which agrees with the findings of similar studies done by Meru and Struwig (2015), Ruhu (2014), Ngugi (2012) and Mieme and Kinoti (2011).

**Table 4.4: Gender of Respondents**

	<b>Frequency</b>	<b>Percent</b>
Male	115	76.2
Female	36	23.8
<b>Total</b>	<b>151</b>	<b>100.0</b>

#### **4.5.2 Age of the Respondents**

Table 4.5 shows the age distribution of the respondents. The table shows that majority (76.8.9%, n= 116) of the respondents were within the age bracket of 21-30 years, whereas 23.2%, n=35 of the respondents were within the age bracket of 21-40 years. This is attributed by the fact that the study was carried out within university business incubators where majority of the participants are either undergraduate or graduate students mainly within the age of 30 years and below. The study agrees with the findings of Athena and Chris (2014), and Haven and Candace (2016).

**Table 4.5: Age distribution of the respondents**

	<b>Frequency</b>	
<b>Percentage</b>		
21 to 30 years	116	76.8
31 to 40 years	35	23.2
<b>Total</b>	<b>151</b>	<b>100.0</b>

#### **4.5.3 Level of Formal Education of the Respondents**

Table 4.6 shows the distribution of the respondents' level of education. The table shows that majority (98.0%, n=148) of the respondents had attained university level of formal education, with only 2.0% with secondary level. The study findings are in sync with the findings of Wulung *et al.* (2014), Ruhiu (2014); Kinoti and Mieme (2011), whereby university graduates dominated in the management of firms sponsored by University business incubators. Formal education and high level

training have been associated with positive impact on firms performance (Claudia, 2013).

**Table 4.6: Level of Formal Education**

	Frequency	
<b>Percentage</b>		
Secondary	3	2.0
University	148	98.0
<b>Total</b>	<b>151</b>	<b>100.0</b>

#### 4.5.4 Age of the Firms

Table 4.7 shows the age in years of firms started and managed by the respondents. The table shows that majority (65.6%, n=99) of the start-up firms were between 1 and 2 years old, 31.1%, n=47 were between 2 and 3 years old while 3.3%, n=5 were 1 year old and below. The study agrees with the findings of Meru and Struwig (2015), Athena and Chris (2014) and Haven and Candace (2016).

**Table 4.7: Age of the Firms**

	Frequency	
<b>Percentage</b>		
0 to 1 year	5	3.3
1 to 2 years	99	65.6
2 to 3 years	47	31.1
<b>Total</b>	<b>151</b>	<b>100.0</b>

#### 4.5.5 Nature of the Firms

Respondents who participated in the study were requested to describe briefly the nature of the firms they were running. The descriptions were analyzed into three categories as shown in table 4.8 namely manufacturing, ICT and Non ICT based. According to the results, a majority (83%, n=126) were in the ICT based services



category, a significant (14%, n=21) were in the non-ICT based services while and manufacturing had least presentation (3%, n=4). The study agrees with the findings of Haven and Candace (2016) whereby ICT based incubated firms dominated the report, Meru and Struwig, (2015), Al Mubarak and Busler, (2017) and Claudia, (2013). According to Claudia, (2013), ICT based firms posted high growth results hence more positive outcomes and positive firm performance. Kenya's ICT sector has been growing tremendously over the recent years which could be a major influence of the findings of this study (GoK, 2017).

**Table 4.8: Nature of Firms**

Percentage	Frequency	
Manufacturing	4	2.85
ICT Based	126	83.12
Non-ICT Based	21	14.03
<b>Total</b>	<b>151</b>	<b>100.0</b>

#### **4.5.6 Level of significance of services offered**

Respondents were requested to rate the services offered by the incubator as either highly significant, significant, neutral, least significant or not significant as shown in the table 4.9 below. According to 62%, of the respondents, services offered were significant whereas 1.18% felt they were least significant. 2.54% felt the services offered were not significant, 5.96% remained neutral and 28.3% rated highly significant. The results below were further affirmed by the results on the general question on significance of the services received from the incubation centres on the performance of the startup firms. 76.2 % and 21.2% of the total respondents agreed and strongly agreed respectively on the statement.

The study agrees with the findings of Athena and Chris (2014) whereby business incubation increased strategic focuses of incubated firms. Ayaste *et al* (2017) found out that firm performance is greatly enhanced when firms avail themselves to an

incubation program. Business incubation participants derive immense benefits in their respective firm growth. Performance of firms through mentorship which is a significant characteristic of the business incubators have an impact on the outcomes related to strategic management. It also agrees with the report findings of UBIINDEX (2017) where University-linked incubation programs have been reported to play a significant role in many countries' innovation strategies whereby they benefit from the readily available talent, research, and infrastructure hence adding value to challenges faced by knowledge based economies.

**Table 4.9: Level of significance of the services offered**

	HS		S		N		LS		NS	
	F	%	F	%	F	%	F	%	F	%
Business Advisory	55	36.4	85	56.3	9	6.0	1	0.7	1	0.7
Business Networking	57	37.7	87	57.6	4	2.6	2	1.3	1	0.7
Technological Support	44	29.1	99	65.6	5	3.3	0	0.0	3	2.0
Technology Transfer	34	22.5	105	72.2	5	3.3	2	1.3	1	0.7
Commercialization of Innovation	24	15.9	88	58.3	22	14.6	4	2.6	13	8.6
<b>Average score</b>		<b>28.32</b>		<b>62</b>		<b>5.96</b>		<b>1.18</b>		<b>2.54</b>

**Significance of the services received at incubator**

	Frequency	%	Valid %	Cumulative %
strongly disagree	1	.7	.7	.7
neutral	3	2.0	2.0	2.6
agree	115	76.2	76.2	78.8
strongly agree	32	21.2	21.2	100.0
<b>Total</b>	<b>151</b>	<b>100.0</b>	<b>100.0</b>	

## **4.6 Descriptive Statistics**

Descriptive statistics was used to establish the variation on the responses based on the statements on Business advisory services, Business networking services, Technological Support services, Technology transfer services, Commercialization of Innovation skills and the incubates managerial skills. The descriptive statistics were used to summarize the characteristics of the variables based on the scale of the questionnaire. The statements used for this purpose were ranked on a five-point Likert scale where 1= strongly disagree 2=disagree 3=not sure 4= agree 5= strongly agree.

### **4.6.1 Business Advisory Services**

The first variable on business advisory services consisted of seven indicators as illustrated in the table 4.10. The indicators included financial management, business proposal writing, sales and marketing, business presentation services, business counseling by moguls, link to financial providers, book keeping and records management training. The responses were by an average of 151 respondents. The seven items had a (mean=3.81) and had a normal variation on their responses (s.d.=1.253).

The study agree with the findings of Greene (2012) and Oni and Daniya (2012), who concluded that business incubation advisory services assist incubates with start-up skills that help spur successful companies. It also agrees with the study by Al Mubarak and Busler (2013; 2015) who found out that incubation advisory services are important for business development and growth. Claudia (2013) also found out that incubates who participated in the training programs showed a stronger tendency to adopt new business routines in financial management, bookkeeping, production management and marketing.

**Table 4.10: Business Advisory Services**

	<b>Frequency</b>	<b>Percent</b>	<b>Mean</b>	<b>S.D</b>
Financial management services	40	26.5	3.81	1.253
Business proposal writing services	23	15.2		
Sales and Marketing services	23	15.2		
Business presentation services	18	11.9		
Business counseling by business moguls	20	13.2		
Link to financial providers	16	10.6		
Book Keeping/ Records Management	11	7.3		
<b>Total</b>	<b>151</b>	<b>100.0</b>		

#### **4.6.2 Business Networking Services**

The variable on business networking services consisted of seven indicators as illustrated in the table 4.11. The responses were by an average of 151 respondents. The respondents were slightly sure that their incubators offered access to business experts in various fields to increase professional business contacts (mean=3.933) and had a normal variation on their responses (s.d.=0.81650). Based on the statement on networking role modeling, the respondents were also sure to some extent that it had increased their provision for financial support (mean=3.9664) with a normal variation of their responses (s.d.=0.59277). The respondents agreed that the incubator access to business clubs had influenced their business sustainability (mean=4.3087; s.d.=0.70614). Respondents further agreed that business fairs or competitions offered by incubator were helpful (mean=4.5067; s.d.= 0.66299).

Based on common shared services, the respondents agreed that sharing of common services provided by the incubator had helped them greatly in cutting down operation costs (mean=4.7133; s.d.= 0.53516). The study agreed that the incubator ability to link them with specialized professional contacts was adequate (mean=4.2667; s.d.=0.65196). Based on market information, the respondents agreed that the market information provided by the incubator was helpful (mean=4.1133; s.d.=0.51209).

Generally, the respondents agreed to the statements on business networking services (mean=4.2583; s.d= 0.63965). The study agrees with the findings of Salem (2014) and Gerlach and Brem, (2015), who concludes that both internal and external networks are useful to social capital building and critical as the sources of firms' competitive capabilities. Al Mubarak and Busler (2015) findings also support this study whereby they found out that incubators offered a platform for strong networking between client, graduated companies and also with international companies that produced successful companies.

**Table 4.11: Business Networking Services**

	<b>N</b>	<b>Min.</b>	<b>Max.</b>	<b>Mean</b>	<b>S.D.</b>
Access to business experts	150	1.00	5.00	3.9333	.81650
Link to business moguls	149	2.00	5.00	3.9664	.59277
Access to business clubs	149	2.00	5.00	4.3087	.70614
Access to business fairs	150	2.00	5.00	4.5067	.66299
Shared common services	150	2.00	5.00	4.7133	.53516
Link with specialized professionals	150	2.00	5.00	4.2667	.65196
Provision of market information	150	2.00	5.00	4.1133	.51209
<b>Aggregate score</b>				<b>4.2583</b>	<b>0.63965</b>

### 4.6.3 Technological Support Services

Table 4.2 shows the findings of the technological support services variable which consisted of seven items. Based on product design the respondents agreed that the services available at the incubator had assisted them in designing and developing products at (mean =4.1788; s.d.=0.5427). The respondents were also sure about the adequacy of the equipment or tools used at the incubator (mean=3.8940; s.d.=0.6649). Based on product design, the respondents agreed that the support offered in product design or production was adequate (mean= 4.1126; s.d.=0.56027). Further, the respondents agreed that the services were well linked to the market information needs (mean=4.1533; s.d.= 0.50150). The respondents were sure on

average of the support offered by incubator to acquire intellectual property rights was sufficient at mean =3.6533; s.d.=0.67542. They were also sure on average that the post incubation services offered were of great help (mean=3.7733; s.d.= 0.63612). The respondents agreed that the services provided at the incubator had aided prompt production at mean=4.0067; s.d.=0.52452. Generally, the respondents were slightly sure about the statements on technological support services (mean=3.9674) and their responses generally had a normal variation (s.d.=0.58648).

