EFFECTS OF INTERNET BROADBAND ACCESS ON SERVICE DELIVERY:
CASE OF HEALTH CARE SECTOR IN ELGEYO-MARAKWET COUNTY,
KENYA

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF LAW, ARTS
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APRIL, 2023
DECLARATION

This research project is my original work and has never been presented for a degree in any other University.

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DEDICATION

I dedicate it to all policy makers on health matters in Kenya and academicians whose research interest is on Broadband Internet Access and Service delivery.

I also dedicate to my children and siblings to continue serving our nation Kenya and the rest of the world.
ACKNOWLEDGEMENT

I thank Dr. Jane Njoroge for her overwhelming support throughout the entire research proposal Journey. She was instrumental in guiding me during the entire research period. I am grateful to the school of humanities and social sciences at Kenyatta University for the opportunity they gave me to pursue a degree of masters of arts in public policy & administration.

Thanks to my colleagues at Kenyatta University for their moral support that made it possible for me to work towards completion of the research project. Thanks to my parents and spouse for encouragements throughout this period.
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ABSTRACT

Broadband Internet access in the healthcare sector worldwide is essential for improvement in service delivery. The extent to which hospitals are connected to broadband Internet varies worldwide. In Kenya, Internet broadband access has been adopted in the healthcare sector but its penetration differs from one county to another. The current study sought to determine the effects of Internet broadband access on service delivery in the healthcare sector in Elgeyo Marakwet County. The specific objectives include to determine how access to Internet infrastructure affects service delivery in health care, to establish how Internet speed affects service delivery in health care and to find out how broadband pricing affects service delivery in the health care. The study was anchored on the diffusion of innovation theory. The study adopted the descriptive survey research design. The target population was 240 respondents comprised of 24 Doctors, 40 Nurses, 40 Clinical doctors, 24 Medical Laboratory Technologist, 16 Pharmacist, 16 Nutritionist or Physiotherapist, 16 Health Records officers, 8 Radiographers or Medical Engineers and 56 management staffs. Both stratified and simple random sampling techniques were adopted in the study. The data for the study was collected using both questionnaires and interview schedule. The current study adopted content validity, which was assessed on the basis of expert’s opinion. Reliability of the research instruments was measured using Cronbach’s alpha. Quantitative data collected was analyzed using descriptive statistics, inferential statistics while qualitative data content analysis. The findings revealed that Internet infrastructure had a positive and significant effect on service delivery (β=0.459, p < 0.05). Internet speed had a positive and insignificant effect on service delivery (β= 0.255, p>0.05) and broadband pricing had a negative and significant effect on service delivery (β= -0.601, p < 0.05). The study concluded that Internet infrastructure affects service delivery in the healthcare sector. This is attributed to proper functioning of Internet server applications which contributes to enhancement of efficiency in the services offered at the facilities. The study also concludes that Internet speed affects service delivery in the healthcare sector. This is attributed to Internet transfer technology that is used at the facility affecting Internet speed which in-turn affects service delivery and Internet transfer technology which makes services affordable at the facility. The study also concludes that Broadband pricing affects service delivery in the healthcare sector in Elgeyo Marakwet County. This is attributed to the price set for Internet broadband access which affects how they offered services at hospitals. The study recommends that the Communication Authority of Kenya (CA) should consider internet infrastructure, Internet speed and Broadband pricing when enhancing Broadband Internet penetration in the healthcare sector in the marginalized counties in Kenya.
CHAPTER ONE

1.0 INTRODUCTION

This chapter is comprised of: the study background, statement of the problem, objectives, significance of the study, limitations and delimitation, theoretical and conceptual framework and operational definition of terms.

1.1 The Background to the Study

There is need for service delivery in the health sector to be improved worldwide. One way of improving service delivery is through adoption of broadband Internet access (Eze, Awa, Okoye, Emecheta & Anazodo, 2021). Broadband Internet access helps to reshape many health-related processes. It helps medics to provide patients with faster diagnosis to their respective health conditions as well as it helps in the development of treatment plans that are suitable to patients (Dholakia & Kshetri, 2021). Ways in which broadband Internet access can improve service delivery include; making patient records as well as test results accessible by patients from the examination room (Fink, 2017). It also helps patients and their attendants access practice guidelines faster. Other ways service delivery in the healthcare sector can be improved is that it facilitates faster consultation electronically on treatment plans (Burstin, Leatherman & Goldmann, 2016). Broadband Internet access supports effective treatment of patients (Eze et al., 2021). There is therefore need for adoption of broadband Internet in the sector with the view of improving service delivery.

1.1.1 Internet Broadband Access

Internet broadband access refers to high-speed Internet access (Chin & Farlie, 2020). Carl (2017) posits that broadband refers to high-speed Internet access than others. According to Mehrotra, Huskamp and Souza (2017), the solution to service delivery below the par in the healthcare sector across the world can be resolved or mitigated by the use of high-speed Internet where hospitals can offer telemedicine, which is a health care service that is delivered remotely through telecommunications. Mehrotra et al. (2017) further posits that its adoption varies across organizations due to access to broadband challenges.
The components of Internet broadband access adopted in this study include: Internet infrastructure, Internet speed and broadband pricing. Internet infrastructure is an array of telecommunications equipment and technologies used in a network that are necessary for provision of faster Internet (Kelley, 2017). Internet speed is the rate at which data moves from the World Wide Web to your home computer among others (Straub, 2014). Broadband pricing refers to setting the cost for fixed broadband connection in a county (Aron, 2013). These components of Internet broadband access affect service delivery in the healthcare sector.

Broadband Internet access has been significantly embraced in the hospitals worldwide but its use is not the same in all nations (Chin & Farlie, 2020). In the United States, Internet broadband access plays an increasingly important role in the healthcare sector (Clyburn, 2016). Telehealth has been adopted where telecommunications technologies are being used to offer healthcare services. This has helped to revolutionize the services offered by hospitals (Clyburn, 2016). In England, Internet broadband access has been adopted in the healthcare sector where medics have had access to more medical data that has helped them to offer quality services to patients (Lou, Sickles, Huang, Hoogstrate, Cao, Wang & Jahangiri, 2017). It helps to ensure information about clients as well as their test results can be easily accessed and shared via Internet platform and therefore it has contributed to improvement in how service is provided in hospitals. In England, adoption of Internet broadband access has helped medic to consult each other electronically and therefore improves healthcare services quality (Rind, Kohane, Szolovits, Safran, Chueh & Barnett, 2019). In the healthcare sector in England, Internet broadband access has made patients to access consultancy services electronically and it helps patients to be diagnosed while at home (Kohane, Greenspun, Fackler, Cimino & Szolovits, 2016).

In Ghana, Internet broadband access in the healthcare sector has contributed to connection of medical devices with various health applications so as to offer services that are of good quality (Rothstein, Jennings, Moorthy, Yang, Gee, Romano & LeFevre, 2016). It has further resolved shortcomings of rural healthcare delivery in Ghana. Internet broadband access has led to patients being treated at home due to adoption of e-prescriptions among others (Baker, Xiang & Atkinson, 2017). Internet broadband access has enhanced service
delivery in the healthcare sector through ehealth, telehealth, digital imaging and eprescription among others (Abekah-Nkrunah, Guerriero & Purohit, 2014). It has enhanced the functioning of health management information systems as well as big data analytics. It is beneficial, as it has cut of costs associated with patients moving from one point to another is need for health services. It has also made patients to get faster treatment at the comfort of their homes (Blusi, Dalin & Jong, 2014).

In Sierra Leone, Internet broadband access has led to utilization of both Electronic Health Records (EHR) and eprescription (Allsop, Powell & Namisango, 2018). Internet broadband access has led to the adoption of Telehealth technologies which has contributed to easy access to health services for those who do not reside in urban setups and therefore it has not only contributed to a reducing strain on hospital resources but enhancement of service delivery in health facilities (Hanson, Puplampu & Shaw, 2017).

In Rwanda, the government has deployed the Kigali Metropolitan Network, which interconnects all government institutions, which include public health facilities (Ackerman & Strickland, 2018). Internet broadband access has contributed to ehealth solutions such as Onehealth and Health Management Information System (HMIS) among others, which have contributed to an improvement in both quality as well as access to healthcare (Katz & Pantelis, 2019). The adoption of Health Management System (HMS) and Telemedicine among others has contributed to improvement in hospitals (Kantengwa, 2017). Internet broadband access has led to approximately more than 500 hospitals connected to R-HMIS (Musabyimana, Ruton, Gaju, Berhe & Grépin, 2018).

In Kenya, the national government has connected Sixteen (16) Level Four (4) hospitals as well as Five (5) level 5 hospitals to high-speed Internet in a bid to realize Universal Health Coverage (UHC) (Thion’o, 2020). According to Ochieng (2020), the hospitals are connected to LANs within the hospitals premises and to the National Optic Fibre Backbone Infrastructure (NOFBI) as backhaul for provision of Internet services so as to improve hospital administration service delivery as well as patient care. It has also contributed to improvement in telemedicine. Internet connectivity to these health facilities has helped to enhance prompt service delivery (Thion’o, 2020). The Kenyan government has deployed
the NOFBI cable to all the 47 County headquarters through Information and Communication Technology Authority (ICTA) (Muinga, Sen, Ayieko & Todd, 2015).

The NOFBI Cable provides affordable and quality broadband infrastructure. NOFBI deployment together with Universal Service Fund (USF) by Communication Authority of Kenya (CA) facilitates access of Internet broadband services to underserve and un-served areas for healthcare delivery among others (Kang’a, Puttkammer, Wanyee, Kimanga, Madrano & Muthee, 2016). This has been achieved through enhancement of broadband connectivity as well as reduction of costs for Applications Service Providers and Community Networks and Services offering Internet Service so as to provide rural broadband coverage.

