

**TECHNOLOGICAL INNOVATION AND PERFORMANCE OF  
TELECOMMUNICATION COMPANIES IN KENYA**

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## DECLARATION

This Research Project is my original work, and has not been presented for any academic credit in any other academic institution.

**Signed.....**

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This Research Project has been submitted for examination with my approval as the University Supervisor.

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## **DEDICATION**

I dedicate this project to my family especially Angel Gabriella, Shamma and Shallom for their efforts and total support all through the period I was away from them studying for the successful completion of this work.

## **ACKNOWLEDGEMENT**

It is my sincere wish to acknowledge and give thanks to the almighty God for bringing me this far. My supervisor Dr. Winnie Njeru and all her team members at the University of Nairobi helped to create who I am. I also wish to acknowledge the entire school of Business for their dedicated hours to provide knowledge. I likewise extend my appreciation to my Moderator Dr. Joseph Owino for his valuable advice and guidance. I wish to recognize my research assistant Edward Kiptanui and Chang for the great support as well as for the encouragement from Ngechu.

## **ABSTRACT**

This project aimed at determining the influence of technological innovation on performance on the telecommunication companies in Kenya. The study was based on the key theories of Technological Acceptance Model (TAM) and Dynamic capabilities. To achieve the objective of the study, a descriptive study design was undertaken through a survey of all the 26 firms in the telecommunication industry using a structured questionnaire. All the firms had their headquarters in Nairobi and hence this study was entirely carried out in Nairobi city. From the study findings, it was observed that innovations had a strong positive influence on the performance of the telecommunications companies. Specifically, product innovations played a higher role of influence compared to the process innovations. It was also found that the important ingredient of training was not well budgeted for by the telecommunication companies. The study thus recommends the inculcation of higher learning institutions in the technological innovations process. It also recommends pooling of resources for improved chances of innovation while suggesting further studies in telecommunication sub sectors as well as relationships with tertiary institutions of Kenya not just in Nairobi County but on a country-wide scale.

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## **ABBREVIATIONS AND ACRONYMS**

<b>ICT</b>	Information and Communication Technology
<b>IT</b>	Information Technology
<b>R &amp; D</b>	Research and Development
<b>ROA</b>	Return on Assets
<b>ROE</b>	Return on Equity
<b>SPSS</b>	Statistical Package for Social Sciences
<b>TAM</b>	Technology Acceptance Model
<b>TRA</b>	Theory of Reasoned Actions

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

The increasing performance disparities in business has largely been caused by increasing globalization, which has resulted in previously strategic issues highlighted on the tactical or operational front. In response to market responsiveness decisions have been largely placed in the hands of market forces (Marren, 2010). Similarly, Quayum and Young (2018) observe that business responses to situations are increasingly similar and somewhat restricted. In other words, the success of an organization needs to change the frame of reference in order to have a large-scale view embraced.

The competitive environment implies that, organizations increasing their competitive advantage are capable of achieving this by inculcation of a policy on innovations. This also implies firms that do a fast tracking of their innovations are able to create jobs and opportunities for high productivity that increases the chance of competitiveness. Studies by Muller et al (2018) indicate that the slow introduction of such innovations and digital transitions have led to the decline in the performance of the IT industry. Similarly, there is a huge disruption in the IT industry due to the introduction of cloud technology as pointed out by Senyo et al (2016). There is also the government policy across the globe in which firm restructuring is mandatory to adhere to the new IT structure leading to a disruption in performance since it takes time to have all systems in place before good performance can be realized. However, Ojala (2016) has indicated that the industry will be on the upward trend if the new technologies are fully embraced and fully implemented.

This study was anchored on the theory of Dynamic Capabilities Theory as originated by Teece, Pisano and Shuen (1997). The core proposition in the theory is that capabilities to integrate through building and integrating internal or external competences will focus on addressing the environment which experiences rapid changes and hence increasing the survival of the firm in the competitive environment. This clearly indicates organizations that adequately and timely reacts to external changes need to have a multiple of various capabilities. Firms and users undergo the general 4 stages of systems usage including learning, acquiring new assets, transforming existing assets and co-specializing. Other scholars to use this theory include Quayum and Young (2018) as well as earlier on Ludwig and Pemberton (2011). This theory is well supported through the technology acceptance model (Davis, 1989) in which technology users generally act in a rational and systematic manner while deciding whether or not a specific technological application should be put to use in the workplace. This suits well with the adoption approach propagated by Rogers in the diffusion theory and hence in good support of the anchor theory. TAM has also been explained by Okafor et al (2016) to be a show that not all ease of usability translates to easy adoption. This therefore strengthens the combination of the diffusion theory and TAM model in this current study.

Locally, competition in telecommunications sector is high and only the very strong are able to survive the market. The IT industry is a very fast growing sector with Kenya's economy growth of 3.7 percent attributed to the improvements in the IT sector specifically in health, agriculture, and banking as well as government branches. Faced with challenges of high cost, system insecurity and high demand for highly skilled IT staff, the sector has however

remained in good performance as Kenya continues to be among the top IT hubs in Africa making the industry a fast growing sector (Economic Survey, 2018).

### **1.1.1 Technological Innovation**

The technological innovation concept stresses that stimulating knowledge does not guarantee sufficient capacity to induce technological change as well as economic performance. This therefore, implies that, there is a need to exploit the available knowledge opportunities. The emphasis is on the importance of individuals as sources of innovation. Other scholars including Suurs (2009) points to the technological innovation approach focusing on system dynamics. The scholar points to how innovations in technology are broadly seen as an essential component for organizations to internally embed in their processes, culture and products. Similarly, it is clear that innovativeness is key to growth strategies in entering new markets, increasing existing market share as well as providing the company with a competitive edge. On the other hand, Therrien, Doloreux & Chamberlin (2011) point out that innovation revolves around complex process related to changes specifically focusing on production functions as well as processes in which organizations will aim to retain and build upon their distinctive technological competence. This means understanding the set of resources the organization possesses while looking at the transformation through innovative capabilities. The summary of this scholarly observations is that innovations appear to be often associated with the development or application of new technologies. In other words, the new products could contain new technical features that offer new functionalities while at the same time, enhancing the level of quality for the product in the wake of new application levels.

From a different point of view, Burgelman et al (2004) have suggested that innovations simply define the capability in a given environment for a firm to exploit various technology sources of its internal capabilities then fanning out to improve on the same in order to boost performance. This then implies that the process is not very dynamic as it focuses on the increasing capacity of retaining technology resources for improvement on the future performance. Similarly, Yam et al (2004) give credence to the skillful innovations that arise due to an organization realizing the innovation strategy in earnest. This are the same views shared by Archibugi and Coco (2005) who observed that such innovations would require proper understanding of the external changes in technological environment why using great dynamism to launch such innovations at the slightest opportunity. It is also notable that Guan et al (2006) came up with similar observations but added the harnessing of management skills as a key ingredient in acquiring the best performance out of these technological innovation.