The results are in harmony with findings of (Ruhui, 2014) who found out that incubator technology development improved incubates' product design and process. The findings of Allen (2012) that technological innovation and the diffusion of knowledge play a crucial role in the process that links between knowledge production and use also supports the findings of this study. The study shows an improvement from the previous findings of Kinoti and Mieme (2011) whereby technology support services rating fell short of incubates expectations.

**Table 4.12: Technological Support Services**

	<b>N</b>	<b>Min.</b>	<b>Max.</b>	<b>Mean</b>	<b>S.D</b>
Assistance in product design	151	2.00	5.00	4.1788	.54266
Adequate tools and equipment	151	2.00	5.00	3.8940	.66485
Adequate support in product design	151	2.00	5.00	4.1126	.56027
Link to market information or needs	150	3.00	5.00	4.1533	.50150
Intellectual property rights	150	1.00	5.00	3.6533	.67542
Post incubation services	150	1.00	5.00	3.7733	.63612
Services aided prompt production	150	2.00	5.00	4.0067	.52452
<b>Aggregate score</b>				<b>3.9674</b>	<b>0.58647</b>

#### 4.6.4 Technology Transfer Services

Table 4.13 below illustrates the variable on technology transfer services which consisted of six indicators. The total number of respondents that participated to this question was 150. Based on the statement of preservation of property rights, the respondents were slightly sure on average whether it was prudent for the incubator to pursue the preservation of property rights (mean=3.7333; s.d=0.72968). Based on strategic partnerships, the respondents agreed that the incubator effort to source strategic partners was reliable (mean=4.1400; s.d=0.55599). Based on prompt, timely communication, the respondents agreed that incubator style of communication innovation results to various media was prompt and timely with a mean=4.0733 and s.d= 0.55599. The study agrees that the incubator partnership with private and public organizations was effective (mean=4.0199; s.d=0.57120). Based on incubator sponsorship, the respondents responses were average (mean=3.9933; s.d=0.44261) whether the program was commendable. Based on real-time market information, the respondents were on average sure as to whether the ability to acquire real time information at the incubator for various markets was prompt (mean= 3.9933; s.d= 0.56349).

Athena and Chris (2014) found out that firms sponsored by UBIs identified benefits resulting from their links with the incubator like awareness of the core-competences whereby they could identify their own limitations, increased strategic focus which many firms struggle with and the need for knowledge databases to enable knowledge transfer. Databases can form part of a virtual infrastructure for firms support. The study agrees also with Mc Adam and Marlow (2011) who concludes that universities are major sponsors of technology transfer programs. Mansano and Pereira (2016) findings agree with the study on the role BIs play in facilitating transfer of technology and innovation in the context of universities, government and private corporations and the need to promote university-industry interaction.

**Table 4.13: Technology Transfer Services**

	<b>N</b>	<b>Min.</b>	<b>Max.</b>	<b>Mean</b>	<b>S.D.</b>
Incubator preservation of property rights	150	1.00	5.00	3.7333	.72968
Reliable strategic partnerships source	150	2.00	5.00	4.1400	.55599
Prompt and timely incubator communication	150	3.00	5.00	4.0733	.60309
Public and private partnership	151	2.00	5.00	4.0199	.57120
Commendable incubator sponsorship	149	2.00	5.00	3.9933	.44261
Real-time market information by incubator	149	2.00	5.00	3.9933	.56349
<b>Aggregate score</b>				<b>3.9922</b>	<b>0.57767</b>

#### 4.6.5 Commercialization of Innovation Skills

From table 4: 14 below, the variable on Commercialization of Innovation skills consisted of seven indicators. The total number of respondents that participated to the question was 150. Based on the statement on trading license, the respondents were not sure to some extent whether incubator link to relevant bodies had assisted in the obtaining of trading licenses (mean=3.8733; s.d.= 0.50894). The respondents were also slightly sure that the incubator facilities had helped in designing of promotional tools (mean=3.9801; s.d=0 .49626). The study also affirmed that incubator assistance to launch their product was slightly commendable (mean=3.9600; s.d=0.57789). The respondents were not sure whether the incubator link with various distributors was commendable (mean=3.9000; s.d.= 0.48811). The respondents however agreed that incubator training on marketing helped on identifying the right customers (mean= 4.0600; s.d.= 0.31152). The respondents also agreed that the incubator idea alignment procedure with the target market was prudent (mean= 4.1800; s.d.=0.44976) . Based on pricing information, the respondents agreed that the incubator information was helpful in pricing their products (mean=4.0728; s.d.= 0.40165). Generally, the study agreed to the statements on commercialization of innovation (mean=4.0037) and the responses had a small variation (s.d. =0.4620).



The study agrees with findings of Jarunee (2014) whereby the rate of university's technology commercialization is very low in many countries partly due to the lack of financial support to firms sponsored by UBIs as well as ineffective linkages between the university and the industrial sector to help the process of technology transfer and innovation commercialization. Haven and Candace (2016) findings also pointed out that incubation in developing countries suffer from a lack of finance and effective connections with marketing channels.

**Table 4.14: Commercialization of Innovation Skills**

	<b>N</b>	<b>Min.</b>	<b>Max.</b>	<b>Mean</b>	<b>S.D.</b>
Trading license	150	2.00	5.00	3.8733	.50894
Incubator facilities	151	2.00	5.00	3.9801	.49626
Incubator assistance in product launching	150	2.00	5.00	3.9600	.57789
Link with distributors	150	2.00	5.00	3.9000	.48811
Incubator training on marketing	150	3.00	5.00	4.0600	.31152
Idea alignment	150	2.00	5.00	4.1800	.44976
Incubator pricing information	151	3.00	5.00	4.0728	.40165
<b>Aggregate score</b>				<b>4.0037</b>	<b>0.46202</b>

#### **4.6.6 Managerial Skills**

The mediating effect of the incubates acquired managerial skills consisted of seven indicators as shown by the table 4.15. The total number of respondents that participated to the question was 150. Based on the statement on teamwork spirit, the respondents were sure as to whether the acquired teamwork skills improved the performance of their start-ups (mean=4.1589; s.d.= 0.58983). Based on decision making, the respondents strongly agreed that careful decision making style was significant in their startups performance (mean= 3.9934; s.d.= 0.64143). Based on delegation, the respondents agreed on the ability to offer leadership through delegating roles and duties amongst their employees (mean=4.1800; s.d.=0.57150).

Further, the respondents were very sure that they effectively motivated their employees to focus on both organizational and individual goals (mean= 4.3333; s.d.= 0.63897). The respondents opined that their business processes were favourable for their start-ups (mean= 4.1248; s.d.=0.69226). Respondents agreed to the statement on the ability to keep with the global trends in their business performance (mean=4.3426; s.d=0.71773). When asked to comment on the effectiveness of communication styles used, the respondents agreed strongly (mean=4.1521;s.d=0.56022). Generally, the respondents agreed with the statements on acquired managerial skills (mean= 4.2181). The responses generally had a normal variation (s.d.=0.63216).

The study agrees with Al mubarak and Busler (2015) whose findings show how incubators offer tangible and intangible services that result into successful companies. This is also in agreement with the findings of NBIA (2014) and Ruhio (2014), who highlights how lack of professional managerial expertise accounts for about 90 percent of start-up firms' failure whereby graduate incubates have the opportunity to overcome these deficiencies through participating in business incubator programs.

**Table 4.15: Managerial Skills**

	<b>N</b>	<b>Min.</b>	<b>Max.</b>	<b>Mean</b>	<b>S.D.</b>
Teamwork spirit	151	2.00	5.00	4.1589	.58983
Decision making	151	2.00	5.00	3.9934	.64143
Business processes	150	1.00	5.00	4.1248	.69226
Delegating ability	150	1.00	5.00	4.1800	.57150
Goal setting	151	1.00	5.00	4.3333	.63897
Global trends	150	1.00	5.00	4.3426	.71773
Effective communication	151	1.00	5.00	4.1521	.56022
<b>Aggregate score</b>				<b>4.2181</b>	<b>0.63216</b>

#### **4.6.7 Firm Performance**

The dependent variable for the study was performance of firms sponsored by university business incubators in Kenya. The study used both financial and non-financial measurements items. These included profits, assets, sales, and number of outlets, products launched, employees, clients and capital injected into the business over the years in operation. Out of the eight items on the variable, the study expunged four and used four whereby the data provided was adequate for analysis. Many respondents declined to answer citing confidentiality of information requested. From the data accessed, the findings indicate a positive performance of the firms as shown in table 4.16. The study findings indicate a high level of profitability (Mean=4.23; s.d=0.6182), high number of new products (Mean=4.01; s.d=0.5864), at least one employee (Mean=3.54; s.d=0.5086) and a low level of additional outlets (Mean=2.7; s.d=0.5671). This is confirmed further by the findings of table 4.9 whereby 76.2% and 26.2% agreed and strongly agreed respectively that the services they received from the UBIs had a significant impact on the performance of their startup firms. Generally, majority of the firms sponsored by university incubators in Kenya have had a positive performance. The findings agree with several past studies that incubated firms have higher success, development and growth rates (Al Mubarak & Busler, 2013; Claudia, 2013; OECD & EU, 2013; Mohammed *et al.*, 2017).

