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Abstract

Purpose: The aim of this study was to establish the factors influencing enhancement in adoption of fiber optic broadband internet services among Law Firms in Nairobi central business district.

Methodology: The current study incorporated descriptive research design where the target population was the 52 law firms that provide legal services in Nairobi central business district. The study conducted a census survey by covering all the units in the population. The study used primary data which was collected by administering semi-structured questionnaires. Quantitative statistics involved descriptive and inferential statistics. Qualitative data collected from the open-ended part of the questionnaire was analyzed using content analysis and the results were presented in prose form. Results were then be presented in tables, diagrams and charts.

Findings: The findings showed that there is a direct and strong relationship between government policy, market access, information technology and competition strategy and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district. The regression findings revealed those government policy, market access, information technology and competition and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district in enhancing their performance.

Unique Contribution to Theory, Practice and Policy: Based on the provided information, the Technology Acceptance Model (TAM), Modern Portfolio Theory, and Diffusion of Innovation Theory were validated in the study. The study recommends that the government should reduce the regulations on penetration of fiber optics by telecommunication companies. This will increase the rate at which the fibre optic broadband internet services are adopted by firms in Kenya. It also recommends that firms should embrace and incorporate fibre optic broadband internet services in market access strategies such as payer perspectives, and pragmatic, viable solutions early, also conducting market research and analysis in order to thrive in today's advancing world of technology.

Keywords: *Adoption, Fiber Optic, Broadband, Internet Services*

INTRODUCTION

Internet technologies are largely used in companies, in public services and by individuals. They have become indispensable support for information flows in the economy, and provide individuals with access to a very large quantity of information and services at home, at school or at work. Since the popularization of the internet over dial-up technologies in the 1980s and 1990s, the development of the broadband infrastructure has greatly increased the possibilities of the world wide web, making it possible to integrate the internet even further into business processes and services, and deliver multimedia content to a large number of consumers (Fornefeld, Delaunay & Elixmann, 2008).

In the current generation and rapidly ravaging technological innovations, the Information and Communication Technological sector has seen major strides and advancements for the betterment of the corporate world. This has led to more severe competition among internet service providers. Ideally, it is very rare to find a company/business entity surviving without internet (Stork, Calandro & Gamage, 2014).

The impact of the penetration of the Fibre Optic Broadband has completely revolutionized and expanded the horizons of business operations in the current era. Businesses have websites that contain information about their products, promotions, employees, customers' reviews and even financial statements (for public companies). In 2010, the Guldborgsund Municipality in Denmark opened what is arguably the first video-linked citizen services centre in Europe. The centre enables citizens in the remote region to receive one-on-one advice from government officials at a much lower cost than a staffed centre could provide. Without this cost savings, the centre would have had to close, depriving the citizen of this service. Other Danish municipalities are looking to adopt the concept (Williams, 2013). In the US, Campante, Durante and Sobbrio (2017) exploited the differences in the availability of Asymmetric digital subscriber line (ADSL) broadband technology across municipalities. It was discovered that broadband Internet had a substantial negative effect on turnout in parliamentary elections between 1996 and 2008. However, it was positively associated with other forms of political participation, both online and offline: the emergence of local online grassroots protest movements, and turnout in national referenda (largely opposed by mainstream parties).

As per Stork, Calandro and Gamage (2014), broadband Africa has as well appreciated the uptake of broadband services with an average growth rate of over 200% since 2009. However, ITU (2012) reports that fixed broadband penetration in Africa remained very low with an estimated penetration of only 0.2% by the end of 2011 which shows that is still a significantly large market that remains untapped. Kim, Kelly and Raja (2010) point out that in developing countries; the broadband internet is linked to economic growth. In this regard, for every 10% increase in broadband penetration, there would be a 1.38% increase in economic growth. This situation has pushed countries in the region to increasingly adopt Fiber to the Home (FTTH) services in the bid to spur economic growth and increase employment opportunities for their citizens. Increasing broadband services penetration in African counties by 1% could contribute an additional 0.0158% to the GDP growth. These findings have driven many African countries to partner with development partners as well as international telecommunication companies to enhance access to the broadband internet through FTTH services among others (Charles & Kagiri, 2018).

Access to advanced information and communication technology (ICT) is a key factor in the economic and social development of Sub-Saharan Africa. Olusola and Christianah (2013) noted that despite Nigeria's growing appetite for data to provide for high-speed Internet, e-commerce, as well as cloud computing, the uptake of ICT and broadband penetration in the country, is still very low as validated by the World Economic Forum (WEF) Networked Readiness Forum for 2013. The country presently has active submarine fibre optic cables connecting the country to the world through Europe deployed by different organizations with huge Internet broadband capacities. However, the Internet broadband penetration in the country is still very low with about 10% of the Oceanic Optical fibre capacities utilized and just 6% of fibre optic broadband penetration. Over 99% of the Internet broadband connection today in Nigeria is through the mobile wireless networks with less than 1% connection via the fixed wired/wireless (Adedoyin & Ndujiuba, 2017).

