

STRATEGIC INFORMATION TECHNOLOGY AND PERFORMANCE OF TELECOMMUNICATION FIRMS IN KENYA

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Abstract- Many Information Technology (IT) firms in Kenya face the challenges of improving the competitiveness, quantity, quality and reliability of data and voice services. Strategic IT is viewed as a key factor in ensuring these challenges are overcome. However, improving firm competitiveness is not always a guarantee to improving firm performance. It is not elaborate whether strategic IT affects firm performance and if it does affect then what the consequent effects can be. The general objective of the research was to determine the effect of strategic IT on the performance of telecommunication firms in Kenya while the specific study objectives included; to establish the effect of strategic IT penetration on performance of Telecommunication firms in Kenya, to investigate the effect of strategic IT access costs on performance of Telecommunication firms in Kenya and to examine how staff strategic IT skills affect performance of Telecommunication firms in Kenya. Task-technology fit theory, efficient structure theory and the resource-based theory were used to guide the study. Descriptive research design was used with a total population of 144 respondents comprising of managers, supervisors and team leaders from the three tier 1 telecommunication firms. Based on stratified sampling technique, the researcher selected a sample size of 44 respondents which is 30% of the total population size. The proposed study employed both secondary and primary data with questionnaires being used to collect primary data. The researcher employed two groups of experts from the ministry of Information and Communication to assess content validity. Reliability was assessed using Cronbach alpha coefficient. Data was analyzed by the regression analysis model and through the aid of SPSS while qualitative data was analyzed through Content analysis through the development of thematic frameworks for each of the open-ended questions. Presentation of analyzed data was done through statistical frequency tables and charts. Based on the study results where all the F statistic as well as the respective t statistic from the study model were significant in their respective p values, the study rejected all the null hypotheses and concluded that strategic IT penetration; strategic IT access costs and staff strategic IT skills all had a positive significant effect on performance of Telecommunication firms. the study stands to benefit the industry players through insightful competitive advantage driving strategies as well as helping scholars by partly anchoring the study on efficient structure theory. The study therefore recommends that Telecommunication firms need to come up with quality innovation capabilities necessary to drive market Penetration process, it is important for Telecommunication firms to ensure that the quality of infrastructure laid to oversee the realization of the projected benefits is firm enough (economically viable) to support the focused benefits and that firms should continually update their personnel with ICT skills through training and especially on any update made on mode operations. The study was limited to its scope but opens window for further research especially on dynamic strategies adopted by ICT firms in response to market turbulence.

Index Terms- Strategic IT, Tier 1 Telecommunication firm, Safaricom, Airtel, Telkom

I. CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

According to Black (2017), Information Technology (IT) investment in organizations increased significantly the past thirty years. This is because of the nature of the worldwide telecommunication environmental completeness which is dynamic and in need of continuous improvements and strategic information communication technologies adaptation for firms operating in such an industry to not only flourish but co-exist in the near future. In fact, firms that fail to invent or rather innovate are not only at the risk of reduced profitability but at the risk of eventual failure (Powell & Dent, 1997). IT is an important function that is applicable and succeeds at all operational and strategic functions. Its application brings with it opportunities but at the same time comes with a lot of challenges for the telecommunication sector (Orlikowski, Walsham, Jones, & DeGross, 2016). Even though the IT development process poses a lot of uncertainty, an organization will always experience some positive change. Strategic IT being an important component of

competitive advantage, telecommunication players competing for a market share will not sustain competition unless they embrace it to help them develop innovative products, systems and services. If they disregard it, there is a very big possibility that other innovative players might want to enter the industry to upset the market share of existing companies (García-Quevedo, Pellegrino, & Vivarelli, 2011). North and Varvakis (2016), noted that firms in current business environment need to be agile if they are to be innovative and competitive.

1.1.1 IT and Firm Performance

Performance of a firm can be viewed as the appraisal of established standards or indicators of efficiency or effectiveness (Soto-Acosta, Popa, & Palacios-Marqués, 2016; Storey, Keasey, Watson, & Wynarczyk, 2016). Information Technology (IT) used by telecommunication firms is aimed at developing an organization that is agile and proactive to effectively respond to the dynamic environment in order to sustain profitability. Competition, innovation and regulations are some of the factors emanating from the environment that greatly affect the firms in the industry (Letangule, Letting, & Nicholas, 2012). Intellectual assets investment is one of the key strategic tools that can enable a business to sustain growth, competitiveness and profitability in today's knowledge economy (Berry, 2000; Omollo, 2008). Information Technology (IT) is a foundation of positive performance in every economic sector world wide (Abdi & Kinyua, 2018; Achieng, 2011). It has been viewed as a stimulant of economic development and also plays a pivotal role in reduction of transactional costs a big determinant in improving productivity. By IT enhancing immediate connection for visual, voice and data, it contributes towards improvement of accuracy, enhances transparency and maximises efficiency. IT solutions also help to enhance service delivery to stakeholders like customers and suppliers (Oni & Ayo, 2010).

Bilgihan, Nusair, Okumus, and Joon-Wuk Kwun (2011), posited that improved competitive advantage status has been the major force behind the huge investments in IT since it is considered a weapon that can strategically be used to effect change in the organization positively (Schmidt, Möhring, Maier, Pietsch, & Härting, 2014; Weiss, Thorogood, & Clark, 2007). Despite of IT success in various regions and organizations, only about a third of Fortune hundred firms realized their investment potential in IT (Tiong, Cater-Steel, & Tan, 2009). A Standish Group report indicated that despite of organizations in the US investing more than two hundred and fifty five billion dollars per annum on IT projects, projects worth fifty five billion was declared failed projects (Young & Poon, 2013). This clearly shows that its not a guarantee that heavy investments must always reflect positive results and hence the need for strategic IT investment. With the dynamism in IT alot of changes are experienced and this has been considered one of the main factors contributing to project delays and budget overruns (Fang, Benamati, & Lederer, 2011). According to Jensen (2017), it is wiser and objective if organizational performance can be measured by the use of different parameters and approaches that look at different areas of an organizations operations in order to give a true picture. Kaplan (2009) argues that performance can be viewed from the following perspectives; part one-financial, part two-internal business, part three-customer, and lastly, part four-innovation and learning. Organizations use financial perspective to assess key drivers that increase financial performance. For example, cash flow, profit margin (Wadongo, Odhuno, Kambona, & Othuon, 2010). The customer perspective is customer focused measuring performance for example in terms of customer satisfaction, brand image, customer retention or loyalty. The efficiency of systems within the firm is analyzed under Internal processes whereas the ability to change or adaptation to change is the main concern of innovation and learning perspective (Kaplan & Norton, 2007; Salingay, 2012). As a strategic performance measurement model, a balanced scorecard provides key aspects of performance measurement, among them the financial aspect that can also be used as future performance drivers (Mucheru, 2008). This study will adopt the perspectives under the balanced score card to measure performance of telecommunication firms in Kenya.

1.1.2 Strategic Information Technology

Strategic IT development can well be understood by reflecting on the work of different scholarly articles. To start with, a literature review by Harun and Hashim (2017) indicates that in earlier years IT wasn't strategic in nature, it was traditionally being used for the sole purpose of reducing organizational costs by automating organizational processes. This has however changed over the years with the development of supporting infrastructures like data banks and warehouses an era referred to as data Processing era that took place in 1960's which emphasized on enhancing operational efficiency. The era was also referred to as the computerization period. They also assert that the data processing era was followed by an era which emphasized the importance of organizational effectiveness known as the management information system era. This era was developed fully during the late 1970's, and is still important to date. Organizations were able to integrate separate but interrelated information systems. This era's achievements were instrumental in laying a concrete foundation for the current era, thus the Strategic era which started in mid1980's and early 1990's with its emphasis on competitiveness, moving from reactive nature to proactive nature of business support operations (Lederer & Hannu, 1996). The interface between strategic IT adoption and operations is necessary to provide a firm with a system under which it can understand the industry or the markets based on all perspectives (Tallon & Pinsonneault, 2011). Pressure due to increased service costs and service quality concerns are forcing telecommunication firms to seek strategic IT supported competitive and innovative systems and methods that can improve the firms operations and overall performance (Joe, 2016). Firms need to strategically adopt competitive methods that will aid mobile or device and internet penetration to a wider population to ensure high access rates (Ghebregiorgis & Mihreteab, 2018). According to Parkes and Teltscher (2011) the last decade has had many changes experienced worldwide in the telecommunications industry. For example, from the year 2008 to 2010, ICT service costs reduced, High-speed internet prices reduced drastically, a trend also seen in the mobile cellular section. This trend that enhanced affordability was an advantage to consumers.

Kenya still lags behind globally in terms of IT index. This is because 2016 report from the Botswana held telecommunication indicators symposium placed the country at position 129. In Africa, it was observed that Kenya retained ninth position after Mauritius in position one, Seychelles in position two, South Africa in third position, Cape Verde in fourth, Botswana in fifth, Ghana in sixth position, Namibia in seventh position and Gabon in eighth position respectively. The country also boasts of being a leader in the east African region in terms of mobile penetration (Chesula & Kiriinya, 2018). IT investments are not a cheap venture. Firms need to have sufficient capital to manage costs of network expansions and service improvements that are declared obsolete frequently (Farrell, 2007). A company like Safaricom has a huge capital base having made 180 million dollars since 2006 according to Singh (2009), a figure which was more than triple combined profits made by competitors, and with this the company is in a position to change transmission systems and upgrade frequently to the detriment of competitors (Chesula & Kiriinya, 2018).

One of the most important resources in any industry are the employees. Staff competence and their satisfaction at work greatly influence the competitiveness of a company within its industry (Baldwin, Cave, & Lodge, 2012). A survey by Harindranath et al. (2008) in the United Kingdom revealed that many firm owner and managers untrained in IT skills and this meant that they keep relying on advice from outside consultants or supplier organizations. Confidence was affected by lack of skills and that also explained the cautiousness in strategic IT investments. Kenya educational curriculum so the incorporation of IT as a big step in promoting the reduction in digital gap and this also increase the number of qualified IT technicians (Wims & Lawler, 2007). Several factors have been identified in Kenya as the determinants of IT professional's development and their skill levels. These include: The maturity level and sophistication in a firm's IT set ups, the number of international and local large IT organizations, the size of local and international IT set ups and the small IT segment growth since they are key consumers. Retention of key experienced staff is still a big concern since if not taken care they will always seek greener pastures elsewhere (Kipkoech & Mwangangi, 2018). Another big challenge on skills development and retention has been on the issue of foreigners who do not support locals to acquire the necessary technical skills by employing foreigners in those projects. Transfer of skills is vital for the growth in the IT industry and players need to work within established government frameworks that require locals to benefit from transfer of skills by foreigners. (Arasa & Gathinji, 2014).

1.1.3 IT in the Global Context

In 2014, China mobile which had an estimated market value of two hundred and eighty billion US dollars and estimated to be the world's top telecommunication company attributes its success to the adoption of good strategic IT. Another company that attributes its success to the implementation of strategic IT is US largest telecommunications company, Verizon Communications Inc. By the year 2015 it had an estimated market value of two hundred and two billion us dollars supported by a sale weigh in which stood at one hundred and twenty-seven billion us dollars and operating in 150 countries. Its general manager attributes the company's success to adapting continuous product and service improvements through strategic information and communication technology (WechuliChesula & Iravo, 2016). IT space worldwide is now shaped by growth of smart devices which allow for smart connectivity. There utilization continues to grow. To illustrate this observation, Klein and Mayer (2011) looked at Global Mobile Consumer Survey (GMCS) for the US market by Deloitte consultancy firm and noted that in aggregate per day, the mobile users access their devices over eight billion times. This information is vital for all players in the sector who are all part of the telecommunication ecosystem. They include; network equipment and or infrastructure companies, wireless and wire line and or broadband carriers, and also the device manufacturers among other players. Telecommunications industry in Africa is seen as being among the best sectors in terms of growth speed. The industry is still experiencing increased new entrants while the existing companies are setting expansion strategies (Ghebrejorgis, Mihreteab, & Sciences, 2018). According to the IT News Africa report published in 2011, which ranked telecommunication companies based their turnover, placed MTN as the leading firm with over 176-million subscribers. The company has over the years invested millions of dollars in strategic information technology systems. Kenya's Safaricom lies at number nine in Africa (Aker & Mbiti, 2010). Rapid development has been experienced in African Countries in the use of IT. With knowledge economy taking centre stage, many institutions are embracing IT solutions as a caterlist for their business growth (Apulu & Latham, 2011). Many scholars have supported the nortion that the use of IT contributes to a large extent to the social and economic development facets of society (Avgerou & Walsham, 2017). IT application in different government, business and community organizations has increased and many are now acknowledging that it is increasing efficiency in administration and delivery of servfices (Wu, Straub, & Liang, 2015).

