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RESEARCH ARTICLE

TRANSFORMATION OF AFRICA’S DIGITAL ECONOMY: AN ANALYSIS OF THE DRIVERS.

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Abstract

The analysis of the trends in the growth of the digital economy in Africa particularly sub-Saharan Africa and the drivers behind that trend are presented in this paper. The author concludes that the digital divide between Africa and other continents is rapidly closing owing to deployment of large data pipes to connect the continent to other regions and countries within the continent, reduction in the cost of internet delivery, increased internet security, decline in the cost of cell phones, increase in population particular the emergence of the youth population which is quick to adopt new technologies, and the migration of the population to cities. Other contributing factors include adoption of production technologies such as such as artificial intelligence and the Internet of Things, the need for telemedicine to deliver healthcare to rural areas and migration of most business transactions to online platforms, which all produce large volumes of data for instant use.

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Introduction:-

The digital economy in Africa, particularly sub-Saharan Africa (SSA), is characterized by low penetration rates, weak connectivity (Curran, 2017), limited infrastructure and lack of innovation (“Enabling Digitalization Index 2018,” n.d.), attributed to the monopolistic nature of these markets. However, there is ample evidence that this is changing, and the disparity when compared with other continents is closing fast as more investments, expertise and resources from local and international telecommunication companies (Telcos) are steadily being deployed to expand the digital economy. This paper seeks to analyze the trends in the growth of the SSA’s digital economy and the drivers behind this trend.

Literature Review and Methodology:-Africa entered the race for deploying information communication technologies rather late compared to other continents causing the largest and deepest digital divide. The digital divide in Africa especially SSA and the effect on economic performance is well documented. Adeogun, Margare(2003) discussed how the digital divide in Africa was preventing the continent from joining the emerging global information economy and this gap has hindered the dissemination of scholastic knowledge. The author concluded that narrowing the digital divide and connecting libraries to the internet would allow African scholars to contribute appreciably to the existing global knowledge and accelerate sustainable development on the continent.

Alexander Gyamfi (2005) concurred with Adeogun Margare's observations and suggested potential solutions for improving access and the state of the information and communication technology infrastructure and creating the right content and information literacy skills, a pre-requisite to growing the digital economy. The proposed solutions included improving access to digital technologies and disseminating information literacy skills through institutions of learning, libraries and local languages.

Trevor Roycroft (2003) acknowledged the digital divide in SSA and identified inadequate telecommunication and internet infrastructure, low levels of economic development, high internet costs, low bandwidth, monopoly telecommunications market structure and the country's official language as the cause of low connectivity. For example, English speaking countries developed faster than Francophone and Portuguese speaking countries. The notion of the monopoly market structure adversely affecting the development of the information and communications technology is further amplified by Piet Buys et al (2009) in their investigation into the disparities in the cell telephone coverage in SSA which found that the lack of competition in these markets was a major obstacle to improvements in infrastructure and coverage.

Meseret Gebremichael and Jason Jackson (2006) suggested that in a world that is increasingly depending on information and communication technologies for business, education, and government access, Africa had a two prong digital divide problem. The first prong was the gap between the continent and the rest of the world. The second prong was internal—the difference in the access to technology between the haves and have nots within the region. A new term “information poverty” in addition to the traditional forms of poverty was coined to further describe these gaps.

Christian Fuchs and Eva Horak (2008) examined Ghana and South Africa to link the digital divide to access to information and communications technologies including usage and usage benefit. The paper also suggested potential solutions for tightening the gap. The authors concluded that for the solutions to be effective, a social structural change needed to occur.

Despite this gloomy prognosis, many authors were optimistic about Africa and now, the long anticipated African digital transformation poised to leapfrog other regions, may be about to materialize. The term digital divide is steadily giving way to digital transformation (Ndemo & Weiss, 2017) due to the tremendous increase in broadband services offerings and wide-spread deployment of mobile technologies. Many countries have experienced a surge in infrastructure development and mobile phone connectivity (Mutula, 2008), a result of new policies that have allowed competition in the African information and communication technologies' markets. As a consequence, multinational Telcos such as Vodacom, Airtel and Etisalat have all invested and established significant footprints in these markets. Locally, SSA has produced brand Telcos such as MTN Group, Econet Wireless/Liquid Telcom (or Econet Group), Globacom and several others (Douglas & Mudau, 2016).

