

DIGITAL TECHNOLOGY AND COMMUNITY EMPOWERMENT: BRIDGING THE RURAL- KNOWLEDGE CENTER GAP

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Abstract

Rural communities in developing countries continue to experience marginalization due to centralization of services in urban areas and institutions. The imbalance in distribution of resources and provision of services isolates rural communities making them remain ignorant of the advancements that can lead to their own socio-economic empowerment. Rural communities lack access to innovations and knowledge necessary for their transformation due to lack of good and effective channels for relaying information or mechanisms that can enable them to tap the knowledge they need to broaden their world view, interpret their situations, and address the barriers that prevent them from getting access to digital technologies. Government and non-government agencies through their research and practices have generated knowledge and information on different issues that have distracted community transformation over the years and which if properly disseminated would enhance the problem-solving ability of the communities. Knowledge would free and empower people from ignorance and set them on a firm path to discovering themselves, interpret reality with confidence, and making decisions that would improve their well-being. This paper argues that rural communities can be empowered by bridging the digital gap through enhanced knowledge management strategies. Through an extensive review of existing literature, this study seeks to explore different strategies for disseminating knowledge to communities using digital technology and examine how government agencies, not-for-profit organizations and local community initiatives can facilitate access to information and enhance digital literacy among rural communities. The findings of the study would potentially advise policy on digital empowerment of rural communities with the view to enabling them tap into the existing opportunities to better their lives.

Keywords: Rural Communities, Community Empowerment, Digital Technology, Knowledge Center, Knowledge Management.

Introduction

This paper examined the digital landscape in Kenya, highlighting the challenges encountered by the rural community in accessing technology, the inequalities in access, usage and benefits of ICT in Kenya between the rural and urban communities. It argues that addressing the acute digital divide in Kenya requires more than just high mobile phone penetration and a widespread mobile money transfer platform. There is need to develop internet access strategies that prioritize connecting the majority of people who lack internet access despite owning multiple mobile phones. The key focus areas for these strategies would include bridging the rural-urban divide, gender disparity, digital illiteracy, insufficient or inaccessible ICT and high mobile penetration contrasted with limited connectivity.

Background of the Study

Since attaining their political independence most countries in Africa have grappled with the persistent problem of unbalanced regional development. Through various policies and interventions, the governments of these countries have tried to reverse the imbalance that stems from the colonial policies that had created wide disparities and imbalances between regions leading to marginalization of many communities in the country. For example, a 2007 report on well-being in Kenya confirmed persistence of disparities especially in the distribution of resources including dissemination of innovation. Most of the time, distribution tends to favor the centers where this knowledge is generated. Wide disparities also exist between urban and rural areas in Kenya, with 85 percent of the poor people living in rural areas characterized by lack of resources and services they need to better their lives ^[1].

Rural communities lack access to innovations that they need to and knowledge necessary for their transformation due to lack of good and effective channels for relaying information or mechanisms that can enable them to tap the knowledge they need to broaden their worldview, interpret their situations, and address the barriers that prevent them from getting access to digital technologies. This digital gap has remains a major stumbling block to communities as it

stands between them and knowledge centers, thus preventing them from accessing innovations that can transform their lives. Thus with appropriate knowledge, they would discover themselves, interpret reality with confidence, and make decisions that can improve their well-being [2]. Using enhanced knowledge management strategies, rural communities can be empowered by bridging the digital gap between themselves and centers of knowledge [3]. Thus information and communication technologies (ICTs) cannot ensure empowerment, they can potentially expand political, social, and economic freedom given the necessary relevant sociocultural technical, economic, and political conditions. ICTs have exploded in the last decade providing a tremendous diversity of tools enabling citizens to participate in the governance of villages, cities, states, and countries and in the establishment of entrepreneurial undertakings that have transformed socioeconomic livelihoods.