Kenya is one of the most industrialized countries in the East African region, yet industry represents only 10 per cent of its Gross Domestic Product (GDP). ICT has been a major contributor to this. The government has liberalized the ICT sector to achieve universal service and access objectives, firstly through competition (where all ICT markets are theoretically open to competition and reliance on the market to deliver services) and where necessary through government intervention. Governments participating in the sector includes retaining an equity interest in a number of ventures at various levels of the ICT value chain – as a shareholder in Safaricom (mobile, broadband), Telkom Kenya (fixed, mobile, broadband) and recently TEAMS (undersea cable) and NOFBI (terrestrial backbone network).

In 2016, there were 29.6 million Internet subscriptions at the end of June up from 26.9 million subscriptions in 2016. In 2017, the number of fixed fibre optic subscriptions in Kenya doubled (54,700 fixed fibre optic subscriptions compared to 27,571 such connections recorded in 2016) due to the intense competition for customers by telecommunication firms. There was also over 100% increase in satellite and terrestrial data wireless subscriptions in the period. Mobile data subscriptions, the most common way for Kenyans to connect to the web, grew 9.9 per cent to 29.42 million. According to the Kenya National Bureau of Statistics and Communications Authority of Kenya (2016) on enterprises' ICT use in Kenya showed that about 91% of the sampled education enterprises have internet in their premises whilst 36.4% reported having IT policy which was slightly lower than the national average of 37% for the sampled enterprises (KNBS, 2017). In 2016-2018, poa! Internet, a private internet service provider, distributed free internet services across schools in Nairobi, Kenya (Okyere, 2020).

In 2018, CAK (2019) indicated that the number of mobile data/Internet subscriptions grew by 2.7% to post 41.8 million from 40.7 million subscriptions registered. Terrestrial wireless data subscriptions declined substantially by 51.3% to stand at 59,380 from 122, 037 recorded. This drop is attributed to the regulatory guidance issued by the Authority to Mawingu Networks Ltd to review its data on the number of data/Internet subscriptions in-line with the official definition of an active subscription which refers to any subscription that has generated revenue within the last 90 days. On the other hand, Satellite data subscriptions rose by 19.4 per cent to stand at 1,391.

Fibre optics is a technology that uses glass threads to transmit data. It consists of a bundle of glass threads each of which is capable of transmitting messages modulated into light waves. Most companies use it because of the following advantages: they have much greater bandwidth than

metal cable hence carry more data; they are less susceptible than metal cables to interference; they are much thinner and lighter than metal wires and furthermore, data can be transmitted digitally rather than analogically. Fibre optics is a particularly popular technology for local area networks. Telephone Companies are steadily replacing traditional telephone lines with fibre optic cables. In the future, almost all communications will employ fibre optics (CAK, 2019).

Many internet service providers have joined the market to exploit the occurring necessity. This has caused interference in the city with each and every company pulling theirs on cable. They complain of poor network quality by some of the providers that affect service delivery and also to create a new revenue stream as they will be able to lease the excess capacity to other providers (Wachira, 2014). There is still much empirical evidence that SMEs in Kenya still faces challenges despite being a major contributor to Kenya's economy. For instance, innovation and technology inabilities in the least Developed Countries (LDCs), stagnant rate of new firms' formation and collapse of already established SMEs before 5 years, huge rental fees that in return affect SMEs cash flows among others (Ombongi & Long, 2018). Therefore, it is against these backdrops that the current study seeks to investigate the situation in Nairobi central business district by addressing the performsnce impact in the Adoption of Fibre Optic broadband internet services among law firms in Nairobi CBD.

Over the last decade, the Kenyan economy has significantly grown at an average of 3.7% and has outperformed all other segments of the economy owing to the developments in the ICT sector. According to ITU and World Bank reports, there have been great strides towards expanding internet access and usage through the increased availability of broadband networks (CAK, 2018). Owing to the availability of fiber optic most businesses in Nairobi have improved on reliability and efficiency thus attracting a number of multinationals such as IBM, Nokia, Siemens Networks, Airtel, Nestle, and Pepsi Cola which have increased Internet and data demand in the region as business and social users adopt video conferencing, Skype and other Internet-based communication which are bandwidth hungry to consider using internet in their commercial activities (KNBS, 2017).

However, the uptake has not yet been optimized. In 2019, CAK reported that Kenya's internet penetration stands at 64.8%. In addition, fibre optic data subscribers grew by 12% totaling to 175,824. In 2018, terrestrial wireless data subscriptions declined substantially by 51.3% to stand at 59,380 from 122, 037. Despite, fixed-wireless subscriptions increasing year-on-year (y-o-y) by 52.4% to record 29,724 subscriptions, fixed fiber optic data subscriptions fell 65% y-o-y (CAK, 2019). This is an indication that the use of fibre optic is still low. The Adoption of Fibre Optic broadband has also been reported to be slow not only in rural areas but also in urban cities (CAK, 2018; KNBS, 2017).