1.1.4 IT in the Kenyan Context

The Communications Authority of Kenya (CA) is an independent regulator which licenses and regulates telecommunications, radio communication and postal services and also ensures that the sector contributes considerably to the development of the country. The CA ensures that all Kenyans are able to access uninterrupted services offered by telecommunication firms (Wyche & Olson, 2018). During the 2016-2017 periods, the CA issued a total of 369 telecom licenses under the Unified licensing Framework (ULF). This represented a 15% increase of the telecom licensee's total number. The Authority also deregistered a total of 412 telecom licensees under the ULF and 276 licensees under the old licensing framework for being non-compliant. The licenses issued by the Authority have fixed terms that are renewable at the licensees' request. In addition, during the period a total of 236 licenses expired out of which 77 were renewed on additional license terms. Deregistration and expiry of licenses without renewal both led to a decrease in number of licensees an indication of their negative impact. Despite of the statistics, the overall Kenyan IT sector registered substantial growth

over the past years (Lodge, 2016). During financial year 2016/2017, a total of six (6) operators provided mobile telephony service, which included three MNOs namely: Safaricom Limited (Safaricom); Airtel Network Kenya Limited (Airtel); Telkom Kenya Limited (Orange) and three MVNOs namely: Sema mobile (Zioncell Kenya ltd), Equitel (Finserve Kenya ltd) and Mobile Pay Ltd (CA Annual Report 2016-2017). The total mobile telephony subscriptions stood at approximately 40.3 million. These subscriptions are distributed as follows: Safaricom (29.2 million), Airtel (6.1 million), Telkom (2.8 million), Equitel (1.8 million), Mobilepay (87,786) and Sema (263). Safaricom, has a 71.2 % market share and it's the only company trading in the securities market. Airtel, holds 17.6% of the market and the remaining market share by several other operators (Stéphane Piot, 2018). According to the CAK 2017 report, performance of the sector in terms of IT penetration is measured through mobile penetration, internet penetration and mobile average revenue per user. Mobile phone penetration in the country stood at 88 percent. The penetration rates on internet hit 112.7 percent which meant that there is continuous growth in customer base and this is bound to increase as almost half the population is still untapped and that's the market that is being targeted which at the end defines the competition in the industry. There was a growth of forty percent on the mobile average revenue per user (MARPU) in the period (2018-2013). Fixed broadband lines have also experienced a similar trend. An increase in voice (over broadband) lines has also been visible. Despite of these growth trends, the overall industry market is classified as being at the growth stage in the industry life cycle (Stéphane Piot, 2018). According to Chesula and Kiriinya (2018) data usage in Kenya has recorded rapid growth. This has been attributed to streaming services. As telecommunication firms move to broadband networks especially by embracing fiber, hence reducing mobile traffic, the usage of Wi-Fi is expected to increase. Services of unlicensed spectrum solution providers (LTE-U) as well as the spectrum efficiency technologies and (VoLTE) Voice over LTE in addition to (VoWiFi) Voice over Wi-Fi services are still considered important in-service expansion and improvements.

The government supported by the private sector contributed to the investments in the IT sector in Kenya. Vision 2030 document has incorporated strategies for IT industry growth. Konza Technology City valued at USD 14.5 billion is one of the mega projected undertaken by the government in the industry. Establishment of IT hubs across the country are also promoting information technologies absorption. iHub for example, has been successfully applied in Kenya. (Mutunga, Were, Ogada, & Management, 2018). Despite of the development in the sector, some parts of the country are still lagging behind in terms of IT infrastructure. Rural market is so much underdeveloped and most of the players within the industry are shifting focus to that market as it is observed that growth of the urban market is stagnating (Namisiko, Sakwa, Waweru, & Business, 2015). Communications Authority of Kenya has stepped up investments in high cost infrastructure to support telecom operators. A good example is the investment in National 4G network through a joint venture ship with the telecom operators. Safaricom has always been on the forefront in advancing its services and this was also replicated in the introduction of the 4G service, Telkom and Airtel launched 4G services in 2017 (Houpis, Rodriguez, Serdarević, & Ovington, 2016). A review of scholarly articles on IT established that several factors are considered key determinants in IT acceptance (Marangunić & Granić, 2015). In Kenya, cost of usage and investment, Infrastructure and use congestion are among the major impediments of IT usage (Oyelaran-Oyeyinka, 2014). Even though the importance of assessing IT investment management processes has been established by many organizations and industry regulators, there still lies difficulty in determining costs of projects, in addition, inability to control cost overruns and ineffectiveness in management of deliverables against set standards are also as a result of failure in evaluation of IT investments (Pai & Huang, 2011). Despite of this, the sector is projected to continue growing as more and more organizations in different industries embrace technology.

1.1.5 Tier 1 Telecommunication Firms in Kenya

Lodge (2016) asserts that the country has three tier 1 registered telecommunication firms. These includes; Safaricom PLC, Airtel Kenya Limited and Telkom Kenya Limited. According to the communications authority of Kenya telecommunication firm's classifications, tier 1 operators are telecommunication firms that own a network, host their own numbers and provide data and voice services. Other classifications include tier two, three and four. These operators are characterized by operating their own numbering systems and may even own some amount of network. However, in most cases they seek services of a higher tier network provider in order to effectively deliver their services. The lowest tier classification is referred to as Tier 0 operator. They are characterized by having their own systems to manage users and embrace technological innovation to avoid purchasing network access from other service providers to support their own. They however rely to a large extend the Tier one to tier four operators for delivery of services. Growth by the tier 1 players has been substantial. According to the first quarter sector statistics report of 2016/2017 from the CA, it showed that Safaricom recorded a slight increase in mobile subscription base to 29.5 million but still lost some market share to close the period with 69.1% from 71.9%. Airtel on the other hand recorded an increase in mobile subscription base and closed the period with 7.3 million subscribers and a 17.2% market share from 14.9% the previous period. (Mohamed & Atheru, 2017). Telkom Kenya just like Airtel also recorded an increase in subscriber base. This increase was due to the rebranding strategy that saw an increase in marketing activities. As at December 2017 its subscriber base stood at 3.8 million which constituted 9.0% share of the market from 8.4% the previous year. Another player, Equitel had an increase of subscribers ending up with 1.93 million but still lost some market share by 0.2% to 4.5%. A mobile money company, Tangaza, an MVNO which is owned by Mobile Pay Limited recorded a total of 89,892 subscribers up from 88,853 subscriptions in the previous quarter, with a market share of 0.2%. Lastly, Sema Mobile a company that has specialized in offering customized mobile solutions to communities recorded a drop in subscriptions leading to a negligible market share (Mohamed & Atheru, 2017). The operators have also seen an increase on the rate of internet

penetration which has been supported majorly by the installation of fiber optic cables. As at December 2017, Kenya, recorded 379 4G enabled stations, 2281 3G enabled stations and 3562 2G enabled stations (Yackee, 2014).

1.2 Statement of the problem

Kenya has experienced an increase in IT investment and use over the year. This however has also come with a lot of challenges including failures. Even though the failures are not unique to Kenya as seen in a study by Mueller-Jacobs and Tuckwell (2012) which shows that global IT failure in the year 2000 stood at 70%-86 % resulting in massive resource wastage. Over the years, many studies have been pointing out that the problem of Business Information Technology alignment is a perennial one (Luftman, Lyytinen, & Zvi, 2017). Even though a lot of progress on understanding effect of IT on performance of organizations, there are still a lot of challenges on IT business alignments. To start with, in Kenya most models used in performance assessment view the relationship between strategic IT and performance as a non-dynamic one instead of analyzing a wide array of variables and activities under which the effect of IT on performance is attained. Secondly, majority of the study models on strategic IT and performance are not based on strong theoretical foundation. Lastly, due to their static view, the models cannot be used to show how companies or firms can clearly find out the connection between application of strategic IT and performance in sectors like telecommunication. This proposed study helps to determine the effect of Strategic IT on performance of Telecommunication firms and through that help to addresses some of the weaknesses of past studies. The telecommunication industry is important and among the major contributors of growth and influencers of innovation in all other industries (Marchewka, 2014). In addition, there is an increasing uptake of modern ICT in the operations of telecommunication industry to enhance performance among staff, better management of information and satisfaction of clients (Manyika et al., 2017). Telecommunication companies use modern information, communication and technology facilities in their operations (Namusonge, Mukulu, & Mokaya, 2017).

Many IT firms in Kenya face the challenges of improving the competitiveness, quantity, quality and reliability of data and voice services. Strategic IT has played a key role in ensuring these challenges emerge out as opportunities for improving competitiveness (Weil, Mbiti, & Mweya, 2011). Muteti (2013), however, asserts that improving firm competitiveness is not always a guarantee to improving firm performance. It is not elaborate whether strategic IT affects firm performance and if it does affect then what the consequent effect can be. Mulwa (2015) identified several factors like financial resources availability, infrastructure and human resource capabilities as some factors that influence ICT adoption by county governments. The research however was not objective as the sample included members of the public who have no knowledge of county government ICT investments. In the proposed study, this weakness shall be addressed in order to get objective results that can be relied upon by researchers even outside the telecommunication field. Abubakar and Tasmin (2012) investigated the impact of IT on banks' performance and customer service delivery in Malaysia; Costar (2012) investigated the role of IT in financial institutions in Uganda; Basweti, Masese, and Ronald (2013) Researched on the impact and challenges of IT adoption in the Tanzanian banking sector. All these studies and many more have concentrated on IT, competitiveness, firm performance and competitive viability with some studies being biased to only one variable. None of those studies has touched on strategic IT and how it affects firm performance. This study sought to fill the identified gap by determining the effect of strategic IT on the performance of telecommunication firms in Kenya.

1.3 Research Objectives

1.3.1 General Objective

The main objective as developed in the background of the study was to determine the effect of strategic IT on the performance of telecommunication firms in Kenya

1.3.2 Specific Objectives

- i. To determine the effect of strategic IT penetration on performance of Telecommunication firms in Kenya.
- ii. To investigate the effect of strategic IT access costs on performance of Telecommunication firms in Kenya.
- iii. To examine how staff strategic IT skills, affect performance of Telecommunication firms in Kenya.

1.4 Research Hypotheses

H₀₁: Strategic IT penetration has no significant effect on performance of Telecommunication firms in Kenya.

H₀₂: Strategic IT access cost has no significant effect on the performance of Telecommunication firms in Kenya.

H₀₃: Staff strategic IT skills have no significant effect on performance of Telecommunication firms in Kenya.

1.5 Significance of the Study

Key beneficiaries are the public sector companies, policy makers and government institutions. The results of the study would help to determine whether to invest in strategic IT as a way of enhancing long term service delivery, efficient production and operations, or on whether strategic IT investment is a misuse and loss of money. Potential investors in the Kenyan telecommunication industry will be able to understanding IT investment factors that they have to consider in investment decision making. Researchers and academicians with an intention of further study on the IT and performance subject would find this study important in providing them with vital content of actual IT investment influencers for local investors in addition, the information from the study shall contribute to literature

that can be used by other scholars. Private investors, governments, academicians and scholars would all find this research findings an important source of knowledge for them to understand and appreciate. Lastly, the study also enriches the practice as well as theory of strategic management, IT and marketing in helping scholars realize the positive relationship between strategic IT and performance in cases where perceptions exist.

1.6 Scope of the Study

This study was limited to the telecommunication industry in Kenya and more specifically the head offices, retail shops and customer care centers of the firms within Nairobi County. The unit of analysis was based on the three tier 1 telecommunication firms according to the Communications Authority of Kenya 2018 report: Safaricom PLC, Airtel Kenya Ltd and Telkom Kenya Ltd. The research study was carried out between February 2019 and October 2019. The subject scope was to determine the effect of strategic IT on the performance of tier 1 telecommunication firms in Kenya.

1.7 Limitations of the study

The study was limited to its scope and was also affected by academic timelines which meant that the study be undertaken within a stipulated period in order to qualify for timely graduation which to some extent affected the research process. However, the researcher tried to overcome this by adhering to the revised time schedule and only considered the scope of work of each activity putting more emphasis on more demanding activities. The researcher also employed research assistants in data collection process. The researcher also foresaw a situation where some information perceived to be confidential might be difficult to access an assumption that was overcome by ensuring that there is high level of confidentiality and anonymity when it comes to response through questionnaires.

II. CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter looks at the pertinent literature relevant to strategic IT as well as performance. Under theoretical review section, three theories that help explain study area and study variables have been discussed. This is then followed by empirical literature on the various variables as well as the research topic. A conceptual framework is developed and discussed as an in-depth analysis of the dependent and independent. The other sections covered include, summary of empirical and literature review and summary of research gaps.

2.1.1 Overview of Strategic Information Technology

Strategic IT can be viewed as the application of IT to support business operations in order to gain a competitive advantage. This also means that strategic IT strategies and tactics require that resources are allocated appropriately to support the implementation of organizational strategies and hence enhance their performance (Cui, Ye, Teo, & Li, 2015). Organizations that have had success stories on application of Strategic IT boost of being IT flexible. This refers to the ability to quickly and economically adapt IT applications in order to optimally support business operations and enhance capabilities to be able to take competitive actions within an industry (Han, Wang, & Naim, 2017).

2.2 Theoretical Review

2.2.1 Resource Based Theory

The theory stipulates that the fundamental sources of organizational superior performance are mainly associated with its resource attributes and capabilities that are vulnerable though not easily copied (Peteraf & Bergen, 2003). Building competitive advantage as supported by the resource-based theory is at the core of strategic management literature (McWilliams & Siegel, 2011). The theory builds on the assumption that firms in an industry have the strategic resources distributed heterogeneously among them and there are differences which are stable over a period of time (Kozlenkova, Samaha, & Palmatier, 2014). Determinants of a firm's strategy are the competitive environment and the resources it has while at the same time, the resources and the competitive environment are affected by a firm's strategy. This interrelationship creates changes within the organizational environment that eventually new information is which leads to creation of new opportunities for learning that may result to new resources being created or developed. For competitive advantage to be sustainable, the following four factors must be considered; superior resources that are believed to be heterogeneous, imperfect resource mobility, ex post limit and ex ante limits to competition (Gamble, Thompson, & Peteraf, 2013).

Despite the positive contributions of the resource based approach, a lot of problems which stand unresolved are still present as noted by many scholars after a series of scrutinizes and assessments. Some of the criticisms are directed to the determination of unit of analysis, the condition of heterogeneity, the exogenous nature of value, the neglect of the environment and the underlying condition of non-limitability based on the behavioural assumption (Foss, 1998). This theory explains the first objective on IT penetration. Firms with more resource and capabilities can be able to apply penetration strategies that are unique to them only compared to firms that are still struggling with their resource base.

2.2.2 Efficient Structure Theory

The efficient structure hypothesis states that those firms that are more efficient than others will earn higher profits. The theory is built on two distinct approaches. The first approach being the X-efficiency hypothesis which postulates that highly efficient firms

eventually become more profitable compared to other firms because of their lower costs (Athanasoglou, Brissimis, Delis, & Money, 2008). It also indicates that firms will end up having more market share that could culminate into high levels of concentration courtesy of them being efficient. However, the approach does not show any relationship (causal) between concentration and the ultimate profitability of the firms (Athanasoglou et al., 2008). The second approach is the Scale–efficiency hypothesis which puts more emphasis on economies of scale as a determinant of profitability rather than differences in management (Rasmussen, 2010). With those economies of scale, large firms will also acquire huge market share that which may then culminate into higher concentration that will then lead to profitability. Demsetz (1973) through his proposition of the efficiency hypothesis formulated the first alternative explanation on market structure and organizational or firm performance. Applied to the telecommunication industry, then the hypothesis postulates that a telecommunication firm that is able to be efficiently run more than others in the industry gains higher profits resulting from low costs of operations. The firm shall also have or acquire huge market share. Hokroh (2013) supported the assumption by stating that efficiency differences shall consequently create industry position differences that eventually intensify concentration. This theory explains the second objective of strategic IT access costs and performance. The theory argues with regards to this variable that firms which are able to reduce costs to a great extent will emerge more profitable and hence with high performance compared to their corresponding firms with high costs and hence minimal profitability.

2.2.3 Task-Technology Fit Theory (TTF)

The TTF theory's assumption is that the capabilities of a technology is measured in terms of how much it can support the demands of a job (Goodhue & Thompson, 1995). TTF models hypothesize that IT shall be applied or used only when, the functions that the user can access fit the job or task of the user. Knowledgeable and rational users will select the methods and tools that can help them accomplish tasks with maximum benefit. IT that do not offer satisfactory benefits shall be avoided. TTF models are based on four major constructs, Technology and Task Characteristics, that jointly affect the Task-Technology Fit (third construct), which later influences the output variable like performance or usage. Individual abilities is accepted universally as an addition to the TTF model (B. Wu & Chen, 2017). Work adjustment theory supports addition of people's abilities to the TTF model which was initially derived from the Work Adjustment Theory. The theory also supports the studies in modern management information system where specific IT experiences are related to the higher utilization of that IT. This theory suggests that customers will choose those financial innovations that will help them complete the task with maximum net benefit and therefore increase the performance of Telecommunication companies (Viswanath & Xiaojung, 2010). This theory supports the third objective on IT skills and performance since it deals with how technological acquired abilities and skills matches with IT capabilities to do the job thereby influencing the overall performance realized by a firm (Goodhue & Thompson, 1995).

2.3 Empirical Review

2.3.1 Strategic IT Penetration

Pradhan, Mallik, Bagchi, and Sharma (2018), studied on ICT penetration and stock markets nexus from cross-country panel evidence using the following independent variables, ICT penetration, stock market development and per capita economic growth. They employed the panel co integration technique and based on the outcome, concluded that the variables are co integrated. Another observation was that a long run relationship existed among them. By employing the vector error correction method and granger causality technique, the study concluded that granger causality in deed existed in the long run as well as in the short run among the variables. However, the exact nature of the results varies for the selected ICT penetration indicators in use. Strategic Information technology's (SIT) penetration is based on how swift IT is able to get rooted to the grassroots. Makanyeza and Ndlovu (2016), assessed on the penetration of IT and its possible effects on export performance using the SME in the manufacturing sector in Zimbabwe as the case study. The research used a cross-sectional survey design of two hundred and forty-three firms in Harare. The study results depicted that the performance of manufacturing firms was directly related to IT penetration. Further, it was revealed that export performance prediction by IT is dimension-specific. Amid three IT dimensions used by the study, it was only the relationship building capabilities that predicted export performance significantly. The rest: marketing capabilities and market intelligence were insignificant predictors of export performance. The researchers recommended for the use of IT to be aligned with firm goals in order to yield greater performance. Oluwole and Adewale (2014) evaluated the penetration effects of IT on the commercial banks in South Africa. The study used secondary data for the period between 1990 to 2012. Orthogonal transformation approach was used to analyze data. The study employed residual cointegration regression analysis by the use of both Kao and Pedroni methods that determined the genuity of the results. The study found out that IT penetration and use increased both ROA and ROCE. Since ROA and ROCE were the determinants of performance, it can thus be concluded that IT penetration and use resulted in high performance levels among the commercial banks in South Africa. The study recommended for banks to emphasize stringent policies that enhance proper IT equipment utilization as compared to emphasis on additional investments which can be costlier to the banks.

Imalingat (2015b), investigated the effect of IT penetration and investment on performance of microfinance banks in Kenya. Descriptive research design was used with a survey of 9 microfinance banks between 2010 and 2014. Secondary data sources were used from World Bank publications and audited financial statements of these banks. The study found that IT adoption and investment directly influenced performance in a positive manner. It was recommended by the study that the microfinance banks keep investing in new technologies such as credit cards and debit cards issuance and use for them to embrace the latest innovations and inventions in the banking sector. The study recommended for further studies on the effect of IT penetration and investment in the entire banking sector

for more representative results across the industry. Another study in Kenya by Wilson, Iravo, Tirimba, and Ombui (2015) investigated the effect of IT penetration and use on the performance of logistics Firms in Nairobi County. The research collected data from 10 logistics firms. Based on the model of the research, they developed on one hand four scales each with an aggregated set of variable to be used to measure IT in company. On the other hand, company performance was measured using three developed scales. SPSS version VI was used to analyze data. The output was then presented using charts and frequency tables. The study realized a 93% response rate. 70% of the respondents were shareholders of logistics firms. The study attributed low performance of logistics firms to low adoption and use of IT since it was established that fifty percent of the firms did not embrace IT in their departments and service delivery. The study results concluded that there was a strong relationship between variables of the study and overall performance of logistic firms in Nairobi County based on the ANOVA result for all variables that was at F value of 2.729 and P value of 0.000.

2.3.2 Strategic IT Access Costs

This variable aimed at establishing whether strategic IT access costs influence performance of firms. IT investment advantages for firms is not limited to the benefits of cost reduction as there are other advantages such as innovation and invention that come with it. Investment in contemporary IT can result in enhanced conveniences such as customer access over wide range of geographical locals thereby creating networking opportunities and more opportunities of cross selling which can result in increased profitability and hence high performance (San-Jose, Iturralde, & Maseda, 2009).

Bell, Bryman, and Harley (2018), did several studies on IT subject between 1987 and 1992. One of them was undertaken between 1987 and 1991 involving 380 large firms. The results indicated that the returns per year on IT capital investments were above 50% while that of Information System (IS) labour capital was very high as well. The annual return on investment in the service area was above 60%. They also did another research study in 1988 – 1992. Using 370 large firm's data on IT spending they studied the impact of IT investment on customer surplus, productivity and profitability. The results indicated that productivity was increased by application of IT which also created substantial value for consumers. They were however unable to detect any increases in profitability as measured by ROA, ROE and Total Return. With the research returning calculated high standard errors of estimates, it meant that some firms obtained significant competitive advantages while others didn't. Despite of the outcome, insufficient data put to question the element of reliability especially in differentiating characteristics exhibited by the high performers and poor performers. It's therefore prudent that further research be undertaken that will be more firm specific and detailed about the applicability of deployed IT and its benefits as well as try to explain why IT investment is beneficial to some firms and a problem to others. Kohli, Devaraj, and Ow (2012), in their article on IT investment influence a firm's market value, noted that managers can only make informed IT investment decisions if they are able to quantify the contribution of IT on a firm's performance. Managers rely on performance evidence such as IT influence on a firm's market value and other performance indicators such as the accounting and financial performance. Through the study, they also examined the efficacy of IT's influence on firm value and also included financial performance measurements for non-publicly traded (NPT) hospitals which didn't use any market-based conventional measures. They found out from their study that influence of IT investment on the firm is more visible and statistically significant on firm value than exclusively on the accounting performance measures.

Avgerou and Walsham (2017) in their book on Information Technology Investment Planning, indicated that the justification for IT investments often rely on anticipated return on investment (ROI). Yet executives frequently struggle with how to incorporate costs and benefits that are associated with employees in the phases of adopting IT. Previous research has shown that these benefits and costs can be significant and ignoring or undervaluing them may lead to inaccurate assumptions about the true expenses and returns of the IT under consideration. This can lead to less than optimal decisions or technology choices that do not provide the anticipated yields.

Hagsten and Sabadash (2014), determined the impact of highly skilled ICT Labour on firm performance. Labour was considered as a cost to ICT as good ICT application in the work place comes with the existence of IT skilled personnel. The study collected secondary data from six European countries. The researchers built a mainstream research applying the economic theory of production in determination of various inputs and outputs' contributions. To investigate the effect of human capital on productivity, the researchers introduced an interaction, but instead of IT investments they allowed both the IT-intensive capital and generally skilled human capital to vary with IT maturity. The European countries used were: Finland, UK, France, Norway, Sweden and Denmark. The study period was between 2001 and 2009. The study established that highly skilled IT labour resulted to high firm performance. The study results were beneficial to the EU employment policy debate on skill mismatch that over time resulted to unmet IT skills' demand. Therefore, from the study results, it was concluded that for firms to meet their IT labour demands, they must be willing to invest in IT costs which in the long run results to high performance.