Technology, community, and public policy should work together to bridge the digital divide to give underprivileged people access to enable them to engage in the digital economy [4]. However, changes in the era affect the nature and attitude of the community in responding to the situation, the village community's traits and attitudes still survive to this day, namely cooperation and accepting what is. Village communities are known for their cooperation and acceptance, attributes and attitudes that can be relied upon in carrying out village development [5] which needs to be carried out by the village community albeit with assistance from both competent professionals and external parties [6]. Optimizing the ability of rural communities in village development is known as empowerment which closely relates to the notion of participatory, independent, network, and justice based on individual and social strengths [7]. The concept of empowerment is oriented towards removing the existing power in a community to be able to carry out activities so that the village becomes developed. Programs for village empowerment need to look at the potential of the village and adapt it to current conditions that have entered the new normal period [2]. Community empowerment is defined as government-

led efforts to assist local communities in planning, deciding, and managing their resources so that they have the capacity and independence to be economically, ecologically, and socially sustainable in the long run ^[8]. Community empowerment is therefore closely related to sustainable development, which necessitates the dynamic prerequisites of economically, environmentally, and socially independent communities ^[9]. It is also an economic development concept that encompasses community values which create a new paradigm in development that is people-centered, participatory, empowered, and sustainable. Furthermore, the concept of development with a community empowerment model does not only meet the fundamental requirements of the community but also seeks options for local economic growth ^[10] which can be achieved through digital technology by disseminating information ^[11]. Knowledge sharing entails transferring tacit (undocumented) and explicit (documented) information from one person to another. In a community, it not only increases cohesiveness but also empowers society by giving access to new ideas, resources, and expertise.

Knowledge sharing in the community significantly impacts societal intellectual assets. It boosts productivity, improves decision-making, and strengthens the community culture. Incorporating a knowledge-sharing culture is mandatory for the success of any society. The conduit of knowledge sharing needs to be shared rather than storing or documenting it because when the community struggles to access information, the bottom line is that it's left behind in many aspects. This paper aims to elaborate on the importance of knowledge sharing and how the use of digital technologies can lead to the shrinking of the digital gap.

Digital technologies have advanced more rapidly than any innovation in our history – reaching around 50 percent of the developing world's population in only two decades and transforming societies, enhancing connectivity, financial inclusion, access to trade and public services ^[12]. Some of the sectors where digital technologies have been embraced include the health sector, for instance, Artificial Intelligence (AI)-enabled frontier technologies are helping to save lives,

diagnose diseases, and extend life expectancy. In education, virtual learning and distance learning have opened programs to students who would otherwise be excluded. Public services are also becoming more accessible and accountable through blockchain-powered systems, and less bureaucratically burdensome because of AI assistance.

Research on knowledge sharing indicates that communities in remote areas experience challenges in accessing digital technologies ^[13]. Notably, those areas that are not yet connected remain inaccessible to the benefits of these technologies and are consequently left behind ^[14]. The pace of connectivity is slowing, even reversing, among some constituencies ^[12]. For example, globally, the proportion of women using the internet is 12% lower than that of men. While this gap narrowed in most regions between 2013 and 2017, it widened in the least developed countries from 30% to 33%^[12].

Statement of the problem

Kenya stands as a prominent digital and economic centre in East Africa. Despite this, it falls behind in global digital GDP rankings, highlighting a significant digital divide. UN Conference on Trade and Development (UNCTAD) data highlights this gap, emphasizing disparities in information and communications technology (ICT) access, usage and benefits, impacting economic growth and human development not only in East Africa but also globally ^[12]. Thus, merely possessing high mobile phone penetration and a widespread mobile money transfer platform does not resolve this acute digital division. To address this issue, the Kenyan government should develop internet access strategies to connect the majority who lack internet access, despite owning mobile phones. These strategies must tackle ICT equipment availability, affordability, digital illiteracy and policy development to address infrastructure issues such as poor broadband coverage and internet reliability. Furthermore, the government should aim to bridge rural-urban and gender divides. Over the past two decades, ICTs have significantly impacted the developed world, influencing various sectors. However, Africa, including Kenya,

lags behind in ICT adoption [2], impacting the continent's development. Despite international, regional and local efforts to bridge this digital gap, Kenya's digital divide persists. This policy brief delves into Kenya's digital divide, offering a framework for analyzing this issue and offering recommendation