In terms of in 4G mobile access, Kenya National Bureau of Statistics indicated a lower uptake by many entrepreneurs yet it has been poised to offer better internet accessibility. The uptake of fibre optic services has not been appreciated and it has been noted that many internet firms do not have fixed phone lines, computers, internet shops (cyber cafes) accessing the internet using fibre optic services. Thus, access to internet services such as internet and email becomes a challenge (CAK, 2018; KNBS, 2017). James and Ogollah (2017) noted issues surrounding the cost of internet to be the main obstacles to growth in web access using fibre optic cables. It is, therefore, worthwhile

for the study to shed more light on the Adoption of Fibre Optic broadband internet services among law firms in Nairobi central business district.

However, there seems to be scant empirical evidence that supports the uptake of fibre optic in Kenya and specifically Nairobi. For instance, Musee (2013) carried out a survey in Nairobi on the performance of ZUKU fibre optic project on the performance of small businesses. The study, however, majored on the performance of the SMEs and failed to address the uptake of fibre optic. Waema and Katua (2014) also analyzed the promises of fibre-optic broadband. However, the study was premised on the case of tourism and tea sectors. Ombongi and Long (2018) on the other hand focused on the factors affecting the financial performance of small and medium enterprises (SMEs) thus presenting a conceptual and a contextual gap. Thus, the current study sought to fill these gaps by establishing the performance enhancement in the Adoption of Fibre Optic broadband internet services among law firms in Nairobi central business district.

Statement of the Problem

Over the last decade, the Kenyan economy has significantly grown at an average of 3.7% and has outperformed all other segments of the economy owing to the developments in the ICT sector. According to ITU and World Bank reports, there have been great strides towards expanding internet access and usage through the increased availability of broadband networks (CAK, 2018). Owing to the availability of fiber optic most businesses in Nairobi have improved on reliability and efficiency thus attracting a number of multinationals such as IBM, Nokia, Siemens Networks, Airtel, Nestle, and Pepsi Cola which have increased Internet and data demand in the region as business and social users adopt video conferencing, Skype and other Internet-based communication which are bandwidth hungry to consider using internet in their commercial activities (KNBS, 2017).

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LITERATURE REVIEW

Theoretical literature looked at the theories related to the determinants of market performance of equities. Specifically, this study was guided by the Technology Acceptance Model (TAM), Modern portfolio theory and the Diffusion of Innovation Theory.

Technology Acceptance Model (TAM) informs the penetration of a technology that is set to improve the operations of businesses. That is, it tells a story on why certain parties will value the use of fibre optic technology as opposed to other forms of internet connectivity. Thus, the study values the tenets of the theory in the study since it informs the study's link between technology and the Adoption of Fibre Optic broadband internet services among law firms.

Modern portfolio theory guides the businesses in Nairobi to consider diversification of portfolio so as to spread risks. Since there are many broadband network providers in the market, they can choose the best one available and supplement it with others like WI-FI, 4G internet, etc. in order to benefit from the use of the internet services.

Diffusion of Innovation Theory informs the study to seek to enhance on their innovative strategies in consideration of the advancements in technology for the betterment of their business operations such as financial management, inventory management, quality control and customer support. Thus, the use of fibre optic is a better solution towards better performance.

Briglauer and Cambini (2018) sought to explore the performance of regulation of basic broadband networks affect the penetration of new fiber-based broadband services. The study explored 25 European Union member states longitudinally by use of panel data from 2003 to 2015 on the penetration of fiber-based broadband technology by households and firms. The findings indicated that an increase in the regulated price for accessing the old network favors consumer penetration of the new technology. Specifically, a rise in the unbundling price of 10 per cent positively affects the fiber-based penetration in the range of 0.7 per cent–1 per cent. From the findings, it was clear that an increase in the access price decreases the take-up rate, meaning that the impact on fiber coverage is stronger than on fiber penetration.

James and Ogollah (2017) sought to determine factors influencing penetration of fiber optics by telecommunication companies in Kenya by using a descriptive research model. The findings revealed that regulation reduces not only the investment incentives of regulated infrastructure operators but also those of potential entrant infrastructure operators who benefit from a risk-free option due to mandatory access obligations asymmetrically imposed on them, past regulation in

first-generation broadband markets has clearly shaped the expectations for NGA regulations and pending decisions on NGA regulations have already led to substantial regulatory uncertainty, which constitutes another investment impediment.

GSM Association (2018) assessed the role of market structures in the development of the mobile sector (operator performance in investment and 4G networks) in Central America (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama). The analysis was a comparative study of public policy in the region whose findings confirm the existence of an inverted U, where operator investment is maximized when operators have an EBITDA margin of 32-38%. Operators whose profitability is below these levels invest less.

Abate et al. (2020) evaluated the impact of free-competitive market on quality, innovation and price in Europe's mobile communications market during the 4G era (2011-18). The findings indicate that European mobile users in more concentrated markets benefitted the most from higher network quality, particularly with regard to download speeds. Likewise, the dispersion of fixed costs and assets among a greater number of players can result in diseconomies of scale and a less efficient use of resources, which translates into lower network performance, to the detriment of consumers. It is also evidenced from the study that investment per operator is greater in markets with higher profit margins, which are also typically more concentrated markets.