This paper builds up on the efforts above by analyzing the status of the digital economy in SSA, particularly the capacity and usage, and identifies the drivers for growth in the digital technologies and infrastructure to help fill the void in literature. The study is of interest to policy makers, business executives and civil society because by addressing the user and capacity profiles, specific areas could be identified for policy design and deployment, regulatory improvement, research engagement and harnessing business opportunities to catalyze improvements. The paper begins with a definition of the digital economy, followed by an evaluation of the capacity of the digital infrastructure, and the trends in the digital economy. Conclusions are then drawn based on the findings.

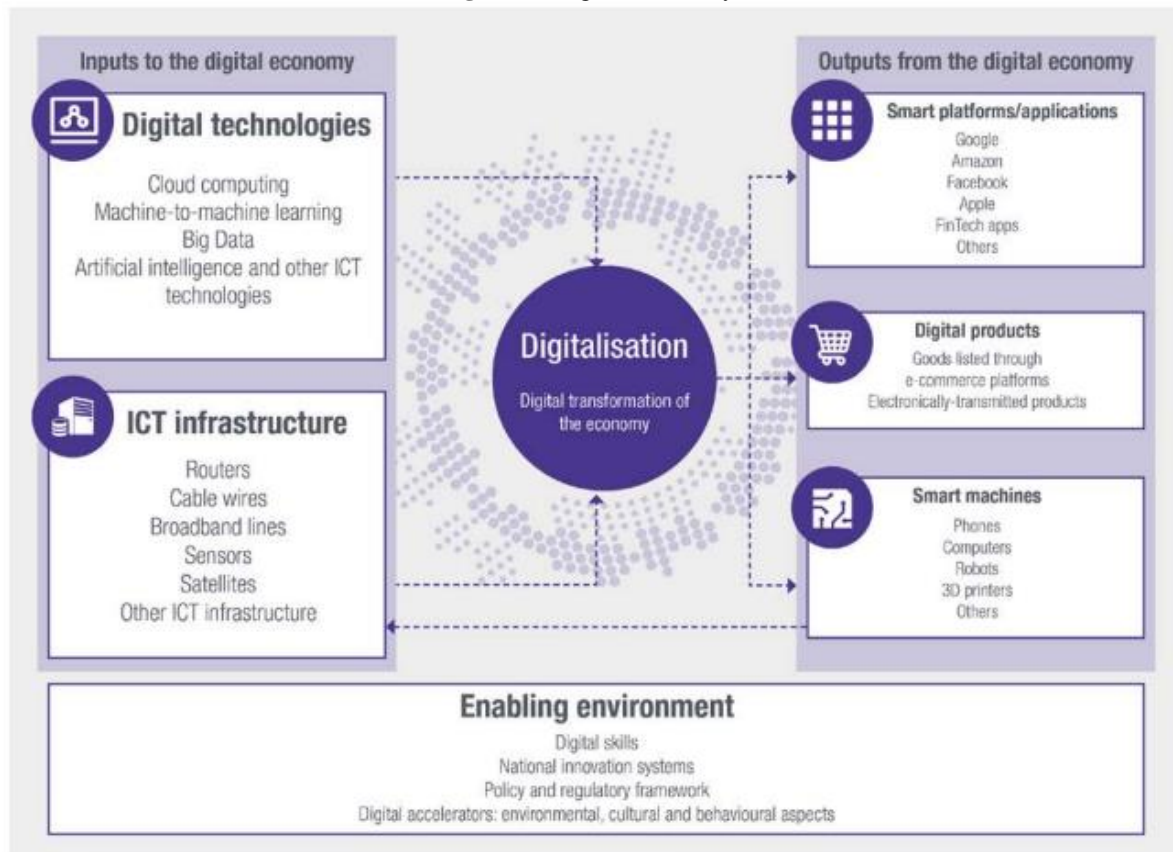
Defining the Digital Economy:-

The term "digital economy" was coined by Tapscott (1997) (“The Digital Economy by Don Tapscott,” n.d.) as “humans networking through technology, including e-business and ecommerce.” Later, the definition morphed into