Objectives of the study

This study sought to explore different strategies for disseminating knowledge to rural communities using digital technology and how government, not for profit organizations and community initiatives can facilitate access to information and enhance digital literacy and to support socio-economic empowerment of rural communities.

Literature Review

To address the digital divide between centers of knowledge and rural communities, the Kenyan government should develop internet access strategies to connect the majority who lack internet access, despite owning mobile phones. These strategies must tackle ICT equipment availability, affordability, digital illiteracy and policy development to address infrastructure issues such as poor broadband coverage and internet reliability. Furthermore, the government should aim to bridge rural-urban and gender divides. The social, political, and economic sectors of any society desire and endeavor to be equipped with digital technologies to enhance information sharing which is essential for transformational development. Access to knowledge instills confidence in people and increases the passion required to live and work in a technology-driven world. Despite this great need for digital literacy for information sharing, rolling out the necessary frameworks has been slow resulting in a knowledge gap between rural communities and knowledge centers, which are mainly concentrated in urban areas.

The rural-urban digital divide programs aim to level the playing fields and ensure remote regions have the same digital advantage as their metropolitan counterparts, however, Kenya News Agency [15] indicated that connectivity in Kenya is far from universal levels of digital

literacy at rural community levels. Thus, there are noteworthy gaps in infrastructure coverage, affordability, energy reliability and other factors widening the urban-rural digital gap in the 47 Counties of the country. Therefore, the research attempts to explore strategies that can be used to improve and bridge the digital gap.

Rural -Knowledge Centre Gap

The digital divide is the gap between individuals and communities with access to digital technologies and those without has remained a significant challenge in rural areas. It is manifested by lack of connectivity and limited digital literacy skills which hinder rural populations from fully participating in the digital economy and accessing essential services hence the need for strategies that can improve connectivity and digital inclusion in rural areas.

As digital infrastructure, technology, and connectivity evolve, investment in rural digital connectivity must be prioritized for economic growth, social inclusion, and improving quality of life^[16]. Getting access to everyday essentials like healthcare, education, financial services, and even entertainment for social interaction can be extremely difficult for those living in remote or under-served areas. However, if internet access is available it would be lifesaving as it would provide greater flexibility and convenience and, in turn, bridge the social inclusion gap, positively impacting mental well-being and leading to an empowered generation.

In developing countries, prioritizing approaches that would increase digital infrastructure in rural areas could ensure that communities have access to the same digital services as those in well-served areas. Kenya has in the last two decades made noteworthy strides in technological advancement, evidenced by the development of the Konza Technopolis, licensing of more internet and cellular service providers, digitization of government services, for example, e-citizen platform, Ardhisasa, NEMIS (a data management platform for the department of education) and the institutionalization of ICT through government departments and corporations such as ICT Authority. There is an equally high rate of adoption evidenced by the

growth of mobile subscriptions (133% of the population in 2022), increased installation of fiber optic per capita, and increased geo-coverage of fixed and mobile broadband. However, despite this digital progression, there is still a digital divide between urban and rural areas, and it remains crucial that a range of connectivity approaches be considered because digital technology is a great asset to economic growth [15].