Nchunge, Sakwa and Mwangi (2013) did a study to establish the performance of ICT infrastructure on ICT penetration in educational institutions; specifically focusing on secondary schools in Kiambu county Kenya. The study by using a descriptive research technique, targeted the school management and the teachers involved in ICT implementation and used Stratified, simple random techniques technique to sample the respondents. The findings that high infrastructure costs, inadequate internet connectivity as well as absence of clear policy guidelines in public and private High schools affected the ICT penetration pace in a negative way which leads to low ICT usage causing delay of actual technology integration in schools. It was thus recommended that basic infrastructure acquisition and support guidelines be availed to schools.

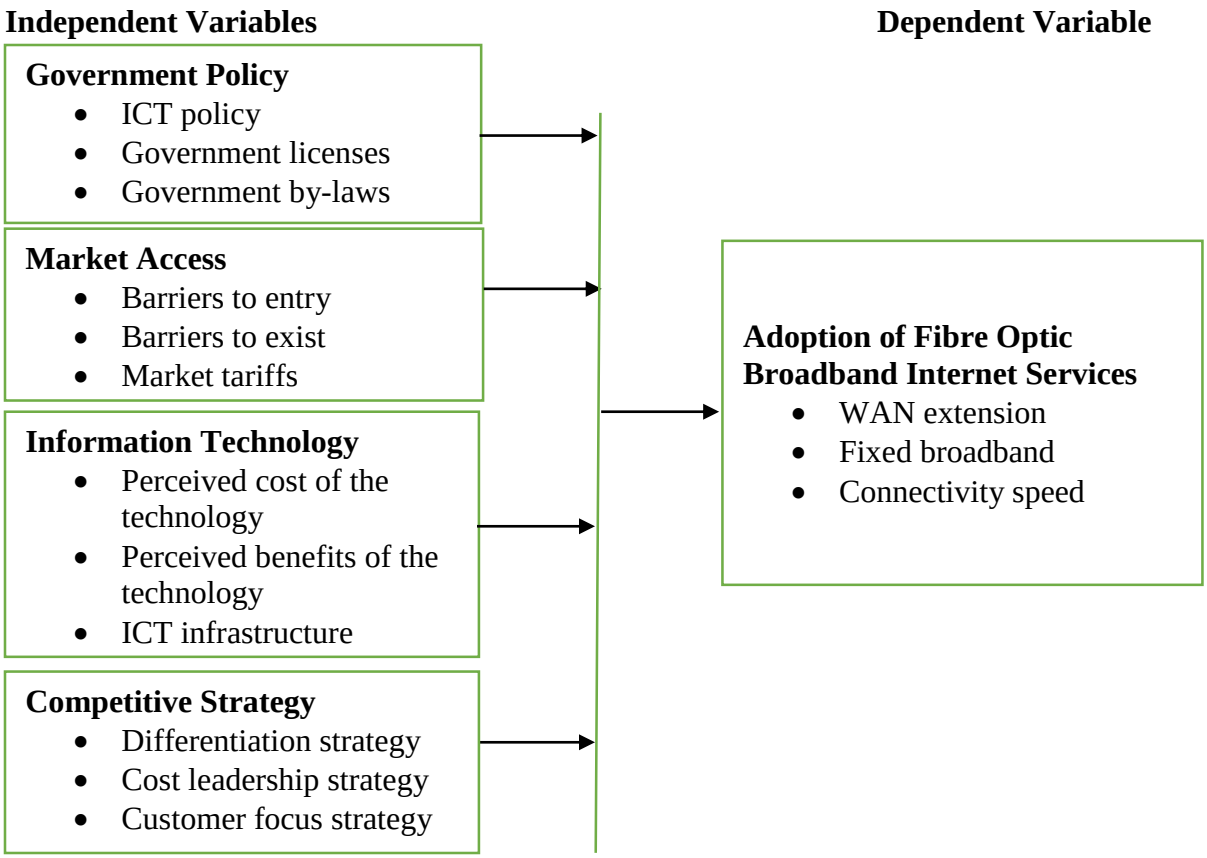
Kanyua (2015) analysed the factors influencing penetration of information and communications technology in public Hospitals in Nairobi County, Kenya. By use of a descriptive research design which targeted seven (7) public hospitals. The study narrowed down to one hundred employees and from their responses it was found that, installation of ICT infrastructure, cost of ICT training materials as well as medical equipment management forms a primary setback to the penetration of ICT. These problems in hospitals' ICT technological infrastructure have drastically performanced the competitive business environment in health sector rendering the services of public hospitals poor in terms of quality. The study recommends that the ministry of health to improve the current ICT status for health sector.

According to Choi, Wong, Chang and Park (2016) competition between the broadband service providers is a key and a significant factor that can cripple the penetration of a technology. The study investigated the effect of inter-platform competition on the penetration of different broadband technologies among xDSL, fibre-optic technologies, and hybrid fibre coaxial (HFC)), and in the process sought to identify potential technology convergence and the speed of technology innovation. The study instrumentally used the Lotka-Volterra equation. From the model, it was

indicated that the competitive forces and market conditions in the industry could be the reason for the penetration rate of the technologies (xDSL, fibre-optic technologies, and hybrid fibre coaxial (HFC)). Although fibre-optic is leading in the market due to an advantage of its superior qualities, alternative technologies have also garnered significant market share in the early stage. Specifically, HFC has gained its own market position, making it a valuable alternative in the short term. Nonetheless, the market will eventually converge to fibre-optics.