**Table 4. 16: Firm Performance**

<b>Profits in Kshs.</b>							<b>Mean</b>	<b>S.D</b>
<b>Period in Years</b>	<b>2014</b>		<b>2015</b>		<b>2016</b>			
	F	%	F	%	F	%	4.23	0.1682
Below 100,000	109	72.19	59	39.07	31	20.53		
101,000-200,000	0	0.0	50	33.11	47	31.13		
201,000-300,000	0	0.0	0	0.0	0	0.0		
301,000-600,000	23	15.23	4	2.65	28	18.54		
601,000-1,000,000	8	5.3	25	16.56	21	13.91		
Above 1,000,000	11	7.28	13	8.61	24	15.89		
Additional outlets							2.7	0.5671
None	65	43.05	60	39.74	54	35.76		
Below 2 Outlets	86	56.95	84	55.63	95	62.91		
3 and Above	0	0	7	4.64	2	1.32		
Number of New Products							4.0	0.5864
None	55	36.42	44	29.14	46	30.5		
Below 2 Products	83	54.96	95	62.91	58	38.4		
3 to 4 Products	12	7.94	12	7.94	30	19.9		
5 and Above	0	0	0	0	17	11.3		
At least One Employee	33	21.85	49	32.45	69	45.70	3.54	0.5086
Aggregate							3.6175	0.4575

## **4.7 Inferential Statistics**

The study went ahead to seek to establish the bivariate aspect of the independent and dependent variables through correlation analysis. Multiple regressions were used to establish the strength of relationship. Inferential statistics were used also to test the null hypothesis. The study used 5% level of significance as the level of decision criteria whereby the null hypothesis was rejected if the p-value was less than 0.05 and accepted if p-value was greater than 0.05. Start-up firms' performance (Y) was calculated as an average of all parameters measuring performance in the research instrument which was a questionnaire (Appendix 11).

### **4.7.1 Business Advisory Services and Performance of Firms Model Summary**

Based on the model summary table 4.17, the coefficient of determination  $R^2$  (R squared) value of 66.7% indicates that the total variation in performance of start-ups is explained by business advisory services. The 33.3% of the variance is as a result of other factors that were not included in the study. The ANOVA table indicates that the model was fit to study relationship between business advisory services and performance of start-ups at  $p=0.000$  hence less than 0.005 therefore significant. From the coefficients table,  $\beta = 0.870$  and  $p=0.000$ , which indicates a positive significant relationship. Therefore, one unit increase of business advisory services offered by UBIs led to an increase in the performance of start-up firms by 0.87 units.

The established regression equation was:  $Y = 0.115 + 0.87X_1 + e$ . Where Y = performance of start-ups,  $X_1$ =business advisory services. The findings agree with studies carried out by Al Mubarak and Busler (2014; 2015), and Claudia (2013) whose findings emphasize on the positive effect of advisory services offered by UBIs on the performance of startup firms. These include business training programs, business planning, startups consulting, financing, and presentation skills. They aid greatly towards growth and success.

**Hypothesis One:**

**H<sub>01</sub>: There is no significant relationship between business advisory services and performance of firms sponsored by university business incubators in Kenya.**

The first hypothesis of the study was to establish the significance level of business advisory services offered by UBIs on the performance of firms sponsored by university business incubators in Kenya. As shown on the table 4.17 below, the study found out that business advisory services had a positive significant relationship because  $p=0.000$  and less than  $0.05$  at  $5\%$  level of significance. Since  $p<0.05$ , the null hypothesis was rejected and the alternative hypothesis accepted.

**Table 4.17: Business advisory services and Performance Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.818 <sup>a</sup>	.669	.667	.450		
a. Predictors: (Constant), Business advisory services						
<b>Anova<sup>b</sup></b>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.138	1	61.138	301.511	.000 <sup>a</sup>
	Residual	30.213	149	.203		
	Total	91.351	150			
a. Predictors: (Constant), Business advisory services						
b. Dependent Variable: Firm Performance						
<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.115	.163		.707	.000
	Business advisory services	.870	.050	.818	17.364	.000
a. Dependent Variable: Firm Performance						

### **Mediating effect of the Managerial Skills on Business Advisory Services**

A regression analysis was carried out to determine the influence of business advisory services offered by the UBIs on performance of start-up firms in consideration of the mediating variable using the regression model  $Y = \beta_0 + \beta_1 X_1 + \beta_6 X_6 + e$ . The model summary table 4.18 above shows that the value of (R squared)  $R^2$  increases in model two to 0.744, indicating a positive relationship. From the ANOVA table, the significance of F statistic is less than 0.05, which implies that the coefficients of the equation fitted are jointly not equal to zero which infers that the model used for the study was fit. From the coefficients table above, the established regression model after mediation is  $Y = 0.125 + 0.565X_1 + 0.27X_6 + e$  Where  $Y$ = performance of start-ups sponsored by university based incubators,  $X_1$ =business advisory services,  $X_6$ = mediator and  $\beta=0.27$ . The coefficients of both regressions are significant which implies that there exists a mediating effect of incubates managerial skills on the relationship between business advisory services and performance of the start-up firms sponsored by university incubators in Kenya.

**Hypothesis test:  $H_{06}$ :** Incubates Managerial skills have no mediating effect on the relationship between business advisory services and performance of firms sponsored by university business incubators in Kenya. Since the P-value is 0.000 and less than 0.05, the null hypothesis was rejected and the alternative accepted that incubates managerial skills has a mediating effect on the relationship between business advisory services and performance of firms sponsored by university business incubators in Kenya.

**Table 4.18: Mediating Effect Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.818 <sup>a</sup>	.669	.667	.450
2	.863 <sup>b</sup>	.744	.741	.397

a. Predictors: (Constant), Business advisory ser

b. Predictors: (Constant), Business advisory, Managerial Skills

**Anovac**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.138	1	61.138	301.511	.000 <sup>a</sup>
	Residual	30.213	149	.203		
	Total	91.351	150			
2	Regression	67.975	2	33.987	215.183	.000 <sup>b</sup>
	Residual	23.376	148	.158		
	Total	91.351	150			

a. Predictors: (Constant), Business advisory services

b. Predictors: (Constant), Business advisory services, Managerial skills

c. Dependent Variable: Firm Performance

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.115	.163		.707	.000
	Business advisory services	.870	.050	.818	17.364	.000
2	(Constant)	.125	.144		.868	.000
	Business advisory services	.565	.064	.531	8.822	.000
	Managerial Skills	.270	.041	.396	6.579	.000

a. Dependent Variable: Firm Performance



#### **4.7.2 Networking Services and Performance of Firms Model summary**

Based on the model summary table 4.19, the  $R^2$  (R squared) value indicates that 85.7% of the variation in performance of start-ups can be explained by business networking services. The other 14.3% of the variance is as a result of factors not included in the study. From the ANOVA table, the model used for the study was fit at  $p=0.000$ . From the coefficients table,  $\beta= 0.81$  which implies that, every one unit increase in business networking services offered by UBIs would lead to an increase in performance of firms by 0.81 units. The established regression equation was:  $Y = 0.319 + 0.81X_2 + e$ . Where  $Y$  = performance of start-ups,  $X_2$ =business networking services. The findings agree with the study of Salem (2014) who found out that network routine, process, capabilities and knowledge sharing play important roles in the development and growth of startup firms. Al Mubarak and Busler (2014) findings also report on how networking activities support development and growth of incubated firms at embryonic stage.

**Hypothesis Two:  $H_{02}$ : There is no significant relationship between business networking services and performance of firms sponsored by university business incubators in Kenya.**

The findings of the study found out that the relationship between networking services and performance of start-up firms was positively significant where  $p=0.000$  hence  $p<0.05$  at 5% level of significance. Therefore, the null hypothesis was rejected and alternative hypothesis accepted.

**Table 4.19: Networking Services and Performance of Firms Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.926 <sup>a</sup>	.857	.856	.296		
a. Predictors: (Constant), Business networking services						
<b>Anova<sup>b</sup></b>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.317	1	78.317	895.277	.000 <sup>a</sup>
	Residual	13.034	149	.087		
	Total	91.351	150			
a. Predictors: (Constant), Business networking						
b. Dependent Variable: Firm Performance						
<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.319	.109		2.923	.004
	Business networking	.810	.027	.926	29.921	.000
a. Dependent Variable: Firm Performance						

### Mediating effect of the Managerial Skills on Networking Services

A regression analysis was done to determine the relationship of business networking services offered by the UBIs and performance of firms considering the mediating variable using the regression model  $Y = \beta_0 + \beta_1 X_2 + \beta_6 X_6 + e$ . The model summary table 4.20 above shows that the value of (R squared)  $R^2$  increases in model 2 to 0.85.8%, indicating that a positive relationship. From the ANOVA table, the F

statistic is significant since p is less than 0.05, which shows that the coefficients of the equation fitted are jointly not equal to zero which means that the model used for the study was fit. From the coefficients table above, the established regression model after mediation is  $Y = 0.125 + 0.769X_2 + 0.038X_6 + e$ . Where Y= performance of start-ups sponsored by university based incubators,  $X_2$ =business networking services,  $X_6$ = mediator and  $\beta=0.038$ . The coefficients of both regressions are significant which implies that there is a significant mediating effect of the incubates managerial skills on the relationship between networking services and performance of the firms sponsored by university business incubators in Kenya.

**Hypothesis test:  $H_{06}$ :** Incubates managerial skills have no mediating effect on the relationship between networking services and performance of firms sponsored by university business incubators in Kenya. Since the P-value is 0.000 and less than 0.05, the null hypothesis was rejected and the alternative hypothesis accepted that incubates managerial skills have a significant mediating effect on the relationship between networking services and performance of firms.

**Table 4.20: Mediating effect Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.926 <sup>a</sup>	.857	.856	.296
2	.926 <sup>b</sup>	.858	.856	.296

a. Predictors: (Constant), Business networking

b. Predictors: (Constant), Business networking, Managerial skills

**Anova<sup>c</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.317	1	78.317	895.277	.000 <sup>a</sup>
	Residual	13.034	149	.087		
	Total	91.351	150			
2	Regression	78.411	2	39.205	448.389	.000 <sup>b</sup>
	Residual	12.940	148	.087		
	Total	91.351	150			

a. Predictors: (Constant), Business networking

b. Predictors: (Constant), Business networking, Managerial skills

c. Dependent Variable: Firm Performance

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.319	.109		2.923	.004
	Business networking	.810	.027	.926	29.921	.000
2	(Constant)	.295	.112		2.645	.004
	Business networking	.769	.048	.879	16.122	.000
	Managerial skills	.038	.037	.056	1.035	.000

a. Dependent Variable: Firm Performance

### 4.7.3 Technological Support Services and Performance of Firms

Based on the model summary table 4.21 below, the  $R^2$  value indicates that 72.0% of the variation in performance of startups was a result of technological support services. The other 28.0% of the variance is as a result of variables not included in the study. From the ANOVA table, the model used for the study was fit at  $p=0.000$ . From the coefficients table,  $\beta= 0.757$  which indicates that one unit increase in technological support services offered by UBIs would cause an increase in performance of firms by 0.757 units.