Mutula (2015) posits that Internet broadband access has been adopted in the healthcare sector in Kenya but its penetration differs from one county to another. Internet broadband access has to some extent provided solutions to challenges associated with an efficient health care system in non-urban setups. According to Mugeni, Wanyembi and Wafula (2017), data on consumer satisfaction with Internet broadband services in the health sector has not been well articulated in the literature, this therefore necessitates the need for the Ministry of Health in both National and County governments in liaison with the Ministry of Information, Communications and Technology, Innovation and Youth affairs and other stakeholders in the healthcare sector in Kenya to opt for broadband Internet use in the healthcare sector.

1.1.2 Service Delivery

Service delivery is rendering a product that is goods or services to the recipients (Maccoby, Norman, Norman & Richard, 2021). It is the provision of services to people (Leroy, 2020). It is an important aspect when assessing healthcare providers and citizens (Abe & Monisola, 2020). Service delivery encompasses how services are offered to patients (Hertz, 2017). Service delivery is what care providers do to meet what user (s) or beneficiaries require (Mwaniki & Dulo, 2018). In the health system, service delivery refers to where patients receive the treatment as well as supplies entitled. In the healthcare sector, all hospital attendants require certain services to be offered to them. How the services are offered to each client determines the extent to which the clients are satisfied. It is good for
broadband Internet to be adopted as it helps to enhance service delivery (Reich, Yueying & McCleary, 2018).

1.1.3 Healthcare sector in Kenya
Major players in the health sector in Kenya include; the MOH, Kenya Medical Services (KEMSA), county governments, other Semi-Autonomous Government Agencies and the private sector (Mwaniki & Dulo, 2018). Access and use of broadband Internet in the healthcare sector in Kenya has grown very fast since 2013. Broadband Internet access has enabled patients to get doctors and nurses and other information online as (Ndavi, Ogola, Kizito & Johnson, 2019). With the rapid increase in access to broadband Internet has strongly enhanced service delivery because it helps data to be easily imported from vital signs monitors, ventilators and infusion devices. This data is then stored safely and displayed in specific formats for quick service delivery.

In Elgeyo-Marakwet County, broadband Internet connectivity has been embraced in the healthcare sector (Amdany, Chelagat & Marete, 2020). Elgeyo-Marakwet County has implemented an Integrated Health management system to link-up Hospitals. However, broadband Internet connectivity is being embraced in education and health sector in Elgeyo-Marakwet County but at a slow pace. Statistics from Communications Authority of Kenya (2021) posits that Elgeyo-Marakwet County is among the marginalized counties, which has recorded an increase in access to broadband Internet in the North Rift region. In the County, Broadband Internet access is evident among households, businesses, government offices, academic institutions, hospitals, financial institutions and firms in the agricultural sector (Kemoi, Mailu & Kibaara, 2020). As much as broadband Internet access has a great impact on service delivery, little is known about how Internet broadband access affects delivery of services in the healthcare sector in Elgeyo-Marakwet County, which the current study sought to address.

1.2 Statement of the Problem
How services are offered in hospitals affect customers, economy and performance of the hospitals. It also affects hospitals corporate image and gives hospitals a competitive edge if service delivery at the hospital is of good quality in comparison to other hospitals within the County. According to Amdany et al. (2020), over 45% of the health facilities in Elgeyo-
Marakwet County lack essential equipment, medication and faces shortage of medical facilities. This has affected effective service delivery in the hospitals in Elgeyo-Marakwet County. Hospitals are facing a number of challenges, for example, they don’t have enough workforce, enough funds and lack the appropriate IT infrastructure (Kemoi et al., 2020). Access to Internet broadband connectivity is supposed to improve service delivery in the hospitals, as it should help the hospital management to be able to track distribution of drugs, private data management, seamless sharing of information regarding patients especially during cases of patients transfer from one hospital to another and enable residents, county health management or hospital management to know the drugs in stock and utilization at a glance. In addition, it enables tracking the time taken in service delivery in health facility hence informs the decisions during emergency cases. The hospitals should therefore increase access to Internet broadband so as to improve on service delivery. However, most of the public hospitals in the County have not been able to increase access to broadband. Empirically, little is known about Internet broadband access and delivery of services in the healthcare sector in Elgeyo-Marakwet County. The current study sought to address this knowledge gap.

1.3 Objectives of the study

i. To determine how access to Internet infrastructure affects service delivery in health care.

ii. To establish how Internet speed affects service delivery in health care.

iii. To find out how broadband pricing affects service delivery in the health care.

1.4 Research Questions

i. How does access to Internet infrastructure affect service delivery in health care?

ii. How does Internet speed affect service delivery in health care?

iii. How does broadband pricing affect service delivery in the health care?

1.5 Significance of the Study

To the government through the Ministry of Health the study findings will help it in liaison with the Ministry of Information, Communications and Technology to subsidize broadband
pricing so as to enhance Internet broadband connectivity in all the health facilities in Elgeyo-Marakwet County.

To the hospitals’ management, findings will shade light more on Internet broadband access and service delivery in health care sector. The management will further benefit from the recommendations of the study and this will help them improve service delivery by enhancing Internet broadband access in the health care sector.

The customers of various hospitals in Elgeyo-Marakwet County will be able to understand how Internet broadband access affects service delivery in hospitals. Service delivery can then be made better in health care sector. The customers can then recommend Internet broadband access penetration to be enhanced in all health facilities, which among others will help to enhance integration of all health services and therefore hospitals will be able to record an improvement in service delivery.

The academicians will also benefit because review of literature on Internet broadband access and service delivery will be done. It will also contribute to theoretical development on Internet broadband access as well as service delivery. This will contribute to academic progression on Internet broadband access and service delivery as suggestions for further studies will be provided in the study. Future researchers will use it for further research on Internet broadband access and service delivery.

1.6 Scope and Limitations

Scope

The study focused on internet broadband access and service delivery in the health care sector in Elgeyo- Marakwet County, Kenya. Indicators of internet broadband access that were adopted in the study were; Internet infrastructure whose indicators were; server applications, domain name system, servers and network. Internet speed and its indicators were; transfer technology, number of users, connection type and internet use. Broadband pricing and its indicators were; price set, price affordability and price competitiveness. Service delivery and its indicators were; quality, affordable, accessible and efficacy. The study was conducted between January 2022 and January 2023.
Limitations

The study faced resource and time constraints given that Elgeyo-Marakwet County has 113 health facilities and therefore collecting data from all of them would be time and cost demanding. To ease the data collection exercise, two research assistants assisted in data collection and the study was done in a section of the hospitals i.e., the study was done only in county, and sub-county hospitals in Elgeyo-Marakwet County. This helped to reduce on the expenses to be incurred in the data collection exercise.
CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL / CONCEPTIVE FRAMEWORK

This chapter entails review of literature on the concept of service delivery, Internet infrastructure, Internet speed and broadband pricing, theoretical and conceptual framework. It also covers gaps and chapter summary.

2.1 Empirical Review

2.1.1 Service Delivery in Healthcare sector

Service delivery is the actual provision of services as well as products to the customer or (Roth & Menor, 2003). It is concerned with the location, timing as well as the manner in which a service product is provided to clients. Service delivery of any business entity is very important as it determines the continuity or the collapse of the business entity (Greenhalgh et al., 2004). The way service is delivered to clients by a service provider is of great importance because it contributes to either satisfaction, retention of customers or dissatisfaction as well as loss of customers (Brown & Osborne, 2012). Service delivery of any organization has a great impact on its image. Service delivery is the most important component that can help an organization to achieve long-term competitive advantage (Roth & Menor, 2003).

Health facilities need to know how their customers view their services because it gives them an indication of their public image (Greenhalgh, Robert, Macfarlane, Bate & Kyriakidou, 2004). Health facilities should ensure that the services they give are of high quality so as to keep or maintain the hospitals good reputation. The indicators of service delivery that will be adopted in this study include: quality, affordable, accessible and efficacy. Quality is a long-term commitment by the county government through health facility to provide services that are able to satisfy the needs as well as the desires of customers continuously. The responsibility of offering quality service falls on both the governments, management of the organization as well as its workforce. Quality is measurable as the customer is able to compare his or her expectations with the values; they get compared to the costs spent.
Quality service delivery is important as well as challenging tasks that hospitals confront with due to its intangibility, unpredictability, inseparability, perishability, as well as labor-intensive nature (Greenhalgh et al., 2004). In the health sector, some clients prefer one hospital to the other on the basis of the quality of services provided at the facility. Affordability is another factor that is considered when accessing service delivery. The services provided should be affordable to the market niche targeted (Pleger, 2000). It should also be accessible to its market niche and the services provided should be efficient. Little is known about service delivery in the healthcare sector in Elgeyo-Marakwet County and hence the need for this study to be done. Service delivery in healthcare sector is affected by many factors but the current study seeks to focus on Internet infrastructure, Internet speed and broadband pricing and how it affects service delivery in the healthcare sector.

2.1.2 Internet Infrastructure and Service Delivery

Internet infrastructure or broadband infrastructure is a network of arrays adopted for the sake of providing high-speed Internet access (Kelley, 2017). It also refers to the physical infrastructure that is used for sending data that is able to provide broadband services (Stead, 2018). It also relates to deployed telecommunications equipment and technologies that are needed so as to provide high-speed Internet access (Johnston, 2020). It is the medium that is used to provide fiber optic cable and copper cable among others (Haynes, Streatfield, Cookman & Wood, 2019).