the “worldwide network of economic and social activities, enabled by digital technologies commonly known as the digital economy” to reflect advancements in technologies (see Figure 1 below for the digital economy model). The digital economy consists of information and telecommunications technologies (ICT) or mobile networks, cloud computing, Internet of Things (IoT), big data, artificial intelligence, and machine learning that improve existing and emerging production processes. These digital technologies, interconnected by ICT infrastructure, allow the economy to develop smart machines, automate manufacturing facilities, create e-libraries and facilitate business transactions (“Digitalization and Digitization – Culture Digitally,” n.d.). Organizations that incorporate digital technologies into their operations increase operational efficiencies and offer services at fast rates, thereby creating technology related jobs and boosting earnings. African governments have been changing policies and conditions to create business environments that are more conducive to attracting investments in the technology sector.

To this end, the African Development Bank has been active in supplementing the efforts of African governments. In 2016, the Bank installed 2060 kilometers of optical fiber backbones in Central and West Africa, launched online applications dedicated to Women entrepreneurs in 36 countries and installed safety navigation systems to save lives on Lake Victoria (AfDB_-_PICU_-_Annual_Report_2016.pdf, n.d.). These projects helped increase the digital economy in Africa. Similar projects are in the offing.

Figure 1:-Digital Economy Model



Source: Banga, K. (n.d.). Digitalization and the Future of Manufacturing in Africa, 81.