Rafert (2016) sought to investigate the effect of broadband competition in driving lower prices and faster download speeds for us residential consumers. The study used primary data provided by Telogical Systems and the findigs indicate that increased competition in broadband markets, measured as the entry of gigabit internet service, additional providers, or higher-speed plans than are currently offered, has a significant effect on prices and speeds. The study records strong effects of the number of competitors on gigabit internet pricing. In particular, if a DMA moves from having one to two providers of gigabit internet, it is estimated that the standard monthly price for gigabit internet will decline by approximately $57 to $62, which is equal to a reduction in price of between 34 and 37 percent.

Conceptual Framework



The conceptual gap was identified in Odhiambo's (2016) study, which focused solely on one service provider and did not consider the broader context of all law firms in the area. There was a

geographical gap indicated by Briglauer and Cambini's (2018) study, which focused on developed countries in the European Union and did not consider the specific context of Kenya. Briglauer (2014) identified a methodological gap in their study, as it relied solely on secondary data. The current study will address this gap by using primary data collection methods.

METHODOLOGY

The current study sought to establish the performance enhancement in the Adoption of Fibre Optic broadband internet services among law firms in Nairobi central business district. Thus, the study used a descriptive research design. The study targeted 52 law firms that uses broadband internet services in Nairobi central business district. Specifically, the study targeted 52 law firms. The list of the firms was available from the Law Society of Kenya (LSK) website as well as the Institute of Certified Public Accountants of Kenya (ICPAK, 2019). Since the current study's population is small that is, 52 Certified Public Accountants, the study used a census survey to target the law firms that uses broadband internet services in Nairobi central business district. Parker and Gallivan (2011) indicates that when the population is too small, sampling is not necessary, since the study is able to cover the whole population units (100% coverage) and thus a census is recommended. The study will make use primary and secondary data. Primary data will be collected using Semi-structured questionnaires. The study used qualitative as well as quantitative which prior to analysis, it was sorted to ensure completeness. Coding of the responses will be done, in order to enable the data to be recorded into SPSS software. The quantitative information was investigated descriptively and inferential statistics were drawn by the use of Statistical Package for Social Sciences (SPSS v25.0). The results from the descriptive analysis were in form of mean, standard deviations, and frequencies as well as in percentage form. Correlation analysis was carried out to find the relationship between variables while regression analysis was used to determine the extent of the relationship between independent predictors and the dependent variable. Results were then be presented in tables. Qualitative data collected from the open-ended part of the questionnaire were analyzed using content analysis and the results were presented in prose form. The study also used a multiple regression analysis model to establish the relationship between the dependent variable and dependent variables.

$$\mathbf{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Where:

Y= Adoption of Fibre optic broadband internet services

α= constant

β_0, β_1, β_2 and β_3, β_4, = Beta coefficients

X_1 = ICT Policy

X_2= Market Access

X_3 = Information Technology

X_4 = Competition

ε = Error term

RESULTS AND DISCUSSIONS

Descriptive Results

Adoption of Fibre Optic Broadband Internet Services

From Table 1 the descriptive results showed that 75% respondents agreed their firm had set aside a budget for adoption of fibre optic (mean=3.89, SD=0.88). The findings indicated that 71% of the respondents agreed that their firm had commissioned a cost benefit analysis report of fibre optic (mean=3.93, SD=0.96). Also, 63% of the respondents agreed that their firm had employed staff who are kowledgable of fibre optic (mean=3.80, SD=0.97). The findings also indicated that 69% of the respondents agreed that their firm had put in place a policy for adoption of fibre optic (mean=3.89, SD=0.91). The findings indicated that 65% of the respondents agreed that their firm reguraly used fibre optic internet (mean=3.89, SD=0.88).

Table 1: Descriptive Results for Adoption of Fibre Optic Broadband Internet Services

	Stongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Standard Deviation
My firm has set aside a budget for adoption of fibre optic	2%	4%	18%	53%	22%	3.89	.88
My Firm has commissioned a cost benefit analysis report of fibre optic	2%	4%	22%	40%	31%	3.93	.96
My firm has employed staff who are kowledgable of fibre optic	2%	4%	31%	36%	27%	3.80	.97
My Firm has put in place a policy for adoption of fibre optic	2%	2%	27%	42%	27%	3.89	.91
My firm reguraly used fibre optic internet	0%	4%	31%	36%	29%	3.89	.88

Government Policy

From Table 2, 66% respondents agreed that the firm had always had access to government financial support for research and development (mean=3.80, SD=0.92). The findings indicated that 62% of the respondents agreed that the government had ensured that there is access to ICT infrastructure and broadband network (mean=3.84, SD=1.04). Also, 58% of the respondents agreed that the government always offers incentives and favourable taxation plans for investment in fibre optic network (mean=3.71, SD=1.06). The findings also indicated that 69% of the respondents agreed that the government always offers support such as finance and expertise to innovations and new products in industry (mean=3.80, SD=1.08). The findings indicated that 60% of the respondents agreed that the government policy has adequate regulations that ensure accessibility to the required resources for innovation (mean=3.82, SD=0.89). The findings also indicated that 57% of the respondents agreed that the firm ensures legal compliance with the set policies and regulations (mean=3.69, SD=1.04). The findings also indicated that 65% of the respondents agreed that the

government recognizes the role of licenses/patents in the security of the intellectual property in the industry (mean=3.82, SD=1.03). These findings resonated with Briglauer and Cambini (2018) and James and Ogollah (2017) who found out that factors such as government offering incentives and favourable taxation plans for investment in fibre optic network boost the effectiveness of adoption of fibre optic broadband internet services.