The established regression equation was:  $Y = 0.271 + 0.757X_3 + e$ . Where  $Y$  = performance of start-ups,  $X_3$ = technological support services. The results agree with the findings of (Ruhio, 2014) who found out that technological support services offered by BIs aided improved product design and processes by the incubates. The findings of Allen (2012) that technological innovation and the diffusion of knowledge play a crucial role in the process that links between knowledge production and use also supports the findings of this study. The study shows an improvement from the previous findings of Kinoti and Mieme (2011) whereby technology support services rating fell short of incubates expectations.

**Hypothesis Three:  $H_{03}$ : There is no significant relationship between technological support services and performance of firms sponsored by university business incubators in Kenya.**

The study found out that the relationship was significant since  $p=0.000$  hence less than 0.05 at 5% level of significance. The results imply that there exists a significant positive relationship between technological support services and performance of firms sponsored by UBIs in Kenya. Therefore, the null hypothesis was rejected and the alternative hypothesis accepted.

**Table 4.21: Technological Support Services Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849 <sup>a</sup>	.720	.718	.414

a. Predictors: (Constant), Technological support services

**Anova<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.805	1	65.805	383.808	.000 <sup>a</sup>
	Residual	25.546	149	.171		
	Total	91.351	150			

a. Predictors: (Constant), Technological support services

b. Dependent Variable: Firm Performance

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.271	.164		1.657	.010
	Technological s	.757	.039	.849	19.591	.000

a. Dependent Variable: Firm Performance

**Mediating effect of the Managerial Skills on Technological Support Services**

A regression analysis was done to determine the relationship of technological support services offered by the UBIs and performance of firms factoring in the mediating variable using the regression model  $Y = \beta_0 + \beta_1 X_3 + \beta_6 X_6 + e$ . The model summary table 4.22 above shows that the value of (R squared)  $R^2$  increases in model 2 to 0.757%, which indicates a positive relationship. From the ANOVA table, the F

statistic is significant since p is less than 0.05, which shows that the coefficients of the equation fitted are jointly not equal to zero which implies that the model used for the study was fit. From the coefficients table above, the established regression model after mediation is  $Y = 0.129 + 0.545X_3 + 0.208X_6 + e$ . Where Y= performance of start-ups sponsored by university based incubators,  $X_3$ =technological support services,  $X_6$ = mediator and  $\beta=0.208$ . The coefficients of both regressions are significant which implies that there is a significant mediating effect of incubates managerial skills on the relationship between networking services and performance of firms sponsored by university business incubators in Kenya.

**Hypothesis test:  $H_{06}$ :** Incubates managerial skills have no mediating effect on the relationship between technological support services and performance firms sponsored by university business incubators in Kenya. Since the P-value is 0.000 and less than 0.05, the null hypothesis was rejected and the alternative accepted that the incubates managerial skills have a significant mediating effect on the relationship between technological support services and performance of firms sponsored by university business incubators in Kenya.

**Table 4.22: Mediating effect Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849 <sup>a</sup>	.720	.718	.414
2	.870 <sup>b</sup>	.757	.754	.387

a. Predictors: (Constant), Technological support

b. Predictors: (Constant), Technological support, Managerial skills

<b>Anovac</b>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.805	1	65.805	383.808	.000 <sup>a</sup>
	Residual	25.546	149	.171		
	Total	91.351	150			
2	Regression	69.180	2	34.590	230.899	.000 <sup>b</sup>
	Residual	22.171	148	.150		
	Total	91.351	150			

a. Predictors: (Constant), Technological support

b. Predictors: (Constant), Technological support, Managerial skills

b. Dependent Variable: Firm Performance

<b>Coefficients<sup>a</sup></b>						
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
		B	Std. Error			
1	(Constant)	.271	.164		1.657	.010
	Technological support	.757	.039	.849	19.591	.000
2	(Constant)	.129	.156		.827	.000
	Technological support	.545	.057	.611	9.492	.000
	Managerial skills	.208	.044	.306	4.747	.000

a. Dependent Variable: Firm Performance



#### **4.7.4 Technology Transfer Services and Performance of Firms**

Based on the model summary on table 4.23, the  $R^2$  (R squared) value indicates that 77.9% of the variation in performance of firms was a result of technology transfer services offered by the UBIs. The other 22.1% of the variance is as a result of variables not included in the study. From the ANOVA table, the model used for the study was fit at  $p=0.000$ . From the coefficients table,  $\beta=0.721$ , which implies that one unit increase in technology transfer services would cause an increase in performance of startups by 0.721 units. The established regression equation was:  $Y = 0.968 + 0.721X_4 + e$ . Where  $Y$  = performance of start-ups,  $X_4$  =technology transfer services. The study findings are in sync with those of Mansano and Pereira (2016) and Jarunee (2014) on the significant role played by UBIs in facilitating transfer of technology and innovation in the context of universities, government and private corporates hence the need to promote university-industry relationship.

**Hypothesis Four:  $H_{04}$ : There is no significant relationship between technology transfer services and performance of firms sponsored by university business incubators in Kenya.**

The findings of the study revealed a positive significant relationship between technology transfer services and performance of firms sponsored by university business incubators in Kenya. This is because at 5% level of significance  $p=0.000$  and less than 0.05 hence the null hypothesis was rejected and the alternative hypothesis accepted.

**Table 4.23: Technology Transfer Services Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.883 <sup>a</sup>	.779	.777	.368

a. Predictors: (Constant), Technology transfer services

Anova <sup>b</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.146	1	71.146	524.672	.000 <sup>a</sup>
	Residual	20.205	149	.136		
	Total	91.351	150			

a. Predictors: (Constant), Technology transfer services

b. Dependent Variable: Firm Performance

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.968	.088		10.976	.000
	Technology transfer services	.721	.031	.883	22.906	.000

a. Dependent Variable: Firm Performance

### Mediating effect of Managerial Skills on Technology transfer Services

A regression analysis was done to determine the relationship of technological support services offered by the UBIs and performance of firms factoring in the mediating variable using the regression model  $Y = \beta_0 + \beta_1 X_4 + \beta_6 X_6 + e$ . The model summary table 4.24 above shows that the value of  $R^2$  increases in model two to 0.797%, indicating that there is a positive relationship. From the ANOVA table, F statistic is significant since  $p < 0.05$ , thus the coefficients of the equation fitted are jointly not equal to zero hence the model used for the study was fit. From the coefficients table

above, the established regression model after mediation is  $Y = 1.087 + 0.942X_4 - 0.198X_6 + e$ . Where  $Y$ = performance of start-ups sponsored by university based incubators,  $X_4$ =technology transfer services,  $X_6$ = mediator and  $\beta=-0.198$ . The coefficients of both regressions are significant which implies that there is a significant mediating effect of the managerial skills of the incubates on the relationship between technology transfer services and performance of firms sponsored by university business incubators in Kenya.

**Hypothesis test:  $H_0$ :** Incubates managerial skills have no mediating effect on the relationship between technology transfer services and performance of firms sponsored by university business incubators in Kenya. Since the P-value is less than 0.05, the null hypothesis was rejected in support for the alternative that the incubates managerial skills have a mediating effect on the relationship between technology transfer services and performance of firms sponsored by university business incubators in Kenya.

**Table 4.24: Mediating effect Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.883 <sup>a</sup>	.779	.777	.368
2	.889 <sup>b</sup>	.790	.788	.360

a. Predictors: (Constant), Technology transfer services

b. Predictors: (Constant), Technology transfer, Managerial Skills

**Anovac**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	71.146	1	71.146	524.672	.000 <sup>a</sup>
	Residual	20.205	149	.136		
	Total	91.351	150			
2	Regression	72.198	2	36.099	278.945	.000 <sup>b</sup>
	Residual	19.153	148	.129		
	Total	91.351	150			

a. Predictors: (Constant), Technology transfer services

b. Predictors: (Constant), Technology transfer services, Managerial Skills

c. Dependent Variable: Firm Performance

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients B	Std. Error Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.968	.088		10.976	.000
	Technology transfer	.721	.031	.883	22.906	.000
2	(Constant)	1.087	.096		11.354	.000
	Technology transfer	.942	.083	1.153	11.297	.000
	Managerial Skills	-.198	.069	-.291	-2.851	.000

a. Dependent Variable: Firm Performance

#### **4.7.5 Commercialization of Innovation Skills and Performance of Firms**

Based on the model summary table 4.25 as illustrated below, the  $R^2$  (R squared) value indicates that 68.1% of the variation in performance of firms was a result of commercialization of innovation skills offered by the university business incubators. The other 31.9% of the variance is as a result of variables not included in the study. The model used for the study was fit since  $p=0.000$ . From the coefficients table, the constant=0.148,  $\beta= 0.863$  which indicates that one unit increase in commercialization of innovation skills offered by the UBIs would increase the performance of startups by 0.863 units. The established regression equation was:  $Y = 0.148 + 0.863X_5 + e$ . Where  $Y$  = performance of start-ups,  $X_5$  = commercialization of Innovation skills.

The results of the study agree well with the study by Haven and Candace (2016) whose findings cite the critical role BIs play on connections with marketing channels to bridge the challenge faced by startup firms. The study cites countries that support UBIs such as Brazil, Chile and USA where the governments acts as catalysts for promoting incubated firms through financing programs and facilitating government-university-industry relationships. The findings further explain how BIs are major mechanisms for promoting commercialization of research and development and advancing technology. UBIINDEX (2017) findings highlights the role played by University-linked incubation programs on commercialization of research in many countries innovation strategies citing the benefits client startups draw from the readily available talent, research, and infrastructure.

**Hypothesis Five:  $H_{05}$ : There is no significant relationship between commercialization of innovation skills and performance of firms sponsored by university business incubators in Kenya.**

The findings of the study based on the fifth hypothesis revealed a positive significant relationship between commercialization of innovation skills and performance of firms sponsored by university business incubators in Kenya.  $p<0.05$  at 5% level of significance hence the null hypothesis was rejected and the alternative accepted.