Importance of enabled connectivity

Improved digital connectivity in Kenya has improved the socio-economic life of people [16]. For example, in the economic sector, growth is evident in new job opportunities that have already increased productivity in different areas of the economy and enhanced the growth of small and medium-sized businesses. This has enabled businesses to operate more efficiently, increasing access to markets and customers, and facilitating innovation and development of new products and services. For example, because of digitalization, knowledge of different methods of producing goods and services is readily accessible by individuals, groups, and communities that were unable to access it in the past and has enabled them to transform their lives. The social life of communities has been influenced greatly by digital connectivity leading to increased social interaction locally and globally which has transformed and enhanced relationships and partnerships which in turn have brought cohesion in families and groups. This developed and enhanced ability to connect via instant messaging and video conferencing which have enabled people to communicate more easily and in real time, regardless of their geographical location. Another advantage of digital connectivity is witnessed in the improved access to healthcare services, especially in remote rural areas. For example, with telemedicine, patients can consult with healthcare professionals remotely, reducing the need for physical appointments. The education sector has not been left behind since access to education has been made easy. Currently, many learning institutions across the globe run online academic programs that have enabled many people to learn. Social media has also played a major role in the formal and

informal dissemination of information globally leading to social inclusion and great enlightenment of marginalized communities.

Notably, it is agreeable that digital investment plays an essential role in driving economic growth by increasing access to markets and customers, especially for small and medium-sized enterprises (SMEs) and farmers. Digital platforms and e-commerce can enable SMEs to reach a national and global consumer base, which can help them grow and compete with larger firms. It can also enable stimulation, innovation, and development of new products and services.

Automation and digitization of service provision can streamline processes and change the speed of operations, leading to greater productivity and output. Thus, better rural digital connectivity will ensure the local population can access essential services including healthcare and education. This can reduce rural-to-urban migration and retain human capital in their rural communities instead of relocating to urban and better-connected areas, which will inevitably benefit the local economy.

Bridging the Digital Technology Gap

To bridge the digital connectivity gap and enhance access to broadband service in rural areas, the Affordable Connectivity Program was created in late 2021^[17]. However, the challenge is the kind of infrastructure available to rural communities to expand access to all residents. Multiple types of infrastructure are preferred since they can create broadband connectivity, each with unique benefits and drawbacks. In all cases, cost is a driving factor that must be addressed if the digital gap is to be reduced. Some of the options that can be used include:

Fiber-Optic Cables

Unlike the copper cables in plain old telephone services (POTS) which use electrical voltage to transmit data, fiber-optic cables are broadband-specific cables buried underground that create a communicating network of glass or plastic carrying light data. This revolutionary invention can

provide a fast and reliable internet connection with the advantage that since the cables are buried, the quality of the connection is not impacted by weather and is infrequently damaged.

Satellite Internet

Satellite Internet uses a satellite dish that can facilitate two-way (upload and download) data transmission. Individual users mount a small satellite dish on roof tops or other static objects in their homesteads to transmit data signals from the at-home satellite dish to one in orbit around the Earth. Mounting a satellite dish is easy and once done, the Internet connection is instant and often faster than a POTS connection. However, compared to fiber-optic, satellite service is slower. Its easy installation and non-reliance on larger internet providers is a significant perk for users in rural and remote areas. However, even though a satellite server would not be subject to the functionality of an entire system such as the POTS and fiber-optic, the individual device can be damaged and immediately interrupt service.

4G and 5G Networks

Mobile/Cellular carriers provide 4G (fourth generation) and 5G (fifth generation) networks of cellular communication, which use radio waves to transmit data that enables Internet connection. The difference between 4G and 5G is the data transmission speed. 5G networks are more efficient, handle more connections per antenna, and provide faster upload and download speeds and will eventually replace the 4G network. An antenna that can navigate these radio waves can be placed on established infrastructure like telephone poles and public institutions.

Fixed-Wireless Networks

Fixed-wireless networks serve as stationary towers and antennae that carry data through radio waves transmitting a carrier's signal across frequencies. Technology has significantly advanced 5G networks of cellular communication that enable internet connection [17]. Fixed-wireless deployment relies on a central tower that broadcasts signals to other receivers installed by individual users. Like a satellite dish, a 5G antenna can be installed on a user's property and provide a wireless connection to multiple personal devices.