Table 2: Descriptive Results for Government Policy

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Standard Deviation
The firm has always had access to government financial support for research and development	2%	4%	27%	44%	22%	3.80	.92
The government has ensured that there is access to ICT infrastructure and broadband network	2%	7%	29%	29%	33%	3.84	1.04
The government always offers incentives and favourable taxation plans for investment in fibre optic network	4%	4%	33%	31%	27%	3.71	1.06
The government always offers support such as finance and expertise to innovations and new products in industry	2%	11%	22%	33%	31%	3.80	1.08
The government policy has adequate regulations that ensure accessibility to the required resources for innovation	0%	4%	36%	33%	27%	3.82	.89
The firm ensures legal compliance with the set policies and regulations	4%	4%	33%	33%	24%	3.69	1.04
The government recognizes the role of licenses/patents in the security of the intellectual property in the industry	4%	2%	29%	36%	29%	3.82	1.03

Market Access

From Table 3, 56% respondents agreed that the firm is able to access different market segments via social media (mean=3.71, SD=1.06). The findings indicated that 58% of the respondents agreed that the firm sells its products both locally and across borders (mean=3.67, SD=1.09). Also, 60% of the respondents agreed that the firm is able to do market research on international and local customers (mean=3.71, SD=1.01). The findings indicated that 75% of the respondents agreed that the firm relies on ICT to do its marketing and promotional activities (mean=3.96, SD=0.98). The findings also indicated that 60% of the respondents agreed that the firm is able to access international market at reduced costs (mean=3.73, SD=0.94).

Table 3: Descriptive Results for Market Access

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Standard Deviation
The firm is able to access different market segments via social media	2%	9%	33%	27%	29%	3.71	1.06
The firm sells its products both locally and across borders.	2%	13%	27%	31%	27%	3.67	1.09
The firm is able to do market research on international and local customers	2%	9%	29%	36%	24%	3.71	1.01
The firm relies on ICT to do its marketing and promotional activities	2%	7%	16%	44%	31%	3.96	.98
The firm is able to access international market at reduced costs	0%	9%	33%	33%	24%	3.73	.94

Information Technology

From Table 4, 75% respondents agreed that perceived cost is an important factor considered by the management in the implementation of ideas (mean=3.98, SD=0.94). The findings indicated that 76% of the respondents agreed that the firm has enough and quality IT infrastructure to enhance the process of ICT development (mean=4.07, SD=0.94). Also, 65% of the respondents agreed that the firm has operational IT department for the implementation of ICT ideas (mean=3.84, SD=0.93). The findings also indicated that 73% of the respondents agreed that the management takes into account the perceived benefits the company will accrue before implementation of ICT ideas (mean=3.91, SD=1.00). The findings indicated that 60% of the respondents agreed that the management does vigorous risk assessment and analysis when an idea is brought on board (mean=3.89, SD=0.88). The findings also indicated that 65% of the respondents agreed that the firm has invested in ICT based internet security (mean=3.89, SD=0.88).

Table 4: Descriptive Results for Information Technology

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Standard Deviation
Perceived cost is an important factor considered by the management in the implementation of ideas	2%	4%	18%	44%	31%	3.98	.94
The firm has enough and quality IT infrastructure to enhance the process of ICT development	2%	2%	20%	38%	38%	4.07	.94
The firm has operational IT department for the implementation of ICT ideas.	2%	2%	31%	38%	27%	3.84	.93
The management takes into account the perceived benefits the company will accrue before implementation of ICT ideas	4%	2%	20%	44%	29%	3.91	1.00
The management does vigorous risk assessment and analysis when an idea is brought on board	0%	2%	38%	29%	31%	3.89	.88
The Firm has invested in ICT based internet security	0%	4%	31%	36%	29%	3.89	.88

Competition

From Table 5, 73% respondents agreed that the firm products are well differentiated to meet the customer needs and expectations (mean=3.96, SD=1.17). The findings indicated that 80% of the respondents agreed that the costs of production and operations have been minimized in order to maximize the revenue (mean=4.31, SD=0.95). Also, 52% of the respondents agreed that the company size is an added advantage to wriggle out the shocks that are experienced in the competitive market (mean=3.44, SD=1.08). The findings also indicated that 80% of the respondents agreed that the prices set for new products are acceptable by the existing and new customers (mean=4.07, SD=1.07). The findings indicated that 74% of the respondents agreed that the firm gets positive feedback on the new and existing products and services provided to the customers (mean=4.00, SD=0.95). The findings also indicated that 74% of the respondents agreed that the firm provides products and services that meet or are over the customer expectations (mean=4.04, SD=0.95). The findings also indicated that 73% of the respondents agreed that the firm has both online and physical markets to take advantage of economies of scale (mean=4.02, SD=1.14).