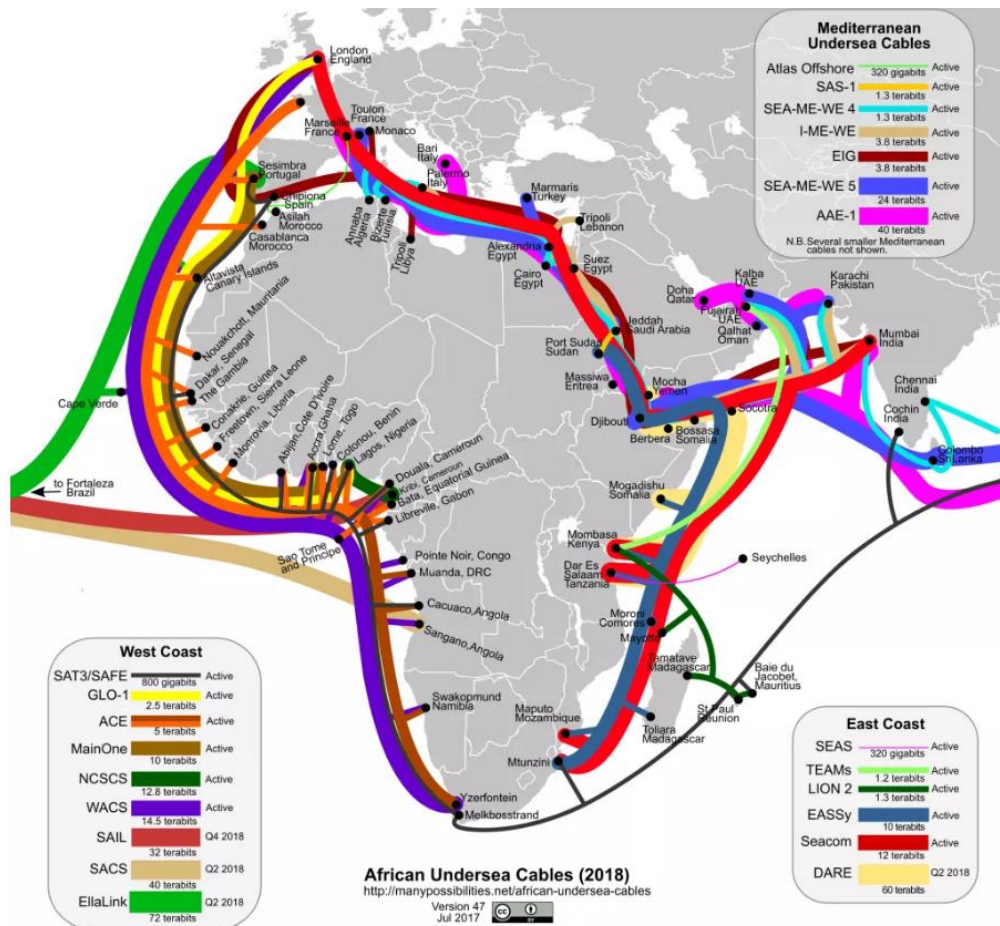
Africa’s Digital Economy Capacity:-

Africa has for a long time been connected to other regions such as the United States — mainly by satellite — and to Europe, by fiber. However, the capacity was low and the costs were extremely high when compared to most other regions in the world (“How is the backbone Internet connected to and within Africa? - Quora,” n.d.). Since 2009, significant improvements have been observed.

The main cables (SAT-3 and SAFE) from Europe were upgraded to the current 340 gigabits per second (Gbps). The SEACOM cable (1,280 Gbps) from Europe through the Mediterranean Sea down to South Africa, which connected many countries on the way, increased the bandwidth fivefold and reduced the cost by 50%. In 2018, plans were in place to launch WACS (West Africa Cable System, 5,120 Gbps) to increase capacity from 1,500 to nearly 7,000 Gbps, reducing costs to about a third of the current levels. The prices to the consumer are expected to be significantly reduced even further when installation of the larger cables — such as ACE (5,120 Gbps) this year and SAex with a bandwidth of 12,800 Gbps next year(IPS, 2018) — is completed.

On a global scale, WASACE (“Multi-continent spanning WASACE submarine cable system announced,” n.d.) plans to link the fast-growing markets of Africa and Latin America with the markets of North America and Europe through four major connectivity corridors — North Africa connecting Europe to North America, South Africa connecting South America to Africa, America connecting South America to North America, and Africa (connecting Nigeria, Angola and South Africa). A schematic view is provided in Figure 2 below (“African Undersea Cables,” 2008).

Figure 2:-ICT Infrastructure in Africa



Source: African Undersea Cables. (October 16, 2008). Retrieved July 26, 2018, from <https://manypossibilities.net/african-undersea-cables/>

Trends in the African Digital Economy:-

Africa’s digital economy in 2012 as measured by the internet Gross Domestic Product (iGDP) — a measure of the internet’s contribution to overall GDP — is led by Senegal at 3.3% and Kenya at 2.9% with an average of 1.1% for the continent, which is low when compared with averages of 1.9% in emerging economies and 3.7% in developed regions (Manyika et al., n.d.). On a global scale, Africa’s international digital B2B (business to business) transactions,

including the Middle East, accounted for a meagre 2.2% of the world's total in 2013 (International E-Commerce in Africa_Low-res.pdf, n.d.). Out of the estimated \$15.5 trillion with B2C (Business to Consumer), Africa accounted for \$1.2 Trillion (International E-Commerce in Africa_Low-res.pdf, n.d.), implying Africa is missing out on a large chunk of business. This deficit, attributed to financial, infrastructural, socio-political and digital divide barriers, is expected to diminish significantly because of the reasons discussed below.

Increase in Mobile Payments

Kenya and its neighboring Uganda are leading the way in the use of mobile money. About 68% and 50% of the people who own cell phones in Kenya and Uganda respectively use them for mobile money, in contrast with South Africa and Senegal where only 29% and 24% respectively use their cell phones to receive or make payments (NW, Washington, and Inquiries 2014).