Broadband infrastructure comprises of all IT infrastructure that is used to provide broadband as well as any software that is used for the course (Patel, Arocha & Kaufman, 2015). It also includes maintenance as well as other functions that are required to support the delivery of broadband (Keen & Wyatt, 2020). Network nodes facilitate access to the broadband infrastructure. In normal practice, market participants who include but not limited to infrastructure owners and service providers’ helps in the oversight of the infrastructure (Séror, 2017). The resultant is that it affects how service is delivered to the consumer.

In United States of America, Tierney, Johnston, Lee and Thompson (2016) opine that Internet infrastructure has been subsidized so as to make it affordable. This has hen made
it possible for an increase in its adoption and subsequent installation in hospitals. According to Lin and Huarng (2017), broadband infrastructure is what is needed for broadband Internet to be accessed. In health facilities, it makes service delivery affordable and it enhances efficiency in service delivery. Broadband infrastructure is necessity in countries like USA because among others it promotes public health and public safety for Americans around the country (Johnston, 2020).

Hospital administration is being transformed worldwide using Internet infrastructure (Kelley, 2017). In the health care sector, existence of broadband infrastructure helps hospital stakeholders to access or use Internet for provision of effective services (Haynes et al., 2019). It facilitates messaging as well as access to fax services and specialized information search. It also helps in the access to portal infrastructures (Corn, Rudzinski & Cahn, 2016). In the health care sector, broadband infrastructures contribute to faster provision of healthcare services (Stead, 2018). Internet infrastructure aids in provision of good health services (Lin & Huarng, 2017).

The components of Internet infrastructure that are adopted in this study included; application server, domain name system, servers and network. Application server refers to a modern form of platform middleware (Miller, Niedner & London, 2021). It is needed for applications to become functional (Barnett, Winickoff, Dorsey, Morgan & Lurie, 2018). In the health sector just like other sectors, application server affects service delivery (Barnett, 2014). Domain name system refers to the database adopted for naming where we find the Internet domain names, which are changed into Internet Protocol (IP) (Stead, 2018). The system is important because DNS is needed for all the activities done on the Internet requires it (Kelley, 2017). A good working DNS in the healthcare sector will help to improve service delivery (Barnett et al., 2018). A server refers to a system that is able to data among others to other computers (Miller et al., 2021). The effectiveness of the servers has an effect on service delivery. A server is used to store, send as well as receive data (Barnett, 2014). Hospitals should adopt those servers that are well functioning (Corn et al., 2016). Studies on how server (s) affect service delivery are few and hence gap exists. In Elgeyo-Marakwet County, there are no studies that have examined the effect of servers on service delivery. This study sought to address this gap.
Networks refer to any network that is used in connection with the provision of an ICT service (Lin & Huarng, 2017). Networks are needed in the healthcare sector because data is exchanged among various stakeholders and therefore networks will help to enhance service delivery (Barnett et al., 2018). A network allows computers to be able to share files and it also allows users to message each other (Corn et al., 2016). These aspects are present in the hospital setup but empirically little is known the subject matter in the healthcare sector. In Elgeyo-Marakwet County, there are no studies that have examined this aspect and how it has affected service delivery in the healthcare sector. A gap exists which this study sought to address.

2.1.3 Internet Speed and Service Delivery

Internet speed is the rate at which data is able to travel from WWW to a computer that is for example at home among others (Straub, 2014). Kbps and Mbps is used to measure Broadband speed. If they are high, it implies that the speed will be fast (Ting, 2015). Broadband or high-speed Internet refers to 100 Mbps for download and 1,000 Mbps or higher on the highest-tier plans for uploads. Broadband Internet is advocated for since it is fast compared to other types (Prasad, 2018).

In a hospital setup, Internet speed is very important, as it is the one of the key considerations when choosing service provider for provision of Internet. It helps to determine not only how quickly tasks are performed online but also how many of those tasks your network can handle at a single time. Internet speed required for an organization or individuals depend on usage and if at the organization, multiple devices are used to access Internet at a time then a faster Internet speed plan is required (Melville, Kraemer & Gurbaxani, 2014). Slow Internet connection kills business productivity and it can result into missed business opportunities. Organizations require fast Internet speed so as to save on time as well as enhance productivity and efficiency. Fast Internet speed is needed to support multiple users (Ziadi & Knufie, 2016).

The indicators of Internet speed that will be adopted in this study include; transfer technology, number of users, connection type and Internet use. Data transfer technology in fixed networks affects broadband speed (Davis, Bagozzi & Warshaw, 2019). The use of Fibre-optic a well as cable networks helps to enhance the speed at which data is transmitted
across the Internet platform (Devaraj & Kohli, 2013). Technology used for data transfer therefore has an effect on Internet speed, which affects service delivery (Melville et al., 2014). In the healthcare sector around the globe, few studies exist that have been conducted on data transfer technology and how it affects broadband speed as well as service delivery in the healthcare sector.

According to Roztocki and Weistroffer (2014), adding clients to an Internet-connected network can contribute to traffic congestion as well as reduction in access speeds for all users. Internet speed is influenced by number of users (Gatautis, 2018). In practice, the number of users affects Wi-Fi speed because the total available bandwidth on Internet package is shared between all the users and is not a per-person allocation (Gichoya, 2015). This implies that the more the users are connected, the more the available bandwidth has to be shared out and therefore it decreases the speeds each user can get. In Elgeyo-Marakwet County, no studies exist that have been conducted on number of users in regards to Internet speed and service delivery in healthcare sector and that is why the current study was done.

Connection type affects Internet speed this is because different network connectivity’s influences Internet speeds (Paletta & Dias, 2018). Internet speed is influenced by use of advancements in technology (Oliveira & Martins, 2017). Whether cable or wireless connectivity is adopted in an organization, cable Internet connectivity is faster and reliable than a wireless network. Internet usage affects Internet speed, which affects service delivery. If several applications are in operations at the same time, it will contribute to slow Internet (Jay & Webber, 2015). This is due to the fact that various applications are competing for the same Internet (resource). In Nigeria, Adewoye, Ayo and Oni (2019) researched on the impact of IT investment on service delivery in Ladoke Akintola University. Internet use was one of the factors that were considered in the study. The findings revealed that Internet use affects both Internet speed and service delivery in Ladoke Akintola University. The study was not conducted in the healthcare sector. Methodological gaps also exist as no diagnostic tests were conducted in the study. The current study seeks to address these gaps. In Elgeyo-Marakwet County, no studies exist
that have been done on Internet broadband Access. The current study sought to address this knowledge gap.

2.1.4 Broadband Pricing and Service Delivery
Broadband pricing refers to setting the average cost of a landline (fixed) broadband connection in a given county (Aron, 2013). The prices are not uniform around the globe. For example, in Ukraine, the monthly price of unlimited 10Mbps landline connection is approximately 3.4 dollars, which is cheap in comparison to Australia that retails at 54 United States Dollars (Numbeo, 2016). Broadband price has become a competitive variable as different countries around the globe seek to improve their endowment of network infrastructures as well as services that are important for competitiveness as well as social inclusion (Lyons, 2020).

For fixed broadband, companies use pricing policies that differ across companies. The pricing policies sometimes have contributed to customer disappointment attributed to abrupt changes in price without the knowledge of the customer (Ford & Spiwak, 2014). The indicators of broadband pricing that will be adopted in this study include; price set, price affordability and price competitiveness. Price set, price affordability and price competitiveness not only affect broadband pricing but it also affects service delivery at organizational level. The price set should be affordable for the market niche targeted and it should also be competitive (Fletcher, 2009). When the price is affordable it implies that consumers will not strain in payment for Internet charges and therefore service delivery that relies on Internet usage will not be adversely affected due to suspension of Internet supply to a given organization just because of inability to pay monthly Internet broadband charges.

Empirically, there are few studies that have conducted on broadband pricing and service delivery in the healthcare sector worldwide. Reddick, Enriquez, Harris and Sharma (2020) researched on determinants of broadband access and affordability. Findings revealed that broadband pricing is among the determinants of broadband access. The study had not examined broadband pricing, which the current study seeks to address. Methodological gaps exist, as sampling techniques adopted in the study were not incorporated in the study. All these were addressed in the current study.
2.2 Theoretical Review

2.2.1 Diffusion of Innovation Theory
The theory was developed by Rogers in 1962. It states that with passage of time an idea spreads and gets embraced within the society. This implies that diffusion has taken place, which contributes, to people embracing a new idea that sometimes has an influence on their behavioral patterns. Internet Broadband access is an innovation whose diffusion helps to improve service delivery. Internet broadband access is an innovation that is meant to increase the quality of Internet services to consumers. It is therefore an innovation whose diffusion in the healthcare sector will help to improve service delivery. When technology is being introduced, it is important to understand those targeted. This will help to improve acceptability of the idea by majority of the people in the society.

It is recognized for its ability to provide an explanation on the process of innovation adoption since the 1960s. In the healthcare sector, the theory is applicable to adoption of new healthcare information technologies. It applies to adoption of a telehealth program (Helitzer, Heath, Maltrud, Sullivan & Alverson, 2013). It is adopted in e-health projects where it helps to provide more explanation on aspects touching on use of technology. In this study, the theory was adopted to assess adoption of Internet broadband access in the healthcare sector.

2.2.2 Technology Acceptance Model (TAM)
It was developed by Davis (1989) who postulated that acceptance of a system is influenced by appreciation of the usefulness of a certain in terms of the fact that a certain program does not require more effort and also how much an individual appreciates that when adopt a particular technology would enhance service delivery. Ke, Sun and Yang (2012) opined that the external factors to Technology Acceptance Model are user characteristics and system characteristics. According to the scholars, people embrace or adopt technology on the basis of user characteristics more than system characteristics. For ease of use of new technology, system characteristics have a significant influence than user characteristics (Ke et al., 2012).