Digital literacy and skills among rural populations for effective utilization of digital technologies

Even though digital skills are no longer a luxury, but a fundamental necessity, millions across the globe lack access resulting in a significant digital divide, particularly in rural communities that suffer from limited infrastructure, financial constraints, and cultural barriers which are formidable obstacles to technology adoption. Limited digital access translates to missed opportunities in education, healthcare, agriculture, and entrepreneurship, hindering individual and community-wide development ^[18]. Having recognized the transforming power of digital literacy, numerous organizations have embarked on a journey to bridge the digital gap by ensuring good technology is accessed, understood, applied, and integrated into the daily lives of communities.

Ensuring that digital technologies benefit the rural population leads to smart villages, which are places where rural communities are empowered and can take the initiative to find solutions to the challenges they face ^[19]. However, it should be noted that digitization can be a powerful force for change if it is well applied to the rural context and implemented with voluntary involvement of rural communities. Consequently, implementation of a bottom-up and tailor-made approach to build digital skills initiatives involving the local community and tuning them to the local context are likely to give good project outcomes.

Community Engagement and Collaboration for Sustainable Digital Inclusion Initiatives

Digital inclusion is a critical aspect of modern society, as access to technology and the internet has become essential for everything from education and employment to healthcare and social connections. However, not everyone has equal access to these resources, and many individuals and communities are left behind in the digital age. Bridging this gap requires a multifaceted

approach that addresses issues of infrastructure, affordability, and digital literacy as hereby discussed.

Infrastructure: The first step in promoting digital inclusion is ensuring that everyone has access to the necessary infrastructure. This includes not only high-speed internet but also devices such as computers and smartphones. One promising approach is to invest in community-based broadband networks, which can provide affordable and reliable internet access to underserved areas.

Affordability: Even with access to infrastructure, many individuals and families may struggle to afford the cost of devices and internet service. To address this issue, some companies and organizations offer discounted or free devices and internet access to low-income individuals. For example, Comcast's Internet Essentials program provides low-cost internet and computers to eligible households, and the nonprofit PCs for People refurbishes and distributes computers to low-income families, an approach that may not be possible in developing countries.

Digital literacy: Promoting digital inclusion requires ensuring that individuals have the skills and knowledge necessary to use the technology effectively. This includes not only basic computer skills but also digital literacy in areas such as online safety, privacy, and information literacy. One effective approach is to offer digital skills training and support through community organizations, libraries, and other public institutions. For example, the Digital Promise program offers a range of digital skills training resources for educators and learners of all ages. Thus by investing in community-based broadband networks, offering subsidies and discounted devices, providing digital skills training and support, we can help bridge the digital divide and ensure that everyone has equal access to the opportunities and resources of the digital age.

Strategies for promoting digital inclusion for community empowerment.

Provision of Affordable Internet Access

One of the most important strategies for promoting digital inclusion is to ensure that affordable internet access is available to all. Many individuals and communities are unable to access the internet due to high costs. By providing affordable internet options, such as low-cost plans or subsidies for low-income households, we can bridge the digital divide. For example, in countries like Estonia and Finland, the government has made Internet access a legal right, ensuring that all citizens have affordable and reliable access to the Internet.

Increasing Digital Literacy

Another crucial aspect of promoting digital inclusion is to increase digital literacy among individuals who may be unfamiliar or uncomfortable with technology. This can be achieved through various initiatives, such as community training programs, workshops, and online tutorials. For instance, organizations like Google and Microsoft have created digital literacy programs that provide free training and resources to help individuals develop the necessary skills to navigate the digital world.

Improving Access to Digital Devices

In addition to internet access and digital literacy, it is also important to ensure that individuals have access to the necessary digital devices, such as computers, smartphones, or tablets. This can be a significant barrier for individuals who cannot afford these devices. To address this, initiatives like the One Laptop per Child program have been implemented in developing countries to provide students with affordable laptops for educational purposes.