Table 5: Descriptive Results for Competition

	Stongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Mean	Standard Deviation
The firm products are well differentiated to meet the customer needs and expectations	7%	4%	16%	33%	40%	3.96	1.17
The costs of production and operations have been minimized in order to maximize the revenue	0%	7%	13%	22%	58%	4.31	.95
The company size is an added advantage to wriggle out the shocks that are experienced in the competitive market	7%	9%	33%	36%	16%	3.44	1.08
The prices set for new products are acceptable by the existing and new customers	7%	0%	13%	40%	40%	4.07	1.07
The firm gets positive feedback on the new and existing products and services provided to the customers	0%	9%	18%	38%	36%	4.00	.95
The firm provides products and services that meet or are over the customer expectations	2%	2%	22%	36%	38%	4.04	.95
The firm has both online and physical markets to take advantage of economies of scale	4%	7%	16%	29%	44%	4.02	1.14

Inferential Results

Correlation Analysis

The results in Table 6 showed that there is a direct and strong relationship between government policy and the adoption of of fibre optic broadband internet services among law firms in Nairobi central business district (r=0.803**, p=0.000). The strong r value of 0.803 indicated a value of greater than 0 which implied that government policy as a linear variable has a positive association with the adoption of fibre optic broadband internet services among law firms in Nairobi central business.

Likewise, the table showed that there is a direct and strong relationship between market access and the adoption of fibre optic broadband internet services among law firms in Nairobi central business (r=0.797**, p=0.000). The strong r value of 0.797 indicated a value of greater than 0 which implied that market access as a linear variable has a positive association with the adoption of fibre optic broadband internet services among law firms in Nairobi central business. These findings resonated with Aku et al. (2018) who established that effective market access can lead to sustainable increases in household incomes and food security, increased rural employment, and sustained agricultural growth. Hence, there is an urgent need to improve market access of perishable crops, particularly, horticultural produce such as vegetable production to ensure sustainability.

The results further showed that there is a direct and strong relationship between information technology and the adoption of fibre optic broadband internet services among law firms in Nairobi central business (r=0.860**, p=0.000). The strong r value of 0.860 indicated a value of greater than 0 which implied that information technology as a linear variable has a positive association with the adoption of fibre optic broadband internet services among law firms in Nairobi central business. These findings were consistent with Titus (2013) who notes that there is significant relationship between IOIS penetration and IOIS technological factors in the Case of University management.

The results further showed that there is a direct and strong relationship between competition and the adoption of of fibre optic broadband internet services among law firms in Nairobi central business (r=0.490**, p=0.000). The strong r value of 0.490 indicated a value of greater than 0 which implied that competition as a linear variable has a positive association with the adoption of of fibre optic broadband internet services among law firms in Nairobi central business. The findings agreed with Choi, Wong, Chang and Park (2016) who revealed that competition between the broadband service providers is a key and a significant factor that can cripple the penetration of a technology. Competitive forces and market conditions in the industry could be the reason for the penetration rate of the technologies (xDSL, fibre-optic technologies, and hybrid fibre coaxial (HFC)). Although fibre-optic is leading in the market due to an advantage of its superior qualities, alternative technologies have also garnered significant market share in the early stage.

Table 6: Correlation Matrix

		Adoption of Fibre Optic Broadband Internet Services	Government Policy	Market Access	Information Technology	Competition
Adoption of Fibre Optic broadband internet services	Pearson Correlation	1	.803**	.797**	.860**	.490**
	Sig. (2-tailed)		.000	.000	.000	.001
	N	45	45	45	45	45
Government Policy	Pearson Correlation	.803**	1	.682**	.842**	.279
	Sig. (2-tailed)	.000		.000	.000	.063
	N	45	45	45	45	45
Market Access	Pearson Correlation	.797**	.682**	1	.786**	.419**
	Sig. (2-tailed)	.000	.000		.000	.004
	N	45	45	45	45	45
Information Technology	Pearson Correlation	.860**	.842**	.786**	1	.358*
	Sig. (2-tailed)	.000	.000	.000		.016
	N	45	45	45	45	45
Competition	Pearson Correlation	.490**	.279	.419**	.358*	1
	Sig. (2-tailed)	.001	.063	.004	.016	

Relationship between Dependent and Independent Variables

Table 7 presents the model fitness of regression used where the results implied that the selected factors are good and satisfactory predictors of and the adoption of fibre optic broadband internet services among law firms in Nairobi central business. This is evident, as shown by the R^2 value which 0.822. This implied that government policy, market access, information technology and competition explain more than 82% (that is 82.2%) of the adoption of fibre optic broadband internet services among law firms in Nairobi central business.