Onyango and Ngugi (2014), examined the effect of ICT (access cost) investment cost on performance of organizations among other variables like IT competency, organization structure, IT policy and government regulations. The top, middle- and first-line managers from Kenya Revenue Authority formed the study sample. And through a descriptive research design where questionnaires were used to collect primary data, the results indicated that ICT investment costs were critical to ICT success and had a direct influence on performance at the organization. Navimipour and Soltani (2016) in their article on relationship between measures of IT investment and facets of corporate business performance noted that results from their study showed a positive relationship between IT investments and firms output and labor productivity. Despite of that, their model was insufficient and hence there is need for it to be

improved in order to effectively and reliably measure performance effects of total IT investments. The study also suggests that the measures of IT investment have differential effects on the various measurement indicators of corporate business performance. For effective results, it would have been wiser to employ different models and research strategies to measure the IT effects on firm output performance and labor productivity and the ones to determine the IT effects on management effectiveness and strategic business performance.

2.3.3 Staff Strategic IT Skills

Several research studies have been undertaken in a bid to unveil the effect of staff strategic IT skills on performance of firms both globally and locally (Bennett & McGuinness, 2009). Forth and Mason (2006), aimed to answer the question, do IT skills shortages hamper firms' performance? The researchers used secondary data from UK enterprises' survey sources in 1999 and also post survey on the same enterprises. The study established that IT skill shortages had an indirect negative impact on performance since that resulted to deficiencies in IT adoption and post adoption IT intensity. Hagsten and Sabadash (2014), determined the impact of IT skills on firm performance in UK, Finland, France, Sweden, Norway, and Denmark (six European countries) between 2001 and 2009. The study collected secondary data from the countries in order to investigate the effect of human capital on productivity. The researchers introduced an interaction, but instead of IT investments they allowed both the IT-intensive capital and generally skilled human capital to vary with IT maturity. The study established that highly skilled IT staff resulted to high firm performance. Wachira, Muturi, and Sirma (2014) evaluated the perceived effect of IT skills on performance of licensed Saccos in Nairobi County in Kenya. A comparative survey research design was used. A census of all the 34 licensed Saccos was done. The study relied wholly on primary data which was collected by semi-structured questionnaires self administered. The study revealed that IT skills and knowledge is crucial in determination of organizational performance as high skills and knowledge of IT influenced the performance of the saccos positively. Wangai and Ngugi (2014), researched on the effect of IT skills on the performance of stock brokerage firms in Kenya. The study used stratified random sampling technique to select 387 respondents who formed the sample size. The respondents were stratified from the top, middle and first line levels of management respectively. Primary data was collected through self administered semi structured questionnaires. Descriptive research design was used. Data was analyzed by SPSS and regression analysis. The study found that the automation of IT skills affected the performance of stock brokerage firms in Kenya positively. Onyango and Ngugi (2014), through a case study of Kenya Revenue Authority investigated the influence of ICT staff skills on the performance of an organization. To achieve this, the study reviewed the following five variables; IT competency, investment cost, organization structure, IT policy and government regulations. The top, middle- and first-line management levels formed the sample of the study. The study employed a descriptive research design with questionnaires being used to collect primary data. The analysis of data was done using SPSS statistical software and presented through charts and frequency table. From the results it was evident that performance at the organization was heavily influenced by the use of competent employees with IT skills.

2.3.4 Performance of Telecommunication Firms

According to Porter (2008), performance is measured by effectiveness, efficiency and profitability. As seen from the resource based theory, in strategic management the fundamental sources of superior performance for organizations are mainly associated with the attributes of the organizations resources and capabilities which are vulnerable but not cheap to copy (J. Wu & Olk, 2014). Strategic Information and communication technology are resources that can enable organizations operate efficiently and effectively towards achieving higher profits (Porter & Heppelmann, 2014). Effectiveness is the ability to choose appropriate goals and achieve them. The main Indicator of effectiveness in an organization is satisfied customers. In telecommunication industry, effectiveness in service delivery includes reliability derived from simplicity in service delivery, speed to market and trust through transparency in operations all brought about by effective implementation of strategic IT systems like customer care management systems (Bititci et al., 2011). According to Porter (2008) the main goal of any business venture is profitability. It therefore means that it's the best indicator of an organizations business success that should be measured. Partial budgeting has been employed by organizations to enable them assess incremental changes in business and their impact on profitability before their main implementation. According to Kariuki (2009), telecommunication companies just like many other companies in different sectors have always measured their success through profitability as they always report their quarterly and annual returns to the public.

2.4 Summary of Empirical and Literature Review

Even though the research tries to look at the most important strategic IT factors influencing performance of telecommunication firms, the scope is too big and the general objective can still be achieved by a research on any one of the independent variables. It's also difficult to get correct results concerning strategic IT penetration as penetration are majorly associated with big firms yet small telecommunication industry players have contributed a lot to the issue of IT penetration. The research shall also concentrate more on mobile service providers yet the industry is more than just mobile services. However, being an area that is yet to be looked at in details by many researchers within the country, the descriptive nature of the research makes it very objective and the output will be of great benefit to the telecommunication firms, scholars and the public at large. In addition, even though many researchers have done studies on different aspects of the IT industry globally, most of them were never specific on Strategic IT effect on telecommunication industry area and yet it's one of the crucial areas that must be emphasized in strategic management of the companies. They didn't specifically analyze which IT factors were influencing performance. No study has been conducted in Kenya to find out how strategic technologies will impact the performance of Telecommunication firms.

Table 2.1: Summary of Empirical Gaps

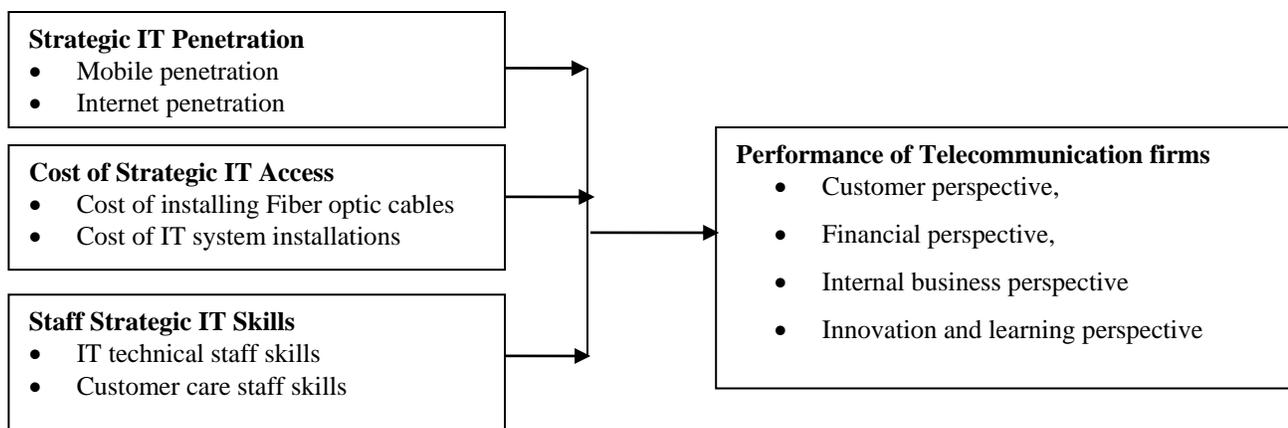
Source	Purpose	Research Gaps
Makanyeza & Ndlovu , (2016). ICT Usage and its Effect on Export Performance: Empirical Evidence from SME in the Manufacturing Sector in Zimbabwe.	Penetration of ICT and its possible effects on export performance	Looked at one aspect of performance influenced by IT which might not give a trues picture of overall company performance
Binuyo & Aregbeshola, (2014). The ICT on commercial bank performance.	Penetration of ICT on, performance	Use of secondary data alone might produced biased results as some data might also not be readily available
Imalingat, S. (2015). The effect of information and communication technology investment on financial performance of microfinance banks in Kenya. University of Nairobi.	ICT Penetration through adoption and effect on performance	Scope limited to banking sector. Need for further research to see if results can be replicated in other sectors.
Wilson, Iravo, Tirimba, & Ombui, (2015). Effect of IT on Performance of Logistic Firms in Nairobi County. <i>International Journal of Scientific and Research Publications</i> , 4(5), 241-283.	ICT penetration and use, performance	Indicators of IT penetration like mobile penetration and internet penetration not captured
Hagsten & Sabadash, (2014). <i>The Impact of Highly-skilled ICT Labour on Firm Performance: Empirical Evidence from Six European Countries.</i>	ICT labour cost, ICT Skills performance	Empirical review without adequate statistical inferences for justification
Onyango & Ngugi, (2014). Influence of information and communication technology investment on organizational performance. A case of Kenya revenue authority. <i>European Journal of Business Management</i> , 1(11), 1-17.	Effect of investment cost, and staff IT competency skills on performance	Results derived from one organization might not be objective for generalization. Not clear how investment costs are determined
Wachira, Muturi & Sirma, (2014). An Evaluation of the Perceived Effect of ICT's on the Performance of Sacco's in Kenya: Case of Licensed Sacco's. <i>Information Knowledge Management Research & Practice</i> , 4(12), 14-32.	Analyse the effect of IT skills on performance	No clear performance indicators specified Need for improved reseach model
Wangai, T., & Ngugi, K. (2014). Influence of Information Technology on Performance Of Stock Brokerage Firms in Kenya. In: Sage Publishers.	Analysis of IT skills and performance	Research not related to the telecommunication sector firms

Source: Author (2020)

2.6 Conceptual Framework

The conceptual framework in figure 2.1 below illustrates both the independent and the dependent variables of this study with their sub variables as guided by the specific objectives.

Figure 2.1: Conceptual Framework



Independent variable
Source: Author (2020)

Dependent Variable

III. CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter explains the study methodology in relation to collection and analysis of data.

3.2 Research Design

The research design that was used in this research was descriptive research design. The design was used because it describes things, character and state of affairs as they exist at a particular point in time (Dawson, 2019). A description survey was also used because it allows researchers to gather data at a particular point in time hence helping in describing the nature of existing conditions, or determines the existing relationship between specific events (Kothari, 2009). The method also deals with problems and desired objectives that are clear. In addition, the method allows for large sample data collection resulting to a more representative result. Being also essentially cross section, it allowed the researcher to use quantitative and qualitative data analysis methods to address the problem. It also provided facts and suggestions on relationship between variables and their apparent causes (Mugenda & Mugenda, 2009). The choice of the descriptive study design allowed the researcher without manipulating the study variables and analyze the state of affairs on IT performance within the telecommunication firms. The findings of this study hence can be generalized to the larger population.

3.3 Target Population

Joyner, Rouse, and Glatthorn (2018), defines population as a group of individuals, objects or items from which samples are taken for measurement. Saunders and Lewis (2012) on the other hand, defined target population as all members of real or hypothetical set of people or objects which an investigation wishes to generate results on. Based on population data presented in appendix iv, the target population of the study was composed of 144 respondents as summarized in table 3.1 comprising of managers, supervisors and team leaders within Nairobi County from the three tier 1 telecommunication firms in Kenya as per the Communication Authority of Kenya classification. The total population is calculated as per the table 3.1 below:

Table 3.1: Target Population of the Study

Telecommunication firms (strata)	Retail shop/centre managers	Retail shop/centre supervisors/ team leaders	Managers in Technology, Resources and Finance departments	Total
Safaricom (N1)	20	40	8	68
Airtel (N2)	9	9	6	24
Telkom (N3)	23	23	6	52
Totals	52	72	20	144 (N)

Source: Survey Data, (2020)

3.4 Sample and Sampling Technique

Based on judgmental sampling technique, the researcher picked a sample size which constitutes 30% of the total population size. In order to achieve a sample size (n) = 62, the researcher used proportionate stratified sampling technique to determine the number of managers to be interviewed from each stratum (telecommunication company). This sampling technique is justified by Mugenda and Mugenda (2009) who assert that a sample of 30% is significant and hence ideal for research purposes. The sample size is shown in table 3.2.

$$\begin{aligned}
 (\text{Total population size (N)}) \times (30\%) &= (\text{Sample size (n)}) \\
 144 \times 0.3 &= 43.2 \\
 n &= 44
 \end{aligned}$$

Table 3.2: Sample Size

Telecommunication firms (strata)	Retail shop/centre managers	Retail shop/centre supervisors/ team leaders	Managers in Technology, Resources and Finance departments	Total
Safaricom (N1)	6 (20x0.3)	12 (40x0.3)	2 (8x0.3)	20
Airtel (N2)	3 (9x0.3)	3 (9x0.3)	2 (6x0.3)	8
Telkom (N3)	7 (23x0.3)	7 (23x0.3)	2 (6x0.3)	16
Totals	16	22	6	44 (n)

Source: Survey Data, (2020)

3.5 Data Collection Instrument

Both primary and secondary data was used for this study. Questionnaires were administered to collect primary data. The admission was done to every member of the sample size of the study. The questionnaires adopted the Likert scale rankings for ease of understanding and clarity of presentations. Further, the questionnaires adopted a semi-structured.