Generally, the top firms have always come up with new products through innovative processes. Typically, innovations can occur in four main categories as incremental, disruptive, architectural and radical designs (Rodgers, 2003). Incremental innovations are the commonest which involve the use of existing technologies to upgrade the performance of a specific service and this can be witnessed in Kenya through Safaricom innovations (Ojala, 2016). The disruptive form of innovation normally gets consumers either annoyed or excited at what appears to be completely a change of how things are done for example in the change from the old keypad on mobile phones to suddenly having touch screens (Muller et al, 2018). The most difficult of the innovations is the architectural since it involves the transfer of knowledge from one section to another market section in a manner

that is hard to replicate by rivals for example the use of automatic gears from the traditional manual gears by the Japanese (Atalay et al, 2013). The most creative however is the radical type which involves a complete change of how things are done in the society for example the invention by Safaricom on Mpesa was such innovation of money transfer that has radicalized the market.

### **1.1.2 Firm Performance**

Performance in organizations generally focuses on the possibility of bringing together resources that are productive in retaining the positive existence of that organization. As observed by Barney (2002), such resources include and are not limited to humans, machinery, and technology as well as capital resources. Similarly, Richard et al. (2008), noted that performance in general focuses on three specific areas including the profits and loss making aspects, the market competitiveness in the specific sector of the organization and the shareholder return or valuation as stipulated through their own definition of what constitutes good or bad performance. Another area that has come to be key in defining performance involves shareholder return in which the main focus is economic value added. Other factors need to be inculcated and this calls for shareholder view, employees, organizational partners and the general coordination of both internal and external systems (King'ori et al, 2017).

Good or bad performance is all measured in specific standards by the industry players of any given market with the assumption of fairness as pointed out by Makanga and Paul (2017). Specifically, the IT industry faces similar determinants like any other industry in terms of profitability, growth, market share, customer and employee satisfaction as well as governance and social performance. These bring in the question of competition fair and

unfair as well as predatory on the market. The Kenyan IT market is also challenged in terms of selling their products while requiring highly skilled staff to maintain or service their customer needs in timely basis.

### **1.1.3 Telecommunication Companies in Kenya**

The telecommunication industry in Kenya has always remained very innovative sector of the economy due to quick access to the global market. As pointed out by Kyengo et al (2016) the industry is known to contribute heavily to the Kenya economy in terms of GDP returns, employment opportunities as well as expanding the tax revenue limits for the country. In other words, Kenya's economy is highly anchored on the fast growing telecommunications industry since all sectors are widely connected through the telecommunications industry. Similarly, the government long term development strategy, Vision 2030 has a strong component of telecommunications as a pillar of supporting the vision (King'ori et al, 2017)

This sector is well developed and key telecommunication players include Telkom Kenya, Safaricom (formerly Vodafone), and Airtel (formerly Zain, Celtel). The key players in the industry include Safaricom and Airtel for mobile communications while Telkom still leads in the fixed line subsector. Other players in the telecommunications industry in Kenya include mobile and fixed line services as well as wide variety of internet related services, money transfer services, digital broadcasting services and national cyber security all requiring mandatory licensing from CAK. Since 2008, a more convenient system for the firms was introduced to allow completion in which competitors were allowed to have a neutral regulatory framework and thus leveling the playground for all. Similarly, the internet service providers including both the national and international contractors have to



comply with the licensing procedures of the Communications Authority of Kenya (CA) which many have complained as being too stringent and expensive to maintain. This has affected the operations of the telecommunications industry leading to the rapid expansion of some and the slow growth of others (Makanga & Paul, 2017).

The mobile market in Kenya has continually undergone strategic changes that shape other industries as well. Specifically, increases in subscriptions have been witnessed rising from 44.1million to 42.8 million in a very short period during the early periods of 2017/2018 financial year. Specifically, the leading competitor, Safaricom registered a large increase of 67 percent in their mobile phone subscriptions following upgrades to 4G technology in the previous year. On the other hand, their main rivals, Airtel Networks Limited also recorded a fair share of increase in subscriptions to 19 percent which was a clear indication of positive performance across the industry (CA, Operators' Returns 2018).

## **1.2 Research Problem**

Highly competitive innovations have remained elusive in the communications industry leading to poor performances in the industry as found by many studies (Kundu & Mor, 2017; Wachira & Ondigo, 2016). However, the ease of adopting to new innovations has remained elusive especially in the Kenyan market leading to firms lagging behind in the competitive market. New entrants and globalization are some of the challenges that have greatly affected the growth of the telecommunication sector since performance driven by IT requires quick adoption of new innovations. Other studies relating innovations and firm's performance have concluded that innovation had a significant contribution to performance of the firm (Rodgers, 2003; Mutua, 2016; Kundu & Mor, 2017). In their conclusions, the scholars mentioned the lack of proper implementation strategies by the

failing firms in which adopted innovations are matched in performance due to the training gaps as well as failure to have correct infrastructure for such new innovations. In their rush to compete firms have thus tended to have innovations into their firms without proper assessment of their contribution towards firm performance. However those pioneering the adoption of IT innovations with adequate research on their adaptability have indicated high performances.

Kundu and Mor (2017) studied the Indian IT market using a cross-sectional survey of 70 IT firms in New Delhi as well as Mumbai and concluded that employee motivation was very critical in the performance of the IT industry. Similarly, Garrison et al (2015) studied cloud computing in emerging IT firms in Central Europe covering 131 firms and concluded that the success of cloud computing as a new invention in the telecommunications industry can only be successful if well supported with industry-specific support factors. Senyo et al (2016) studied 33 firms in Ghana IT industry to establish their cloud computing capability and concluded that profit making was key in driving new innovative adoption. Similarly, Buli (2017) studied the Ethiopian SME market for innovative adoptions using descriptive research design on 94 SMEs concluding that funding and ease of use for new innovations played a key role in acceptability of such new inventions. Locally, Wachira and Ondigo (2016) have focused on banking industry concluding that commercial banks in Kenya would improve their performance if IT solutions were to be adopted. This is also the same case with Kyengo et al (2016) who earlier emphasized the use of telecommunication strategies to improve performance of IT industry in Kenya.

Studies on technological innovation mainly focused on financial markets while emphasis little on the telecommunication sector as evidenced by King'ori et al (2017) as well as

Mwangi and Kagiri (2016). The current study is therefore filling the gaps in which previous studies focused on IT and financial industries. Finally, the environment of similar studies carried out in global and regional areas present a gap to be filled by carrying out a local study. This study therefore answered the research question, “what influence the technological innovations have on performance specifically in the telecommunications industry in Kenya”.

### **1.3 Research Objective**

The objective of the study was to determine the influence of technological innovation on performance on the telecommunication companies in Kenya.

### **1.4 Value of the Study**

The body of knowledge and academia would benefit from the practical application and critique of the TAM model as well as the theory of Dynamic capability theory in the IT sector. Specifically, the study compared the constructs in the theories and compare how applicable they were in supporting or opposing them. Conclusions and recommendations on theories would be of value to other scholars prior and after this current study.

The study will also be useful to the management of telecommunication companies in enabling the formulation of plans and targeting technological innovation products effectively. The study will be beneficial to the existing management of telecommunication companies in understanding the technology challenges facing the industry and how to address the problems.

Another area of possible value addition will be in government and policy makers who could use this study in policy and law formulation specifically for telecommunication industry as

relates to technology and innovation use. The study also will be beneficial to the scholarly world in their quest to add more knowledge to the telecommunication studies. Similarly, future researchers could formulate further studies based on the recommendations of this study.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

The chapter aims to review literature related to the study from other scholars. The main focus is to review literature conducted in similar study areas. Specifically, the chapter will focus on theoretical and empirical review of the existing literature and the conceptual framework. This will link various types of technological innovations and performance of the firm to the reviewed theories.