**Table 4.25: Commercialization of Innovation Skills Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825 <sup>a</sup>	.681	.678	.443

a. Predictors: (Constant), Commercialization of innovation

**Anova<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.166	1	62.166	317.384	.000 <sup>a</sup>
	Residual	29.185	149	.196		
	Total	91.351	150			

a. Predictors: (Constant), Commercialization of innovation

b. Dependent Variable: Firm Performance

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.148	.157		.940	.000
	Commercialization of innovation	.863	.048	.825	17.815	.000

a. Dependent Variable: Firm Performance

### **Mediating effect of the Managerial Skills on Commercialization of Innovation**

A regression analysis was done to determine the relationship of commercialization of innovation skills offered by the UBIs and performance of firms factoring in the mediating variable using the regression model  $Y = \beta_0 + \beta_1 X_5 + \beta_6 X_6 + e$ . The model summary table 4.26 above shows that the value of (R squared)  $R^2$  increases in model 2 to 0.74%, indicating that there is a positive relationship. From the ANOVA table, the F statistic is less than 0.05, which shows that the coefficients of the equation fitted are jointly not equal to zero which implies that the model used for the study was fit. From the coefficients table above, the established regression model after mediation is  $Y = 0.173 + 0.572X_5 + 0.251X_6 + e$ . Where  $Y$ = performance of start-ups sponsored by university based incubators,  $X_5$ =commercialization of innovation skills,  $X_6$ = mediator and  $\beta=0.251$ . The coefficients of both regressions are significant which implies that there is a significant mediating effect of the incubates managerial skills on the relationship between technology transfer services and performance of the firms sponsored by university business incubators in Kenya.

**Hypothesis test:  $H_{06}$ :** Incubates managerial skills have no mediating effect on the relationship between commercialization of innovation skills and performance of firms sponsored by university business incubators in Kenya. Since the P-value is 0.000 and less than 0.05, the null hypothesis was rejected in support for the alternative that incubates managerial skills have a mediating effect on the relationship between commercialization of innovation skills and performance of firms sponsored by university business incubators in Kenya.

**Table 4.26: Mediating effect Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825 <sup>a</sup>	.681	.678	.443
2	.860 <sup>b</sup>	.740	.736	.401

a. Predictors: (Constant), Commercialization of innovation

b. Predictors: (Constant), Commercialization of innovation, Managerial Skills

**Anovac**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	62.166	1	62.166	317.384	.000 <sup>a</sup>
	Residual	29.185	149	.196		
	Total	91.351	150			
2	Regression	67.589	2	33.795	210.492	.000 <sup>b</sup>
	Residual	23.762	148	.161		
	Total	91.351	150			

a. Predictors: (Constant), Commercialization of innovation

b. Predictors: (Constant), Commercialization of innovation, Managerial Skills

c. Dependent Variable: Firm Performance

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.148	.157		.940	.000
	Commercialization of innovation skills	.863	.048	.825	17.815	.000
2	(Constant)	.173	.142		1.216	.000
	Commercialization of innovation	.572	.066	.547	8.611	.000
	Managerial Skills	.251	.043	.369	5.812	.000

a. Dependent Variable: Firm Performance



## 4.8 Multiple Regression Analysis

Multiple regression was carried out in the study to determine the effect of the independent variables ( $X_1, X_2, X_3, X_4, X_5$ ) which include business advisory, networking, technological support and technology transfer services and commercialization of innovation skills on the dependent variable (Y) which is the performance of the firms sponsored by the university business incubators in Kenya. A multiple regression on introduction of the mediating variable was also carried out. The regressions established the strength of relationship of the independent variables against the dependent variable. The optimal model of the study was generated.

### 4.8.1 Test for Normality

The researcher used the Shapiro Wilk test to examine the normality for the residuals of the variables under study. The test is mainly run in research activities whereby the number of observations is less than 2000 which fits well with this study (Shapiro *et al*, 1968). Table 4.27 results indicate that residuals of the variables were normally distributed because the p values for all the variables were greater than 0.05.

**Table 4.27: Test for Normality**

	Shapiro Wilk- Statistic	Sig.
Business Advisory Services	.658	.162
Business Networking Services	.752	.206
Technological Support Services	.945	.326
Technology Transfer Services	.863	.569
Commercialization of Innovation Skills	.964	.728
Incubates Managerial Skills	.933	.202

#### 4.8.2 Regression Model Summary One

From the model summary table below, the value of  $R^2$  (R squared) value is 0.888. This shows that 88.8% of the variation in the performance of startup firms is explained by the predictor variables. The remaining 11.2% of the variation is explained by factors not included in the study. Therefore, 88.8% of performance of firms sponsored by university business incubators can be explained by business advisory services, business networking services, technological support services, technology transfer services and commercialization of innovation skills offered. The analysis of variance (ANOVA) as shown above tests the significance of the model used in the study was significant at 5% level of significance. The value of  $p=0.000$  which means that the alternative hypothesis holds since  $p$ -value is less than 0.05. This depicts that the independent study variables are significant predictor variables at explaining performance of firms sponsored by UBIs and the model is significantly fit at 5% level of significance. Since all the  $p$  values are less than 0.05, the alternative hypothesis is supported.

The relationship between business advisory services and performance of startup firms sponsored by UBIs was positively significant at  $\beta=0.308$ ;  $p<0.05$ ;  $t=2.736$ . The relationship between business networking services and performance of firms sponsored by UBIs was positively significant at  $\beta=0.542$ ;  $p<0.05$ ;  $t=8.017$ . The relationship between technology support services and performance of s firms sponsored by UBIs was positively significant at  $\beta=0.064$ ;  $p<0.05$ ;  $t=5.843$ . The relationship between technology transfer services and performance of firms sponsored by UBIs was positively significant at  $\beta=0.269$ ;  $p<0.05$ ;  $t=5.769$ . The relationship between commercialization of innovation skills and performance of firms sponsored by UBIs was negatively significant at  $\beta=-0.345$ ;  $p<0.05$ ;  $t=-2.644$ . Therefore, business advisory, networking, technological support, technology transfer services and commercialization of innovation skills have a significant effect on performance of firms sponsored by university business incubators in Kenya.

**Table 4.28: Regression Model Summary One**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.942 <sup>a</sup>	.888	.884	.265

**Anova**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	81.138	5	16.228	230.404	.000 <sup>a</sup>
Residual	10.213	145	.070		
Total	91.351	150			

**Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	.132	.124		1.069	.000
Business advisory	.308	.113	.290	2.736	.000
Business networking	.542	.068	.620	8.017	.000
Technology support	.064	.076	.070	5.843	.000
Technology transfer	.269	.047	.330	5.769	.000
Commercialization of	-.345	.130	-.330	-2.644	.000

a. Dependent Variable: Firm Performance

From the model summary table below, the value of  $R^2$  (R squared) in model two indicates an increase to 0.907. This depicts that 90.7% of the variation in the performance of firms sponsored by UBIs is explained by all the five independent variables and the mediating effect of incubates managerial skills jointly. From the ANOVA table below, the model used for the study was fit since p values are less than 0.05.

**Hypothesis test:  $H_{06}$ :** Incubates managerial skills have no mediating effect on the relationship between strategic business services and performance of firms sponsored by university incubators in Kenya. Since the P-value is 0.000 and less than 0.05, the null hypothesis was rejected in support for the alternative that incubates managerial skills have a significant mediating effect on the performance of firms sponsored by university business incubators in Kenya.

**Table 4.29: Regression Model Summary Two**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.942 <sup>a</sup>	.888	.884	.265		
2	.952 <sup>b</sup>	.907	.903	.243		

Anovac						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	81.138	5	16.228	230.404	.000 <sup>a</sup>
	Residual	10.213	145	.070		
	Total	91.351	150			
2	Regression	82.876	6	13.813	234.692	.000 <sup>b</sup>
	Residual	8.475	144	.059		
	Total	91.351	150			

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	.132	.124		1.069	.002
	Business advisory services	.308	.113	.290	2.736	.000
	Business networking	.542	.068	.620	8.017	.000
	Technology support services	.064	.076	.070	5.843	.000
	Technology transfer services	.269	.047	.330	5.769	.000
	Commercialization of	-.345	.130	-.330	-2.644	.000
2	(Constant)	.182	.115		1.160	.003
	Business advisory services	.346	.103	.326	3.355	.001
	Business networking	.551	.062	.629	8.905	.000
	Technology support services	.062	.070	.067	5.884	.037
	Technology transfer services	.541	.066	.662	8.231	.000
	Commercialization of Managerial Skills	-.366	.119	-.350	-3.064	.003