3.5.1 Validity

Validity refers to the extent in to which instruments of collecting data are accurate in its intended measurements (Frankfort-Nachmias, Nachmias, & DeWaard, 2014). Mugenda and Mugenda (2009), assert that validity is the extent to which data analysis results actually represent the phenomenon being studied. There are three forms of data validity namely, construct, content and criterion-related validities (Daniel & Sam, 2015). Construct validity determines the extent to which data collected from data collection instrument accurately reflects a theoretical concept. Criterion-related validity assesses behavior of subjects in specific situations. Content validity is the extent to which the measurement device offers adequate coverage of questions being investigated as is usually assessed by experts in the field of study (Cooper & Schindler, 2014; Salkind, 2010). This study assessed content validity using two groups of experts from the ministry of Information and Communication.

3.5.2 Reliability

Daniel and Sam (2015), defined reliability as the extent to which errors contained in a measuring instrument appear inconsistently each time a given unit is measured by the same instrument. The study instrument was reviewed based on the pre-test experience by both the researcher and the research assistants. Cronbach's alpha was used a measure of internal consistency, that is, how closely related a set of items are as a group and based on recommendation of Nunnally (1978) that instruments used in research should have reliability of about 0.70 and above. If the alpha value is less than 0.7, this indicates low internal consistency of the data that implies that the questions on the instrument are either vague or not understood by the respondents and therefore the respondents are assumed to have used guesswork to complete the questions. In that regard, the questionnaire is edited to achieve desirable Cronbach's alpha.

3.6 Data Collection Procedure

A letter to facilitate data collection stage was attained from Kenyatta University. The questionnaire was self-administered where the respondents themselves complete the questionnaires without the presence of an interviewer (Frankfort-Nachmias et al., 2014). Due to the sensitive information needed for the study, self-administered questionnaires are deemed more effective than mail questionnaires because this gives assurance to respondents that their privacy is protected in that the data they provide would be handled and protected in such a way that they would not be associated with them personally (Cooper & Schindler, 2014). The researcher obtained permission to do research by seeking clearance from NACOSTI.

3.8 Analysis and Presentation of Data

Before embarking on data analysis, the returned questionnaires were checked and corrected for consistency and completeness. Both Descriptive and inferential statistics were used to highlight and explain key findings. Qualitative data was analysed by use of content analysis. Significance relationship of the variables was analysed using ANOVA method. The study used SPSS software to facilitate data Analysis. Regression model was used to analyze data. The independent and dependent variables were analyzed by the following regression equation:

$$Y = \alpha + \beta_1 A_1 + \beta_2 A_2 + \beta_3 A_3 + e$$

Y = Performance of Telecommunication firms in Kenya

α = Constant

β = Independent variables coefficients

A_1 = strategic IT Penetration

A_2 = Cost of strategic IT access cost

A_3 = Staff strategic IT skills

e = Error term

3.8.1 tests on assumptions of classical linear regression model Normality Test

The study undertook normality tests using Shapiro-wilk statistic, multicollinearity tests using variance-inflating factor (VIF), heteroscedasticity tests using Levine's test and linearity tests was done using ANOVA test of linearity in order to determine whether the data and the models meet the assumptions of the classical linear regression model.

3.8.5 Data presentation

Data that was analyzed was presented by statistical frequency tables and charts. These presentations were supported by results discussions in prose. The presentation was done in systematic order as per the order of the variable and the outline of questions in the questionnaires.

3.9 Ethical Issues

As a way of enhancing ethical standards in the study, confidentiality was of utmost importance. Questionnaires design ensured no questions that prejudice ones emotional or psychological wellbeing were captured. The design promoted anonymity. The researcher also acquired supporting letters that indicated the legality and permission of undertaking the research study from the university and also from other relevant government bodies. This instilled confidence to the respondents. Some of the letters are listed in the appendices.

IV. CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The chapter outlines the study findings presented using tables followed by discussions the findings arranged in order of objectives as outlined from chapter one.

4.1.1 Response Rate

The study targeted a sample size of 44 respondents in collecting data out of which 41 filled in and returned the questionnaires making a response rate of 93.2% as shown in Table 4.1.

Table 4.2: Response Rate

Response	Frequency	Percentage
Responded	41	93.2
Not responded	3	6.8
Total	44	100

Source: Survey Data, (2020)

According to Mugenda and Mugenda (2003) assert that response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was considered to excellent.

4.2 Diagnostic Tests

4.2.1 Reliability Results

The study sought to determine the reliability of the results. This was tested by the use of Cronbach's alpha.

Table 4.3: Reliability Analysis

Variable	Cronbach's alpha	Verdict
Strategic It Penetration	0.844	Reliable
Strategic It Access Costs	0.914	Reliable
Staff Strategic It Skills	0.764	Reliable
Performance of Telecommunication Firms	0.755	Reliable
Aggregate Score	0.819	Reliable

Source: Survey Data, (2020)

A pilot study was conducted to test the reliability and validity of the research instruments. The findings of the pilot study are as presented in Table 4.2. The results showed that strategic IT access costs had the highest reliability alpha of 0.914, followed by strategic IT penetration with a reliability alpha of 0.844, staff strategic IT skills with a reliability alpha of 0.764 and telecommunication firms 0.755, From the findings, the Cronbach's alpha of all the variables was above the threshold of 0.7 thus implying that the instrument was reliable and valid. According to Zikmund and Barin (2012) a reliability test which yields a coefficient greater than or equal to 0.7 is sufficient enough.

4.2.2 Normality test

The normality was tested using the Shapiro-Wilk test which also has power to detect departure from normality due to either skewness or kurtosis or both. If statistic ranges from zero to one and figures are higher than 0.05 there is an indication that the data is normal (Razali & Wah, 2011). Shapiro-Wilk test assesses whether data is normally distributed against hypothesis that:

H₀: Sample does not follow a normal distribution.

H_a: Sample follows a normal distribution.

When the p-value is greater than the alpha value, then one fails to reject the null hypothesis. Table 4.3 shows the results of the Shapiro-Wilk normality test.

Table 4.4: Tests of Normality

	Kolmogorov-Smirnov ^a		Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.
Strategic IT Penetration	0.127	41	0.019	0.827	41	0.001
Strategic IT Access Costs	0.121	41	0.024	0.874	41	0.002
Staff Strategic IT Skills	0.176	41	0.071	0.624	41	0.004

Lilliefors Significance Correction

Source: Survey Data, (2020)

The table shows that the distribution of data on strategic IT penetration (p-value 0.001>0.05), strategic IT access costs (p-value

0.002>0.05); and, staff strategic IT skills (p-value 0.004>0.05) are all normally distributed. Since the p value for all the variables were less than the alpha value, we reject the null hypothesis that “the sample does not follow a normal distribution”. This therefore implies that sample follows a normal distribution.

4.2.3 Heteroscedasticity

The measure of heteroscedasticity is important multivariate analysis and even though its violation may reduce the accurateness of the analysis, the effect on ungrouped data is not fatal (Tabachnick & Fidell, 2007). Levene test was used to examine the equality of variances for the variables calculated (strategic IT penetration, strategic IT access costs and, staff strategic IT skills). Regression analysis assumes that variances of the population from which different samples are drawn are equal.

Table 4.5: Test of Homogeneity of Variances

Levene Statistic	df1	df2	P-value
1.626	41	41	.003

Source: Research data, (2020)

From Table 4.4, the resulting P-value of Levene's test is below the conventional 0.05 critical value, demonstrating that the obtained differences in sample variances are probable not to have occurred based on random sampling from a population with equal variances. Thus, there is momentous difference between the variances in the population.

4.2.4 Multi Collinearity Test

Mason and Perreault (2011) explain that when there exists multicollinearity, the coefficient estimates may change erratically in response to any small changes in the model or the data. The VIF detects multi collinearity by measuring the degree to which the variance has been inflated. A VIF greater than 10 is thought to signal harmful multi collinearity as suggested by Baum (2006).

Table 4.6: Summary of Collinearity Statistics

Model	Collinearity Statistics	
	Tolerance	VIF
Strategic IT Penetration	0.748	3.728
Strategic IT Access Costs	0.628	3.436
Staff Strategic IT Skills	0.175	3.478

Source: Survey Data, (2020)

The VIF was checked in all the analysis and the outcome was not a cause for concern based on the assumptions by Baum (2012) who indicated that a VIF greater than 10 is a cause of concern. Results in Table 4.5 shows that all the variables had a variance inflation factors (VIF) of less than 10: strategic IT penetration (3.728), strategic IT access costs (3.436) and, staff strategic IT skills (3.478). This implies that there was no severe collinearity with the variables thus all the variables were maintained in the regression model.

4.3 Background Information

This section starts by analyzing the participant’s demographic information. Specifically, this study inquired information on respondent’s gender, age, job title and highest academic qualification.

4.3.1 Distribution of Respondents by Gender

Participants were required to indicate their gender category. This was sought in view of ensuring fair involvement of both genders. Results are presented in Table 4.6.

Table 4.7 Respondents by Gender Category

	Frequency	Percentage
Male	25	61.0
Female	16	39.0
Total	41	100.0

Source: Survey Data, (2020)

Based on the finding, this study concludes that there was fair involvement of participants from both genders, thus implying that the findings of this study did not suffer gender biasness.

4.3.2 Distribution of Respondents by Age

Individuals of various age groups tend to perceive and interpret subjects differently. In view of gathering opinions from these groups, respondents were required to indicate their age category. Results are presented in Table 4.7.

Table 4.8 Respondents by Age Group

Category	Frequency	Percentage
Below 30 years	7	17.1
31 to 40 years	11	26.8
41 to 50 years	12	29.3
51 to 60 years	8	19.5
Above 61 years	3	7.3
Total	41	100.0

Source: Survey Data, (2020)

The results in Table 4.2 revealed that, most of the respondents (29.3%) were aged between 41 and 50 years, 26.8% of the respondents were aged between 31 and 40 years, 29.3% of the respondents were aged between 41 and 50 years, 17.1 % of the respondents were aged below 30 years whereas 7.3% of the respondents were aged above 61 years. This implies that majority of respondents who took part in this study were aged more than 30 years. The results therefore show fair participation of respondents from different groups.

4.3.3 Job Designation

Respondents were required to indicate their job designation. Results are presented in table 4.8

Table 4.9: Job Designation

Category	Frequency	Percentage
Center Managers	6	14.63
Center Supervisors	9	21.95
Team Leaders	8	19.51
Managers in Technology	7	17.07
Resources and Finance Departments	11	26.83
Total	41	100.0

Source: Survey Data, (2020)

Results show that participants worked various positions among which include; with most working with (26.83%) resources and finance departments, 21.95% worked as center supervisors, 19.51% worked as team leaders, 17.07% worked as managers in technology while 14.3% worked as center managers. This implies that participants holding various positions were fairly involved in this study.

4.2.4 Period of Service

Employee period of service is closely related with individual understanding on organizational external and internal operations. Based on this assumption, respondents were required to indicate their period of service in their respective organizations. Results are presented in Table 4.9.

Table 4.10 Period of Service

	Frequency	Percentage
Less than 1 year	1	2.4
2 to 4 years	10	24.4
5 to 9 years	12	29.3
Over 10 years	18	43.9
Total	41	100.0

Source: Survey Data, (2020)

The study established majority of the respondents (43.9%) had served for a period of over 10 years, 29.3% of the respondents had served for a period of 5 to 9 years, and 24.4% of the respondents had served for a period of 2 to 4 years, whereas 2.4% of the respondents had served for less than 1 year. This implies that a big number of the respondents had served the organization for a considerable period of time (5 years and more) which implies that they had high levels of experience and understanding of the telecommunication companies they were working in. This depicts therefore that the respondents were in a position to respond to the survey questions regarding their organizations adequately.

4.3.4 Highest Academic Qualification

Individual educational qualifications are closely associated with ability to interpret, and solve challenges. In view of gauging the respondent's ability to respond to study subject participants were required to indicate their highest educational qualifications. From the results in table 4.10, the study established that most of the respondent (39.0%) held bachelors' education 29.3% of the respondents held college diploma education, 17.1% of the respondents held master's education and above while 14.6% of the respondents held

certificate or below as their highest level of education qualification. This indicates that all of the respondents were literate which implies that they were in a position to give comprehensible information sought by the study effortlessly.