Creating Digital Public Spaces

Creating digital public spaces is another effective strategy for promoting digital inclusion. These spaces can provide free internet access and resources, allowing individuals to connect, learn, and engage with the digital world. Libraries, community centers, and schools can serve as digital public spaces, offering not only internet access but also workshops, training programs, and

online resources. For example, the New York Public Library offers free Wi-Fi access and computer workshops to help bridge the digital divide in underserved communities.

Collaboration and Partnerships

Collaboration and partnerships between governments, not for profit organizations, and private sector organizations are crucial for promoting digital inclusion. By working together, these entities can leverage their resources and expertise to develop innovative solutions and initiatives. For instance, the Digital Inclusion Alliance in the United Kingdom brings together various organizations to address digital exclusion by sharing best practices, coordinating efforts, and advocating for policy changes.

Advocating for policies that promote digital inclusion

Finally, in their endeavor to reduce the digital gap, businesses and agencies can advocate for policies that promote digital inclusion. Some policies can either promote or hinder digital inclusion efforts. By advocating for policies that promote digital inclusion, businesses can help in enhancing connectivity and access to digital tools and resources by people in rural areas. Today there are a number of local organizations that advocate for policies that provide tax incentives for businesses that provide digital skills training to their employees and rural communities.

Businesses play a crucial role in promoting digital inclusion. In this endeavor, they provide affordable access to technology, offer digital skills training, support digital infrastructure development, collaborate with community organizations, and advocate for policies that promote digital inclusion. By doing so, they help to bridge the digital divide and ensure that everyone has equal access to technology. Businesses need to recognize and appreciate the big role they play in the promotion of digital inclusion and the

Methodology

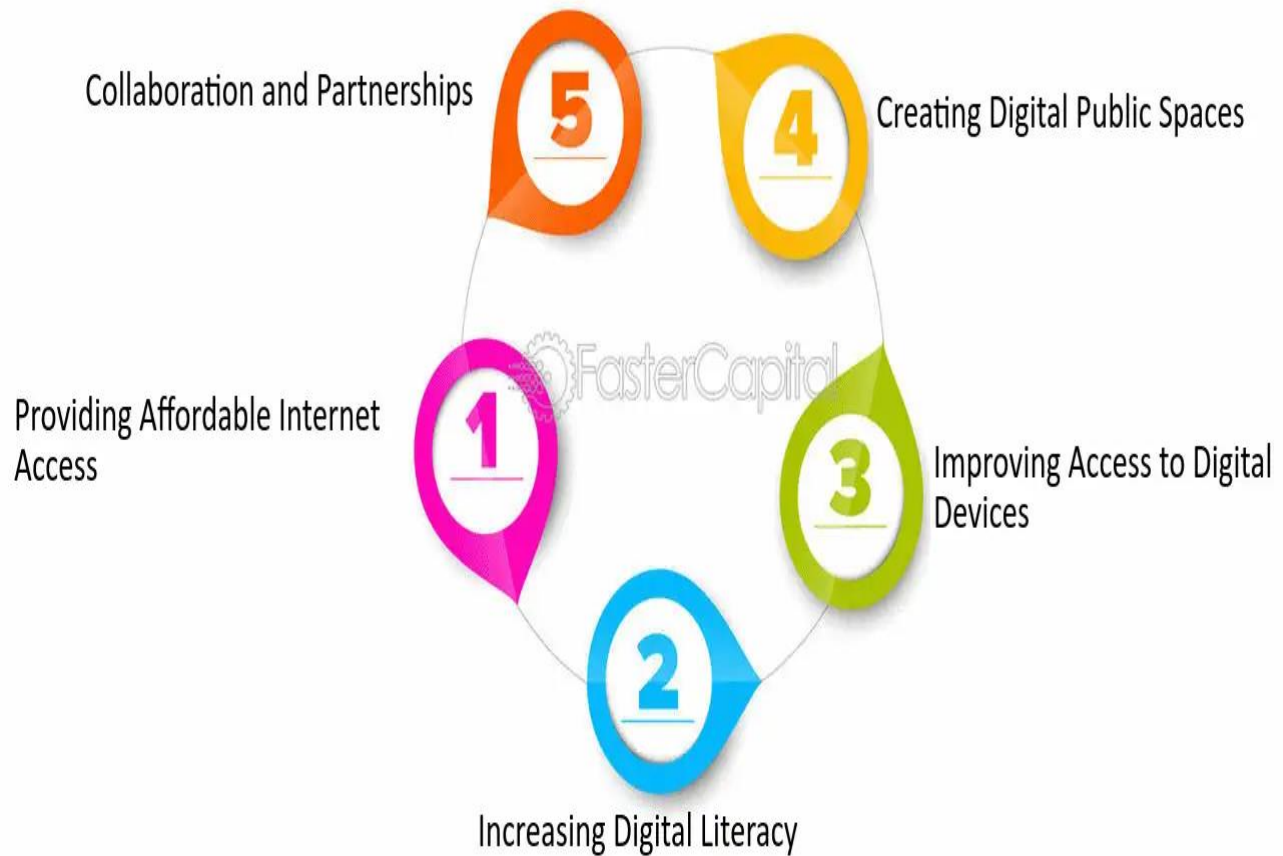
The study adopted a desktop research methodology based on a literature review. Data was systematically retrieved online from databases. These included the Academic Journal of Interdisciplinary Studies, SCImago Journal & Country Rank (SCImago), and the Directory of Open Access Journals (DOAJ). SCImago and DOAJ are openly available and provide their data in an easily downloaded format. The study largely focused on the average number of citations received by a journal, commonly called an impact factor. Citation metrics of digital divide and empowerment were analyzed in two different ways. Firstly, they were analyzed with journals as the unit of analysis, which was at the level the data retrieved from the different databases. The study also weighted citation metrics of the articles published.