The high percentage in Kenya and Uganda has been catalyzed by the launch of M-Pesa in 2007 — a platform for making or receiving money without the use of cash — which has since become popular as a tool for people in urban areas to send money to rural areas where people have more access to cell phones than banks (93% of the people in Africa own cell phones) (Digitalization_Maturity_Report_2017.pdf, n.d.). Africa has a high mobile access rate because it leapfrogged the world by going straight to mobile before going to the web (africa-group-newsletter-december-digital-africa.pdf, n.d.).

The money received on the M-Pesa platform can be cashed out at local stores or left on the digital device as a de facto savings account for use when needed. In 2013, 19 million out of the over 44 million people in Kenya utilized this platform to send money and for commercial transactions because more shops are accepting digital payments (CNBC.com, 2013). During 2013, the number of M-Pesa agents grew by 40% to 65,000 (CNBC.com, 2013). In 2017, the number of subscribers grew to 28 million, and this trend is expected to continue as more Kenyans get cell phones and as mobile money gains traction across the continent (“How you helped Safaricom make Sh48 billion profit,” n.d.).

Increase in Internet Subscribers

Internet subscription in Africa has been growing at a staggering pace. In 2000, only 4.5 million out of the over one billion people used the internet. By 2014, this figure grew to 453 million, a growth of 9,942% compared with 89.1% for the rest of the world (Ericsson Mobility Report, n.d.-a). In 2017, total internet subscriptions grew to 688 million, with smart phone subscriptions accounting for 290 million, and the average data traffic per smart phone increased from 700 MB (megabytes) to 1.4 GB (gigabyte) (Ericsson Mobility Report June 2018). Despite this herculean growth, Africa represents only 35.2% penetration against 58% for the rest of the world. In terms of the proportion of the world share of subscriptions, Africa represents only 10.9% of the total world internet users (“Africa Internet Users, 2018 Population and Facebook Statistics,” n.d.) despite hosting 16% of the world population — 1.2 billion of the 7.4 billion world population (“Africa Population 2018 (Demographics, Maps, Graphs),” n.d.).

The buoyancy in internet users in Africa is expected to continue. Projections suggest that by 2020, there will be more than 700 million smartphone connections in Africa, which is more than double the estimated level in North America. In Nigeria alone, with 170 million people, 16 smartphones are sold every minute (“Africa Population 2018 (Demographics, Maps, Graphs),” n.d.). For the year 2016, Africa's mobile data traffic grew by 96%, dwarfing the rest of the world's 63%, with Asia Pacific coming a distant second at 71% (“Cisco Visual Networking Index,” n.d.). This trend is expected to continue for several reasons. First is the increase in financial transactions. Businesses are increasingly conducting business on the internet, forcing customers to have access to the internet. Second, many users did not trust the internet for business transactions as they were particularly concerned about scams and cyber-attacks, which prevented them from disclosing financial information online. As more businesses included electronic commerce as part of their offering, these firms took measures to secure the transactions — such as using security certificates and data protection providers such as PayPal and Zelle — to ensure the transactions are conducted safely. Even though these attacks were initially dealt with by individual companies as internal technology problems, later, the continent began to recognize the extent of the problem, which led to the formation of a coordinated continental cybersecurity convention in 2014 by the African Union Assembly — consisting of all 54 member states — to establish a legal framework for protecting personal data, regulating ecommerce and beefing up cybersecurity. By this time, many countries had already started to implement regulations to curtail fraud related to internet connectivity.

The actions of individual firms, individual countries and the collective action of African countries to combat cybersecurity restored trust in the internet. Internet surfers now access social media platforms such as Facebook,