Table 4.11: Highest Academic Qualification

	Frequency	Percentage
Certificate and below	6	14.6
Diploma	12	29.3
Bachelors	16	39.0
Masters and above	7	17.1
Total	41	100.0

Source: Survey Data, (2020)

4.4 Descriptive Analysis

The following section presents descriptive statistical findings on strategic IT penetration telecommunication firms in Kenya then followed by the second variable on strategic IT access costs by Telecommunication firms in Kenya and lastly, the descriptive findings on influence of staff strategic IT skills on performance of telecommunication firms in Kenya.

4.4.1 Strategic IT Penetration

Participants were required to indicate their level of agreement with the following statements that relate to the strategic IT penetration among Telecommunication firms in Kenya.

Table 4.12 Strategic IT Penetration Measures

	N	Min	Max	Mean	Std Dev
Financial performance of telecommunication firm is highly influenced by mobile penetration.	41	3.00	5.00	4.27	0.67
Mobile penetration supports role out of innovative products and services.	41	3.00	5.00	4.22	0.65
Internet penetration helps boost profitability levels and hence performance.	41	3.00	5.00	4.10	0.62
Roll out of 4 th Generation network improves service delivery.	41	3.00	5.00	4.10	0.62
Aggregate Score				4.17	0.64

Source: Survey Data, (2020)

Results show that majority of the respondents agreed that financial performance of telecommunication firm is highly influenced by mobile penetration (M= 4.27 SD =0.67) and mobile penetration supports role out of innovative products and services (M= 4.22 SD =.65). These findings support the empirical literature by Makanyeza and Ndlovu (2016) that performance of firms was directly related to IT penetration.

Further the study revealed that internet penetration has helped to boost profitability levels and hence performance and that roll out of 4th Generation (4G) network has helped improve service delivery (M= 4.10 SD =0.62). These findings concurs with the observations made by Oluwole and Adewale (2014) that IT penetration and use increased both return on on assets (ROA) and return of capital employed. On overall the aggregated score for all sub-measures was recorded at 4.17 with low standard deviation of 0.64. In other words, based on the measurement scale, the aggregated score of 4.17 translates to agree thus implying that majority of the respondent agreed with each of the above statement that assessed on strategic IT penetration among Telecommunication firms in Kenya. Further a low standard deviation of 0.64 from the mean also reaffirms that respondents almost concurred in their opinions.

Participants were required to indicate some of the challenges that influence the most mobile and internet penetration to the telecommunication firm.

Table 4.13: Challenges Hindering IT Penetration

challenges	Percentage
Poor network infrastructure	61.0%
Lack of enough staff skills	61.0%
High distribution costs	51.2%
Government regulation	58.5%
Lack of consumer awareness	53.7%

Source: Survey Data, (2020)

The findings revealed challenges that hindered the efforts by telecommunication firm to enhance mobile and internet penetration. The respondents rated lack of enough staff skills; and, poor network infrastructure highest at 61.0% each. Further, government regulation

(58.5%), lack of consumer awareness (53.7%) and high distribution costs (51.2%) followed in that order. These findings concur with the study findings by Kohli, Devaraj, and Ow (2012) contents that IT adoption and investment in IT firms directly influence performance in a positive manner.

4.4.2 Strategic IT Access Costs

Respondents were required to indicate their level of agreement with the following statements that relate to the influence of strategic IT access costs on performance of Telecommunication firms in Kenya.

Table 4.14 Statements relating to strategic IT

	N	Min	Max	Mean	Std Dev
Investment in contemporary strategic IT can result in enhanced efficiency thereby resulting in reduced access costs	41	3.00	5.00	4.24	0.66
Strategic IT investment costs are critical to the success of telecommunication firms	41	3.00	5.00	4.32	0.65
High cost of strategic IT system installations negatively influences internal business operations.	41	3.00	5.00	4.20	0.68
Our firm has a budget allocated for new information technology investments	41	3.00	5.00	4.27	0.59
Aggregate Score				4.26	0.65

Source: Survey Data, (2020)

Results show that majority of the respondents agreed that strategic IT investment costs are critical to the success of telecommunication firms (M = 4.32; SD =0.65), investment in contemporary strategic IT can result in enhanced efficiency thereby resulting in reduced access costs (M= 4.24SD =0.66), the firm has a budget allocated for new information technology investments (M=4.20 SD =0.68) and high cost of strategic IT system installations negatively influences internal business operations (M= 4.20 SD =0.68). These findings concur with the study findings by Avgerou and Walsham (2017) who contents that for firms to meet their IT labour demands, they must be willing to invest in IT costs which in the long run results to high organizational performance. On overall the aggregated score for all sub-measures was recorded at 4.26 with low standard deviation of 0.65. In other words, based on the measurement scale, the aggregated score of 4.26 translates to agree thus implying that majority of the respondent agreed with each of the above statement that assessed on strategic IT access costs among Telecommunication firms in Kenya. Further a low standard deviation of 0.65 from the mean also reaffirms that respondents almost concurred in their opinions.

The study sought to determine if after implementation of strategic IT, the cost of IT services reduced significantly to the benefit of the consumer.

Table 4.15 Impact of strategic IT implementation on cost of IT services

	Frequency	Percentage
Yes	30	73.2
No	11	26.8
Total	41	100.0

Source: Survey Data, (2020)

Majority of the respondents agreed that (73.2%) after implementation of strategic IT, the cost of IT services offered reduced to the benefit of the consumer whereas 26.8% were of the contrary opinion. This this implies that after implementation of strategic IT, the cost of IT services reduced and therefore becoming affordable by the customers.

4.4.2 Staff Strategic IT Skills

Respondents were required to indicate their level of agree with statements relating to the influence of staff strategic IT skills on performance of telecommunication firms in Kenya.

Table 4.16 : Statements relating to staff strategic Skills

	N	Min	Max	Mean	Std Dev
Strategic IT staff skills' shortages have a direct impact on customer service.	41	3.00	5.00	4.37	0.58
High IT staff technical skills results to improved internal business.	41	3.00	5.00	4.27	0.55
Our firm uses relevant IT skills and equipment necessary for 21 st century existence	41	3.00	5.00	4.24	0.54
Most of our customer care staff have pre-requisite IT skills and knowledge	41	3.00	5.00	4.27	0.55
We have frequent ICT trainings in our firm	41	3.00	5.00	4.24	0.58
Has strategic IT skills influenced innovation and learning within the organization	41	3.00	5.00	4.12	0.64
Aggregate Score				4.25	0.57

Source: Survey Data, (2020)

Results show that majority of the respondents agreed that strategic IT staff skills' shortages have a direct impact on customer service (M= 4.37 SD =0.58), high IT staff technical skills results to improved internal business and that all customer care staff employed by telecommunication have pre-requisite IT skills and knowledge (M= 4.27 SD =0.55). These findings support the empirical literature by Forth and Mason (2006) ungues that IT skill shortages has an indirect negative impact on performance. Further the study revealed that most of the telecommunication firms held frequent ICT trainings ((M= 4.24 SD =0.58)), most of the firms used relevant IT skills and equipment necessary for 21st century existence (M= 4.24 SD =0.54) and that strategic IT skills influenced innovation and learning within the organization (M= 4.12 SD =0.64). These findings support the empirical literature by Hagsten and Sabadash (2014) that IT skills and knowledge is crucial in determination of organizational performance as high skills and knowledge of IT influenced the performance of the saccos positively. On overall the aggregated score for all sub-measures was recorded at 4.25 with low standard deviation of 0.57. In other words, based on the measurement scale, the aggregated score of 4.25 translates to agree thus implying that majority of the respondent agreed with each of the above statement that assessed on strategic IT skills among Telecommunication firms in Kenya. Further a low standard deviation of 0.57 from the mean also reaffirms that respondents almost concurred in their opinions.

Table 4.17: Staff Skills of operations and performance of ICT service-based firms

	Percentage
Able to handle different IT gargets	63.4
Able to increase service delivery speed	63.4
Able to reduce wastages associated with paper work	53.7

Source: Survey Data, (2020)

According to the study, acquisition of strategic IT skills enables the staff to handle different IT gargets and increase service delivery speed as shown by 63.4% of the respondents in each case. Further, the study indicates that acquisition of strategic IT skills enable helps to reduce wastages associated with paper work as shown by 53.7% of the respondents. This implies that acquisition of strategic IT skills enables leads to enhanced organizational performance. These findings support the empirical literature by Wangai and Ngugi (2014) the study established that highly skilled IT staff resulted to high firm performance.

4.5 Performance of Telecommunication Firms in Kenya

This study sought to determine the influence of strategic IT penetration, cost of strategic IT access staff and strategic IT skills on performance of telecommunication firms in Kenya. Results are presented in Table 4.28.

Table 4.18 Performance of Telecommunication firms in Kenya

	N	Min	Max	Mean	Std Dev
Our firms overall performance has been declining since the penetration of mobile phones and the internet in Kenya.	41	1.00	3.00	1.68	0.69
The cost of putting in place IT equipment and machinery is relatively high than the benefits derived	41	1.00	3.00	1.76	0.66
The cost of strategic IT access has negative impact on internal business perspectives.	41	1.00	3.00	1.83	0.74
The cost of training staff on strategic IT skills is high making our organization make declined profits	41	1.00	3.00	1.85	0.73
The cost of training staff on IT Skills is more than the benefits derived on organizational performance	41	1.00	3.00	1.78	0.72
Our customers are satisfied with our services and hence we experience high retention rates due to strategic IT investments and installations.	41	4.00	5.00	4.37	0.49
Our firm has invested heavily on IT installations and employment of technical teams to enhance innovation and learning for improved performance and market leadership	41	4.00	5.00	4.46	0.50
Aggregate Score				2.53	0.65

Source: Survey Data, (2020)

Results show that majority of the respondents disagreed that the firms overall performance has been declining since the penetration of mobile phones and the Internet in Kenya (M=1.68 SD =0.69) the cost of putting in place IT equipment and machinery is relatively high than the benefits derived (M= 1.76 SD =0.66), the cost of training staff on IT skills is more than the benefits derived on organizational performance (M= 1.78 SD =0.72). These concur with the empirical literature by(Soto-Acosta et al., 2016; Storey et al., 2016) that information technology (IT) used by telecommunication firms is aimed at developing an organization that is agile and proactive to effectively respond to the dynamic environment in order to sustain profitability. Also, the respondents disagreed that the cost of strategic IT access has negative impact on internal business perspective (M= 1.83 SD =0.74) and that the cost of training staff on strategic IT skills is high making our organization make declined profits (M= 1.85 SD =0.73). These findings support the empirical literature by Kariuki (2009), asserts that effectiveness in service delivery includes reliability derived from simplicity in service

delivery, speed to market and trust through transparency in operations all brought about by effective implementation of strategic IT systems like customer care management systems. However, most of the respondents were in agreement with the statements that most of the telecommunication firms had invested heavily on IT installations and employment of technical teams to enhance innovation and learning for improved performance and market leadership (M= 4.46 SD =0.50). The respondents were further in agreement with the statement that the customers are satisfied with services and therefore telecommunication firms experience high retention rates due to strategic IT investments and installations. (M= 4.37 SD = 0.49). These findings concur with the observations made by North and Varvakis (2016) IT is an important function that is applicable and succeeds at all operational and strategic functions. On overall the aggregated score for all sub-measures was recorded at 2.53 with low standard deviation of 0.65. In other words, based on the measurement scale, the aggregated score of 2.53 translates to agree thus implying that majority of the respondent agreed with each of the above statement that assessed on performance Telecommunication firms in Kenya. Further a low standard deviation of 0.57 from the mean also reaffirms that respondents almost concurred in their opinions.

4.6 Inferential Analysis

After the descriptive analysis, the study used inferential statistics (Pearson correlation and regression test) to predict the linear association between the predictor variables and explanatory variables as well as in determining the strengths of association in the model.

