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Using I-Hubs for Bridging The Gap of Digital Divide In Rural Kenya

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Abstract
The world is moving towards digital economy where almost everything being done today is digitally controlled because necessity is the mother of innovation. Everybody is striving to attain digital stability as a lot of revenue is generated in the digital world. Digital divide therefore becomes so disadvantageous to people left without access to computers and the internet. In this paper, researchers discuss the role of Kenyan innovation hubs in closing the gap between those who have access to the internet and computers and those who do not. The paper discuss the World Bank projection of the GDP emanating from the use of ICTs and the challenges facing innovation. Government support plays a key role in ensuring that the people secluded from ICTs are able to access these services especially those in rural areas. This research found that in Kenya, innovation hubs have helped the citizens staying in rural areas to gain access to internet and develop their ideas and innovations as well as undergo mentorship. Nonetheless, a lot of support is needed from the Kenyan government through the launching of more innovation hubs especially in rural areas that can help improve the online business, innovation and thus increase the GDP from ICTs.

Key words: I-Hubs, Digital Divide, Innovation, GDP, internet

Abstrak
Dunia bergerak menuju ekonomi digital di mana hampir semua yang dilakukan saat ini dikendalikan secara digital karena kebutuhan adalah ibu dari inovasi. Semua orang berusaha untuk mencapai stabilitas digital karena banyak pendapatan dihasilkan di dunia digital. Oleh karena itu, kesenjangan digital menjadi sangat tidak menguntungkan bagi orang-orang yang dibiarkan tanpa akses ke komputer dan internet. Dalam makalah ini, peneliti membahas peran hub inovasi Kenya dalam menutup kesenjangan antara mereka yang memiliki akses ke internet dan komputer dan mereka yang tidak. Makalah ini membahas proyeksi Bank Dunia terhadap PDB yang berasal dari penggunaan TIK dan tantangan yang dihadapi inovasi. Dukungan pemerintah memainkan peran kunci dalam memastikan bahwa orang-orang yang terpisah dari TIK dapat mengakses layanan ini terutama di daerah pedesaan. Penelitian ini menemukan bahwa di Kenya, pusat inovasi telah membantu warga yang tinggal di daerah pedesaan untuk mendapatkan akses ke internet dan mengembangkan ide dan inovasi mereka serta menjalani bimbingan. Meskipun demikian, banyak dukungan yang dibutuhkan dari pemerintah Kenya melalui peluncuran lebih banyak hub inovasi terutama di daerah pedesaan yang dapat membantu meningkatkan bisnis online, inovasi, dan dengan demikian meningkatkan PDB dari TIK.

Kata kunci: I-Hub, Kesenjangan Digital, Inovasi, PDB, internet

I. Introduction

The United Nation's World Summit of Information Society (WSIS), Geneva 2003, Tunis Commitment, Tunis 2005 and the Copenhagen Declaration agreed that ICT is a key player in eradication of poverty and unemployment as it helps in creation of development-oriented information society [25]. The best way to make use of ICT services is through research and innovation; the later becoming the most widely used method of technological advancement. Innovation is the change in traditional practice for the remarkable success of humanity towards colonizing the earth, technology and product diversification [1] . The importance of innovation has thus made human beings to be cleverer and daring to make their lives more comfortable especially when it comes to technological advancements in various fields. ICT has not been left out in this, as many countries around the world have resorted to innovation in ICT. Kenya has for almost 20 years committed itself to gain economic stability and global recognition through technological advancement. The commitment of Kenya in technological developments started with vision 2030 economic blueprint [2]. In trying to meet the objectives of this economic blueprint, Kenya has made a great milestone in technological advancement in the area of ICT for years now. During the period of Covid-19 Pandemic, innovation was heightened in the country to keep its economy afloat amid the ravaging effects of the pandemic. The innovations which were majorly concentrated on use of ICT for teaching and learning, making of local computer-controlled ventilators and online business transactions helped in fast-tracking the achievement of Kenya's ICT Policy Vision 2030 [3]. Innovation hubs are also an important component of technological advancement that are used to help countries attain economic stability and for interconnecting people in different parts of the world to interact and share knowledge and resources. I-Hubs form a basis were innovation ideas are bred, incubated and hatched into solution centered systems basing on prevailing conditions in a given environment.