### **2.2 Theoretical Review**

To carry out this review, the main focus will be on theories pointing to different technological innovations adopted by various firms in the telecommunication industry. Specifically, there are diffusion theory of innovation and technology acceptance theory. Both theories agree that technological innovations influences performance but are different on what need to be done to achieve optimal performance.

#### **2.2.1 The Technology Acceptance Model (TAM)**

The Technological Acceptance Model theory (TAM) has its main key points in new technology determining when and how a firm will apply such. In other words, TAM is a theoretical model that evaluates the effects of things like system characteristics on user acceptance (Davis, 1986). The main assumption of TAM is that a computer user generally acts in such a manner as to decide when and how to use new technology in the organization depending on the ease of use. Davis (1986) points to three major determinants of technology acceptance which relate to cognition and effectiveness as suggested by previous studies. The scholar first reasons through the theory of reasoned actions (TRA) and goes

ahead to imply that the very causal links between perceived usefulness, as well as ease of use together with attitude in using that specific technology combines well with behavioral intention thus seeking to synthesize technology adoption.

The key concern for the TAM model is how users come to adopt and when they can be able to make use of the new technology regardless of its viability in the performance of the firm. In other words, the perceived uses and ease of applying or using the new technology are very key in the adoption of the same leading to an examination of how top management train or ensure this adaptation (Sun & Lee, 2013). Every firm is thus faced with the dilemma of either having a few staff fully trained to have the full knowledge of the new technology or send a few individuals as champions in adopting to the rest of the firm. However, as pointed out by Garrison et al (2015) it is the usefulness that should drive adoption as it connects directly to the firm performance.

Generally, it is always explained that the readiness and willingness to resist openly the use of new technology is what we refer to as resistance to technology. Examples of common resistance to technological innovations include but is not limited to use of touch screen in mobile telephony, use of wireless receivers instead of the traditional hand held ones and the adoption of flat screens for television viewing as opposed to the traditional dome-shaped designs. According to Van de Ven (2017), other common resistances to date include failure to use projection screens as some people have stuck to the use of slides. Despite the many times that innovators and their supporters try to influence people to get to accept new technological innovations, there will always be a sense of resistance as explained in the TAM model. The key to unlocking that resistance is to measure and study people's perceptions to any given product however much good it is according to the

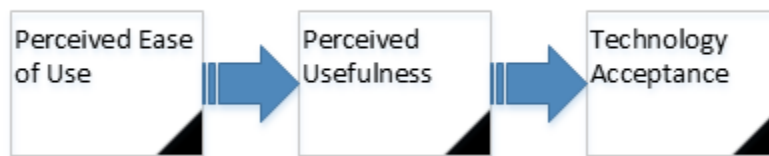
innovators. This therefore calls for heavy budgets on the side of innovators in order to fully test the market perception of the new inventions. Even then, the perceptions need to be in sync with the expected cost implications of the usage for the new innovations. It is from such surveys or research results that each innovation can stand a chance of competing in the open market with both old and new products especially in the fast growing telecommunications industry (Garrison et al, 2015)

The TAM model also puts into strong perspective the level of usefulness in which every other new user would like to have a perception that the new innovative technology is of necessary use and not just another luxurious addition by whatever company that is behind the innovations. Locally, examples abound in which new innovations go to waste even if they were expensive ventures since the perceived usage of the same by consumers was not fully analyzed. Skill levels therefore matter and hence the need to have an education system that can be an encouragement to fast adoption of useful innovative technology. It is also important to note that such barriers as social, technological and organizational can hinder the smooth acceptance of new innovative technology as observed by Rogerson (2018).

In the present world, innovations that are easy to transfer from one location to the other are highly likely to be accepted while those with multiple usages are even more likely to be acceptable especially in remote areas. These coupled with affordability can lead to a high acceptance level of new technological innovations. According to Bonham (2018), the more segmented the new innovative technology, the more likely it will be acceptable beyond the first market entry point. However the most important observation is that the users of any technology should never develop a negative attitude and hence their exposure to the

technology is very much to be measured. This reduces the risk of over-exposure that normally results into anxiety and leads to negative perception or avoidance. IN other words, some form of training is necessary especially to the key distributors of the innovative technology while the end users are supposed to have as little training as possible. This is what made acceptance of the mobile telephone very easily adaptable and has almost led to the demise of the fixed line services.

The validated TAM diagram can be summarized in the following sketch sourced from Qingxiong (2004).



**Figure 1:** Validated TAM Diagram

**Source:** Qingxiong (2004)

### 2.2.2 Theory of Dynamic Capabilities

The theory of Dynamic capabilities by Teece, Pisano and Shuen (1997) points out that the capabilities to integrate, build, and reconfigure internal and external competences to address rapidly changing environments is the key stay of an organization. In other words, organizations are expected to adequately and timely react to external changes which require a combination of multiple capabilities. There are thus a variety of characteristics of the economic environment in which adaptation taking place may affect this. This includes the speed under which the organization is capable to change, while the adoption itself may also



have feedbacks on the environment. To better understand this process, many important questions have to be answered.

In capabilities theory, the emphasis of learning and adoption of new systems is very critical in order for the firm to accept changes. The theory calls for managers and their strategic plans to be focused towards absorption of environmental changes with readiness to acquire new assets or dispose of others in order to survive the competition. Uncertainty can be diverted by leveraging the external inventions to the internal capabilities so that the firm is not left behind in the current industry developments. Qaiyum and Wang (2018) contend that in general, the focus of innovation in technology is to have information that will help minimize the uncertainty of that information for adoption. Citing the case of banking industry, the scholars have concluded that the speed at which a firm can ably adopt to new innovations is key to how customers will react. The main focus on dynamic capabilities is the ability to move forward as a unit in times of innovations instead of finding new forces to drive the firm. This means the co-specialization would involve all those in the industry through learning and good new asset adoption to adapt to the new innovations infrastructure.

### **2.3 Types of Technological Innovations**

Innovations can generally be placed into four main types including incremental, disruptive, architectural and radical innovations. Every organization can therefore have the innovations either through their own initiatives or through forced circumstances for instance the elimination of telephone booths in Kenya was forced by the rapid usage of mobile systems.

### **2.3.1 Incremental Technological Innovations**

The first type of innovation is the incremental in which an organization or firm builds on what it already has in working environment. This could simply mean increasing the value to the customer or improving on how things are done in the organization. Such innovations require simple processes to change and are easily noticeable by customers in which it is possible to have easy use of the new innovations (Van de Ven, 2017). Such innovations could involve new instructions that simplify the way items are used as well as the way new orders are made in a firm.

One of the known advantages of technological innovations is the speeding up of work in an environment. This is because, generally, new innovations come with lots of improved speed functionalities thereby improving the works and services of any given line in the firm. It would also be argued that to some extent, there are improved profits in the organization since users are normally attracted to good innovations. There is a tendency to have increased efficiency since both new and old beneficiaries of the new innovations have increased productivity.

### **2.3.2 Disruptive Technological Innovations**

Another common innovation is the disruptive type in which the market has to accommodate a type of innovation that upsets the normal way of doing things (Lui, Ngai & Lo, 2016). The normal standard for such innovation is that it would be slightly more expensive although noticeably more effective in whatever it is meant to do as compared to the present technology. A good example is the touch screen on mobile telephone sets which initially seemed inconvenient due to the price but has been slowly embraced by the market.