4.6.1 Correlation Analysis

In order to confirm the relationship between study variables and the performance of telecommunication firms in Kenya, the study used Pearson moment correlation to determine the relationship. The results are as shown in Table 4.18

Table 4. 19: Correlations results

		Performance of Telecommunication	Strategic IT Penetration	Strategic IT Access Costs	Staff Strategic It Skills
Performance of Telecommunication	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	41			
Strategic IT Penetration	Pearson Correlation	.371*	1		
	Sig. (2-tailed)	.017			
	N	41	41		
Strategic IT Access Costs	Pearson Correlation	.354**	.322**	1	
	Sig. (2-tailed)	.000	.001		
	N	41	41	41	
Staff Strategic It Skills	Pearson Correlation	.363**	.026	.382**	1
	Sig. (2-tailed)	.020	.084	.000	
	N	41	41	41	41

Source: Survey Data, (2020)

From Table 4.12, show a positive correlation between Strategic IT Penetration and Performance of Telecommunication was established by a correlation factor of 0.371. This fair relationship was found to be statistically significant as the p value was 0.017 which was less than 0.05. The findings contradict study results by Wilson, Iravo, Tirimba, & Ombui, (2015) found low performance by Logistic Firms in Nairobi County which was attributed to low adoption and use of ICT. The study also found a strong positive correlation between performance of performance of Telecommunication and strategic IT access costs as shown by correlation coefficient of 354; the significant value was 0.000 which was less than 0.05. These results contradict the research findings by Onyango & Ngugi, (2014) established that ICT investment costs have a direct influence on the performance. Competent. The study found a positive correlation between staff strategic IT skills and performance of Telecommunication as shown by correlation coefficient of 0.363. The significant value was 0.001 which less than 0.05. The findings support the empirical findings by Hagsten & Sabadash, (2014) established that ICT skills had a direct positive impact on firm’s financial performance.

4.6.2 Regression Test

In this study, a multiple regression analysis was conducted to test the influence among predictor variables. The research used statistical package for social sciences (SPSS V 21.0) to code, enter and compute the measurements of the multiple regressions. The model summary is presented in the table 4.19 below.

Table 4.20: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661 ^a	.437	.422	.48423

Source: Survey Data, (2020)

The study used coefficient of determination to evaluate the model fit. The adjusted R^2 also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables. The model had an average adjusted coefficient of determination (R^2) of 0.422 and which implied that 42.2% of the variations on performance of Telecommunication are explained by the independent variables understudy (strategic IT penetration, strategic it access costs and staff strategic IT skills).

The study further tested the significance of the model by use of ANOVA technique. The findings are tabulated in table 4.20 below.

Table 4.21: Summary of One-Way ANOVA results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	19.695	3	6.565	27.999	.000 ^b
Residual	8.658	37	.234		
Total	28.353	40			

Critical value = 4.90

Source: Survey Data, (2020)

From the ANOVA statics, the study established the regression model had a significance level of 0.000% which is an indication that the data was ideal for making a conclusion on the population parameters as the value of significance (p-value) was less than 5%. The calculated value was greater than the critical value ($27.999 > 4.90$) an indication that Strategic IT Penetration, strategic it access costs and staff strategic IT skills all have a significant effects on performance of Telecommunication. The significance value was less than 0.05 indicating that the model was significant.

In addition, the study used the coefficient table to determine the study model. The findings are presented in the table 4.21 below.

Table 4.22: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-2.245	.390		5.759	.000
1 Strategic IT Penetration (A_1)	.723	.290	.371	2.495	.017
Strategic IT Access Costs (A_2)	.633	.268	.354	2.360	.023
Staff strategic IT skills (A_3)	.801	.329	.363	2.433	.020

As per the SPSS generated output as presented in table above, the equation ($Y = \beta_0 + \beta_1A_1 + \beta_2A_2 + \beta_3A_3 + \epsilon$) becomes:

$$Y = -2.245 + 0.723A_1 + 0.633A_2 + 0.801A_3$$

From the regression model obtained above, a unit change in Strategic IT Penetration while holding other factors constant would positively change performance of Telecommunication by a factor of 0.723. These findings concurs with the observations made by Oluwole and Adewale (2014) that IT penetration and use increased both return on on assets (ROA) and return of capital employed. Results show that a unit change in strategic IT access costs while holding the other factors constant would positively change performance of Telecommunication by a factor of 0.633. These findings concur with the study findings by Avgerou and Walsham (2017) who contents that for firms to meet their IT labour demands, they must be willing to invest in IT costs which in the long run results to high organizational performance. Finally test regression results show that unit change in staff strategic IT skills while holding the other factors constant would enhance the performance of Telecommunication by a factor of 0.801. These findings concur with the study findings by Kohli, Devaraj, and Ow (2012) contents that investing in strategic IT skills has a direct positive influence on firm's performance.

4.6.3 H_{01} : Strategic IT penetration has no significant effect on performance of Telecommunication firms in Kenya.

The study found a positive significant relationship between strategic IT Penetration and performance of Telecommunication firms in Kenya. The study found a positive correlation between strategic IT penetration (A_1) and performance of telecommunication firms in Kenya (correlation factor of 0.371; significant value = 0.017). These findings concur with the study findings by Kohli, Devaraj, and Ow (2012) who contends that adoption and investment directly influenced performance in a positive manner. Also, the regression model confirmed that enhancing quality in strategic IT penetration enhance the performance of telecommunication firms in Kenya. From the coefficients table significant value for Strategic IT penetration was 0.017 which is less than 0.05. Since the P-value of 0.017 is less than 0.05, we reject the null hypothesis. Therefore, the null hypothesis which stated that; Strategic IT penetration has no significant effect on performance of Telecommunication firms in Kenya was rejected. The implication is that there exists a significant positive relationship between Strategic IT penetration and performance of Telecommunication firms in Kenya. The findings are

supported by other studies like Binuyo and Aregbeshola, (2014) which showed that ICT penetration and use results in high performance levels among the commercial banks in South Africa. However these findings contravenes the findings by Imalingat (2015b) who asserts that Use of ICT to enhance penetration came along with high maintenance costs due to a constantly evolving environment that negatively affected firms with limited resources. Descriptive results affirm that that financial performance of telecommunication firms in Kenya is highly influenced by mobile penetration strategies in place. Further, the results indicate that mobile penetration supports role out of innovative products and services. These findings support the empirical literature by Makanyeza and Ndlovu (2016) that performance of manufacturing firms was directly related to IT penetration. Further the study revealed that internet penetration helped to boost profitability levels and hence performance of the telecommunications firms in Kenya. Further, the study has established that rolling out of 4G network improved service delivery by telecommunications firms in Kenya. These findings concurs with the observations made by Oluwole and Adewale (2014) that IT penetration and use led to increased both return on assets (ROA) and return of capital employed. However the findings revealed challenges that hindered the efforts by telecommunication firm in Kenya to enhance mobile and internet penetration. The main challenges were established as lack of enough staff skills, poor network infrastructure, and high distribution costs, government regulation, lack of consumer awareness and high distribution costs. The findings confirms the postulation by resource based theory that firms with more resource and capabilities can be able to apply penetration strategies that are unique to them only compared to firms that are still struggling with their resource base.

4.6.4 H₀₂: Strategic IT access cost has no significant effect on the performance of Telecommunication firms in Kenya.

Results show that strategic IT access costs had a direct significant influence on performance of Telecommunication firms in Kenya. The study found a positive correlation between strategic IT access costs and performance of telecommunication firms in Kenya. These findings concur with the study findings by Avgerou and Walsham (2017) who highlighted that for firms to meet their IT labour demands, they must be willing to invest in IT which in the long run results to high performance. Also, the regression model obtained show that enhancing quality in strategic IT access costs would enhance the performance of telecommunication firms in Kenya. These findings support the assertion by Onyango and Ngugi (2014) that though ICT investment costs may be high, in long term, the investment has a positive direct influence on organisational performance. The significant value for Strategic IT penetration presented in coefficients table was 0.023 which is less than 0.05. Since the P-value of 0.023 is less than 0.05, the null hypothesis two which stated that, strategic IT access cost has no significant effect on the performance of Telecommunication firms in Kenya is therefore rejected. The implication is that there exists a significant positive relationship between Strategic IT access cost and performance of Telecommunication firms in Kenya. Descriptive results confirm that after implementation of strategic IT, the cost of IT services offered reduced leading to enhanced consumer satisfaction. The results also show that strategic IT investment costs are critical to the success of telecommunication firms and that investment in contemporary strategic IT can result in enhanced efficiency thereby resulting in reduced access costs. The study has also revealed that the firms has a budget allocated for new information technology investments and that high cost of strategic IT system installations negatively influences internal business operations. These findings support the empirical literature by Onyango and Ngugi, (2014) established that ICT investment costs have a direct influence on the performance. However these findings contradict the findings by Kohli et al. (2012), who advocate for traditional systems, citing that the cost associated with laying an efficient ICT infrastructure is costly and sometimes, lack of ICT knowledge's especially to old generation may render the whole initiative infeasible.

4.6.5 H₀₃: Staff strategic IT skills have no significant effect on performance of Telecommunication firms in Kenya.

The study found a positive correlation between staff strategic IT skills and performance of telecommunication firms in Kenya. These findings concur with the study findings by Onyango and Ngugi (2014) who revealed that performance at the organization was heavily influenced by the use of competent employees with IT skills. The regression model obtained predicts that enhancing quality in staff strategic IT skills would enhance the performance of telecommunication firms in Kenya. The findings support the augment by Wachira et al. (2014) that IT skills and knowledge are crucial in determination of organizational performance as high skills and knowledge of IT influence the performance of the organisations positively. From the coefficients table significant value for Strategic IT penetration is 0.020 which is less than 0.05. Since the P-value of 0.020 is less than 0.05 the null hypothesis three which stated that strategic IT skills have no significant effect on the performance of Telecommunication firms in Kenya is therefore rejected. The implication is that there exists a significant positive relationship between strategic IT skills and performance of Telecommunication firms in Kenya. Descriptive results show that strategic IT staff skills' shortages have a direct impact on customer service. The results further highlight that high IT staff technical skills results to improved internal business and that all customer care staff employed by telecommunication have pre-requisite IT skills and knowledge. These findings support the empirical literature by Forth and Mason (2006) who argue that IT skill shortages has an indirect negative impact on performance. Further the study revealed that most of the telecommunication firms in Kenya held frequent ICT trainings and used relevant IT skills and equipment necessary for 21st century existence. The study has also revealed that strategic IT skills influence innovation and learning within the organization. These findings support the empirical literature by Hagsten and Sabadash (2014) who indicated that IT skills and knowledge are crucial in determination of organizational performance as high skills and knowledge of IT influenced the performance of the sacco's positively. Similar observation are made by Wangai and Ngugi (2014) observed that highly skilled IT staff are a precursor to high firm performance. However these findings contradict the findings by Onyango and Ngugi (2014), Skilled ICT workers command higher wages or annual salaries, highly Skilled ICT employees are limited to their or her area of work and cannot multi-task and that

specialization means taking the chance that complacency could lead to missteps, which can cost the company money and compromise safety.

Assessment on the combined effect of strategic IT penetration cost of strategic IT access staff and strategic IT Skills on performance of telecommunication firms in Kenya revealed that the overall performance of telecommunication firms has been enhanced by penetration of mobile phones and the internet in Kenya. Further, the study has revealed that the cost of putting in place IT equipment and machinery is relatively lower than the benefits derived and that the cost of training staff on IT skills is less than the benefits derived on organizational performance. These concur with the empirical literature by (Soto-Acosta et al., 2016; Storey et al., 2016) who indicated that that Information Technology (IT) used by telecommunication firms is aimed at developing an organization that is agile and proactive to effectively respond to the dynamic environment in order to sustain profitability. The study further revealed that the cost of strategic IT access has positive impact on internal business perspective and that the cost of training staff on strategic IT skills is high challenging performance. These findings support the empirical literature by Kariuki (2009), asserts that effectiveness in service delivery includes reliability derived from simplicity in service delivery, speed to market and trust through transparency in operations all brought about by effective implementation of strategic IT systems like customer care management systems. Finally, most of the telecommunication firms had invested heavily on IT installations and employment of technical teams to enhance innovation and learning for improved performance and market leadership. Further, it was revealed that customers are satisfied with services and therefore telecommunication firms experience high customer retention rates which enhance their performances. These findings concur with the observations made by North and Varvakis (2016) that IT is an important function that is applicable and succeeds at all operational and strategic functions.

V. CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the study summary, conclusions and recommendations based on the study findings. The objectives of this study were to determine the effect of strategic IT penetration on performance of Telecommunication firms in Kenya, to investigate the effect of strategic IT access costs on performance of Telecommunication firms in Kenya and to examine how staff strategic IT skills affect performance of Telecommunication firms in Kenya.