A. Barriers to Innovation in developing countries

Developing countries are generally known to have low industrial development and with lower Human Development Index as compared to other countries in the world. This means that the countries are still growing in terms of technological advancements. The United Nations classifies countries according to their economic stability and growth as either developed or developing. Kenya is classified under the category of developing countries among many other countries in Africa, Asia and Latin America [4]. Developing countries generally face a number of challenges that affect the broad area of development including agriculture, industry, education medicine and technology. The following are some of the challenges faced by developing countries derailing their industrialization process: 1) Inadequate funding, 2) Poor infrastructure, 3) Insufficient support from governments, 4) Lack of motivation for innovations, 5) Inadequate research facilities, 6) Lack of opportunities and poor cooperation among business firms [5]. Innovation helps countries to be economically stable hence most countries classified as developed do well in innovation, creativity and invention. In Kenya for example, innovations among its citizens in the early years of 21st century lagged behind due to inadequate funding, insufficient support from the government, volatility of innovation and inadequate research facilities. Due to the volatile nature of technological innovations and the changing technological environments, it has been a challenge for Kenyan innovators to strike the balance of mechanisms and expectations of the society on technological innovation [6]. This is especially difficult when working alone without government support and without I-hubs where people meet to bring onboard different ideas. However, during the wake of the novel Corona virus disease, the country witnessed a lot of innovations and inventions in various areas including medicine, and ICT [2].

B. Digital Divide

In 1990s, Digital divide was defined as the gap between those who have access to computers and the internet and those who do not have the access [7]. Digital divide existed long before 1990s but the term was not being used before, instead information inequality or knowledge gap were the common terms used. The origin of this term is

connected to the US Department of Commerce National Telecommunications and Information Administration (CNTIA) [8] which advices the US president on the telecommunication and information policies. Digital divide therefore excludes some groups of people from the uptake of Information Communication Technologies. According to [9], the following groups of people are excluded in ICTs by digital divide: low-income earners, elderly people, unemployed, people with low literacy level, rural and urban areas, single parents, people leaving with disabilities, women and children. In Kenya, there exists digital divide between rural and urban areas, and between Kenya (developing country) and developed countries. Poor power supply in rural areas in Kenya which predicates the internet and computers among other aspects make the internet to be less cost-effective [10] leading to poor distribution of the internet in these areas. This inadequacy of power, computers and the internet has made rural areas in Kenya to lag behind in technology and innovation. Figure 1 below shows the penetration and uptake of internet in Kenya for a period of 30 years since 1990 to 2020.