The model assumes that it is easy to use the innovation and it is beneficial and therefore it affects external factors on the behavior of use of information technology. The model has
been criticized by Hai and Kazmi (2015) on the grounds that the model is not robust enough to provide explanation on the behavior of users about purchase, rejection or technology use acceptance. The theory has been adopted in this study because it provides information on usefulness and benefits of technology, which are key in embracing new technology. The model was relevant in explaining broadband Internet access.

2.3 Conceptual Framework

It is as shown below:

Independent variable

**Internet Broadband Access:**
- Internet infrastructure;
  - Server applications
  - Domain Name System
  - Servers
  - Network
- Internet speed;
  - Transfer technology
  - Number of users
  - Connection type
  - Internet use
- Broadband pricing;
  - Price set
  - Price affordability
  - Price competitiveness

Source: Researcher (2022)

The independent variable is Internet Broadband Access and its constructs include; Internet infrastructure, Internet speed and broadband pricing. The indicators of Internet infrastructure that was adopted in this study include; service applications, domain name system, servers and network. The sub constructs of Internet speed include; transfer technology, number of users, connection type and Internet use. The indicators of broadband pricing include; price set, price affordability and price competitiveness. The dependent

Figure 2.1: Conceptual Framework
variable is service delivery and its indicators include; quality, affordable, accessible and efficacy.

2.4 Gaps
The summary of research gaps is provided in Table 2.1.

### Table 2.1: Gaps

<table>
<thead>
<tr>
<th>Researcher (s)</th>
<th>Topic</th>
<th>Findings</th>
<th>Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adewoye, Ayo and Oni (2019)</td>
<td>Impact of IT investment on service delivery in Ladoke Akintola University.</td>
<td>The findings revealed that Internet use affects both Internet speed and service delivery in Ladoke Akintola University.</td>
<td>Methodological gaps also exist as no diagnostic tests were conducted in the study.</td>
</tr>
<tr>
<td>Reddick, Enriquez, Harris and Sharma (2020)</td>
<td>Determinants of broadband access and affordability: An analysis of a community survey on the digital divides in the United States of America.</td>
<td>Findings revealed that broadband pricing is a determinant of broadband access.</td>
<td>Methodological gaps exist, as sampling techniques adopted in the study were not incorporated in the study.</td>
</tr>
<tr>
<td>Ng’ang’a (2014)</td>
<td>Impact of ICT in service delivery of the Ministry of Planning and devolution in Kenya.</td>
<td>The findings revealed that Internet infrastructure has a positive and significant effect on service delivery.</td>
<td>The study was narrow in scope, as it had not incorporated application server, domain name system, servers and network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A methodological gap exists, as the sampling techniques adopted in the study were not provided in the study.</td>
</tr>
</tbody>
</table>
2.5 Chapter summary
This chapter has reviewed literature on Internet infrastructure, Internet speed and broadband pricing and how they affect service delivery. It is evident that scarce literature exists on the constructs and therefore the need for a study to be conducted to address research gaps that exist on the subject matter in the body of knowledge. Few empirical studies exist on Internet broadband access and service delivery in the health care sector in Kenya. The literature reviewed reveals that methodological gaps and contextual knowledge gap exist in the studies reviewed in the study. Most of the studied reviewed had not been done in the healthcare sector and also in not Elgeyo-Marakwet County. The current study sought to address all these knowledge gaps.
CHAPTER THREE: RESEARCH METHODOLOGY

This chapter entails the components elucidated below.

3.1 Research Design
The study adopted the descriptive survey research design. It describes the situation the way it is and is thus suitable as it allowed the researcher to administer questionnaires and interview schedule so as to collect data (Kumar, 2018). It is also a type of a research design that allows researchers to collect data, condense among others for easy understanding (Igwenagu, 2016). It is suitable for the current study, which sought to report the situation as is without manipulating the variables.

3.2 Variables

3.2.1 Dependent Variable
It is service delivery and its indicators include: quality, affordable, accessible and efficacy.

3.2.2 Independent Variables
It is Internet broadband access whose indicators include; Internet infrastructure, Internet speed and broadband pricing.

3.3 Site of the Study
Elgeyo-Marakwet County. It has two County and six sub-county hospitals. One mission hospital, 16 health centers, 79 dispensaries, 10 private clinics, and 12 community units. The need to see better service delivery in the public health sector in the County informed choice of this study area.

3.4 Target Population
It was 240 respondents who comprised of 24 Doctors, 40 Nurses, 40 Clinical doctors, 24 Medical Laboratory Technologist, 16 Pharmacist, 16 Nutritionist or Physiotherapist, 16 Health Records officers, 8 Radiographers or Medical Engineers and 56 management staffs drawn from two county hospitals and six sub-county hospitals. The target population had been arrived at as follows; 3 Doctors, 5 Nurses, 5 Clinical doctors, 3 Medical Laboratory Technologist, 2 Pharmacist, 2 Nutritionist or Physiotherapist, 2 Health Records officers, 1
Medical Engineers or Radiographers and 7 other management staffs in each facility. The target population was as presented in Table 3.1.

### Table 3.1: Target Population

<table>
<thead>
<tr>
<th>S/NO</th>
<th>Groups</th>
<th>Target size</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Doctors</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Nurses</td>
<td>40</td>
<td>16.7</td>
</tr>
<tr>
<td>3.</td>
<td>Clinical doctors</td>
<td>40</td>
<td>16.7</td>
</tr>
<tr>
<td>4.</td>
<td>Medical Laboratory Tech</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>5.</td>
<td>Pharmacist</td>
<td>16</td>
<td>6.7</td>
</tr>
<tr>
<td>6.</td>
<td>Nutritionist or Physiotherapist</td>
<td>16</td>
<td>6.7</td>
</tr>
<tr>
<td>7.</td>
<td>Health records</td>
<td>16</td>
<td>6.7</td>
</tr>
<tr>
<td>8.</td>
<td>Medical Engineers or Radiographers</td>
<td>8</td>
<td>3.3</td>
</tr>
<tr>
<td>9.</td>
<td>Management staffs</td>
<td>56</td>
<td>23.3</td>
</tr>
</tbody>
</table>

**Total** 240 100.0

Source: County Ministry of Health records (2022)

### 3.5 Sampling Techniques and Sample size

#### 3.5.1 Sampling Techniques

The study adopted both stratified and simple random sampling techniques. The former was used to stratify the respondents into doctors, nurses, management staffs and hospital clients. The groups are organized on the basis of shared characteristics of the members in the group. The latter was used to pick respondents from each group.

#### 3.5.2 Sample size

It was 150 respondents calculated using a formula by Yamane’s (1967).

\[
n = \frac{N}{1 + N(e)^2} = \frac{240}{1 + 240(0.05)^2} = 150 \text{ respondents.}
\]

For the number of respondents per group this formula is adopted;

\[
N_h = \text{Population size per strata}
\]
nh = sample size per strata

\[ \text{nh} = n(Nh/N) \]

Table 3.2 shows the sample size per stratum.

**Table 3.2: Sample size**

<table>
<thead>
<tr>
<th>S/NO</th>
<th>Groups</th>
<th>Sample size</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Doctors</td>
<td>15</td>
<td>10.0</td>
</tr>
<tr>
<td>2.</td>
<td>Nurses</td>
<td>25</td>
<td>16.7</td>
</tr>
<tr>
<td>4.</td>
<td>Medical Laboratory Tech</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>5.</td>
<td>Pharmacist</td>
<td>10</td>
<td>6.7</td>
</tr>
<tr>
<td>6.</td>
<td>Nutritionist or Physiotherapist</td>
<td>10</td>
<td>6.7</td>
</tr>
<tr>
<td>7.</td>
<td>Health records</td>
<td>10</td>
<td>6.7</td>
</tr>
<tr>
<td>8.</td>
<td>Medical Engineers or Radiographers</td>
<td>5</td>
<td>3.3</td>
</tr>
<tr>
<td>9.</td>
<td>Management staffs</td>
<td>35</td>
<td>23.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>150</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

### 3.6 Research Instruments

Questionnaire and interview schedule were used. The questionnaire was semi-structured in nature while the interview schedule was unstructured and was used to collect data from the hospital clients.

### 3.7 Pilot Study

It is done to assess whether the research instruments are well constituted in regards to design and relevance of statements or questions (Igwenagu, 2016). The pre-test of the research instrument was conducted in Nakuru County. The appropriate sample size for the pilot study is 10% of the sample size (Novikov & Novikov, 2019). The pre-test was conducted on 15 respondents (10% of 150) and it was used to assess both reliability and validity.
3.8 Validity and Reliability

3.8.1 Validity

Validity refers to how accurately the statements or survey questions helps to address what is intended (Gupta & Gupta, 2022). The current study adopted content validity, which was assessed on the basis of expert’s opinion i.e., supervisor and others experts on matters Internet broadband access. Their opinions were used to refine the research instrument.

3.8.2 Reliability

It was measured using Cronbach’s alpha. A threshold of 0.7 Cronbach alpha was considered. Pandey and Pandey (2021) posit that the cronbach’s alpha co-efficient considered sufficient is the one that is above or equal to 0.70.

The study established that the composite value of Cronbach’s co-efficient was 0.7363 (73.63%). This was above the recommended Cronbach’ alpha co-efficient that is supposed to be above or equal to 0.70. It was as tabulated below.

