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Digital inclusion initiatives: Bridging the connectivity gap in Africa and the USA – A review

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Abstract

This paper provides a comprehensive overview of digital inclusion initiatives aimed at mitigating the connectivity gap in Africa and the United States. As the world becomes increasingly reliant on digital technologies, the importance of ensuring equitable access to information and communication technologies (ICTs) has become a global priority. This review explores the current state of digital inclusion efforts in two distinct regions, Africa and the USA, to understand the challenges, successes, and lessons learned in bridging the digital divide. The first section of the review focuses on Africa, where disparities in digital access are particularly pronounced. Examining various initiatives, policies, and strategies implemented by governments, non-governmental organizations, and international partners, the review delves into the multifaceted approaches taken to extend connectivity to underserved populations. It highlights the role of innovative solutions such as community networks, mobile technologies, and public-private partnerships in fostering digital inclusion across diverse socio-economic landscapes. In the second section, the review turns its attention to the United States, where digital inclusion efforts also face challenges despite higher overall connectivity rates. By analyzing federal and local initiatives, as well as private sector contributions, the review explores the nuances of digital inclusion in an advanced technological landscape. The examination encompasses efforts to address urban-rural disparities, promote digital literacy, and ensure affordable broadband access for marginalized communities. Comparative analysis between the two regions identifies commonalities and differences in the approaches to digital inclusion. The review assesses the impact of cultural, economic, and political factors on the effectiveness of initiatives, emphasizing the need for context-specific strategies. Furthermore, it evaluates the role of regulatory frameworks and policy interventions in shaping the trajectory of digital inclusion initiatives. Drawing from the experiences of both continents, this review contributes insights to inform future digital inclusion policies and practices globally. By synthesizing the lessons learned from Africa and the USA, policymakers, researchers, and practitioners can develop more nuanced and contextually relevant strategies to bridge the connectivity gap, fostering a more inclusive and equitable digital future for all.

Keywords: Digital Inclusion; Initiatives; Connectivity gap; Africa; USA; Review

1. Introduction

In an era defined by the ubiquitous presence of digital technologies, the imperative to bridge the digital divide and foster inclusive access to the digital realm has emerged as a critical global challenge. As societies worldwide become increasingly reliant on digital infrastructure for communication, education, healthcare, and economic participation, the

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disparities in digital access have the potential to exacerbate existing socio-economic inequalities (Bandyopadhyay et. al., 2021, Robinson et. al., 2020, Sá et. al., 2021). This review explores and compares digital inclusion initiatives in two diverse yet interconnected regions—Africa and the United States—providing an in-depth analysis of efforts undertaken to bridge the connectivity gap.

The digital divide is not only a matter of access to technology but encompasses a broader spectrum of challenges, including affordability, digital literacy, and the equitable distribution of benefits derived from digital participation. Africa, with its rich diversity and unique socio-economic landscapes, grapples with the task of harnessing the potential of digital technologies to uplift communities facing historical and geographical challenges. Meanwhile, the United States, despite its advanced technological infrastructure, contends with urban-rural disparities, economic divides, and digital literacy gaps that hinder the realization of universal digital inclusion (Sanders & Scanlon, 2021, Shukla, et. al., 2023, Poole, 2020, Vasylieva, Kryklii & Petrushenko, 2021).

The motivation for this review stems from the recognition that successful digital inclusion strategies must be contextually relevant, acknowledging the specific challenges and opportunities presented by each region. By juxtaposing the initiatives undertaken in Africa and the USA, this review aims to distill key insights, draw meaningful comparisons, and derive lessons that can inform global efforts to bridge the connectivity gap.

The journey from digital exclusion to inclusion involves navigating a complex interplay of policies, technological innovations, public-private partnerships, and community-driven initiatives. Through a systematic examination of the strategies employed in Africa and the USA, we aim to shed light on the factors influencing the success or failure of digital inclusion efforts, fostering a deeper understanding of the nuances that shape the landscape of connectivity on both continents.

This comprehensive review aims to contribute to the evolving discourse on digital inclusion, offering valuable perspectives that can guide policymakers, researchers, and practitioners toward more effective, inclusive, and sustainable solutions in the pursuit of a digitally connected world.