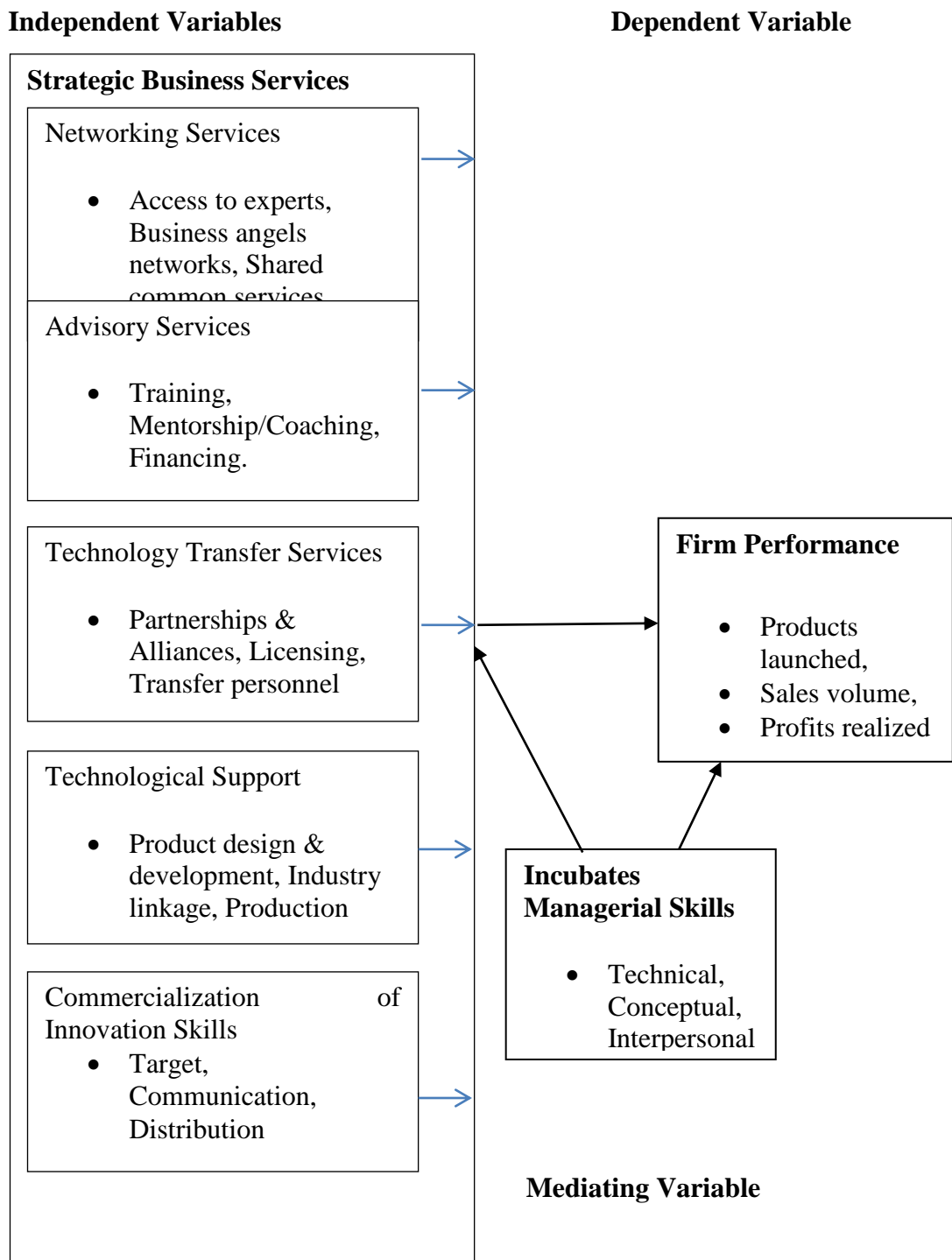
a. Dependent Variable: Firm Performance

### 4.8.3 The Optimal Model

The general objective of the study was to examine the effect of strategic business services on the performance of firms sponsored by university business incubators in Kenya. The multiple regression analysis of the study variables showed a significant relationship where  $p < 0.05$ . This indicates that holding all variables under study to a constant zero, performance of firms sponsored by university business incubators in Kenya would be at 0.132 and a unit increase in performance would be due to a change in networking services at 0.542, business advisory services by 0.308, technology transfer services at 0.269, technological support services at 0.064 and a decreased commercialization of innovation skills at 0.345. The optimal model was:

$$Y = 0.132 + 0.542 X_1 + 0.308 X_2 + 0.269 X_3 + 0.064 X_4 - 0.345 X_5 + e$$

The results agree with studies done by Meru and Struwig (2015) and Al Mubarak and Busler (2015) whose findings on networking services offered by incubators had the highest mean rating.



**Figure 4.1: Revised Conceptual Framework**

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This final chapter presents the summary of the study findings as per the specific objectives, conclusion, recommendations and areas for future research. The study sought to examine the effect of strategic business services on the performance of firms sponsored by university business incubators in Kenya. Specifically, the study sought to establish the effect of business advisory services on performance of firms sponsored by university business incubators in Kenya, to find out how business networking services affect performance of firms sponsored by university business incubators in Kenya, to explore the effect of technological support services on performance of firms sponsored by university business incubators in Kenya, to find out how technology transfer services affects performance of firms sponsored by university business incubators in Kenya, to establish the effect of commercialization of innovation skills on performance of firms sponsored by university business incubators in Kenya and to determine the mediating effect of the managerial skills on the relationship between strategic business services variables and performance of firms sponsored by university business incubators in Kenya.

#### **5.2 Summary of Major Findings**

The study research population was the graduate incubates sponsored by university business incubators running and managing firms after going through incubation process successfully. These were drawn from Nairobi, Kenyatta and Strathmore universities. A sample size of 189 out of a population of 372 was targeted whereby 151 graduate incubates responded to the research instrument issued. The six research hypotheses guided the findings.

##### **5.2.1 Business Advisory Services**

The study sought to establish the effect of business advisory services on performance of firms sponsored by university business incubators in Kenya. Business advisory



services had a positive significant relationship on the performance of the firms. The average mean of 3.81 for the items of the variable indicates that the business advisory services offered by the UBIs to the incubates were significant in the performance of their firms. Financial management services had the highest score at 26.5% although link to financial services providers scored a low of 10.6%. Bookkeeping and records management which is also an essential requirement in running of business affairs had the lowest score of 7.3%. The Bivariate analysis indicated that one unit increase of business advisory services offered by UBIs would lead to an increase in the performance of the firms by 0.87 units. The  $R^2$  (R squared) value of 66.7% indicates that the total variation in performance of firms is explained by business advisory services. The acquired managerial skills had a significant mediating effect on the relationship between business advisory services and performance of firms sponsored by university business incubators in Kenya.

### **5.2.2 Business Networking Services**

The second objective was to find out how business networking services affect performance of firms sponsored by university business incubators in Kenya. The study found out that business networking services had a positive significant relationship on the performance of the firms under study. The average mean of 4.258 indicates that the networking services offered by UBIs highly influenced the performance of the firms. Shared common services which is a major characteristic of business incubation program had the highest mean of 4.7. Access to business experts scored the lowest at 3.933 which is crucial for any business development and growth at embryonic stage. The  $R^2$  (R squared) value of 85.7% indicates that the variation in performance of the firms studied can be explained by business networking services.  $\beta = 0.81$  implies that one unit increase in business networking services offered by UBIs would lead to an increase in performance of the firms by 0.81 units. The acquired managerial skills had a significant mediating effect on the relationship between business networking services and performance of firms sponsored by university business incubators in Kenya.

### **5.2.3 Technological Support Services**

The study further explored the effect of technological support services on performance of firms sponsored by university business incubators in Kenya. The variable items under study had an average mean score of 3.967 and had a positive significant relationship on the performance of the firms. The provision of assistance in product design had the highest mean of 4.178 with intellectual property rights lowest at 3.65. The  $R^2$  value of 72.0% indicated that variation in performance of the firms was a result of technological support services.  $\beta = 0.757$  indicates that one unit increase in technological support services offered by UBIs would cause an increase in performance of the firms by 0.757 units. Technological support services are crucial in aiding the development and growth of the firms especially in exploring creativity and innovation. The acquired managerial skills had a significant mediating effect on the relationship between technological support services and performance of firms sponsored by university business incubators in Kenya.

### **5.2.4 Technology Transfer Services**

The study sought to find out how technology transfer services affects performance of firms sponsored by university business incubators in Kenya. The study found out that technology transfer services offered by the UBIs had a positive significant relationship on the performance of the firms under study. On an average of 3.99, respondents agreed that technology transfer services offered by the UBIs influenced the performance of their firms. The UBIs offered reliable strategic partnerships which was rated the highest with a mean of 4.14 and preservation of property rights the lowest with a mean of 3.73. The  $R^2$  (R squared) value indicated that 77.9% of the variation in performance of the firms was a result of technology transfer services offered by the UBIs.  $\beta = 0.721$  which implies that one unit increase in technology transfer services would cause an increase in performance of the firms by 0.721 units. The acquired managerial skills had a negative significant mediating effect on the relationship between technology transfer services and performance of firms sponsored by university business incubators in Kenya. This implies a negative influence on the performance of the firms.

### **5.2.5 Commercialization of Innovation Skills**

The fifth objective of the study was to establish the effect of commercialization of innovation skills on performance of firms sponsored by university business incubators in Kenya. The items under study had an average mean of 4.01 with idea alignment with the target market scoring the highest at 4.18 and link to relevant trading license issuers lowest at 3.87. The  $R^2$  (R squared) value of 68.1% indicates that the variation in performance of the firms under study was a result of commercialization of innovation skills offered by the UBIs. The Bivariate analysis showed  $\beta = 0.863$  and  $p = 0.000$  implying that one unit increase in commercialization of innovation skills offered by the UBIs would increase the performance of the firms by 0.863 units. The acquired managerial skills had a significant mediating effect on the relationship between commercialization of innovation skills and performance of firms sponsored by university business incubators in Kenya.

### **5.2.6 The mediating Managerial Skills**

The study further determined the mediating effect of the acquired managerial skills on the relationship between strategic business incubation variables and performance of firms sponsored by university business incubators in Kenya. Overall, the items under study had a mean of 4.2181 whereby ability to make careful decisions scored the lowest at 3.9934, followed by implementation of business processes at 4.1248, effective communication at 4.1521, teamwork spirit at 4.1589, delegating effect at 4.1800, goal setting at 4.3333 and being at par with global trends highest at 4.3426. The study found that the acquired managerial skills had a significant mediating effect on the relationship between the five variables under strategic business services and performance of firms sponsored by university business incubators in Kenya. The variables under study were business advisory, networking, technological support, transfer services and commercialization of innovation skills.

## **5.3 Conclusion**

The study made several conclusions based on the research findings. Data analysis was organized as per research objectives and hypotheses which were statistically

tested. The general objective of the study was to examine the effect of strategic business services on the performance of firms sponsored by university business incubators in Kenya.

The first objective was to establish the effect of business advisory services on performance of firms sponsored by university business incubators in Kenya. The study concludes that business advisory services offered by university business incubators throughout the incubation period were statistically a significant factor in relation to the performance of the firms. Frequently mentioned services include business training programs, business planning, and firms business consulting, financing, and presentation skills. Therefore, it is highly advisable that business incubation and innovation centres scale up advisory services that they offer so as to ensure sustainable success and growth level of firms upon exit due to its contribution towards their development and growth.

The second objective sought to find out how business networking services affect performance of firms sponsored by university business incubators in Kenya. The study concludes that business networking services offered by university business incubators had a statistically significant relationship on the performance of the firms. Business networking had the highest statistically significant performance upon multiple regression with advisory, technological support, technology transfer services and commercialization of innovation skills. In this regard, UBIs whose main goal is to produce sustainable firms should maximize their efforts in provision of excellent business networking services improving on access to business experts in various fields which had the lowest mean score.