Table 3.3: Reliability Analysis of Each Variable

<table>
<thead>
<tr>
<th>Item</th>
<th>No. of items</th>
<th>α co-efficient</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet infrastructure</td>
<td>7</td>
<td>.7660</td>
<td>Consistent</td>
</tr>
<tr>
<td>Internet speed</td>
<td>7</td>
<td>.7330</td>
<td>Consistent</td>
</tr>
<tr>
<td>Broadband pricing</td>
<td>3</td>
<td>.7410</td>
<td>Consistent</td>
</tr>
<tr>
<td>Service delivery</td>
<td>4</td>
<td>.7050</td>
<td>Consistent</td>
</tr>
<tr>
<td><strong>Composite value</strong></td>
<td><strong>21</strong></td>
<td><strong>.7363</strong></td>
<td><strong>Consistent</strong></td>
</tr>
</tbody>
</table>

3.9 Data Collection Procedures

The needed approval was sought before commencement of the data collection exercise from respective organizations. For example, from Kenyatta University, a letter of introduction was sought prior to commencement of the exercise, a research license from NACOSTI, go ahead letter from Elgeyo-Marakwet County Commissioner and any other approval from the management of various Hospitals. Once, all approvals were received, the researcher self-administered the questionnaires where the respondents were allowed between 10 to 15 minutes to fill the questionnaires. For the interview, the researcher
booked for the appointment prior and upon approval, the researcher accompanied with an interview guide interviewed the respondents.

3.10 Data Analysis

After collection, data in the questionnaire was sorted so as to identify questionnaires that were completely filled and those that were incomplete. Coding was done for those questionnaires that were completely filled before being fed to the SPSS software. It was analyzed using both descriptive statistics i.e., (mean, standard deviation, frequency and percentages) and inferential statistics i.e., correlation and multiple linear regression analysis. Empirical model for the study was as follows;

\[ Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \epsilon \]  

Equation 3.1

Where;

\[ x_1 \] internet infrastructure
\[ x_2 \] internet speed
\[ x_3 \] broadband price
\[ \beta_1-\beta_3 \] co-efficients of the parameters
\[ \epsilon \] error term

Data collected using interview schedule was analyzed using content analysis and was presented using written narratives.

3.11 Ethical Considerations

The researcher ensured that all participants were recruited on voluntary basis. The respondents that accepted to participate in the study voluntarily were allowed to pull out without any consequences. Respondents’ confidentiality was upheld. The research instruments were instead serialized. The respondents were told what the study was all about, benefits and risks if any before allowed to engage in the current study. In the current study, the researcher ensured the work is not plagiarized and also all other research misconducts were avoided.
CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction
This chapter covers both research findings and discussion.

4.2 Response Rate
The study issued 150 questionnaires and 141 were returned, however 10 questionnaires were incomplete. This implies that 131 questionnaires were completely filled which was equivalent to 87.3% response rate as shown in Table 4.1.

On gender, 89 (67.94%) were male while 42(32.06%) female. This showed that most of the respondents were male. In regards to age, 70 (53.4%) were aged between 31 and 40 years, 33(25.2%) above 40 years, 27(20.6%) between 21 and 30 years and 1(0.8%) less than 20 years. The respondents were of age to understand Internet Broadband Access and service delivery in the study area. In regards to level of education, 77(58.8%) of the respondents had a bachelor’s degree, 22(16.8%) had diploma, 21(16.0%) master’s degree and 11(8.4%) had other qualifications such as Certified Public Accountants (CPA), PhD and certificate. The level of education is important as it has a great influence on how the respondents comprehend issues on Internet Broadband Access in the study area. In this study, the respondents were all educated and therefore were in the rightful position to provide responses on Internet Broadband Access and service delivery. The study was also interested on the length of service; this was important in-terms of knowhow on Internet Broadband Access and service delivery in the health care sector in the study area. Majority of the respondent’s length of service was between 6 and 10 years, 40(30.5%) between 0 and 5 years and 11(8.4%) above 10 years.
Table 4.1: Response rate

<table>
<thead>
<tr>
<th>Questionnaires issued</th>
<th>Questionnaire returned</th>
<th>Incomplete questionnaires</th>
<th>Complete questionnaires</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>141</td>
<td>10</td>
<td>131</td>
<td>87.3%</td>
</tr>
</tbody>
</table>

4.3 Demographic characteristics

The demographic characteristics considered in this study were; gender, age bracket, level of education and length of service as shown in Table 4.2.

Table 4.2: Demographic characteristics

<table>
<thead>
<tr>
<th>n=131</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>89</td>
<td>67.94</td>
</tr>
<tr>
<td>Female</td>
<td>42</td>
<td>32.06</td>
</tr>
<tr>
<td>Age bracket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 years and below</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>21-30 years</td>
<td>27</td>
<td>20.6</td>
</tr>
<tr>
<td>31-40 years</td>
<td>70</td>
<td>53.4</td>
</tr>
<tr>
<td>Above 40 years</td>
<td>33</td>
<td>25.2</td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>22</td>
<td>16.8</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>77</td>
<td>58.8</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>21</td>
<td>16.0</td>
</tr>
<tr>
<td>Others (specify)</td>
<td>11</td>
<td>8.4</td>
</tr>
<tr>
<td>Length of Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-5</td>
<td>40</td>
<td>30.5</td>
</tr>
<tr>
<td>6-10</td>
<td>80</td>
<td>61.1</td>
</tr>
<tr>
<td>Over 10 years</td>
<td>11</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Source: Survey Data (2022)

4.4 Descriptive statistics

This section covers the findings on descriptive statistics, which were presented as per the specific objectives.

4.4.1 Descriptive Analysis on Internet Infrastructure and Service Delivery

On whether Internet infrastructure affect service delivery in the healthcare sector in Elgeyo-Marakwet County. Findings are presented in Figure 4.1.
As per figure 4.1, 129(98%) of the respondents opined that Internet infrastructure affects service delivery in the healthcare sector in Elgeyo-Marakwet County while 2(2%) stated that Internet infrastructure does not affect service delivery in the healthcare sector in Elgeyo-Marakwet County. One of the respondents interviewed revealed that:

"Internet infrastructure affects service delivery at the health facility. The Internet server applications improve service quality at the facility. The domain name system supports all Internet activities and hence faster service delivery."

Further findings on Internet infrastructure and service delivery are presented in Table 4.3.

**Table 4.3: Internet infrastructure**

<table>
<thead>
<tr>
<th>Statements</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper functioning of Internet server applications has contributed to</td>
<td>131</td>
<td>2.0992</td>
<td>0.96759</td>
</tr>
<tr>
<td>enhancement of efficiency in the services we offer at the facility.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Internet server applications we use have improved service quality at</td>
<td>131</td>
<td>2.4656</td>
<td>1.51046</td>
</tr>
<tr>
<td>the facility.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our domain name system supports all internet activities and hence faster</td>
<td>131</td>
<td>2.0382</td>
<td>0.99541</td>
</tr>
<tr>
<td>service delivery.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The domain name system we use is effective and it has improved Web</td>
<td>131</td>
<td>1.5420</td>
<td>0.91365</td>
</tr>
<tr>
<td>browsing and other internet activities, which have led to, improved</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>service delivery.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The servers we use enhance faster service delivery.

We have fiber optic cable or radio infrastructure connected to the hospital, for Internet provision

We have networks that facilitate data exchanged among various stakeholders and therefore they enhanced service delivery.

<table>
<thead>
<tr>
<th>Description</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The servers we use enhance faster service delivery.</td>
<td>131</td>
<td>2.1832</td>
<td>0.90129</td>
</tr>
<tr>
<td>We have fiber optic cable or radio infrastructure connected to the hospital, for Internet provision</td>
<td>131</td>
<td>3.0000</td>
<td>1.40876</td>
</tr>
<tr>
<td>We have networks that facilitate data exchanged among various stakeholders and therefore they enhanced service delivery.</td>
<td>131</td>
<td>1.8321</td>
<td>1.08240</td>
</tr>
</tbody>
</table>

**Overall Mean**

2.1658  1.11137

**Source: Survey Data (2022)**

The study sought to determine whether proper functioning of Internet server applications has contributed to enhancement of efficiency in the services we offer at the facility. The statement recorded a mean of 2.0992 and a standard deviation of 0.96759. Proper functioning of Internet server applications had contributed to enhancement of efficiency in the services offered at the facilities. The study is in agreement with that of Kelley (2017), that proper functioning of Internet server applications has contributed to enhancement of efficiency in services offered. The study was also interested in determining whether Internet server applications used has improved service quality at the facility. The item had a mean of 2.4656 and a variation in responses of 1.51046. This implies that Internet server applications used had improved service quality at the facilities. Findings resemble that of Patel et al. (2015) that Internet server applications used improves service quality at the facilities.

In regards to whether their domain name system supports all Internet activities and hence faster service delivery. Majority of the respondents agreed that domain name system supports all Internet activities and hence faster service delivery. This is because the item had a mean of 2.0382 and a standard deviation of 0.99541. The study is in agreement with that of Tierney et al. (2016) that that domain name system that supports all Internet activities contributes to faster service delivery. In relation to whether, the domain name system used is effective and it had improved Web browsing and other Internet activities, which had led to, improved service delivery. The item had a mean of 1.5420 and a standard deviation of 0.91365. Domain name system used was effective and it had improved Web browsing and other Internet activities, which had led to, improved service delivery. The study by Lin and Huarng (2017) also established that the domain name system used that is
effective improves Web browsing and other Internet activities and therefore leads to improvement in service delivery.