2. Bridging the Connectivity Gap: Digital Inclusion Initiatives in Africa and the USA

In an era where digital technologies play an integral role in shaping societies, the issue of digital inclusion has risen to the forefront of global discourse. The digital divide, encompassing disparities in access, affordability, and digital literacy, has the potential to deepen existing inequalities (Mishi & Anakpo, 2022, Singla, 2022). This paper explores the digital inclusion initiatives undertaken in two diverse yet interconnected regions—Africa and the United States—and delves into the strategies aimed at bridging the connectivity gap.

Africa, with its rich tapestry of cultures and landscapes, faces unique challenges in the quest for digital inclusion. The continent is characterized by a wide range of socio-economic conditions, from urban centers with burgeoning tech hubs to remote rural areas with limited infrastructure. Governments across Africa have been actively implementing national policies and strategies to address these disparities. Additionally, non-governmental initiatives, including those driven by international organizations and community networks, play a crucial role in extending connectivity to underserved populations. Innovations such as mobile technologies and public-private partnerships contribute to overcoming infrastructural challenges, making significant strides in fostering digital inclusion (Danladi et. al., 2023, Svotwa, Makanyeza & Wealth, 2023, Tafese, 2022).

While the USA boasts advanced technological infrastructure, it grapples with its own set of digital inclusion challenges. Urban-rural disparities, economic divides, and varying levels of digital literacy pose obstacles to universal connectivity. Federal, state, and local-level initiatives aim to address these challenges, with broadband providers and corporations contributing to affordability programs and community outreach. Digital literacy programs play a vital role in ensuring that all citizens, regardless of socio-economic background, can harness the benefits of the digital age.

Drawing parallels between digital inclusion efforts in Africa and the USA reveals both commonalities and differences. Cultural, economic, and political factors influence the effectiveness of initiatives in each region, emphasizing the importance of context-specific strategies (Jamil, 2021, Santos, Carvalho & Martins, 2023). By examining these initiatives, we gain valuable insights into the diverse approaches that can be employed to bridge the connectivity gap.

Persistent challenges, such as funding constraints, regulatory hurdles, and evolving technological landscapes, underscore the need for ongoing commitment to digital inclusion. Emerging trends, including the rise of new technologies and the growing importance of digital skills, shape the future landscape of connectivity. Recommendations

for policymakers, technologists, and community leaders focus on collaborative strategies that address both immediate challenges and long-term goals (Burbules, Fan & Repp, 2020, Ciarli, et. a., 2021).

Figure 1 infographics of data from Africa (Schaeffe et al., 2015)

In the pursuit of a digitally connected world, the initiatives explored in Africa and the USA offer valuable lessons. Digital inclusion is not just about access to technology; it is about empowering individuals and communities to thrive in an increasingly digital society. By understanding the nuances of digital inclusion efforts in diverse contexts, we can work towards a future where connectivity is truly inclusive, leaving no one behind in the transformative journey of the digital age. Bridging the connectivity gap is not just a technological challenge—it is a shared responsibility and an opportunity to build a more equitable and connected world.

2.1. Digital Inclusion in Africa

Africa, a continent of unparalleled diversity, is experiencing a digital revolution that has the potential to reshape economies, empower communities, and bridge longstanding socio-economic gaps (Kilag et. al., 2023, Catacutan, et al., 2023). As the world becomes increasingly interconnected, the importance of digital inclusion in Africa cannot be overstated. This article delves into the current state of digital inclusion on the continent, exploring initiatives, challenges, and the transformative impact of technology (Afjal, 2023, Adejugbe et al., 2022).

Africa's digital landscape is as varied as its geographical features. While some urban areas boast thriving tech ecosystems, vast rural regions face infrastructural challenges that hinder connectivity. The continent is home to over a billion people, speaking thousands of languages and representing myriad cultures. Digital inclusion efforts must navigate this complexity to ensure that the benefits of the digital age are accessible to all.

Internet penetration rates in Africa have been steadily increasing, with a significant portion of the population gaining access to the web. However, the overall penetration rate varies widely between urban and rural areas. Mobile technology plays a crucial role in providing digital access across the continent. Mobile phones are often the primary means of internet access for many Africans.