The third objective explored the effect of technological support services on performance of firms sponsored by university business incubators in Kenya. The study concludes that technological support services offered by university business incubators throughout the incubation period were statistically a significant factor in relation to the performance of the firms. Promoting a culture of technology innovation is vital not only to research and development considerations but also investment policies, education, market dynamics, and strategic public-private

partnerships. Therefore, university business incubators must be seen as part of the innovation system and promoters of innovative projects.

The fourth objective aimed to find out how technology transfer services affects performance of firms sponsored by university business incubators in Kenya. The study concludes that technology transfer services offered by university business incubators were statistically a significant factor in relation to the performance of the firms under study. Universities being major sponsors of technology transfer programs must endeavour to extend their basic mission of teaching, generating new knowledge and service to the society by retaining all the knowledge transferred to the client firms who are the recipients in this study.

The fifth objective sought to establish the effect of commercialization of innovation skills on performance of firms sponsored by university business incubators in Kenya. The study concludes that commercialization of innovation skills offered by university business incubators were statistically a significant factor in relation to the performance of the firms studied. In this regard, university based incubators play a significant role in connections with marketing channels to bridge the challenge faced by client firms whereby they benefit from the readily available talent, research, and infrastructure.

The sixth objective was to determine the mediating effect of the managerial skills on the relationship between strategic business services and performance of firms sponsored by university business incubators in Kenya. The study found a significant mediating effect on the relationship implying partial mediation. Based on the descriptive findings of this study, the means of the items on the questions were relatively high as highlighted by owners and or directors of the firms which in return would accelerate their development and growth hence increasing rate of success upon exit from the UBIs. Therefore, university sponsored business incubators play a crucial role towards elevation of client firms to sustainable organizations.

## **5.4 Knowledge Gained**

### **Contribution of the Study to Theory**

The study observed that strategic business services had a significant effect on performance of the firms sponsored by university business incubators in Kenya. The study compliments with the theories reviewed in this study underpinning strategic services offered by university business incubators (UBIs).

### **Contribution of the Study to the Existing Knowledge**

In conclusion, the findings of the study affirm that university business incubators offer business advisory, networking, technological support, and technology transfer services and commercialization of innovation skills simultaneously throughout the incubation period. These strategic services aim to equip the founders or owners or directors with necessary skills which are of paramount importance in smooth running of client firms so as to ensure maximum success rate in the post incubation process. In this regard, it is evident that there is a positive relationship between strategic business services and performance of firms sponsored by university business incubators in Kenya.

The multiple regression analysis indicated that 88.8% of variation of performance of firms sponsored by university business incubators in Kenya is explained by the variables under study. The findings from a Kenyan perspective add to the existing literature globally that 75% of incubated business firms survive upon exit from the incubation and innovation centres. The introduction of the acquired managerial skills as a mediating variable on the relationship between strategic business services and performance of the firms under study is another critical element. The mediating effect of the acquired managerial skills had a significant effect which definitely influences the growth and development of firms increasing their sustainable success rates since management skills plays a crucial supportive leadership role.

## **5.5 Recommendations**

Based on the findings of the study, multiple regression revealed that commercialization of innovation skills offered by university incubators (UBIs) rated low despite being a critical requirement in determination of the success of performance of the firms under study. The researcher recommends that UBIs management relook at strategic ways of connecting graduate incubates with relevant marketing channels so as to successfully launch their products to their targeted markets.

From the findings of the study, support to acquire intellectual property rights and post incubation services as offered by the incubation centres scored the lowest means at 3.6 and 3.7 respectively. It is highly recommended that respective university business incubation management seek ways on how to assist the resident client incubates in these areas. It is paramount that the source of the knowledge retains it as it is transferred to the recipients to avoid its destruction ensuring development and growth hence high rate of survival during post incubation period.

The mediating effect of the acquired managerial skills had a significant effect on the performance of the firms sponsored by university business incubators. It is recommended that business incubators management offer more of management skills capacity building since not all incubates get a chance to acquire this in their different study fields. This would be in areas of technical, conceptual and interpersonal/human skills so as to ensure sustainability of these firms which are still at embryonic development stages.

## **5.6 Areas for Further Research**

The general objective of the study was to examine the effect of strategic business services on the performance of firms sponsored by university business incubators in Kenya. The researcher highly recommends further research on the performance of these firms upon exit from the university business incubation centres. It is also recommended to find out what happens to the dormant graduate incubates who do not commercialize their successfully incubated innovative ideas.

It is vital to carry out a research on the interrelationship between university business incubators and the Triple Helix model characteristics.

It is also recommended to carry out research on why majority of the chartered universities in Kenya have not yet established business incubators. This is on the premise that as institutions of higher learning, they are knowledge banks and should be on the front line in facilitating the knowledge transfer and commercialization hence promoting university-industry interaction.

It is highly recommended that further research be carried out to find out the extent to which the government policy on incubation contributes towards successful development and growth of firms sponsored by university business incubators in Kenya.



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**APPENDICES**

**Appendix I: Letter of Introduction**

Date.....

To.....

.....

.....

Dear Sir/Madam,

**REF: COLLECTION OF RESEARCH DATA**

My names are Zipporah Karimi Muiruri and a PhD candidate in Business Administration at The Jomo Kenyatta University of Agriculture and Technology. Currently I am carrying out a research on *Strategic Business Services and Performance of Firms Sponsored by University Business incubators in Kenya*". I am in the process of gathering data and I have identified you as one of the respondents in this study. I kindly ask you to take some time to respond to the attached questionnaire. I assure you that your responses will be treated with utmost confidentiality and will be used solely for the purpose of this study.

Thank you in advance for your time and responses.

Yours Sincerely,

Zipporah K Muiruri

HD 433-C004/ 6042/2014

## Appendix 11: Questionnaire

Firms Sponsored by University Business Incubators in Kenya

Kindly fill your responses in the space provided or tick (√) appropriately

### SECTION ONE- Demographic information

1. Name (optional).....

2. Gender: (tick)                      Male                                            Female                     

3. Age:

Below 21 years                     

21-30 years                             

31-40 years                             

41-50 years                             

Over 50 years                          

4. Level of formal Education

None                                     

Primary                                  

Secondary                              

Tertiary                                

University                              

5. Nature of firm:.....

6. Age of the firm:

0-1 year                                

1-2 years                                

2-3 years                                

Over three years

7. On a scale of 1-5, rate the level of significance the following services offered by the incubator have had on your firm? 5- Highly significant, 4- Significant, 3- Neutral, 2- least significant and 1- Not significant.

- Business Advisory Services
- Business Networking Services
- Technological Support Services
- Technology Transfer Services
- Commercialization of Innovation Skills

8. Please tick (√) as appropriate.

Statement	Strongly Agree	Agree	Neither agree Nor Disagree	Disagree	Strongly Disagree
The services i received at the incubator have been significant to my firm in terms of performance.					

## SECTION TWO- Business Advisory Services

1. Given the following statements under business advisory services, please tick (√) the services provided by the incubator.

- Financial management skills
- Business proposal writing skills
- Sales and Marketing skills
- Presentation skills
- Business counselling by business moguls

Link to financial providers

Book Keeping/ Records Management

2. Please list down any other comments.....

.....

**SECTION THREE- Business Networking Services**

Given the following statements under business networking services offered by the incubator, tick (√) as appropriate their effect on your start-up.

	Statement	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
1.	Access to business experts in various fields increased my professional business contacts.					
2.	Link to business moguls/investors increased my provision for financial support.					
3.	The incubator access to business clubs has influenced my business sustainability.					
4.	The business fairs/competitions offered by the incubator are helpful.					
5.	The shared common services provided by the incubator have helped me greatly in cutting down operational costs.					
6.	The ability to link us with specialized professional contacts is adequate.					
7.	The market information provided is helpful.					

8. Please list down any other comments

.....

.....

**SECTION FOUR- Technological Support Services**

Given the following statements under incubation technological support services, how have they influenced your start-up company? Tick (√) as appropriate.

	Statement	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
1	The services available have assisted me in designing and developing my product/s.					
2	The equipment/tools at the incubator is adequate.					
3	The support offered in product design/production is adequate.					
4	The services are well linked to the market information/needs.					
5.	Support to acquire Intellectual Property rights is sufficient.					
6.	The post incubation services are of great help.					
7	The services provided have aided prompt product/s production.					

8. Please list down any other comments

.....  
 .....

**SECTION FIVE- Technology Transfer Services**

Given the following statements on technology transfer services, state the level of impact they have had on your start-up. Tick (√) appropriately.

	Statement	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
1.	The incubator's pursuit to preserve intellectual property rights is prudent.					
2.	The incubator's effort to source for strategic partnerships is reliable.					
3.	The incubator's style of communicating innovation results to various media is prompt and timely.					
4.	The incubator's partnership with public and private organizations is effective.					
5.	The incubator's sponsorship program is commendable.					
6.	The ability to acquire real time information at the incubator for various markets is prompt.					



7 Please list down any other comments

.....  
 .....

**SECTION SIX- Commercialization of Innovation Skills**

Given the following statements on commercialization of innovation skills, how have they influenced your firm? Tick (√) appropriately.

	Statement	Strongly agree	Agree	Not sure	Disagree	Strongly Disagree
1.	The incubator link to relevant bodies assisted in obtaining necessary trading licences.					
2.	The incubator facilities helped me in designing promotional tools.					
3.	The Incubator assistance to launch my product/s is commendable.					
4.	The incubator link with various distributors is commendable.					
5.	The incubator's training on marketing helped to identify the right customers.					
6.	The incubator idea alignment procedure with the target market was prudent.					
7.	The incubator information was helpful in pricing my product/s.					

8. Please list down any other comments

.....  
 .....

**SECTION SEVEN- Managerial Skills**

Please rate the following statements on the management skills and their influence on your firm? Tick (√) as appropriate.

	Statement	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
1.	Teamwork has contributed significantly to our firm performance.					
2.	Careful decision making is key in all of our operations.					
3.	Business processes ease our day to day operations.					
4.	We always delegate duties and roles to ensure timely completion of all activities.					
5.	We emphasize on goal setting and achievement.					
6.	We are always at par with global trends through research & development.					
7.	Effective communication is our endeavour.					