Table 7: Model Fitness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.907[a]	.822	.804	.35616

The Analysis of Variance as shown in table 8 was also statistically significant implying that government policy, market access, information technology and competition affects the adoption of fibre optic broadband internet services among law firms in Nairobi central business. This is further supported by the F statistic 46.192 where the value was greater than the critical value at 0.05 significance level, $F_{statistic} = 46.192 > F_{critical} = 2.372$ (4, 374).

Table 8: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	23.438	4	5.859	46.192	.000[b]
Residual	5.074	40	.127		
Total	**28.512**	**44**			

The findings revealed that government policy and the adoption of fibre optic broadband internet services among law firms in Nairobi central business have a direct and strong relationship (**β**=0.279, p=0.036) indicating that an increase in one unit of government policy improves the adoption of fibre optic broadband internet services among law firms in Nairobi central business by 0.279 units. Therefore, indicates that the influence of government policy on the adoption of fibre optic broadband internet services among law firms in Nairobi central business district is statistically significant. These findings corroborate those of Briglauer and Cambini (2018) who stated that that an increase in the regulated price for accessing the old network favors consumer penetration of the new technology. Specifically, a rise in the unbundling price of 10 per cent positively affects the fiber-based penetration in the range of 0.7 per cent–1 per cent. It was clear that an increase in the access price decreases the take-up rate, meaning that the impact on fiber coverage is stronger than on fiber penetration.

The results also revealed that market access and the adoption of of fibre optic broadband internet services among law firms in Nairobi central business (**β**=0.230, p=0.038) indicating that an increase in one unit of market access improves the adoption of of fibre optic broadband internet services among law firms in Nairobi central business by 0.230 units. Therefore, the influence of market access on the adoption of fibre optic broadband internet services among law firms in Nairobi central business district is statistically significant. These findings resonated with Aku et al. (2018) who established that effective market access can lead to sustainable increases in household incomes and food security, increased rural employment, and sustained agricultural growth.

Regression results revealed that information technology and the adoption of of fibre optic broadband internet services among law firms in Nairobi central business have a direct and strong relationship (**β**=0.382, p=0.013) indicating that an increase in one unit of information technology improve the adoption of of fibre optic broadband internet services among law firms in Nairobi central business in Kenya by 0.382 units. Therefore, the influence of information technology on the adoption of fibre optic broadband internet services among law firms in Nairobi central business district is statistically significant. These findings were consistent with Cuevas-Vargas (2016) that in Guanajuato (Mexico), there exists enough empirical evidence the ICTs are a facilitator of innovation by influencing the performance of the businesses positively and significantly. Advancement of technology can make employees of a given company to be super-efficient as well as improve the relationship with the customers.

Regression results revealed that competition and the adoption of fibre optic broadband internet services among law firms in Nairobi central business have a direct and strong relationship (**β**=0.186, p=0.020) indicating that an increase in one unit of competition improves the adoption of fibre optic broadband internet services among law firms in Nairobi central business by 0.186 units. Therefore, the influence of competition on the adoption of fibre optic broadband internet services among law firms in Nairobi central business district is statistically significant.

Table 9: Regression coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.281	.342		-.820	.417
Government Policy	.279	.128	.270	2.173	.036
Market Access	.230	.107	.239	2.150	.038
Information Technology	.382	.147	.381	2.591	.013
Competition	.186	.077	.178	2.420	.020

$Y = -0.281 + 0.279X_1 + 0.230X_2 + 0.382X_3 + 0.186X_4$

Where:

Y = Adoption of Fibre Optic broadband internet services

X_1 = Government Policy

X_2 = Market Access

X_3 = Information Technology

X_4 = Competition

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The findings showed that there is a direct and strong relationship between government policy and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (r=0.803**, p=0.000). The regression findings revealed those government policy and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (**β**=0.279, p=0.036). The findings also showed that there is a direct and strong relationship between market access and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (r=0.797**, p=0.000). The regression findings revealed those market access and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (**β**=0. 230, p=0. 038).

The findings showed that there is a direct and strong relationship between information technology and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (r=0.860**, p=0.000). The regression findings revealed those information technology and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (**β**=0.382, p=0. 013). The findings also showed that there is a direct and strong relationship between competition and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (r=0. 490**, p=0.000). The regression findings revealed those competition and the adoption of fibre optic broadband internet services among law firms in Nairobi central business district (**β**=0.186, p=0.020).

It was therefore, concluded that government policy, market access, information technology and competition effects have a positive and significant relationship with the adoption of fibre optic broadband internet services among law firms in Nairobi central business district in enhancing their performance. Thus, the firm has always had access to government financial support for research and development, the government has ensured that there is access to ICT infrastructure and broadband network, the government always offers incentives and favourable taxation plans for investment in fibre optic network for instance has increased the adoption of fibre optic broadband internet services.

Based on the findings of the study, the study recommends that the government should reduce the regulations on penetration of fiber optics by telecommunication companies. This will increase the rate at which the fibre optic broadband internet services are adopted by firms in Kenya. The study also recommends that firms should embrace and incorporate fibre optic broadband internet services in market access strategies such as payer perspectives, and pragmatic, viable solutions early, also conducting market research and analysis in order to thrive in today's advancing world of technology.

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