Despite progress, challenges in infrastructure, including limited fixed-line broadband infrastructure in rural areas, can still impact digital access. In many regions, the expansion of high-speed internet infrastructure remains a priority. Affordability remains a key factor influencing digital access. While the cost of internet services has been decreasing, it can still be a barrier for a significant portion of the population, particularly in low-income areas.

Many African governments have recognized the importance of digital inclusion and have implemented various initiatives to improve access. National broadband plans, policy frameworks, and regulatory reforms aim to create an

environment conducive to digital growth. Digital literacy levels vary across different regions and demographics. Efforts to enhance digital literacy through education and training programs are ongoing. The growth of e-commerce and the adoption of digital services, such as mobile banking and digital health platforms, indicate a shift toward more digitally enabled economies. African countries have witnessed a burgeoning start-up ecosystem, particularly in the technology sector (Robinson et. al., 2020, Sanders & Scanlon, 2021). This has contributed to innovation and the development of solutions to address specific challenges related to digital access (Priharsari et. al., 2023, Stanley et al., 2022). There are notable disparities in digital access between regions and countries. While some nations have made significant strides, others face more substantial challenges. Collaboration with international organizations and partnerships with private entities play a role in advancing digital access initiatives. Projects funded by global institutions aim to improve infrastructure and connectivity. Emerging technologies, such as 5G, are expected to play a significant role in shaping the future of digital access in Africa. Additionally, the continued growth of digital ecosystems and increased investment in technology infrastructure are anticipated.

It's important to note that the state of digital access in Africa is dynamic, with ongoing efforts aimed at addressing challenges and fostering a more inclusive digital landscape. For the latest and most accurate information, it's recommended to refer to recent reports and updates from relevant sources and organizations.

Governments across Africa recognize the pivotal role of technology in driving economic development and social progress. National policies and strategies aim to create an enabling environment for digital inclusion (Lambert, 2020, Olowonubi et al., 2022). This includes investments in infrastructure, regulatory frameworks, and initiatives to extend connectivity to remote and underserved areas. Countries such as Kenya, Nigeria, and South Africa have made notable strides in fostering a conducive environment for digital innovation (Solomon & van Klyton, 2020, Uddin et al., 2022).

Several African governments have been actively involved in initiatives to improve digital access and bridge the digital divide (Walsh, Murphy & Horan, 2020, Ye & Yang, 2020). These initiatives encompass a range of strategies, policies, and projects aimed at expanding internet connectivity, enhancing digital literacy, and fostering technological innovation.

Launched in 2013, the Smart Africa Initiative is a collaborative effort among African countries to accelerate the socio-economic development of the continent through increased access to ICTs. It focuses on policy reform, infrastructure development, and creating a favorable environment for digital growth (Arnardu & Francke, 2021, Bandauko & Nutifafa Arku, 2023, Mboup & Oyelaran-Oyeyinka, 2019).

Led by the African Union, the Connect Africa Initiative aims to promote investment in ICT infrastructure across the continent. It seeks to address challenges related to undersea cables, cross-border connectivity, and last-mile infrastructure to improve overall digital access. Many African countries have adopted national broadband plans and policies to guide the development of high-speed internet infrastructure. These plans often include targets for broadband coverage, strategies for infrastructure deployment, and regulatory frameworks to attract investment.

Several governments have developed comprehensive digital transformation strategies that encompass various sectors, including education, healthcare, and governance. These strategies aim to leverage technology to drive economic growth and improve public services.

Governments are investing in the expansion of ICT infrastructure, including the deployment of broadband networks, to connect urban and rural areas. This includes investments in fiber-optic networks, satellite technology, and other means of connectivity.

Many African governments are implementing e-government initiatives to enhance service delivery and citizen engagement. Online platforms for government services, digital identification systems, and e-governance applications contribute to improved access and efficiency.

Recognizing the importance of digital literacy, governments are implementing programs to enhance the skills of their populations. These initiatives include training programs, educational campaigns, and partnerships with private entities to promote digital skills development.

Governments are actively engaging with private sector entities through PPPs to accelerate the deployment of digital infrastructure. These collaborations involve joint investments, technology transfer, and expertise sharing. Some governments are establishing innovation hubs, technology parks, and incubators to support the growth of the tech ecosystem. These hubs foster entrepreneurship, innovation, and the development of local tech solutions. African

governments collaborate with international organizations, such as the World Bank, International Telecommunication Union (ITU), and various development agencies, to access funding, expertise, and support for digital access projects.