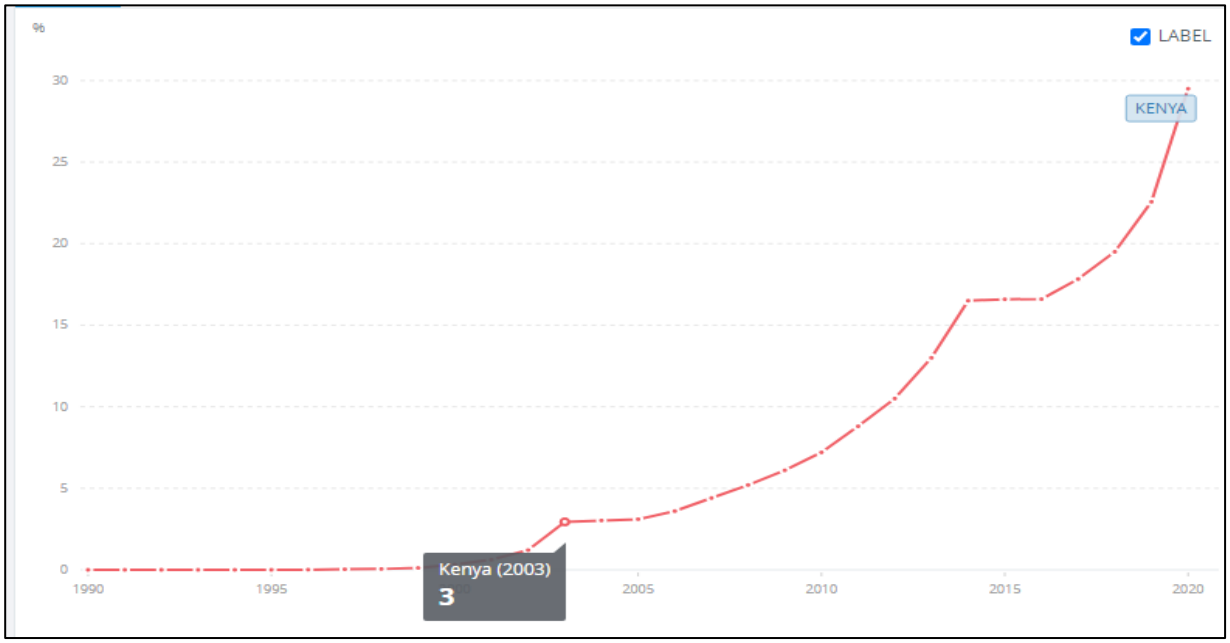

Figure 1 Sourced from World Bank**:** Individuals using internet (% of Kenya's population) [11].

From figure 1 above, there has been an exponential increase in the number of people in Kenya accessing the internet for a period of 30 years. However, for that period a maximum of only 30% of Kenyans are able to access the internet. This could be as a result of the large population of people leaving in rural areas who are unable to access the internet services. According to the UN specialized agency for ICTs, the world is increasingly becoming digitized, and the economy of digital exclusion is more expensive than closing the gap of digital divide [12]. The urgency further stated that 60% of the global GDP is expected to be contributed by digital technologies by 2022 thus people who are unable to connect to digital systems highly risk being left trailing in economic development. Figure 2 below sheds more light why ICT has been important in Kenya's economy over time from 2013 to 2019.