Findings and Discussion

The research found that bridging the digital divide and promoting digital inclusion is essential for community empowerment. This can be attained through implementing the strategies such as;

1. providing affordable internet access,
2. increasing digital literacy,
3. improving access to digital devices,
4. creating digital public spaces, and
5. fostering collaboration and partnerships, can ensure that everyone has equal opportunities to participate in the digital world, hence bridging the gap.

What You Need to Know Bridging the digital divide Strategies for promoting digital inclusion



source:[23]

According to Intermax Networks ^[19] the internet is a gateway to information and opportunities from education and healthcare to commerce and social interaction. However, despite its undeniable importance, millions worldwide still lack reliable access to high-speed internet. This

digital divide, often exacerbated by socioeconomic factors and geographical location, poses significant challenges for individuals and communities seeking to fully participate in the digital age [19]. They have the potential to significantly impact bridging the digital divide and ensuring that everyone has equal access to technology. This can be achieved through, providing affordable access to technology, providing affordable access to technology, collaborating with community organizations and Advocating for policies that promote digital inclusion

Conclusion

Kenya's digital divide persists due to disparities in access, affordability and digital literacy. Urban areas exhibit higher digital literacy and adoption, while rural and marginalized communities lag behind. Limited availability of digital equipment at all levels of education hinders digital literacy. Infrastructure investments, low-cost satellite internet and public-private partnerships are critical to accelerating digital engagement.

Recommendations

Progressive policies should encourage equitable access by lowering taxes and tariffs so that the rural community with limited income can afford and access technology.

Digital inclusion programmes in kenya should be extended to the rural communities not only in the slum areas in the urban setting. Information technology should be a compulsory subject in all levels of education, not as elective subject.

Libraries and digital spaces should be embraced and empowered in the rural setting as a training ground for information literacy skills for the communities.

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