It's important to note that the landscape of government initiatives in Africa is dynamic, with new programs and policies continually evolving. For the latest and most accurate information, it is advisable to refer to official government sources and reports from relevant organizations.

Beyond governmental efforts, non-governmental organizations (NGOs) and international partners play a crucial role in promoting digital inclusion. These initiatives often focus on community-driven approaches, emphasizing the importance of grassroots participation. Community networks, for instance, bring connectivity to areas where traditional infrastructure is lacking, fostering a sense of empowerment and shared knowledge.

For non-Governmental Initiatives aim at bridging the Digital Divide in Africa, the following are some. Alliance for Affordable Internet (A4AI) a coalition hosted by the Web Foundation, works towards making broadband internet more affordable in developing countries, including several in Africa. The alliance engages with governments, private sector entities, and civil society to advocate for policy and regulatory reforms that promote affordability and accessibility. Another is the Internet.org (now Free Basics by Facebook) launched by Facebook, Internet.org (now part of Free Basics) aims to bring affordable internet access to underserved regions, including parts of Africa. The initiative collaborates with local mobile operators to provide free access to essential online services, fostering digital inclusion. GSMA Mobile for Development (Belli, Manzar & Pahwa, 2020, Nakagaki & Sarpong, 2021). The GSMA Mobile for Development program focuses on leveraging mobile technology to address socio-economic challenges. In Africa, this initiative collaborates with mobile operators and other stakeholders to implement projects that enhance digital access, particularly in remote and rural areas. World Bank Digital Development Partnership. The World Bank supports various digital development projects in Africa, working closely with governments and local organizations. Initiatives include funding for infrastructure development, digital literacy programs, and projects aimed at fostering entrepreneurship in the digital economy. Community networks empower local communities to build and manage their own communication infrastructure. Organizations like the Internet Society support the establishment of community networks in Africa, providing resources, training, and technical assistance. These networks often play a crucial role in connecting remote and underserved areas. Numerous grassroots organizations across Africa focus on digital inclusion at the community level. These organizations often work with local populations, providing training, resources, and access to technology. Examples include Digital Grassroots, which promotes internet literacy and inclusion through community engagement and educational initiatives.

Open source projects contribute to digital access by providing free and accessible tools. Organizations like the Open Source Initiative (OSI) support the development and adoption of open source technologies, making them accessible to communities and reducing barriers to entry for digital initiatives. Youth-led organizations, such as the African Youth for Development Commission, often spearhead digital access projects. These initiatives focus on empowering young people with digital skills and knowledge, recognizing the pivotal role of youth in driving technological innovation and adoption. Tech hubs and incubators in Africa serve as focal points for innovation and collaboration. Organizations like iHub in Kenya and CcHub in Nigeria provide support, mentorship, and resources to startups and initiatives that contribute to digital access and inclusion (Benkenstein et. al., 2020, Pearce, 2020, Tartarini et. al., 2020).

Non-governmental initiatives, whether led by international organizations or driven by communities and grassroots efforts, play a vital role in bridging the digital divide in Africa. These initiatives leverage diverse approaches, from policy advocacy to community-driven connectivity projects, contributing to a more inclusive and connected digital landscape on the continent. In the face of infrastructural challenges, Africa has witnessed the emergence of innovative solutions to enhance digital inclusion. Mobile technologies, particularly the widespread use of mobile phones, have become instrumental in providing access to information and services. Mobile banking, health apps, and agricultural tools are transforming the way people in remote areas engage with crucial aspects of their lives.

Affordability remains a barrier for many, and digital literacy is a key concern. Addressing these challenges requires holistic approaches that go beyond infrastructure development. It involves investing in education and skill development programs to empower individuals to navigate the digital landscape confidently.

As technology continues to evolve, so does the potential for digital inclusion to drive positive change in Africa. Emerging technologies, such as artificial intelligence and the Internet of Things, present new opportunities for economic growth and improved service delivery. However, ensuring that these benefits are inclusive requires proactive efforts to close existing gaps and anticipate future challenges.