8. Please list down any other comments

.....  
.....  
.....

**SECTION EIGHT- Firms Performance**

Over the 5 years period, what has been the recorded performance trend of your firm in figures.

	Indicators	2011	2012	2013	2014	2015	2016
1.	Profits						
2.	Total Assets						
3.	Total Sales						
4.	Number of additional outlets						
5.	New products						
6.	Number of Employees						
7.	Additional Capital into business						
8.	Number of clients/ customers						

9. Please list down any other comments

.....  
.....

Thank you for participating.

**Appendix 111: List of Firms sponsored by University Business Incubators in Kenya**

Name of the Firm	Contact
Strathmore University Incubation Centre	
Valuraha	wangechi@valuraha.com
Purpink	info@purpink.co.ke
V P Studio	victor@victorpeace.com
Henga Systems	joe@hengasystems.com
Magazine Reel	dmmabiria@magazinereel.com
Rosolo Safaris & Events	maundusamson@gmail.com
Jaynaz Limited	jaynazwachira@gmail.com
Hema	jemimahkiiru@gmail.com
1809 Ltd	ian.langatt@gmail.com
Onad Interactive	kennedy.nyaga@gmail.com
Kiko Software	erickwasambo@gmail.com
Study Mate	ochiengcg.gordon@gmail.com
AppBees	mbuvi.steve@gmail.com
MkulimaLeo	ingaliab@hotmail.com
Dynamic Systems	kuriandungu@gmail.com
ePrescribe	gkrugut@gmail.com
Stock-Matic	ndungu.ernest@student.jkuat.ac.ke
Kikosi Ltd	namunyaksaruni@gmail.com
Bud Code	sharcyville@gmail.com

Tichaa	allanmukhwana@gmail.com
Blue Gate Technologies Limited	jbosire@bluegate.co.ke
MxdApps	denokawawa@gmail.com
M-Safiri	ngethe@manyattarent.com
GeekLab Squad	samonkoba@gmail.com
Optination	colleowino@gmail.com
EMS (Efficient Electricity Management System)	esthermonchari@gmail.com
Herufi Africa Ltd	dan.onyango@yahoo.com
Sufuria.com	njurus@sufuria.com
Coders4Africa	daffea@gmail.com
Coders4Africa	john.adams@coders4africa.com
Tatu Creatives	masidza@tatucreatives.co.ke
Tatu Creatives	jeff@tatucreatives.co.ke
Snipers Inc	mwaupeter7@gmail.com
E Sacco	kasozitizomu@gmail.com
Suluhu Tech	joannabusoba@gmail.com
Griin	watibk@gmail.com
StartAppz Kenya	bahatibrian@gmail.com
Mkulima	patrickngare@outlook.com
Kilimo Watch	alibaskuta@gmail.com
Green Up Africa	gilwellm@gmail.com
E Vet	kimathimwobobia@gmail.com

ConviFarm/Kilimo Rahisi	njunge.josphat@gmail.com
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	kazungu61@gmail.com
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	mnmahingo@gmail.com
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	antkhaji@gmail.com
	kiokokelvin@outlook.com
Team Beacons	anne.murakaru@gmail.com
	kabugimatu@gmail.com
	odanga.masinde@gmail.com
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	dominickimg@gmail.com
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	kenn@designlabtechnologies.com
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	frankrowan2@gmail.com
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	vivian@hisaplay.co.ke
Team Lynk	ajg126@gmail.com
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	sharumach@gmail.com
Briglobe	benerd@briglobe.com
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	amayomordecai@gmail.com
Spotme	georgewayne2490@gmail.com
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	lucymwende62@gmail.com
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Legitimate Technologies	opiyo.harry@gmail.com
Pamoja Finance	joseph.mokaya@intel254.com
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	hmwawuda25@gmail.com
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	poluoch1@gmail.com
	martwamwa56@gmail.com
	wycliffeguguni@gmail.com
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	maxwellotieno.mo@gmail.com
	mosegathecha@gmail.com
Genteel Fashion	amuriuki@genteel.co.ke
	bbaliach@genteel.co.ke
	business@genteel.co.ke
Beba Handbags	migwecharlene@gmail.com
Green Connect Kenya	adede22@gmail.com
	leroy@greenpact.co.ke
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	pwachuka@gmail.com
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	bkbrainstorm@gmail.com
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	magdamemz@gmail.com
	leonjeru@gmail.com
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Ben & Johnson Co.	0723005304
Tagit Lost & Found	0727430930
Ecodoneti	0721836930
Flexiply	<a href="mailto:info@flexiply.co.ke">info@flexiply.co.ke</a>
Spennk Cleaners	0722491130
Levit	<a href="mailto:levitnudi@gmail.com">levitnudi@gmail.com</a>
Cordops Interactive	<a href="mailto:hillches@gmail.com">hillches@gmail.com</a>
Salsy Innovative	<a href="mailto:chomba@salsyinnovate.com">chomba@salsyinnovate.com</a>
Bitsoko Inc	0727866080
Leorganic Fertilizer	0795908037
Cleanstar	0729879322
Chimera IOT	0723539760

CT Finance Services	0718665048
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African Culinary	www.africaculinary.com
Aesthetic facelift	jjoan@gmail.com
Online GiftShop	onlinegiftshop@gmail.com
Student Discount Card	0203753500
Ideal Pixels	<a href="mailto:info@idealphixeld.co.ke">info@idealphixeld.co.ke</a>
Eco Hub Concept	0795836822
Zalisha Africa	info@zalishafrica.com
Flexpay	<a href="mailto:info@flexpay.com">info@flexpay.com</a>
Savika BioJiko	info@aceeslimited.org
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Pesa Track	gicheruc@gmail.com
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Chura Ltd	<a href="mailto:info@chura.co.ke">info@chura.co.ke</a>
Farm Drive	0704981897
Rockesi	info@rockesi.co.ke

Ideal animations	idealanimations@gmil.com
Jibonde Fresh	info@Jibondefresh.com
Intelligent Traffic	0774653786
ThroughPass Africa	info@throughpass.co.ke
Techxus Systems	info@techxus.co.ke
Creatix Systems	info@creatixsystems.co.ke
Telvic parking solutions	info@telvicsolutions.co.ke
Word Translation App	0705653946
Children's Ebook	chidrenEbook@gmail.com

## Appendix IV: Research Approval



**JOMO KENYATTA UNIVERSITY  
OF  
AGRICULTURE AND TECHNOLOGY  
DIRECTOR, BOARD OF POSTGRADUATE STUDIES**

P.O. BOX 62000  
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TEL: 254-067-52711/52181-4  
FAX: 254-067-52164/52030

REF: JKU/2/11/HD433-C004-6042/2014

28<sup>TH</sup> APRIL, 2017

**ZIPPORAH KARIMI MUIRURI**  
C/O NCBD  
JKUAT

Dear Ms. Karimi,


**RE: APPROVAL OF Ph.D. RESEARCH PROPOSAL AND OF SUPERVISORS**

Kindly note that your Ph.D. research proposal entitled: "STRATEGIC BUSINESS INCUBATION AND PERFORMANCE OF START-UP FIRMS SPONSORED BY UNIVERSITY INCUBATORS IN KENYA." has been approved. The following are your approved supervisors:-

1. Dr. Patrick .K. Ngugi
2. Prof. Romaus Odhiambo

  
**PROF. MATHEW KINYANJUI**  
**DIRECTOR, BOARD OF POSTGRADUATE STUDIES**

Copy to: Dean, SEPM  
/cm

  
JKUAT is ISO 9001:2008 certified  
Setting Trends in Higher Education, Research and Innovation





## Appendix V: NACOSTI Research Permit



### NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,  
2241349, 3310571, 2219420  
Fax: +254-20-318245, 318249  
Email: dg@nacosti.go.ke  
Website: www.nacosti.go.ke  
When replying please quote

9<sup>th</sup> Floor, Utalii House  
Uhuru Highway  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref. No. **NACOSTI/P/17/77966/17639**

Date: **19<sup>th</sup> June, 2017**

Zipporah Karimi Muiruri  
Jomo Kenyatta University of  
Agriculture & Technology  
P.O. Box 62000-00200  
**NAIROBI.**

#### **RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on *“Strategic business incubation and performance of start-up firms sponsored by university incubators in Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **19<sup>th</sup> June, 2018.**

You are advised to report to **the Vice Chancellors of the selected Universities, the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

  
**GODFREY P. KALERWA MSc., MBA, MKIM**  
**FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The Vice Chancellors  
Selected Universities.

The County Commissioners  
Nairobi County.

## Appendix VI: Research Ethics Letter



**JOMO KENYATTA UNIVERSITY  
OF**

**AGRICULTURE AND TECHNOLOGY**

P. O. Box 62000-00200 Nairobi, Kenya Tel 0675870225 Email:herc@jkuat.ac.ke  
Office of the Director Research, JKUAT Ethics Review Committee

REF: JKU/2/4/896B

DATE: 27<sup>TH</sup> SEPTEMBER 2017

Zipporah Karimi Muiruri,  
P. O. Box 104920-001001,  
Nairobi.  
REG. NO. HD433-C004-6042/14

**SUBJECT: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED "STRATEGIC BUSINESS INCUBATION AND PERFORMANCE OF START-UP FIRMS SPONSORED BY UNIVERSITY INCUBATORS IN KENYA"**

Reference is made to your letter dated 7<sup>th</sup> September 2017 on the above subject.

I am pleased to inform you that the JKUAT Ethics Review Committee reviewed your proposal and approved ethical clearance request during a meeting held on Monday 25<sup>th</sup> September 2017.

Validity of this ethical clearance is one year effective from 25<sup>th</sup> September 2017 to 25<sup>th</sup> September 2018. You are required to apply for renewal of ethical clearance on a yearly basis if the study is not completed at the end of the approved study period. You are expected to provide six monthly progress reports and a final report upon completion of your study.

Yours sincerely

**Dr. Patrick Mbindyo**  
**SECRETARY, JKUAT IERC**

Copy To: DVC (RPE), Chairman (JKUAT IERC)



*JKUAT is ISO 9001:2008 and 14001:2004 Certified*  
*Setting Trends in Higher Education, Research and Innovation*