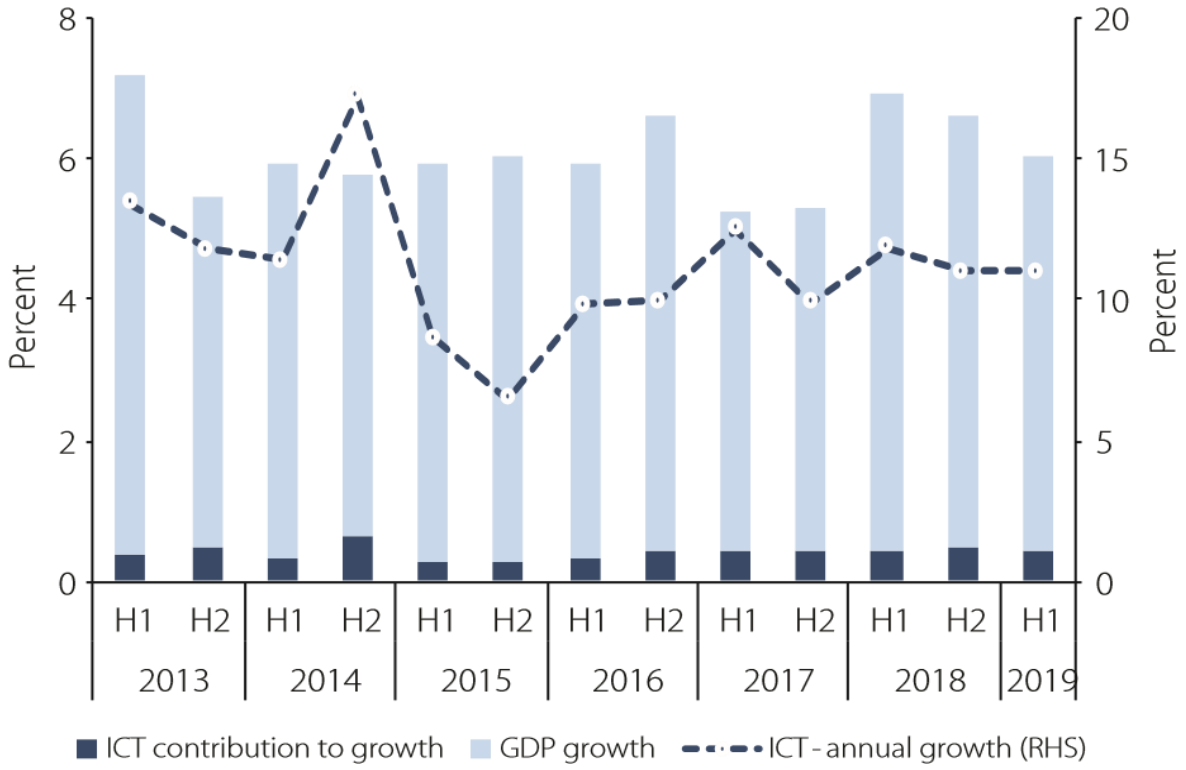

Figure 2 Source: Kenya National Bureau of Statistics

Figure 2 above shows that ICT has been contributing to Gross Domestic Product (GDP) growth of the country by 10.8% on average annually since the year 2016 thus proved to be a dynamic source of economic growth and job creation [13]. Although there is a promising growth of GDP from ICT in Kenya going into the future, a lot has to be done in order to increase the input of ICT on the country's GDP so as to meet the projection of United Nations specialized agency for ICTs of 60% although the country is already behind the schedule. The main cause of this derail in many countries is the gap between those who have an access to internet and computers and those who do not have any access. This is because by January 2022, only 42.0% of Kenyans were able to use internet which has not reached in many rural areas as 71% of the population stay in rural areas [14]. To narrow this gap, Kenya as a country has among many other practices invested in I-Hubs that would then help fast track the contribution of ICTs towards the 60% ICT GDP projection by the UN.

II. Methods

This research paper adopted qualitative research method in which secondary data which is published online with information on innovation was used. Thematic analysis methods were used to dissect, understand and analyze collected data in related areas.

III. Results and Discussions

A. Innovation Hubs (I-Hubs)

I-Hubs have also been a source of bringing people from different backgrounds together for exchange of ideas thereby enhancing co-working which has been applied in various fields around the world [15]. Co-working spaces created by establishment of innovation hubs help knowledge workers to gather together, create knowledge and benefit from it by working alone yet staying together [16]. These hubs have consequently helped the freelancers to

come together for support on the art of freelancing and social connection. Innovation hubs have also been used in many developed and developing countries to help enhance their technological advancements. In UK for example, the London Innovation Hub (LIH) which started in the year 2005, has transformed into 80 hubs with membership of over 13,000 worldwide [17]. LIH is especially important because everybody in the world today looks at London as a model of innovation, social entrepreneurship and development. Consequently, in Zambia (Africa), the Lusaka Innovation founded in 2011 was the only hub in the country which was aimed at helping young graduates of computer science gain skills in programming [17]. The hub has evolved to become a Centre for innovators to connect and collaborate in working on various viable business project models. In Kenya, a number of innovation hubs have been started by various stake holders both in public and private sectors making Kenya to become a Tech Hub in the entire of East Africa [2]. The following are some of the renowned I-Hubs started in Kenya that are harnessing technical knowledge and ICT innovation from Kenyan youths to enhance technological advancements up to rural areas of the country.