Another form of innovation is the architectural in which a new market receives completely new lessons and overall skills or technology but in a very receptive manner since people or customers of any given market do not like being disrupted. It is the new market that normally dictates how the new technology would work. A good example is the use of automatic vehicles in Africa and also the mobile telephone in general which initially had resistance.

There is also a tendency towards increased accessibility to information. This quick access to information resulting from technological innovations is a positive step in promoting efficiency. Users find it easy to then receive and respond to information and hence increases the overall production in the organization system.

### **2.3.3 Radical Technological Innovations**

A third form of innovation is normally taken to be very radical since it is done in a completely new way and with most industry players forced to have to adopt to this new technology. Examples include the telephone itself as well as such innovations as airplane mode of transport. There are many factors that could force the innovations to be successful including the customers, price and environment where the innovations are being applied (Bonham, 2019).

There is a strong case for the obvious improved and developed communications due to the technological innovations in which distances no longer matter. This is due to the many technological innovations that have made it possible to have reliable links over long distances

## **2.4 Empirical Review and Knowledge Gaps**

This section is concerned with the exploration of studies that have been related to the current study in terms of theories used, methodologies as well as conclusions and recommendations. Specifically these are studies from the field as opposed to readings from text books. Both global and regional studies as well local ones are reviewed.

Sun and Lee (2013) studied technological innovation on the introduction of a new product technology into a given market using cross sectional survey with a sample of 72 firms across Korea. In their findings and conclusions, the scholars noted that innovation is becoming increasingly important especially when competing in the global market. They further noted that the firms in the peripheral markets have realized that technological innovations are central to gaining a huge market share. Therefore, they should very carefully consider the type of innovation offered within each market in relation to their overall product portfolio. This was a positive relationship indicating that innovations can be beneficial if well adopted. Armbruster and Lay (2008) carried out a survey of 59 motor industry and transportation firms in Belgium using simple questionnaires and observation guides. The scholars in their findings and conclusion state that technological innovation affects the processes, routines and finally the operations of an organization. They finally emphasize that it changes and applies new processes and procedures that will initiate new products or services within the organization in the turbulent markets and environments that also influences the flexibility, speed and the quality of production. In effect, the scholars indicated that both positive and negative effects can result as a consequence of technological adaptations.

Jimenez and Sanz-Valle's (2011) studied Spanish dairy industry technological advancements through a survey of 122 firms related to the industry. The scholars used field visits and interview guides. In their findings, a positive relationship among organizational learning, innovation and firm performance was found to be strong. The scholars concluded that organizations that trained their employees on new innovations gained in performance and were less likely to suffer from redundancy cases.

Atalay et al. (2013) focused on the relationship between innovation and firm performance in Turkish automotive supplier industry. The scholars applied cluster sampling with respect to car manufacturers in 29 auto firms. In their findings, technological innovation had a significant and positive impact on firm performance. However, they also proposed that new technology should not be directly introduced in fledgling firms as it was bound to cause some disruptions. The authors also made recommendations to the effect that good innovation strategies and marketing activities are more likely to gain valuable competitive advantage only if well harnessed. They also highlighted the importance of both technological and non-technological innovation for optimum firm performance.

Akingbade (2011) studied the relationship between organizational use and ease of adoption for new technologies in Nigeria peninsular states using 39 firms. This scholar found that organizational innovation favors the development of technological innovations. Another finding was that altogether both innovation types could be key ingredients in the achievement of superior firm performance. The scholar contends that technologies can only

lead to increased productivity or improve performance when combined with other resources effectively by human resources. Similarly, the scholar found a positive relationship between technology and business activities, indicating it could be a springboard for good business performance.

Locally, there have been studies on various fronts concerning telecommunications in Kenya. Mutua (2016) studied mobile technology innovations in Kenya using cross-sectional study design with a sample of 73 firms. The scholar made findings that Kenya's "silicon savannah" was becoming the telecommunications hub in the region but that there was need to have more training opportunities to cater for the large demand of services with few well trained staff. Mutua cites the convergence of multiple factors in having a direct and indirect impact on the fast growth of telecommunications with innovations taking time to be accepted. Bett, Obura and Oginga (2018) explored the capabilities in telecommunications firms in Kenya with respect to the information systems applied using correlational survey design with a sample of 48 firms. The study applied structured questionnaires and found that information systems had a weak relationship in the improvement of telecommunications firms in Kenya. From the findings, it was also established that the telecommunications industry is driven by more factors as opposed to only information systems – IS.

From the studies in global environment, the conditions under which the telecommunication firms operate are quite different from the ones in Kenya thus creating a gap that will be filled by carrying out a local study. Similarly, whereas the regional studies in Nigeria and

South Africa have applied cross sectional designs in their methodology, this study will use descriptive design to carry out the field work. The local studies were anchored on resource based theory whereas this current study will use the dynamic capabilities theory as the anchor to the field visit.

Using the empirical studies from the previous sections, the current study has established gaps that were an inspiration to carry out a field study. The previous studies all dealt with telecommunications on case study level in which they focused on specific firm or firms. This current study was filling a gap in which all the main telecommunications firms in Kenya were surveyed. Other studies also focused on joint firm venture to solve a telecommunication problem. Again whereas most of the studies have used cross sectional research design, this current study applied descriptive study design as it is most suitable for both logistical and objective considerations.

Another area of concern for the current study was that most of the studies in the previous readings indicate a different operational environment that is most likely different from the Kenya local setting. It is clear that most of the innovations in Kenya are normally adopted from the developed countries. This study presented a chance of finding out any innovations by Kenyans in the market. Similarly, some of the theories used in the previous studies were focusing on the human culture whereas this current study chose on two unique theories including Dynamic capabilities and TAM.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter of the study project is concerned with the methodology used in designing and analyzing the data derived from the field. It includes research design, the target population, and data collection procedure as well as data analysis techniques.

### **3.2 Research Design**

The study adopted a descriptive cross-sectional research design in order to achieve the research objectives. This is a flexible and objective design for various field challenges that could arise during administration of questionnaire and data interpretation (Kothari, 2006).

The study was suitable for descriptive cross-sectional design since the phenomena to be studied involved studying the results of IT innovation as they were in the field without any influence on them at the time of the study. In so doing, the study sought to establish the prevalence of any of those specific factors in the innovation environment that relate to performance of firms. This was therefore an observational mode of study in which the innovations were as observed on the ground.

### **3.3 Population of the Study**

Kothari (2004) defines population as all objects in any field of inquiry also termed as the 'universe'. In this study, the population was all respondents in telecommunications firms in Kenya which comprise fixed telephony, mobile/cellular, mobile money transfer, postal services, courier services and internet/satellite providers. There are 26 such registered firms licensed to operate in Kenya as per the reports of Communications Authority of



Kenya (CA, 2018). The population was small enough to be fully engaged as a census exercise leading to a high response rate.

### **3.4 Sample Size and Sampling Technique**

This study as a census of the whole population sought to collect an appropriate sample from the population using convenience sampling. Cooper and Schindler (2012) recommend this method since it is possible to collect samples from the most convenient location of the study site given that the population has very similar objects. Accessibility and proximity to the researcher was very paramount in the selection of this sampling technique leading to adequate responses.