The study sought to determine whether the servers used enhance faster service delivery. The item recorded a mean of 2.1832 and a standard deviation of 0.90129. Servers used were found to enhance faster service delivery. The findings resemble that of Corn et al. (2016) that the servers used enhance faster service delivery. On whether fiber optic cable or radio infrastructure had been connected to the hospital, for Internet provision. The item had a mean of 3.0000 and a standard deviation of 1.40876. Most of the healthcare facilities had fiber optic cable or radio infrastructure connected to the hospital, for Internet provision. The findings are in tandem with that of Lin and Huarng, 2017) that most healthcare facilities have fiber optic cable or radio infrastructure connected to the hospitals. In a nutshell, on whether networks that facilitate data exchanged among various stakeholders had been adopted in the health facilities and therefore enhance service delivery. The item had a mean of 1.8321 and a standard deviation of 1.08240. Findings show that health care sector had networks that facilitate data exchanged among various stakeholders and therefore they enhance service delivery. The findings resemble that of Barnett et al. (2018) that health care sector had networks that facilitate data exchanged among various stakeholders and therefore they enhance service delivery. The Internet infrastructure construct recorded an overall mean of 2.1658; this meant that Internet infrastructure had a significant impact on service delivery.

4.4.2 Internet speed and Service Delivery

The study sought to establish how Internet speed affects service delivery in health care. The respondents were asked whether Internet speed affect service delivery in the healthcare sector in Elgeyo-Marakwet County. Findings are presented in Figure 4.2.
The findings as summarized in figure 4.2 reveal that Internet speed affects service delivery in the healthcare sector in Elgeyo-Marakwet County. Out of the total respondents (127, 97%) stated that Internet speed affects service delivery in the healthcare sector in Elgeyo-Marakwet County while 4(3%) opined that Internet speed affects service delivery in the healthcare sector in Elgeyo-Marakwet County. One of the respondents interviewed opined that;

“Internet speed affect service delivery at the facility. The Internet transfer technology makes services affordable at the facility. Internet use has helped to improve how information is shared with other hospitals on need basis and therefore service delivery has improved.”

The study sought to determine whether Internet speed is affected by the Internet transfer technology used at the facility, which affects service delivery. Findings were presented in Table 4.4. The item had a mean of 2.3359 and a standard deviation of 1.26862. This implies Internet speed is affected by the Internet transfer technology that is used at the facility, which affects service delivery. The findings are similar to that of Ting (2015) that Internet speed is affected by the Internet transfer technology used at the facility and therefore it has an effect on service delivery. On whether the Internet transfer technology makes services affordable at the facility. The item recorded a mean of 1.6718 and a standard deviation of 0.87216. This implies that Internet transfer technology makes services affordable at the facility. The study is in agreement with that of Melville et al. (2014) that Internet transfer technology makes services affordable.

In response to whether despite the fact that many Internet users existed at the facility it did not affect both Internet speed and service delivery. The item had a mean of 1.8702 and a
standard deviation of 0.82646. This implies that despite the fact that many Internet users existed at the facility it did not affect both Internet speed and service delivery. Findings resemble that of Davis et al. (2019) that despite the fact that many Internet users existed at a facility it does not affect both Internet speed and service delivery. In relation to whether the type of Internet connection did not affect both Internet speed and service delivery at the facility. The type of Internet connection was found to affect both Internet speed and service delivery at the facility. The item recorded a mean of 2.3130 and a standard deviation of 1.40375. The study agrees with that of Roztocki and Weistroffer (2014) that type of Internet connection affects both Internet speed and service delivery. On whether Internet use at the facility had increased the number of clients attended to daily at the facility, it was found that Internet use at the facility had increased the number of clients attended to daily at the facility. The item recorded a mean of 1.7099 and a standard deviation of 1.13333. These results are in agreement with that of Gichoya (2015) that Internet use increases the number of clients attended to daily at health facilities.

Table 4.4: Internet speed

<table>
<thead>
<tr>
<th>Statements</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet speed is affected by the Internet transfer technology we use at the facility, which affects service delivery.</td>
<td>131</td>
<td>2.3359</td>
<td>1.26862</td>
</tr>
<tr>
<td>The Internet transfer technology makes services affordable at the facility.</td>
<td>131</td>
<td>1.6718</td>
<td>0.87216</td>
</tr>
<tr>
<td>Despite the fact that we have many Internet users at the facility it does not affect both Internet speed and service delivery.</td>
<td>131</td>
<td>1.8702</td>
<td>0.82646</td>
</tr>
<tr>
<td>Our Internet connection type does not affect both Internet speed and service delivery at the facility.</td>
<td>131</td>
<td>2.3130</td>
<td>1.40375</td>
</tr>
<tr>
<td>Internet use at the facility has increased the number of clients we attend to daily at the facility.</td>
<td>131</td>
<td>1.7099</td>
<td>1.13333</td>
</tr>
<tr>
<td>Internet use has helped to improve how we share information with other hospitals on need basis and therefore service delivery has improved.</td>
<td>131</td>
<td>2.1832</td>
<td>1.23289</td>
</tr>
<tr>
<td>Internet use has helped to improve how we share information with our clients and therefore service delivery has improved.</td>
<td>131</td>
<td>2.1679</td>
<td>0.99346</td>
</tr>
<tr>
<td>Overall Mean</td>
<td></td>
<td>2.0360</td>
<td>1.10438</td>
</tr>
</tbody>
</table>

Source: Survey Data (2022)
The study was interested in determining whether Internet use had helped to improve how information was shared with other hospitals on need basis and therefore service delivery had improved. The item had a mean of 2.1832 and a standard deviation of 1.23289. This implies that Internet use had helped to improve how information was shared with other hospitals on need basis and therefore service delivery had improved. The findings are in the same wavelength with that of Adewoye et al. (2019) that Internet use helps to improve how information is shared with other hospitals on need basis and therefore service delivery is improved. On whether, Internet use had helped to improve how information was shared with our clients and therefore service delivery had improved. The item recorded a mean of 2.1679 and a standard deviation of 0.99346. This implies that majority of the respondents agreed that Internet use had helped to improve how information was shared with our clients and therefore service delivery had improved. Findings resemble that of Oliveira and Martins (2017) that Internet use helps to improve how information is shared with clients and therefore it improves service delivery. The Internet speed construct had an overall mean of 2.0360; this implies that Internet speed has a significant effect on service delivery.

### 4.4.3 Broadband Pricing and Service Delivery

The study sought to assess how broadband pricing affects service delivery in the health care. The respondents were asked to state whether broadband pricing affect service delivery in the healthcare sector in Elgeyo-Marakwet County. The findings are summarized in Figure 4.3.
The findings as per figure 4.3 reveal that 120(92%) of the respondents opined that broadband pricing affects service delivery in the healthcare sector in Elgeyo-Marakwet County while 11(8%) revealed that broadband pricing does not affect service delivery in the healthcare sector in Elgeyo-Marakwet County. One of the respondents’ interviewed revealed that;

“Broadband pricing affects service delivery at the health facility. When Broadband price is affordable it affects how we offer service at the hospital. When Broadband price is competitive it affects service accessibility at the hospital and hence it affects service delivery.”

Further findings of broadband pricing were presented in Table 4.5.
Table 4.5: Broadband Pricing

<table>
<thead>
<tr>
<th>Statements</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The price set for Internet broadband access affects how we offer services at the hospital.</td>
<td>131</td>
<td>2.7023</td>
<td>1.42340</td>
</tr>
<tr>
<td>Broadband price affordability affects how we offer service at the hospital.</td>
<td>131</td>
<td>2.3435</td>
<td>1.52805</td>
</tr>
<tr>
<td>Broadband price competitiveness affects service accessibility at the hospital.</td>
<td>131</td>
<td>1.7176</td>
<td>1.11130</td>
</tr>
<tr>
<td>Overall Mean</td>
<td></td>
<td>2.2545</td>
<td>1.35425</td>
</tr>
</tbody>
</table>

**Source: Survey Data (2022)**

The study was interested in whether the price set for Internet broadband access affects how they offered services at the hospital. The item had a mean of 2.7023 and a standard deviation of 1.42340. It meant that price set for Internet broadband access affects how they offered services at the hospital. Findings resemble that of Ford and Spiwak (2014) that that the price set for Internet broadband access affects how services are offered at the hospital. On whether, Broadband price affordability affects how services are offered at the hospital, majority of the respondents agreed that Broadband price affordability affects how services are offered at the hospital. This is because the item had a mean of 2.3435 and a standard deviation of 1.52805. The findings are similar to that of Reddick et al. (2020) that Broadband price affordability affects how services are offered.

The study also sought to determine whether Broadband price competitiveness affects service accessibility at the hospital. The item had a mean of 1.7176 and a standard deviation of 1.11130. This showed that Broadband price competitiveness affects service accessibility at the hospital. Findings are similar to that of Fletcher (2009) that Broadband price competitiveness affects service accessibility. Broadband construct recorded an overall mean of 2.2545. This implies that broadband pricing had a significant effect on service delivery.
4.4.4 Descriptive Analysis of Service Delivery

The study assessed service delivery in the healthcare sector in Elgeyo-Marakwet County. Findings were presented in Table 4.6. On whether service quality had improved since Internet broadband penetration in the facility. The item had a mean of 2.2519 and a standard deviation of 1.51070. This shows that service quality had improved since Internet broadband penetration in the facilities. The study resembles that of Greenhalgh et al. (2004) that service quality improves due to Internet broadband penetration in the facilities. One of the respondents’ interviewed revealed that;

“The quality of service received at the health facility improved due to the Internet broadband access at the facility.”