B. Kenya: The Silicon Savannah

Silicon savannah is widely known as the hub for technological ecosystem making Kenya a recognized IT hub in East Africa. Kenya coined the title Silicon Savannah which means that the country provides a fruitful environment for government support for innovation through technology. The moniker term Silicon Savannah which springs from two ecosystems of California's Silicon Valley is a center for high tech and innovation and grassland savanna which is an ecosystem characterized by tree and grasses forming a conducive environment for growth. The mobile technology and digital payments made a great step in earning Kenya this name [18]. Silicon Savannah is home to one of the fastest internet speed in the world; thanks to the fiber optic cable laid undersea making big firms such as Microsoft, Intel, Facebook and IBM an environment to invest in high tech technologies [19]. Through Silicon Savannah, Kenya is becoming a major technological hub in Africa. In the year 2007, Kenya's iconic Telecommunication company Safaricom launched M-PESA which is a mobile money transfer service that earned Kenya a global recognition for becoming the first banking service for mobile phones to be developed and used in developing countries [20].The mobile phone money transfer service has been in operation till today in Kenya and beyond whereby in the year 2022 alone, there were over 19 billion M-PESA transactions in Kenya [20]. After development of M-PESA app, later in the same year 2007, turbulent political instability in Kenya led to the launch of Ushahidi (witness) app which helped citizens to track the real time post-election violence outbreaks and report to police immediately [21]. Silicon Savana moniker coined by Kenya, proves that the country is alive to technological advancement and has considerably invested in innovations.

C. Afrilabs and Association of Countrywide Innovation Hubs (ACIH)

Association of Countrywide Innovation Hubs (ACIH) based outside of Nairobi-Kenya, has the objective of promoting activities of its member hubs and to support them build sustainable businesses in rural and semi-urban areas in Kenya. AfriLabs which is Africa's largest network of innovation hubs was started in the year 2011 with the aim of supporting African entrepreneurs, developers and innovators. It achieves this objective by proving them with a friendly co-working space and training them in readiness for developing and implementing innovative solutions facing the continent [22]. Afrilabs and the (ACIH) signed a long-term partnership to co-support the rural innovations by creating training and mentorship programs to help grass root I-hubs in Africa thrive [23]. *"Through this collaboration, we are looking to an inclusive innovation ecosystem in Africa and becoming a source of prosperity for all by strengthening grass root hubs to foster rural and peri-urban innovation."* said ACIH chairperson. Afrilabs supports over 340 Innovation Hubs across all the 52 countries in Africa and empowers innovators and developers through technological trainings, legal and financial support. On the other hand, ACIH is a network of I-hubs in Kenya found outside Nairobi city with membership of over 56 technology and Innovation Hubs with the main objective of promoting activities of member hubs. ACIH does this by supporting their vision of building sustainable businesses in rural and second-tier towns in Kenya [23] through expert opinion, joint research and engaging the government in policy frameworks on behalf of startups.

D. Konza Technopolis

Kenya's vision 2030 economic blueprint paved way for the development of Konza Technology city project aiming at developing a technology innovation hub in Africa [24]. The city is located in a rural area 60 Kilometers south of Nairobi capital city on the way to Mombasa city and is still under construction. It is estimated to cost about 1.2 trillion Kenyan shillings (US $14.5 billion) upon completion. According to Konza city website, [25] it will be a world class city powered by the ICT sector, superior infrastructure and governance systems that are business friendly. The city will sit on a 5,000-acre plot surrounding three rural counties; Machakos, Makueni and Kajiado. The project will attract software developers, disaster recovery centers, data centers and will be home to a hi-tech university focusing on research and technology, TVET institutions, schools and hospitals and stadiums [25]. These investments will make Konza a smart city and a hub of innovation bringing light to former rural areas. The Konza Technopolis Development Authority (KoTDA) developed the vision to make the city a "global technology and innovation hub" and the mission to "develop a sustainable smart city and an innovation ecosystem, contributing to Kenya's knowledge-based economy" [25]. With these objectives, the city will create 200,000 jobs by the end of the year 2030. Many of the staff who will work in the city during construction and setup of ICT infrastructure will be locals from the rural areas of the three counties making them interact with digital equipment and infrastructure.