### **3.5 Data Collection**

The study collected primary data from the field. The collection of primary data was done using structured questionnaires as the main instrument. The respondents were managers of IT resources, human resource personnel, financial administrators and equivalents or marketing manager from the various departments who had a clear understanding of the various technological innovations adopted by their firms. A drop and pick method was used in administering the questionnaires. Each firm was thus targeted for those 4 respondents. A total of 104 questionnaires were distributed with a return of 94. Of the 94, there were 3 incomplete or spoilt questionnaires thus leaving 91 clean responses for analysis.

In order to ensure that the response rate was high, the study made use of direct calls to the respondents. This involved arranging for meetings and letting the respondents have a free hand in when to give back their responses. The atmosphere at the responding firms was made amicable in order to help open up in responses for the majority of the respondents by use of official introduction letter from the School of Business.

### **3.6 Data Analysis**

This study applied descriptive analysis in analyzing the data collected. The analysis was carried out using Statistical Package for Social Science (SPSS) after coding and summarizing the responses from the field.

As a descriptive study, the analyzed data was presented in form of frequencies and percentages as well as mean and standard deviation. These are necessary in order to demonstrate the variances and strengths of each variable items in the study. Both tables and figures were used to present the analysis results. The final part of analysis involved comparison of the firm performance and the main independent variables and this was accomplished through the use of a regression model.

## CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

### 4.1 Introduction

This study sought to establish the influence of technological innovation on performance on the telecommunication companies in Kenya. It specifically targeted the 26 telecommunications firms in Kenya with a strong basis of both the TAM model as well as the theory of Dynamic capability theory in the IT sector. Chapter four therefore sets to provide analysis and findings from the field with a discussion of the same using scholarly articles from the literature review in the previous study sections.

### 4.2 General Demographics Background

In this section, the study focused on Part A of the questionnaire in order to establish important demographic information from the field of study.

#### 4.2.1 Response Rate

The response rate refers to the comparison between what was targeted and what numbers actually responded from the field of study as indicated in Table 4.1.

**Table 4.1 : Study response rate**

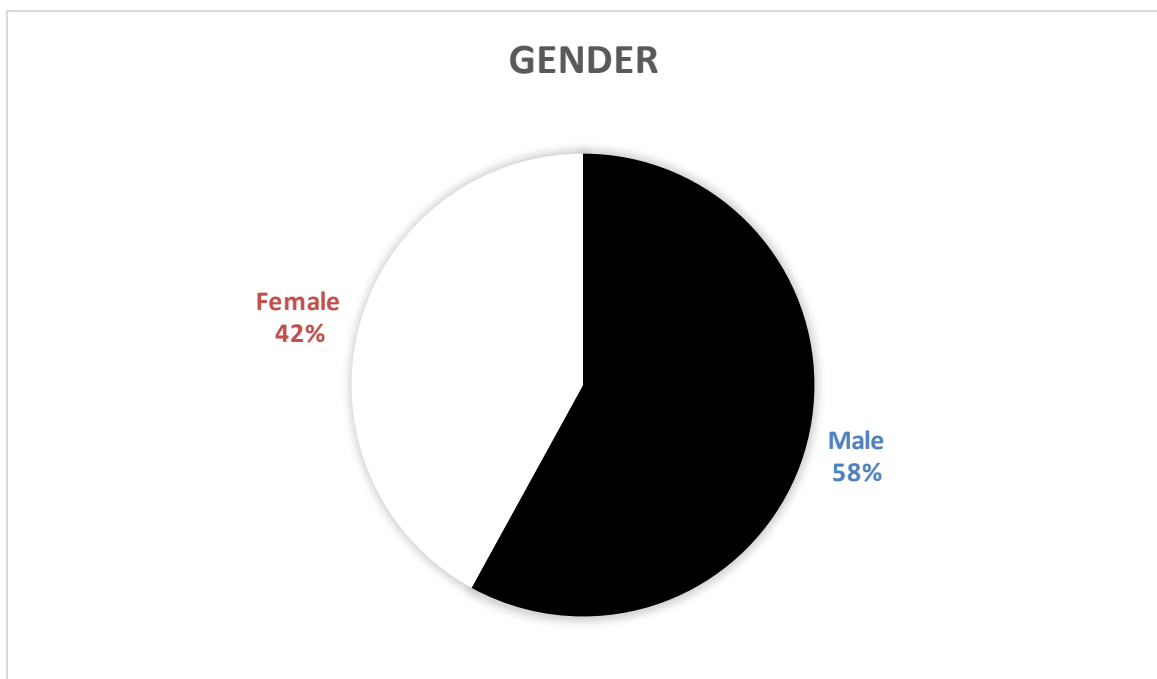
<b>Staff</b>	<b>Target</b>	<b>Actual Response</b>	<b>Percentage</b>
Management	26	22	84%
IT Departments	26	23	87%
R&D Departments	26	22	84%
Marketing Departments	26	24	93%
<b>Totals</b>	<b>104</b>	<b>91</b>	<b>87</b>

**Source:** Primary Data (2019)

As a survey of all the telecommunication companies, the study targeted top managers, IT staff, research and development as well as those in marketing departments. Each firm was thus targeted for those 4 respondents. A total of 104 questionnaires were distributed with a return of 94. Of the 94, there were 3 incomplete or spoilt questionnaires thus leaving 91 clean responses for analysis. This translates to 87 percent response rate. In accordance to statistical thresholds the response was sufficient to carry out analysis as indicated by Kothari (2011).

#### 4.2.2 Distribution of Respondents by Gender

The respondents had been asked to include their gender information as indicated in Figure 2.



**Figure 2:** Gender of Respondents

**Source:** Primary Data (2019)

The results from the field indicate that more males (58 percent) were in the industry as compared to the females (42 percent). The study was not however not affected by the

differences in the gender of the respondents, but a clear sign that innovations are supported by both the male and female professionals in the industry.

### 4.3.3 Distribution of Respondents by Academic Qualifications

In this sub section, the study focused on the highest academic level attained by the respondents. Specifically, the completed studies were put to the fore as opposed to those yet to be completed as indicated in Table 4.2

**Table 4.2: Highest Academic Qualifications**

Level	Frequency	Percentage
KCPE	6	6%
Diploma	30	33%
1 Degree	40	44%
Master's Degree and above	15	17%
<b>Totals</b>	<b>91</b>	<b>100%</b>

**Source:** Primary Data (2019)

From the results in Table 1b, the highest majority of respondents had acquired a first degree with 44 percent indicating so. This was followed by those respondents with a Diploma who had 33 percent share. There were only 17 percent respondents with a Master's degree while the least qualification was a KCPE certificate which had 6 percent of the respondents.

### 4.2.4 Distribution by Telecommunications Subsectors

In this section of demographics, the study aimed at establishing the various subsectors where the respondents were based or operation from as indicated in Table 4.3.

**Table 4.3: Telecommunications Sub-sector**

<b>Subsector</b>	<b>Frequency</b>	<b>Percentage</b>
Mobile/Cellular	54	60%
Fixed line	12	13%
Mobile money	51	56%
Courier	32	35%
Internet	57	63%
<b>Totals</b>	<b>91</b>	<b>100%</b>

**Source:** Primary Data (2019)

From the results in Table 4.3, it is noted that the figures in frequency do not add up to 91 which was the total response. This is due to several repeats in which a respondent was able to fill-in for various sub-sectors. The percentages therefore are with respect to the total 91 responses and hence does not add to 100. Majority of the respondents were into the mobile or cellular subsector with 60 percent indicating so. Similarly, most of them were in the internet or browsing sub-sector with 63 percent indicating so, while the least subsector was fixed line in which only 13 percent respondent to be in the subsector.