The future of digital inclusion in Africa holds immense promise, driven by a convergence of technological advancements, innovative initiatives, and a growing recognition of the transformative power of digital access. As we look ahead, several key trends and areas of focus emerge that will shape the trajectory of digital inclusion on the continent:

The deployment and adoption of 5G technology are poised to revolutionize digital connectivity in Africa. With increased speed and capacity, 5G can enable a wide range of applications, from enhanced mobile services to the Internet of Things (IoT), contributing to more inclusive and efficient digital ecosystems. Bridging the urban-rural digital divide remains a priority. Innovations such as low Earth orbit (LEO) satellite networks, TV white spaces, and community-driven initiatives will play a pivotal role in extending connectivity to remote and underserved areas, empowering communities and fostering economic development. Recognizing the importance of digital literacy, future initiatives will focus on comprehensive digital skills development programs (Garba, Oshiga & Moriki, 2022, Najjuuko et. al., 2021, Takeuchi, 2022). This includes integrating digital education into formal curricula, providing accessible training for diverse demographics, and equipping individuals with the skills needed for the digital economy.

The continued evolution of e-government initiatives will enhance service delivery and citizen engagement. Smart city concepts, incorporating digital technologies for improved urban living, will become more prevalent, promoting efficiency, sustainability, and a higher quality of life.

The growth of fintech solutions and digital finance platforms will contribute to financial inclusion. Mobile banking, digital payment systems, and blockchain-based solutions will empower individuals, especially those in rural areas, with access to financial services and opportunities for economic participation.

The youth demographic will play a central role in shaping the digital landscape. Increased support for youth-led innovation, entrepreneurship, and STEM education will fuel the development of locally relevant solutions, driving economic growth and sustainability.

Future digital inclusion efforts will increasingly involve collaboration between governments, private sector entities, non-governmental organizations, and international partners. Public-private partnerships, community-driven initiatives, and multi-stakeholder collaborations will be essential for holistic and sustainable approaches. The adoption of artificial intelligence (AI) and data analytics will offer opportunities for addressing societal challenges, improving healthcare, optimizing agriculture, and enhancing overall decision-making processes. Ethical considerations and responsible AI practices will be integral to ensure inclusive and unbiased outcomes (Matsuoka & Rocha, 2021, Okano-Heijmans & Vosse, 2021, Silva, 2021).

Governments will continue to refine and implement policies that promote digital inclusion, address regulatory challenges, and create an enabling environment for technology adoption. Policies will need to be adaptable, considering the evolving nature of digital technologies. Sustainable and climate-smart technologies will be integrated into digital inclusion initiatives. This includes leveraging technology to address environmental challenges, promote sustainable practices, and mitigate the impact of climate change on vulnerable communities. The future of digital inclusion in Africa is dynamic and promising. By harnessing emerging technologies, fostering collaboration, and prioritizing inclusivity, the continent is well-positioned to unlock the full potential of the digital age, ensuring that the benefits of connectivity reach all corners of society. The collective efforts of governments, organizations, and communities will be instrumental in shaping a more connected, empowered, and resilient Africa.

In conclusion, digital inclusion in Africa is a dynamic and multifaceted journey towards creating a more connected, empowered, and resilient continent. As initiatives continue to evolve and adapt to the unique challenges of the region, the transformative power of technology has the potential to uplift communities, foster innovation, and contribute to a brighter future for all Africans in the digital age.

2.1.1. Innovations in Technology and Connectivity: Driving Digital Inclusion

Mobile money platforms, such as M-Pesa in Kenya, have revolutionized financial services, providing a secure and accessible means for individuals to conduct transactions, save money, and access financial services without the need for traditional banking infrastructure (McBride, and Liyala, 2023). Mobile money has significantly increased financial inclusion, particularly in regions with limited banking infrastructure. It empowers individuals in rural areas to participate in the formal economy, fostering economic growth and resilience. mHealth initiatives leverage mobile technologies to enhance healthcare accessibility and delivery. Applications include telemedicine, health information dissemination, and remote patient monitoring, providing healthcare services beyond traditional brick-and-mortar settings. mHealth solutions improve healthcare outcomes by reaching underserved populations, reducing barriers to