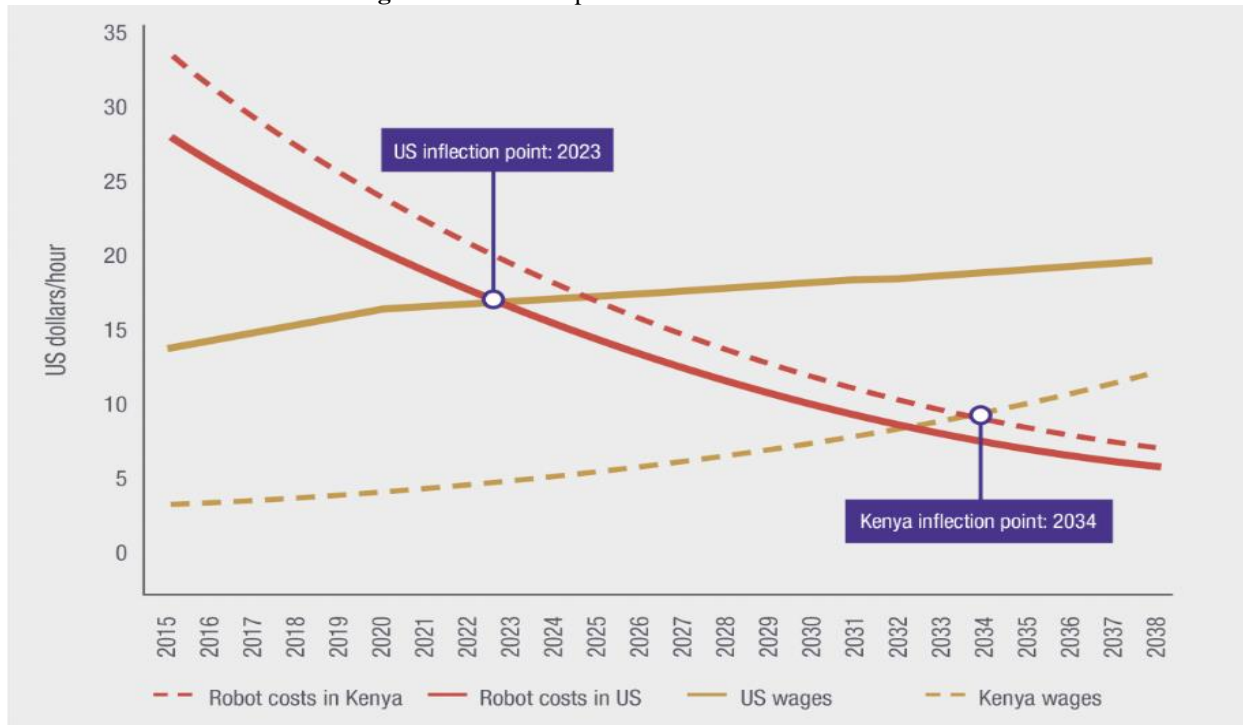
LinkedIn, Instagram, content-rich apps and rich video content, leading to an increase in internet usage. In 2013, for example, the average data use in Africa stood at 37,500 TB (terabytes) per month and the usage doubled to an average of 76,000 TB of data per month in 2014. Coinciding with the effort to regulate ecommerce was the fall in internet access costs due to larger capacity cables allowing the continent to be flooded with cheaper cell phones, giving the consumers more reason to go online (“Africa Internet Users, 2018 Population and Facebook Statistics,” n.d.). In 2017, the Ericsson report said mobile data in Sub-Saharan Africa is anticipated to increase twenty times more than the expected global expansion by the end of 2019 (Ericsson Mobility Report, n.d.-b).

Another factor that will increase internet usage in Africa pertains to the age of and the increase in the population. With the median age of 19.5 years, Africa is the youngest population in the world. In the age bracket of 18-24 years, Africa has 226 million people, and this population is predicted to double by 2055. In addition, the continent’s total population, which currently exceeds 1.2 billion people, is projected to reach 2.5 billion by 2050 — a quarter of the world population (“Africa’s defining challenge,” n.d.). Most of the population growth will come from the urban areas due to migration of the rural population to the urban areas, particularly the younger members of the population. Africa, with an average urbanizing rate of 3.4%, is the continent with the fastest urbanization, and 60% of the population is projected to live in cities by 2050. The urban growth is bringing with it an increase in the middle class. Consumer spending in Africa is estimated to exceed US\$1 trillion annually by 2020 (“African Consumer Market Growth Opportunity Stands To Reap Powerful Rewards,” 2017). The 18 largest cities in Africa will have a combined spending power of US\$1.3 trillion by 2030, giving retailers an enormous opportunity to meet the demands of these newly-empowered shoppers (“Urban growth a boon for Africa’s industrialization | Africa Renewal Online,” n.d.).