### **4.3 Product Innovations**

This study analysis commenced with a focus on the product innovations in the industry from which several factors were considered. The study used a Likert-Like scale with scores of 1-5. The results are presented in Table 2.

**Table 2: Product Innovations**

<b>Factors of product innovation</b>	<b>Frequency</b>	<b>Mean</b>	<b>S.Dev</b>
To what extent does product innovations increase sales	71	3.22	.213
The firm can easily adopt to new product innovations	58	2.67	.177
The new products increase competitive edge of the firm	82	3.51	.012
The innovations in the industry receiving adequate protection in terms of property rights	49	2.54	.151
There are products from new innovations	86	3.01	.224
Marketing new innovations is easy	74	2.17	.136
The firm create their own innovations	31	2.38	.114
Average score	64	2.78	.147

**Source:** Primary Data (2019)

From the results in Table 2, the frequencies can never add to the total responses of 91 since the options were inclusive enabling one to choose more than one option. The highest ranking mean value in the product innovations was 3.51 scored in the increasing competitive edge of the firm with a standard deviation of 0.012. This was followed by increasing the firm sales with mean value of 3.22 and a standard deviation of 0.213. Another factor with significant mean value was products from new innovations which recorded mean value of 3.01 and a standard deviation of 0.224. Other resulting factors did

not score highly with the lowest being that of marketing new innovations with a score of 2.17 followed by creating their own innovations which scored a mean of 2.38 and a standard deviation of 0.136. The moderate factors in the product innovations include adopting new innovations as well as receiving adequate property rights. These two had mean values of 2.67 and 2.54 respectively.

#### 4.4 Process Innovations

The next focus of the study analysis was on process innovations which is another type of innovation in the industry. This mainly concerns the way of doing things or running processes for production of goods and services by the specific firm. Results of process innovations are presented in Table 3.

**Table 3: Process Innovations**

<b>Process Innovations</b>	<b>Frequency</b>	<b>Mean</b>	<b>S.Dev</b>
Process innovations improved efficiency in performance	74	2.76	.014
Big staff attractions when new processes are innovated	83	2.01	.126
New process innovation lead to staff redundancy	91	1.81	.139
Your firm process innovations hard to replicate by rival firms	75	3.88	.005
The firm's process innovations are easily adopted	86	3.13	.031
More staff can easily work on the new processes	90	2.36	.120
The firm has not incurred heavy costs due to new processes	71	2.55	.296
The new processes cannot be easily replicated	99	1.78	.117



No redundancies following the new processes	88	3.62	.025
An expert form runs the new firm processes	95	1.52	.092
Average score	85	2.54	0.096

**Source:** Primary Data (2019)

From the results in Table 3, the highest mean of 3.88 was scored in factor of hard to replicate by rivals, implying that new process innovations were not easily replicable by rival firms. Equally high on mean value was redundancies following process innovations with a score of 3.62. Other high scores in process innovations included innovations not being easily adopted and improved performance following process innovations which had mean values of 3.13 and 2.76 respectively. Low mean values indicating low significance were scored in big staff attractions, expert firms running the new process and ease of replication with mean scores of 2.01, 1.52 and 1.78 respectively. All the mean scores had standard deviations of acceptable proportions indicating

#### **4.5 Learning and Training**

The innovation aspect go hand in hand with learning and training thus leading to the exploring of those aspects in this study. The results are presented in Table 4.4.

**Table 4.4 : Mean Scores for Learning and Training**

<b>Learning and training aspects</b>	<b>Frequency</b>	<b>Mean</b>	<b>S.Dev</b>
The firm enforce training on new innovations	84	3.01	1.101

Individual incentives to train on new innovations recognized by your firm	93	2.31	.312
Training on new innovations lead to promotions and remuneration increase	80	2.17	.201
Individual incentives to train on new innovations recognized by your firm	79	2.78	.057
The firm provide training at first adoption of innovations	80	1.77	.108
There are more training scholarships by the firm	100	1.42	.222
Trainers are well motivated for new innovative training	89	1.70	.019
The firm regularly budgets for extra training	78	1.37	.206
New trainings are always beneficial to the current work stations	90	1.76	.115
All firm departments receive some form of training	94	2.43	.038
Average Score	87	2.07	0.24

**Source:** Primary Data (2019)

Following from results in Table 4.4, the highest mean value was 3.01 scored for enforcing training on new innovations with a standard deviation of 1.01 followed by the contribution of learning towards the innovative processes with a mean score of 2.78 and a standard deviation of 0.057. However most factors in learning and training had moderate mean

scores with firm recognition and promotions as well as remuneration improvements scoring medium values of 2.31 and 2.17 respectively. The rest of learning and training aspects had below threshold scores with the lowest being regular budgeting for innovations getting a mean score value of 1.37.

In general, the results on learning and training are mainly in line with most scholars' findings from previous studies. Artalay et al (2013) found that budgeting for learning and training was negatively skewed and not in favor of regular updates for company innovations in Turkey. This was attributed to the secret nature of innovations making it hard to openly point out the budgeted amounts for such innovation trainings. Similarly, Van de Ven (2017) found that innovations are not easy to adopt even after training, recommending that staff needed motivation in order to get to use new innovations both in terms of products and processes. Other scholars that found similar observations were Okafor et al (2016) and Garrison et al (2015) who indicated that training and learning can lead to promotions and remunerations increase.

#### **4.6 Firm Performance at Telecommunications Companies**

The final variable of analysis was performance of telecommunications companies in Kenya and this was similarly analyzed using mean and standard deviation as indicated in Table 5.

**Table 5: Mean Scores for Performance**

<b>Performance factors</b>	<b>Frequency</b>	<b>Mean</b>	<b>S.Dev</b>
Innovations resulted into positive financial performance of the firm	95	2.55	.810
Innovations resulted in improved business processes that can be measured	83	3.11	.312

New innovations increased the rate of customer retentions for the firm	96	2.32	.084
Training and workshops on new innovations led to increased performance by the firm	81	2.61	1.211
Losses in financial performance can be attributed to new innovations in the industry	87	3.74	.049
There is increased customer base following new inventions	79	2.98	.420
More branches can be opened following new inventions	90	2.80	.032
Exchangeable due to the new innovations	86	1.76	.421
More branches can be opened following new inventions	98	2.42	.322
Average score	88	2.67	0.407

**Source:** Primary Data (2019)

From the results in Table 5, the highest mean value was scored at performance in the industry being attributed to the new innovations in the industry with mean value of 3.74 and a standard deviation of 0.049. This was followed by improved business that can be measured with a score of 3.11 and a standard deviation of 0.312. On the extreme end of mean scores, the lowest mean was 1.76 which was the exchangeability of innovations indicating that the ease of exchanging innovations was very low. Other aspects of performance indicated medium mean scores including increased customer base, new branch opening and improved sales. The three aspects scored mean values of 2.98, 2.80 and 2.42 respectively with standard deviations of 0.420, 0.032 and 0.322 respectively. This

is an indication that the introduction of new innovations on the market will have mixed results neither totally successful nor totally a failure.