Table 4.6: Service Delivery

<table>
<thead>
<tr>
<th>Statements</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our service quality has improved since Internet broadband penetration in the facility.</td>
<td>131</td>
<td>2.2519</td>
<td>1.51070</td>
</tr>
<tr>
<td>Broadband Internet penetration in the facility has made our services are more affordable at the facility.</td>
<td>131</td>
<td>2.1756</td>
<td>1.32712</td>
</tr>
<tr>
<td>Our services are more accessible to the public due to Broadband Internet penetration at the facility.</td>
<td>131</td>
<td>2.0916</td>
<td>1.17964</td>
</tr>
<tr>
<td>We attend to our clients more efficiently due to Internet broadband penetration in the facility.</td>
<td>131</td>
<td>2.6031</td>
<td>1.29305</td>
</tr>
<tr>
<td>Mean Score</td>
<td>131</td>
<td>2.2806</td>
<td>1.3276</td>
</tr>
</tbody>
</table>

Source: Survey Data (2022)

On whether, Broadband Internet penetration in the facility has made their services more affordable at the facility, most of the respondents revealed that Broadband Internet penetration in the facility has made their services more affordable at the facility. The item had a mean of 2.1756 and a standard deviation of 1.32712. The findings resemble that of Roth and Menor (2003) that Broadband Internet penetration makes services more affordable. In regards to whether services are more accessible to the public at the facility due to Broadband Internet penetration. Majority of the respondents agreed with the statement that services were more accessible to the public at the facility due to Broadband Internet penetration. This is because the item recorded a mean of 2.0916 and a standard deviation of 1.17964. The study agrees with the findings of Brown and Osborne (2012)
that services are more accessible to the public when there is Broadband Internet penetration.

The study also sought to determine whether hospital clients are attended to more efficiently due to Internet broadband penetration in the facility. The item had a mean of 2.6031 and a standard deviation of 1.29305. This implies that that majority of the respondents agreed that hospital clients are attended to more efficiently due to Internet broadband penetration in the facility. The findings are in agreement with that of Pleger (2000) that hospital clients are attended to more efficiently due to Internet broadband penetration. The overall mean was 2.2806, which implies that service delivery had improved due to adoption of Internet Broadband Access. One of the respondent’s interviewed revealed that;

“Service delivery efficiency improved due to broadband Internet use at the hospital.”

4.5 Inferential Statistics

Both correlation and regression analysis are covered in this section.

4.5.1 Correlation Analysis

Correlation analysis results were presented in Table 4.7.

Table 4.7: Correlation

<table>
<thead>
<tr>
<th>n=131</th>
<th>Service delivery</th>
<th>Internet infrastructure</th>
<th>Internet speed</th>
<th>Broadband price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service delivery</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet infrastructure</td>
<td>.791**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet speed</td>
<td>.569*</td>
<td>.397**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Broadband price</td>
<td>-.908*</td>
<td>-.533**</td>
<td>-.452**</td>
<td>1</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Results obtained in Table 4.7 above indicate a positive significant relationship (r=0.791, p=0.000) between Internet infrastructure and service delivery in the healthcare sector in
Elgeyo-Marakwet County. This implies a close association between service delivery in the healthcare sector and Internet Infrastructure in Elgeyo-Marakwet County. Lin and Huarng (2017) also found similar findings that Internet infrastructure enhances service delivery. The results also reveal that there is a fairly strong positive relationship between Internet speed and service delivery in the healthcare sector in Elgeyo-Marakwet County (r=0.569, p=0.000). This implies that the faster the Internet speed the better the service delivery in the healthcare sector in Elgeyo-Marakwet County. The study is in agreement with that of Ziadi and Knufie (2016) that Internet speed has a positive relationship with service delivery. There was a significant negative relationship (r=-0.908, p=0.000) between broadband price and service delivery in the healthcare sector in Elgeyo-Marakwet County. This implies that an increase in broadband price adversely affects service delivery in the healthcare sector in Elgeyo-Marakwet County. Findings are similar to that of Reddick et al. (2020) that broadband price has a strong negative relationship with service delivery.

4.5.2 Multiple Linear Regression Analysis

It was adopted to predict service delivery from Internet infrastructure, Internet speed and broadband pricing. From the Table 4.8 below, the value of adjusted R-square is 0.853, implying that 85.3% of change in service delivery was attributed to Internet infrastructure, Internet speed and broadband pricing while the 14.7% (100-85.3) % is attributed to the other variables that are not in the model.

Table 4.8: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.925(^a)</td>
<td>.856</td>
<td>.853</td>
<td>1.44517</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Internet infrastructure, Internet speed, broadband pricing

ANOVA was adopted for conducting the goodness of fit test. Findings are shown in Table 4.9.

Table 4.9: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression</td>
<td>253.331</td>
<td>3</td>
<td>84.444</td>
<td>11.117</td>
</tr>
<tr>
<td>1</td>
<td>Residual</td>
<td>964.715</td>
<td>127</td>
<td>7.596</td>
<td></td>
</tr>
</tbody>
</table>
a. Dependent Variable: service delivery
a. Predictors: (Constant), Internet infrastructure, Internet speed, broadband pricing

Findings revealed that service delivery can be predicted from Internet infrastructure, Internet speed and Broadband price as the p-value was less than or equal to 0.05. Regression coefficient analysis results were as follows.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>6.062</td>
<td>1.274</td>
<td>4.759</td>
<td>.000</td>
</tr>
<tr>
<td>Internet infrastructure</td>
<td>.459</td>
<td>.092</td>
<td>.529</td>
<td>4.997</td>
</tr>
<tr>
<td>Internet speed</td>
<td>.255</td>
<td>.138</td>
<td>.284</td>
<td>3.295</td>
</tr>
<tr>
<td>Broadband pricing</td>
<td>-.601</td>
<td>.204</td>
<td>-.281</td>
<td>-2.947</td>
</tr>
</tbody>
</table>

As per Table 4.10, Internet infrastructure had a positive and significant role on service delivery in the healthcare sector in Elgeyo-Marakwet County of (β=0.459, p values of 0.000, hence, p<0.05). This implies that improvement in Internet infrastructure by one unit improves service delivery by 0.459 units. The study agrees with that of Tierney et al. (2016) that Internet infrastructure improves service delivery. Internet speed had a positive and a non-significant effect on service delivery in the healthcare sector in Elgeyo-Marakwet County of (β=0.255, p values of 0.859, hence, p>0.05). This implies that an improvement in Internet speed by one unit improves service delivery by 0.255 units. Findings resemble that of Adewoye et al. (2019) that Internet speed enhances service delivery. Broadband pricing had a negative and a significant effect on service delivery in the healthcare sector in Elgeyo-Marakwet County of (β=-.601, p values of 0.000, hence, p < 0.05). This implies that an increase in broadband pricing by one unit decreases service delivery by 0.601 units.
The findings are in tandem with that of Reddick et al. (2020) that broadband pricing affects service delivery.

The regression model was as outlined below;

\[ y = 6.062 + .459x_1 + 0.255x_2 - .601x_3 + \epsilon \]

The constant value of 6.062 implies that at zero for Internet infrastructure \((x_1=0)\), Internet speed \((x_2=0)\) and broadband pricing \((x_3=0)\), service delivery in the healthcare sector in Elgeyo-Marakwet County is at 6.062 units.
CHAPTER FIVE: SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction
This chapter covers summary of the findings, conclusion and recommendations.

5.2 Summary of the Findings
On Internet infrastructure and service delivery, findings recorded an overall mean of 2.1658, which revealed that all the respondents opined that Internet infrastructure affects service delivery in the healthcare sector in Elgeyo-Marakwet County. Findings revealed that proper functioning of Internet server applications has contributed to enhancement of efficiency in the services offered at the facilities. Internet server applications used had improved service quality at the facilities. Domain name system supports all Internet activities and hence faster service delivery. Findings revealed that the domain name system used was effective and it had improved Web browsing and other Internet activities, which had led to, improved service delivery. The study established that the servers used enhance faster service delivery. Most healthcare facilities had infrastructure either fiber or wireless connected to the hospital, for Internet provision. Findings revealed that the health care sector had networks that facilitate data exchanged among various stakeholders and therefore they enhance service delivery.

On Internet speed and service delivery, overall mean of 2.0360 was recorded revealing that Internet speed affects service delivery in the healthcare sector in Elgeyo-Marakwet County. Internet speed is affected by the Internet transfer technology that is used at the facility, which affects service delivery. Internet transfer technology makes services affordable at the facility. Findings revealed that when many Internet users existed at the facility it affected both Internet speed and service delivery. Type of Internet connection affects both Internet speed and service delivery at the facility. Internet use at the facility had increased the number of clients attended to daily at the facility. Majority of the respondents agreed that Internet use had helped to improve how information was shared with other hospitals on need basis and therefore service delivery had improved.
On broadband pricing and service delivery with an overall mean of 2.2545, the study established that broadband pricing affects service delivery in the healthcare sector in Elgeyo-Marakwet County. The price set for Internet broadband access affects how they offered services at the hospital. Broadband price affordability affects how services are offered at the hospital. Broadband price competitiveness was found to affect service accessibility at the hospital.

Descriptive analysis of service delivery revealed that service quality had improved since Internet broadband penetration in the facilities. Broadband Internet penetration in the facility has made their services more affordable at the facility. Services were more accessible to the public at the facility due to Broadband Internet penetration. Hospital clients were attended to more efficiently due to Internet broadband penetration in the facility. This is backed by the overall mean of 2.2806 implying that service delivery had improved due to adoption of Internet Broadband Access.

5.3 Conclusion

The study concluded that Internet infrastructure affects service delivery in the healthcare sector. This is attributed to proper functioning of Internet server applications which contributes to enhancement of efficiency in the services offered at the facilities, improvement of service quality at the facilities due to Internet server applications used, Domain name system which supports all Internet activities and hence faster service delivery, domain name system used that is effective and which improves web browsing and other Internet activities, servers used which enhances faster service delivery, use of fiber optic cable or radio infrastructure connected to the hospital, for Internet provision and having networks that facilitate data exchanged among various stakeholders and therefore they enhance service delivery.