The growth in the urban population is also outpacing traditional retail outlets. Many cities have insufficient physical market places and schools forcing consumers to utilize online shopping malls and schools. It is anticipated that ecommerce will generate US\$75 billion in revenues by 2025, a 40% annual growth rate over the next 10 years (MGI_Lions_go_digital_Full_report_Nov2013.pdf, n.d.). The combination of the increase in the general population and that of young population who are quick to embrace technology, the desire for internet usage and cheaper cell phones will push up the number of internet subscriptions, causing a surge in data usage (Ericsson Mobility Report June 2018, 2018).

The fourth factor is the adoption of technologies in manufacturing processes. The manufacturing industry is poised to deploy new technologies that increase productivity and efficiency and to drive innovation. These technologies will require generating data insights in real-time to support and instruct workers and robots in complex manufacturing processes. Currently, the cost of technologies such as artificial intelligence and the Internet of Things is prohibitive (Banga, n.d.). In furniture manufacturing, for example, the cost of operating robots is higher than labor, making replacing labor with machines cost-inefficient. However, this will not be the case within the next two decades. As illustrated in Figure 3 below, using the example of Kenya versus the United States (U.S.), by 2023, it will be more cost effective for the U.S. to increase automation in manufacturing and other processes that render themselves to automation, while for Kenya, that time will come in 2034 (Digitalization_Maturity_Report_2017.pdf, n.d.). Once the automation occurs, there will be pressure to use more data.

Though the list is not exhaustive, the last driver for internet usage in Africa is healthcare. African countries are consistently seeking to deliver modern healthcare systems — that rival world standards of healthcare — to millions of people in urban and rural communities to improve the quality of life and catalyze economic and social development (Pizzi et al., 2014). Healthcare services are concentrated in the cities, leaving rural and hard-to-reach areas — where over 600 million people live — without access to healthcare. African governments and international development organizations, such as the United Nations and World Health Organization, have deployed telemedicine programs to remotely diagnose and treat patients in radiology, pathology, dermatology, audiology and pediatrics, in South Africa, (Naidoo & Mars, n.d.), Mozambique, Senegal, Uganda and Kenya, for example (Mbarika & Okoli, 2003), to treat malaria, tuberculosis and other diseases in areas where traditional healthcare methods cannot function (“Telemedicine in Africa: Connecting Professionals in the Fight against Cancer,” n.d.). There is a need for high capacity cables to meet this new demand for high volumes of data.

Figure 3:-Cost Comparison and Break-Even Points

Source: Digitalization Maturity Report 2017.pdf. (n.d.). Retrieved from http://www.siemens.co.za/pool/about_us/Digitalization_Maturity_Report_2017.pdf

Conclusions:-

Though Africa still lags other regions in internet connectivity, there are signs that the digital economy is expanding very quickly. Large data pipes are being installed to increase the data capacity, reduce the cost of internet delivery, and the actions at firm, country and continent level against fraud and cybersecurity are helping the digital economy to grow. The explosion of mobile phone networks transformed data and communications on the continent allowing Africa to catapult right into the mobile age. Consequently, financial transactions and marketplace exchanges such as M-Pesa have flourished in ecommerce and are even acting as de facto savings accounts for people largely in rural areas where the banking infrastructure is scarce. The decline in the cost of cell phones, the increase in population and the emergence of the youth population (who are quick to adopt technologies), the migration of the population to cities (resulting in higher incomes) and the need for telemedicine to deliver healthcare to rural areas (though in its infancy) are all trending upwards and driving up the digital economy. The digitization of the economy is expected to accelerate soon, particularly with the increase in the use of production technologies such as artificial intelligence and the Internet of Things, which all produce large volumes of data for instant use.

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