#### **4.8 Discussion of Findings**

In order to link the innovativeness and firm performance, the study discusses the findings with reference to the literature review in earlier sections. The study has found that there are staff of all levels in the industry including certificate and diploma holders as well degree holders. This is in line with both Rogerson (2018) and Ojala (2016) who observed that the telecommunications industry is highly driven by people of various academic levels since innovation is not entirely academic based. Similarly, the scholars observe that the industry which initially was male dominated is now well balanced with both females and males competing for positions in the industry. Findings from the current study established that both gender were found in the telecommunication industry thus confirming what earlier scholars had established.

The findings on product innovations are in line with what other scholars in the field of innovations have found in their studies including Rogerson (2018) and Ojala (2016). In both their studies, there was an indication that marketing new product innovations was very difficult and that in most cases, there was difficulty in securing complete property rights. Rogerson also found that there was increased competitive edge when new product innovations were on the market. Ojala on the other hand confirmed in her findings that product innovations were more likely to increase sales. Similarly, Kundu and Mor (2017) found that there was a high likelihood of attaining a competitive edge when a firm introduced product innovations that were tightly protected. This is however most likely to work in environments where there is a policy on protecting such innovations especially

over a period of time to enable the innovations reap maximum benefits from their innovations without being imitated.

Product innovations as found by Muller et al (2018) was dominated by heavy competition and issues of property rights management. Equally, the question of marketing keeps cropping up in the findings of previous scholars. Wachira and Ondigo (2016) found that the marketing efforts for new innovations were very demanding and that most firms do not get the right mix of marketing to advance the case for their innovations. This is implied that the majority of innovations do not have adequate marketing resources and also lack the necessary market to prosper. However, it can also be interpreted that the economy of any country plays a role in product innovations since people cannot easily switch to new innovations if at all they cannot use the current products due to costs or other factors.

The industry reports indicate that firms are very competitive yet there is always one firm that is leading in the industry especially on innovations. This is for example, Safaricom in Kenya whose innovations continually drive the market as opposed to the rival firms. Studies by Buli (2017) established that the best markets if not influenced by politics are driven by technological innovations and high level marketing. These two factors in the current study were also found to have a significant relationship. The implication therefore is that the more innovations there are, the more competitive firms will be and this can only be maintained if there are adequate property rights to shield the innovators from unfair competition. The theory of TAM is clearly demonstrated in the field findings since there is some resistance and a slow acceptance of the new innovations which is a sign of step by step acceptance as described by Qaiyum and Wang (2018).

The results of process innovations both support and oppose the findings from other studies of similar nature review in empirical section. Buli (2017) found that new processes can actually lead to staff redundancies while at the same time, most of the new processes are best handled by an expert firm that normally gets contracted by the company. Other scholars including Kundu and Mor (2017) found the Indian market to easily replicate the process innovations leading to very high rivalries on the Indian market. However, there are other studies that have similar findings in line with the current study. Mutua (2016) and Bonham (2019) both found that process innovations were hard to replicate by rival firms. They also found that processes are innovated with performance improvement plans and this would inevitably lead to some staff being redundant.

Process innovations also drive the performance of the telecommunications industry in a way as findings indicate the specific factors that play a major role while others also play minor roles. Even though they are more subtle than the product innovations, they play a very critical role. As pointed out by Bonham (2019), the process innovations that industry uses to change business environment are always well guarded as they at times represent a large percentage of the survival of that firm, giving examples of global firms like Coca Cola and Unilever as classic examples of process innovators that have always stayed ahead of the competition.

The key ingredient in their stability also lies in the strong property rights or preservation of patents that have been secured as well as being respected world- wide. It is important to note that apart from the protection, the technological advancement of making the processes difficult to replicate also plays a key role. Muller et al (2018) emphasizes on the need to have daring or risky adventures in order to make head way in the world of

innovations. In other words, there is a suggestion that the firms that are risk-averse will not be competitive even if they remain in business. This then calls for good learning and training plans in order to have companies ready for innovative changes as well as aggressive marketing that can retain the position of the firm on the market once the process innovations are introduced in the firm. Garrison et al (2015) emphasizes on the need to have adequate budgets for harnessing innovative environments that are sustainable. The scholars also support retraining and learning instead of the dreaded redundancies that result in case of new process innovations. If all factors are held constant, the regression model as pointed out by other scholars including Muller et al (2017) and Lui et al (2016) supports the relationship between technological innovations and firm performance. This also confirms a strong link between innovations and performance as earlier found in studies by Van de Ven (2017), Kundu and Mor (2017) and Kyengo et al (2016).



## **CHAPTER FIVE: SUMMARY, CONCLUSION & RECOMMENDATIONS**

### **5.1 Introduction**

In the final chapter of this thesis, the focus of the study is to give a summary of the findings, conclusions and recommendations resulting from the conclusions. The section will attempt to give each of the subsections as per the study objectives. The chapter will also provide an insight in to the limitations encountered and also provide suggestions for further reading or study.

### **5.2 Summary of Findings**

In this study, the main objective was to determine the influence of technological innovation on performance on the telecommunication companies in Kenya. As such, all the visited firms were found to be practicing or had implemented most of the technological innovations in the market but to a varying extend. Specifically, there were three innovation related categories of findings.

Product innovations were found to have a strong influence on the performance of the Kenyan telecommunications companies with the main driving force being increased sales and having a competitive edge on the market by the firms. It was also established that the least factors in the product innovations towards performance were marketing of the new product innovations as well as property rights protection from the government authorities making it difficult to keep a monopoly of such product innovations.

In terms of process innovations, it was established that the most process innovations were easy to adopt since they are normally internally driven and that they can be very hard to

replicate by rival firms. Another major finding was that it was difficult not to have some redundancies while the new process innovations have been implemented or adopted by the companies. In terms of training and learning, it was found that most telecommunications companies did not budget heavily for learning and training. Similarly, it was found that even though the technical innovations led to forced trainings, there was no guarantee of increased remunerations or rewards even though it clearly led to increased performance. The study also found that technological innovations had hugely contributed to the success or better performance in the telecommunications companies and even led to the opening of new branches for the very successful companies.

### **5.3 Conclusion**

From the foregoing findings in the previous subsection, the study concludes that the technical innovations if well harnessed can be a strong driver of the performance of the telecommunications companies in Kenya. The study also concludes that the various process as well as product innovations have been poorly marketed leading to some companies performing well while others perform dismally under the same technological innovations due to the poor marketing decisions they make.

Kenyan telecommunication companies are therefore well versed on the technological innovations but do not make adequate implementation plans. Similarly, the Kenyan telecommunications companies have the need for technological innovations but do not put in heavy or adequate budgets for training while there appear to be no rewarding system in recognizing the technological innovations.

From the findings, it is conclusive that most telecommunications firms do not have good marketing for their innovations and that they have not budgeted well for the innovative process. This could mean that there is either lack of adequate resources to fully indulge in the innovation process or simply that the local firms do not have adequate incentives to invest in their own inventions instead preferring the ready-made stuff from other countries to the Kenyan market.

#### **5.4 Recommendations**

Arising from the previous subsector findings, these recommendations are meant for various stakeholders in the telecommunications environment. First, the government both in the central seat and the county level as the policy makers could have an enforcement of better protection for the property rights of newly introduced technological innovations. This would include protecting the innovations for some period in order to enable optimum benefits for the inventors of the said technology. There is also need to have the government protecting budding companies from the invasive technological innovations from other countries that may look cheap but which instead of improving the country's technological know-how, ends up slowing down such efforts.