E. National Government Innovation Hubs

The national Government of Kenya through the Ministry of ICT in the year 2019 established 300 Constituency Innovation Hubs across all the constituencies in the country [26]. This establishment was meant to help train the youths across 290 constituencies on online jobs through the use of Ajira Digital Platform. This platform was launched by the same ministry of ICT in the year 2018 to help over one million youths to work online annually. According to the Principal Secretary of the Ministry of ICT, the world is moving away from traditional physical jobs to multiemployer online jobs [26] . The innovation hubs are also meant to help the youth enhance their innovation capability which is in line with the country's ICT policy. The ministry was set to partner with Constituency Development Fund Boards to provide laptops and internet to youths from various constituencies living in both rural and urban areas [26]. Through the use of these Innovation hubs. the Government of Kenya was able to train over 150,000 youths on Ajira Digital Platform by December 2022 increasing the number of youths working online to 1.9 million up from 1.2 million in the year 2021 [27]. Due to establishment of the 300 innovation hubs in the country with at least once I-Hub per constituency, many youths in rural Kenya are also able to access computers and internet. This is because more than half of the constituencies in the country are in rural regions.

F. County governments I-Hubs

Kenya is divided into 47 county governments which run devolved central government programs. Bungoma County is one of the rural county governments available in Kenya. Being a rural county, technological uptake and advancement is very low as compared to urban counties like Nairobi. This is because there is poor distribution of electrical power, computers and the internet [10] bringing about undesired gap of digital divide between the two counties. In the quest to bridge this gap, the county government of Bungoma in the year 2015 launched a US$2 million Matili Technology Hub (mtHub) during the ICT convention and Innovation Forum [28]. The aim of the hub was to help tap innovative minds for the economic prosperity by use of ICT in the county. "*There is great emphasis across major cities to adopt technology solutions, but this time we are looking to have citizens at county level innovate and benefit from solutions that they themselves engineered"* said the governor of Bungoma County at that time. Prior to the launch, the county government officials partnered with international universities to help set up the I-hub. They also had travelled to Lagos Nigeria with young tech entrepreneurs to participate in the DEMO Africa event [28]. The event equips young techies with knowledge and skills relevant in setting up technology parks and innovation hubs as well us networking. In Baringo County, there exists Rift Valley Innovation Centre (RVIC) which is one of the newly established rural based ICT innovation hubs [29]. It consists of ultra-modern ICT center

with computers, internet and servers that can support over 200 users concurrently. RVIC is an incubation center for young techies to add value to the community through entrepreneurship and business mentorship.

IV. Conclusion

This paper presented importance of ICT to countries in the quest to attain industrial and economic stability. The paper has discussed how innovation in ICT can help fast-track the implementation of ICT in various areas. However, the challenges facing ICT penetration in Kenya have been discussed. Nevertheless, the paper as also how various stake holders are working to see that innovation is open to all amid these challenges. In the past, many innovators failed to achieve their dreams because they stayed in rural areas where there was poor internet connectivity, very few computers and lacked support and training. This problem brought about a disparity between those who had access to computers and the internet and those who did not have access (especially those leaving in rural areas). The disparity which is widely referred to as digital divide is undesirable as it makes the people to economically lag behind in the current information society. At the onset of digital innovations in Kenya, only people leaving in urban areas were able to learn about using ICT for coming up with innovations as well as showcase their innovations. However, in the recent past, the idea of Innovation Hubs and incubation hubs have greatly improved on how to harness the skills of young innovators regardless of where they stay. From the data collected in this paper, researchers discussed how innovation hubs have been used to help Kenyan innovators staying in rural areas to have access to computers and the internet. This access to internet has become a ladder towards bridging the gap of digital divide that has for long existed between the rural and urban areas. Although, data from the World Bank and Kenya Bureau of Statistics show that even though the population of Kenyans who can access internet is growing, their percentage is still too low and the number of innovation hubs is very low. More and more innovation hubs need to be put into villages by the Kenyan government and other stake holders to help many Kenyans who cannot access or afford the internet gain free access so that they can achieve their innovation dreams through ICT.

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