5.2 Summary of the Findings

This section presents the summary of finding presented in the previous chapter. This section is organized into four sections that are in line with the study objectives.

5.2.1 Strategic IT Penetration

In line with the first objective, the study found a positive correlation between strategic IT Penetration and performance of telecommunication firms in Kenya. It was also established that the financial performance of telecommunication firms in Kenya is highly influenced by mobile penetration strategies in place. Strategies such as internet penetration helped to boost profitability levels and hence performance of the companies. Further, the study established that rolling out of 4G network improved service delivery by telecommunications firms in Kenya and that mobile penetration supports role out of innovative products and services. These findings support the empirical literature by Makanyeza and Ndlovu (2016) that performance of manufacturing firms was directly related to IT penetration. Results also show that IT penetration and use led to increase both return on on assets (ROA) and return of capital employed. It was also established that adoption and investment directly influenced performance in a positive manner. The findings support the augment by Binuyo and Aregbeshola, (2014) that ICT penetration and use resulted in high performance levels among the telecom firms in South Africa. However these findings contravenes the findings by Imalingat (2015b) who asserts that Use of ICT to enhance penetration came along with high maintenance costs due to a constantly evolving environment that negatively affected firms with limited resources. However, the findings revealed challenges that hindered the efforts by teleco firm to enhance mobile and internet penetration. Among the challenges noted include lack of enough staff skills, poor network infrastructure, government regulation, lack of consumer awareness and high distribution costs. The findings confirm the postulation by resource-based theory that Firms with more resource and capabilities can be able to apply penetration strategies that are unique to them only compared to firms that are still struggling with their resource base.

5.2.2 Strategic IT Access Costs

In line with the second objective, the study found a positive correlation between strategic IT access costs and performance of telecommunication firms in Kenya. The study findings illustrate that investment in contemporary strategic IT can result in enhanced efficiency thereby resulting in reduced access costs. Further, the study indicates that strategic IT investment costs are critical to the success of telecommunication firms. These findings support the augment by Onyango and Ngugi (2014) that ICT investment costs were critical to ICT success and had a direct influence on performance at the organization. The findings are also in line with others by Onyango and Ngugi, (2014) that indicates that ICT investment costs have a direct influence on the performance, However these findings contravenes the findings by Kohli et al. (2012), who advocate for traditional systems, citing that the cost associated with laying an efficient ICT infrastructure is costly and sometimes, lack of ICT knowledge's especially to old generation may render the whole initiative infeasible.

5.2.3 Staff Strategic IT Skills

In line with third objective, the findings of this research revealed that staff strategic IT skills has positive effect on performance of telecommunication firms in Kenya. IT skills and knowledge is crucial in determination of organizational performance. Also the findings show that knowledge of IT influenced the performance of the organisations positively and that strategic IT staff skills' shortages have a direct impact on customer service. These findings support the empirical literature by Forth and Mason (2006) argues that IT skill shortages has an indirect negative impact on performance. Similarly, Onyango and Ngugi (2014) contend that performance at the organization was heavily influenced by the use of competent employees with IT skills. The study also found high IT staff technical skills results to improved internal business and that all customer care staff employed by telecommunication have pre-requisite IT skills and knowledge. Also, it was established that most of the telecommunication firms held frequent ICT trainings and that the firms used relevant IT skills and equipment necessary for 21st century existence. The study highlights that strategic IT skills influences innovation and learning within the organization. These findings are in line with others by Hagsten and Sabadash (2014) who indicated that IT skills and knowledge is crucial in determination of organizational performance as high skills and knowledge of IT influenced the firms performance positively. However these findings contravenes the findings by Onyango and Ngugi (2014), Skilled ICT workers command higher wages or annual salaries, highly Skilled ICT employees are limited to their or her area of work and cannot multi-task and that specialization means taking the chance that complacency could lead to missteps, which can cost the company money and compromise safety

5.2.4 Performance of Telecommunication Firms in Kenya

Assessment on overall performance of Telecommunication firms in Kenya revealed the cost of putting in place IT equipment and machinery is relatively lower than the benefits derived and that the cost of training staff on IT skills is less than the benefits derived. Also, the study revealed that the cost of strategic IT access has positive impact on internal business perspective and that the cost of training staff on strategic IT skills is high hurting the organizational profits. These findings support the empirical literature by Kariuki (2009) who asserts that effectiveness in service delivery includes reliability derived from simplicity in service delivery, speed to market and trust through transparency in operations all brought about by effective implementation of strategic IT systems like customer care management systems. Further the findings show that most customers were more satisfied with services and hence high retention rates due to strategic IT investments and installations were witnessed in the firms. These findings concurs with the observations made by North and Varvakis (2016) that IT is an important function that is applicable and succeeds at all operational and strategic functions.

5.3 Conclusions

The study concludes that strategic IT Penetration had positive significant effect on the performance of Telecommunication firms in Kenya. It was also concluded that ICT penetration and use resulted in high performance levels among the telecom firms. The study also illustrates that strategies such as internet penetration helped to boost profitability levels and hence performance and that rolling out of 4th Generation network improved service delivery. Finally, the study has indicated that mobile penetration supports role out of innovative products and services. The study also concludes that strategic IT access costs had a direct significant influence on performance of Telecommunication firms in Kenya. The study further concludes that high cost of strategic IT system installations negatively influences internal business operations. The results have also shown that after implementation of strategic IT, the cost of IT services offered reduced to the benefit of the consumer and that most of the Telecommunication firms had budget allocated for new information technology investments. The study further concludes that high IT staff technical skills results to improved internal business performance and that all customer care staff employed by telecommunication have prerequisite IT skills and knowledge. In addition, the study further established that acquisition of strategic IT skills enables the staff to handle different IT gargets, increase service delivery speed and reduce wastages associated with paper work. It was also established that telecommunication firms held frequent ICT trainings and used relevant IT skills and equipment necessary for 21st century existence. This indicates the firms' commitment in enhancing skills and knowledge. Further, the study concludes that strategic IT skills influence innovation and learning within the organizations.

5.4 Recommendations

Based on the study findings, this study recommends that the top management of telecommunication companies in Kenya need to continually adapt the strategic IT penetration as this adoption was found positively linked with market performance. Telecommunication firms need to come up with quality innovation capabilities necessary to drive market penetration process. Given that strategic IT access costs was found to be positively linked with performance of telecommunication firms in Kenya, its therefore paramount for telecommunication firms to ensure quality infrastructure is laid to oversee the realization of the projected benefits. Staff technical skills were established to enhance internal business operations. This study therefore recommends that, telecommunication firms should continually update their personnel with ICT skills and especially on any update made on mode operations.

5.5 Areas of Further Research

The main objective as developed in the background of the study is to determine the effect of strategic IT on the performance of telecommunication firms in Kenya. Similar studies may explore on dynamic strategies adopted by ICT firms in response to market turbulence.

APPENDICES

Appendix I: Questionnaire

Dear Sir/Madam, RE: **PERMISSION TO CARRY OUT ACADEMIC RESEARCH**

I am a graduate student undertaking Masters of Business Administration Degree (Strategic Management Option) in Kenyatta University and conducting a research study entitled ‘THE EFFECT OF STRATEGIC INFORMATION COMMUNICATION TECHNOLOGY ON THE PERFORMANCE OF TELECOMMUNICATION FIRMS IN KENYA. The purpose of this letter is to request for permission to interview the respondents using the attached questionnaire copy and interview schedule. The information obtained is strictly for academic purpose and shall be treated with utmost confidentiality.

Thank You.

NAME OF TELECOMMUNICATION COMPANY.....

Section A: Background Information

1. Please indicate your gender

- (a) Male (b) Female

2. Please indicate your age.

- (a) Below 30 (b) 31 – 40
 (c) 41 – 50 (d) 51 – 60
 (e) Above 61

3. Please State your Job title.....

4. How long have you worked with the company?

- (a) Less than 1 year (b) 2-4 years
 (c) 5-9 years (d) Over 10 years

5. What is your highest academic qualification?

- (a) Certificate and below (b) Diploma
 (c) Bachelors (d) Masters and above

Section B: Strategic IT Penetration

This part aims to determine the influence of strategic IT Penetration on performance of Telecommunication firms in Kenya.

1. Please indicate how much you agree or disagree with each of the following statements on a scale of 1 to 5. The scale is indicated as follows;

5 - Strongly Agree (SA); 4 – Agree (A); 3 – Neutral (N); 2 – Disagree (D); and 1 - Strongly Disagree (SD).

S/No	STATEMENT	SA	A	N	D	SD
1	Financial performance of telecommunication firm is highly influenced by mobile penetration.					
2	Mobile penetration supports role out of innovative products and services.					
3	Internet penetration helps boost profitability levels and hence performance.					
4	Roll out of 4 th Generation network improves service delivery.					

2. What challenges influence the most mobile and internet penetration to the telecommunication firm?

- a. Poor network infrastructure
- b. Lack of enough staff skills
- c. High distribution costs
- d. Government regulation
- e. Lack of consumer awareness

Section C: Strategic IT Access Costs

This part aims to determine the influence of strategic IT Access Costs on performance of Telecommunication firms in Kenya.

1. Please indicate how much you agree or disagree with each of the following statements on a scale of 1 to 5. The scale is indicated as follows;

5 - Strongly Agree (SA); 4 – Agree (A); 3 – Neutral (N); 2 – Disagree (D); and 1 - Strongly Disagree (SD).

S/No	STATEMENT	SA	A	N	D	SD
1	Investment in contemporary strategic IT can result in enhanced efficiency thereby resulting in reduced access costs					

2	Strategic IT investment costs are critical to the success of telecommunication firms					
3	High cost of strategic IT system installations negatively influence internal business operations.					
4	Our firm has a budget allocated for new information technology investments					

5. After implementation of strategic IT, has the cost of IT services offered reduced to the benefit of the consumer?
YES.....NO.....

Section D: Staff Strategic IT Skills

This part aims to determine the influence of staff strategic IT Skills on performance of Telecommunication firms in Kenya.

1. Please indicate how much you agree or disagree with each of the following statements on a scale of 1 to 5. The scale is indicated as follows;

5 - Strongly Agree (SA); 4 – Agree (A); 3 – Neutral (N); 2 – Disagree (D); and 1 - Strongly Disagree (SD).

S/No	STATEMENT	SA	A	N	D	SD
1	Strategic IT staff skills’ shortages have a direct impact on customer service.					
2	High IT staff technical skills results to improved internal business.					
3	Our firm uses relevant IT skills and equipment necessary for 21 st century existence					
4	Most of our customer care staff have pre-requisite IT skills and knowledge					
6.	We have frequent ICT trainings in our firm					
7.	Has strategic IT skills influenced innovation and learning within the organization					

8. How do staff skills on ICT services influence internal business operations of the firm?

- a. Able to handle different IT gargets
- b. Able to increase service delivery speed
- c. Able to reduce wastages associated with paper work

Section E: Performance of Telecommunication Firms in Kenya

This part aims to determine the influence of strategic IT penetration, cost of Strategic IT access staff and strategic IT Skills on performance of Telecommunication firms in Kenya

Please indicate how much you agree or disagree with each of the following statements on a scale of 1 to 5. The scale is indicated as follows;

5 - Strongly Agree (SA); 4 – Agree (A); 3 – Neutral (N); 2 – Disagree (D); and 1 - Strongly Disagree (SD).

S/No	STATEMENT	SA	A	N	D	SD
1	Our firms overall performance has been declining since the penetration of mobile phones and the internet in Kenya.					
2	The cost of putting in place IT equipment and machinery is relatively high than the benefits derived					
3	The cost of strategic IT access has negative impact on internal business perspectives.					
4	The cost of training staff on strategic IT skills is high making our organization make declined profits					
5	The cost of training staff on IT Skills is more than the benefits derived on organizational performance					
6	Our customers are satisfied with our services and hence we experience high retention rates due to strategic IT investments and installations.					
7	Our firm has invested heavily on IT installations and employment of technical teams to enhance innovation and learning for improved performance and market leadership					

Appendix IV: NACOSTI research authorization letter



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
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Website: www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Wajaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/19/91290/30550** Date: **10th June, 2019.**

Mohammed Wandabwa Chesula
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Strategic information technology and performance of Telecommunication firms in Kenya.*" I am pleased to inform you that you have been authorized to undertake research in Nairobi County for the period ending **7th June, 2020.**

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

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a copy of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.



BONFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified

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