Another recommendation is to the players in the telecommunications industry in the country to specifically team up in protecting their innovations especially those that are from within themselves as opposed to those that come from across the Kenyan borders. It is also recommended that telecommunication companies have rewarding systems for those who have made technological innovations or the teams that were involved in such ventures.

Finally it is recommended that the telecommunications companies make strong links with the Kenyan institutions of learning to develop strong research and development platform that are key to all technological innovations. This would then form a key reserve of technological innovators that can be relied upon to help design and maintain a steady flow of technological innovations just as it has been proved in the Asian so-called tiger nations of Taiwan, Singapore, South Korea as well as Japan.

### **5.5 Limitations of the Study**

The study could not be completed without some limitations. Specifically there was a challenge on resources for reference and financial support. This was overcome through concerted efforts visiting various library reserve sections as well as soliciting for financial resources from friends and family. The need for field work visits also meant that repeated visits required extra funds and this was sorted through more funding requests.

This study focusing on technological innovations was faced with so much secrecy since the telecommunications firms have a natural tendency to keep such issues concerning innovations totally under secret. It was through the strong introduction letter from the School of Business that a breakthrough was made to visit all the firms. Similarly, on accessing the companies, the individual respondents were normally very busy staff and to overcome this, various methods including use of telephone calls and meetings increased the response rate.

### **5.6 Suggestions for Further Research**

Having made a summary, conclusion and recommendations of the study, it is now possible to have suggestions on areas of further study. Specifically, the study suggests that more

variables should be considered in the study of technological innovations towards firm performance. Another area of study would be the relationship between the technological innovations and the designing of courses at the tertiary academic institutions of the country. It is also important to have segregated sectors of the telecommunication industry in studying technological innovations since the technologies running through them cannot be said to be fully similar.

Other scholars could also expand the scope of the study beyond Nairobi City County to measure the relationship of technological innovations. As a national study, there is need to have new regions explored on how to cope with new innovations. This would specifically focus on product innovations to establish how the various Kenyan Counties response to the technological innovations and how that affects the performance of the telecommunication industry. Such a study would help establish what a firm could improve in a specific region of Kenya in order to increase either their branch network or the overall sales volumes.

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# APPENDICES

## Appendix 1: Introductory Letter from the University of Nairobi



### UNIVERSITY OF NAIROBI SCHOOL OF BUSINESS

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Telephone: 020-8095398  
Telegrams: "Varsity", Nairobi  
Telex: 22095 Varsity

Tel: 020 8095398  
Nairobi, Kenya

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**DATE:** 29<sup>th</sup> October, 2019

#### TO WHOM IT MAY CONCERN

The bearer of this letter **Elizabeth Mudogo** of Registration Number **D61/76233/2009** is a Master of Business Administration (MBA) student of the University of Nairobi, Strategic Management option.

She is required to submit as part of her coursework assessment a research project report

We would, therefore, appreciate if you assist her by allowing her to collect data within your organization for the research.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organization on request.

Thank you.

*for*  
  
**PROF. JAMES NJIHIA**  
**DEAN, SCHOOL OF BUSINESS**



## **Appendix 2: Listed Telecommunications Companies**

List of Telecommunications Companies in Kenya as at April, 2019

<b>Telecommunications Companies in Kenya</b>
1. Safaricom
2. Airtel Kenya
3. Telkom Kenya
4. Kenya Data Networks Source -
5. Liquid telecom Kenya
6. Antco Automation & Telecommunication Ltd
7. Dansue Communication Services
8. Communications Carrier Ltd
9. Jamii Telecommunications Ltd
10. Indigo Telecom Limited
11. MTN Business
12. Fireside Group Ltd
13. Telkom Kenya - Extelcoms
14. Kenya Energy & Telecommunications
15. Wilken Telecommunication Solar
16. Adwest Communications Limited
17. Samchi Telecom
18. Masaba Services
19. Orange – Kakamega
20. Teledata technologies Ltd
21. Broadband Communication Networks Limited

22. Ericsson Kenya Limited
23. Simba Telecom
24. Telkom Plaza
25. MyISP Limited,
26. Amiran Communications

Source (Communications Authority of Kenya, 1<sup>st</sup> Quarter Report, 2019)

### Appendix 3: Questionnaire

#### SECTION A: General Information

1. Gender                      Male ( )      Female ( )

2. Highest level of qualification

KCPE                              ( )

Diploma                              ( )

Undergraduate                      ( )

Masters and above                      ( )

3. What subsector telecommunication is your firm? (Choose multiple if that is your case)

Mobile/Cellular ( )      Fixed line ( )      Mobile money ( )      Courier ( )      Internet ( )

#### SECTION B: Innovations

<b>Product Innovations</b>	No Extent (1)	Small Extent (2)	Moderate extent (3)	Great extent (4)	Very Great extent( 4)
4. To what extent does product innovations increase sales					
5. The firm can easily adopt to new product innovations					
6. The new products increase competitive edge of the firm					
7. The innovations in the industry receiving adequate protection in terms of property rights					
8. There are products from new innovations					
9. Marketing new innovations is easy					
10. The firm create their own innovations					

**SECTION C: Process Innovation**

To what extent do you agree with the following statement on process innovations?

<b>Process Innovations</b>	No Extent (1)	Small Extent (2)	Moderate extent (3)	Great extent (4)	Very Great extent (5)
11. Process innovations improved efficiency in performance					
12. Big staff attractions when new processes are innovated					
13. New process innovation lead to staff redundancy					
14. Your firm process innovations hard to replicate by rival firms					
15. The firm's process innovations are easily adopted					
16. More staff can easily work on the new processes					
17. The firm has not incurred heavy costs due to new processes					
18. The new processes cannot be easily replicated					
19. There are no redundancies following the new processes					
20. An expert form runs the new firm processes					

**Section D: Learning and Training**

To what extent do you agree with the following statements on learning and training at your firm?

<b>Learning and training</b>	No Extent (1)	Small Extent (2)	Moderate extent (3)	Great extent (4)	Very Great extent (5)
21. The firm enforce training on new innovations					
22. Individual incentives to train on new innovations recognized by your firm					

23. Training on new innovations lead to promotions and remuneration increase					
24. The firm provided training that contributed to the innovative process					
25. The firm provide training at first adoption of innovations					
26. There are more training scholarships by the firm					
27. Trainers are well motivated for new innovative training					
28. The firm regularly budgets for extra training					
29. New trainings are always beneficial to the current work stations					
30. All firm departments receive some form of training					

**Section E: Telecommunications Performance**

To what extent do you agree with the following statements on telecommunications industry?

<b>Performance</b>	Small Extent (1)	Moderate extent (2)	Great extent (3)	Very Great extent ( 4)
31. Innovations resulted into positive financial performance of the firm				
32. Innovations resulted in improved business processes that can be measured				
33. New innovations increased the rate of customer retentions for the firm				
34. Training and workshops on new innovations led to increased performance by the firm				

35. Losses in financial performance can be attributed to new innovations in the industry				
36. There is increased customer base following new inventions				
37. More branches can be opened following new inventions				
38. More products are exchangeable due to the new innovations				
39. Staff are very motivated following improved sales in new innovative products				

40. Outline any other possible innovations that could boost telecommunications industry performance

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**Thank you for participating**

**THE END**