The study also concludes that Internet speed affects service delivery in the healthcare sector. This is attributed to Internet transfer technology that is used at the facility affecting Internet speed which in-turn affects service delivery and Internet transfer technology, which makes services affordable at the facility. It is also attributed to many Internet users existing at the facility, which affected Internet speed and service delivery, the type of Internet connection that affects both Internet speed and service delivery at the facility.
Internet use at the facility that had increased the number of clients attended to daily at the facility and Internet use that helps to improve how information is shared with other hospitals on need basis.

The study also concludes that broadband pricing affects service delivery in the healthcare sector in Elgeyo-Marakwet County. This is attributed to the price set for Internet broadband access, which affects how they offered services at hospitals and Broadband price that is affordable and which affects how services are offered at the hospitals. It is also attributed to Broadband price competitiveness that affects service accessibility at the hospitals.

5.4 Recommendations for Policy Implementations
The Management and Board of Communications Authority of Kenya (CA) consider reviewing the Internet Service provision chain from landing station to consumers in view of reducing the cost of purchase of broadband Internet by consumers, CA Board and Management to consider reviewing the telecommunications Market Structure- Unified Licensing Framework in bid to come-up with new commercial license which attracts lower initial license fee, which in turn will propel broadband Internet penetration across the country, CA Board and Management should consider development of Internet Service guidelines which will provide clarity on the scope of the licenses that is Applications Service Provider license and the Network Facilities Provider (Tier1, 2 and 3), CA Management to sensitize communities, Non-governmental Organizations and County governments on availability of non-commercial license for provision of broadband Internet aimed at increasing broadband Internet access in the communities across the country. Further, CA Management and Universal Service Fund Advisory Council to consider internal hospital network, servers, domain name system, computers, type of connection in provision of broadband Internet services to hospitals, The Information and Communication Technology Authority (ICTA) in charge of management of National Optic Fibre Backbone Infrastructure (NOFBI) consider extending the fibre connection from county headquarters to sub-county and later to location level in the Office of the President-chiefs offices and the public be encouraged to use the online services in accessing medical when the services are availed in their area.
5.5 Suggestion for Further Research

A further study should be conducted on Internet broadband access and service delivery in the health care sector in other counties in Kenya. The study should consider as measures of Broadband Internet Access besides, Internet infrastructure, Internet speed and broadband pricing. This will help to enhance the existing body of knowledge on Internet broadband access and service delivery in the health care sector.
REFERENCES


Siele, L. (2019). County health facilities increase to 129 as access to healthcare reduced to 3.7Km. Retrieved from https://elgeyomarakwet.go.ke/county-health-facilities-increase-to-129-as-access-to-healthcare-reduced-to-3-7km/


APPENDIX 1: INTRODUCTORY LETTER

Dear Sir/Madam

RE: EFFECTS OF INTERNET BROADBAND ACCESS ON SERVICE DELIVERY: A CASE OF HEALTH CARE SECTOR IN ELGEYO- MARAKWET COUNTY

I study at Kenyatta University and I am conducting a study on “Effects of Internet Broadband Access on Service Delivery: A case of Health Care Sector in Elgeyo-Marakwet County.”

The information sought is for academic purposes only all ethical considerations will be upheld in the study. Do not write your name on the questionnaire.

Kindly, fill the attached questionnaire for me.

Yours faithfully,

Chemjor, Titus K.
Masters’ student, Kenyatta University
APPENDIX II: QUESTIONNAIRES FOR DOCTORS, NURSES AND MANAGEMENT STAFFS

Instructions
Please tick (✓) appropriately.

Section I: Background Information

1. Indicate your gender
   
   Male ☐ Female ☐

2. Indicate your age bracket
   
   Less than 20 years ☐ 21-30 years ☐ 31-40 years ☐ above 40 years ☐

3. Level of Education
   
   Diploma ☐ Bachelor’s Degree ☐ Master’s Degree ☐ Other (Specify)………………………………………………

4. Period served as an Employee at the Hospital
   
   0-5years ☐ 6-10years ☐ over 10years ☐

5. In your opinion, does Internet infrastructure affect service delivery in the healthcare sector in Elgeyo Marakwet County?
   
   Yes ☐ No ☐

6. If yes, respond to 7 but if NO proceed to 8.

7. Kindly, respond on these statements on Internet infrastructure. Tick (√) appropriately.

<table>
<thead>
<tr>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper functioning of Internet server applications have contributed to enhancement of efficiency in the services we offer at the facility.</td>
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</table>
The Internet server applications we use have improved service quality at the facility.

Our domain name system supports all internet activities and hence faster service delivery.

The domain name system we use is effective and it has improved Web browsing and other internet activities, which have led to, improved service delivery.

The servers we use enhance faster service delivery.

We have fiber optic cable or radio infrastructure connected to the hospital, for Internet provision.

We have networks that facilitate data exchanged among various stakeholders and therefore they enhance service delivery.

8. In your opinion, does Internet speed affect service delivery in the healthcare sector in Elgeyo-Marakwet County?
   Yes ☐ No ☐

9. If YES, respond to statements in 10 and if NO proceed to 11.

10. Kindly, respond on the following statements on Internet speed. Tick (√) appropriately.

<table>
<thead>
<tr>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
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</thead>
<tbody>
<tr>
<td>Internet speed is affected by the Internet transfer technology we use at the facility, which affects service delivery.</td>
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<td>The Internet transfer technology makes services affordable at the facility.</td>
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<tr>
<td>Despite the fact that we have many Internet users at the facility it does not affect both Internet speed and service delivery.</td>
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<tr>
<td>Our Internet connection type does not affect both Internet speed and service delivery at the facility.</td>
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</tbody>
</table>
Internet use at the facility has increased the number of clients we attend to daily at the facility.

Internet use has helped to improve how we share information with other hospitals on need basis and therefore service delivery has improved.

Internet use has helped to improve how we share information with our clients and therefore service delivery has improved.

11. In your opinion, does broadband pricing affect service delivery in the healthcare sector in Elgeyo Marakwet County?
   
   Yes □  No □

12. If your answer is YES, respond to statement in no. 13 but if NO proceed to no.14.

13. Kindly, respond on the following statements on broadband pricing. Tick (✓) appropriately.

<table>
<thead>
<tr>
<th>Statements</th>
<th>SA</th>
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<th>SD</th>
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</thead>
<tbody>
<tr>
<td>The price set for Internet broadband access affects how we offer services at the hospital.</td>
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<td>Broadband price affordability affects how we offer service at the hospital.</td>
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<tr>
<td>Broadband price competitiveness affects service accessibility at the hospital.</td>
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</table>

14. Kindly, respond on the following statements on service delivery. Tick (✓) appropriately.

<table>
<thead>
<tr>
<th>Statements</th>
<th>SA</th>
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<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our service quality has improved since Internet broadband penetration in the facility.</td>
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<td>Broadband Internet penetration in the facility has made our services are more affordable at the facility.</td>
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<tr>
<td><strong>Our services are more accessible to the public due to Broadband Internet penetration at the facility.</strong></td>
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<td><strong>We attend to our clients more efficiently due to Internet broadband penetration in the facility.</strong></td>
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</table>

**End**
APPENDIX III: INTERVIEW GUIDE

1. What your age?
2. Are you aware whether the hospital is connected to broadband Internet access?
3. In your opinion, does Internet infrastructure affect service delivery at the health facility?
4. Does Internet speed affect service delivery at the facility?
5. In your opinion, does broadband pricing affect service delivery at the health facility?
6. Has the quality of service received at the health facility improved due to the Internet broadband access at the facility?
7. Has service delivery efficiency improved due to broadband Internet use at the hospital?
8. Any other comment
APPENDIX IV: RESEARCH AUTHORIZATION LETTER FROM COUNTY COMMISSIONER ELGEYO MARAKWET COUNTY

MINISTRY OF INTERIOR & NATIONAL ADMINISTRATION
State Department for Internal Security and National Administration

COUNTY COMMISSIONER'S OFFICE,
ELGEYO-MARAKWET COUNTY,
P.O. BOX 200-30700
ITEN

Ref: PSC 24/2 VOL III/145

Date: 29th November, 2022

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION

Mr. TITUS KIPTUM CHEMJOR

This is to confirm that the above named has been authorized to carry out a research on "EFFECTS OF INTERNET BROADBAND ACCESS ON SERVICE DELIVERY: A CASE OF HEALTH CARE SECTOR IN ELGEYO MARAKWET COUNTY, KENYA" for a period ending 28th November 2023.

Please accord him the necessary assistance.

Julius K. Maloyo, HSC
For: County Commissioner
ELGEYO MARAKWET COUNTY

All Deputy County Commissioners
Elgeyo Marakwet.

JKM/bjc
APPENDIX V: KU RESEARCH AUTHORIZATION LETTER

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke
P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: C153/CTY/F/PT/38229/2017

DATE: 16th November, 2022

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR CHEMJOR TITUS KIPTUM REG.NO. C153/CTY/PT/38229/2017

I write to introduce Mr. Chemjor Titus Kiptum who is a Postgraduate Student of this University. He is registered for M.PPA degree programme in the Department of Public Policy & Administration.

Mr. Chemjor intends to conduct research for a MPPA Project Proposal entitled, “Effects on Internet Broadband Access on Service Delivery: A Case of Health Care Sector in Elgeyo Marakwet County, Kenya”.

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL

Dr/s
APPENDIX V: RESEARCH PERMIT

This is to certify that Mr. TITUS KIPTUM CHEMJOIR of Kenyatta University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Elgeyo-Marakwet on the topic: EFFECTS OF INTERNET BROADBAND ACCESS ON SERVICE DELIVERY: A CASE OF HEALTH CARE SECTOR IN ELEGEYO MARAKWET COUNTY, KENYA for the period ending 28 November 2022.

License No: NACOSTI/P/22/22316

Ref No: 123793

Date of Issue: 28/November/2022

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