medical information, and enabling remote consultations (Abdulhamid, 2020, Cerrato & Halamka, 2021, Ndung'u& Oguso, 2021). This is particularly crucial in regions with limited access to healthcare facilities. Mobile technologies are applied to agriculture through apps that provide farmers with real-time information on weather patterns, market prices, and best farming practices. This facilitates informed decision-making, improving agricultural productivity. Farmers gain access to valuable information, leading to more efficient and sustainable farming practices. This, in turn, contributes to food security, income generation, and the overall economic development of rural communities. Mobile technologies are harnessed to provide educational content and learning resources. Mobile learning platforms offer flexibility in accessing educational materials, especially in areas with limited access to traditional educational infrastructure. Mobile learning expands educational opportunities, overcoming geographical barriers. It enables individuals, including those in remote locations, to acquire knowledge and skills, contributing to improved literacy and workforce readiness. Internet.org, now Free Basics, is a public-private partnership led by Facebook. It collaborates with mobile operators to provide free access to essential internet services, including health, education, and information, with the aim of overcoming affordability barriers. This initiative has extended basic online services to millions of people who might otherwise be excluded, fostering digital inclusion and providing a stepping stone for further internet adoption.

Public-private partnerships are instrumental in deploying infrastructure for rural connectivity. Telecom operators, in collaboration with government entities, work to extend networks to remote areas, overcoming challenges related to cost and infrastructure deployment. These partnerships expand internet access to underserved regions, contributing to economic development, education, and improved communication in rural communities. Public-private partnerships often support innovation hubs and tech incubators. These collaborative spaces bring together government, private sector organizations, and entrepreneurs to foster technological innovation and entrepreneurship. Innovation hubs and incubators contribute to the development of local solutions, support startups, and stimulate economic growth by nurturing a culture of innovation and collaboration (Akanle, Ademuson & Omotayo, 2019, Haque et. al., 2020, Mwantimwa et. al., 2021). Partnerships between government, private sector entities, and community organizations facilitate shared access initiatives. This involves establishing community centers or Wi-Fi hotspots in public places, enhancing connectivity in urban and rural areas. Shared access initiatives increase internet availability in public spaces, providing individuals with a cost-effective way to access online resources, conduct business, and engage with digital services.

Innovations in mobile technologies and public-private partnerships are pivotal in advancing digital inclusion. These initiatives leverage the ubiquity of mobile devices and the collaborative strengths of public and private entities to overcome barriers, connect communities, and drive socio-economic development. The ongoing evolution of these innovations will continue to shape the digital landscape, ensuring that the benefits of connectivity are accessible to all.

2.1.2. Comparative analysis of digital inclusion efforts across African countries

Digital inclusion efforts across African countries exhibit both commonalities and unique approaches shaped by diverse socio-economic, cultural, and infrastructural contexts. This comparative analysis explores key themes and differences in the digital inclusion landscape across select African nations:

Some of the government Policies and Strategies are here presented. Kenya's government has been a frontrunner in digital inclusion, implementing policies like the National Broadband Strategy and the Digital Literacy Program. Public-private partnerships, such as the Huduma Kenya initiative, provide various government services digitally. Kenya's proactive approach has resulted in improved digital literacy and increased access to government services for its citizens. Nigeria has focused on policies like the National Digital Economy Policy and Strategy, aiming to enhance broadband penetration and digital skills. Initiatives like the N-Power Tech program target youth employment through digital skills development. Nigeria's emphasis on digital skills aligns with its goal of building a digital economy, fostering economic growth and youth empowerment. South Africa has invested in undersea cable systems, like the West Africa Cable System, to improve international connectivity (Dauda et. L., 2019, Meru & Kinoti, 2022, Ndung'u, 2019). The Broadband Infraco project focuses on developing national backbone infrastructure. While progress has been made, challenges persist, and efforts continue to bridge urban-rural connectivity gaps. Rwanda's government has invested in the National Backbone and e-Government Infrastructure project, enhancing connectivity. The "Smart Rwanda" initiative integrates technology into various sectors, promoting smart cities. Rwanda's strategic investments have positioned it as a digital leader on the continent, with improved connectivity and e-governance. Ghana has seen the emergence of community networks like the Ghana Open Data Initiative and the MESH Community Wi-Fi project. These initiatives empower local communities to build and manage their own networks. Community-driven efforts contribute to improved connectivity, especially in rural areas, fostering grassroots digital inclusion. Ethiopia has implemented the "Digital Ethiopia 2025" strategy, including initiatives like "Sheger Wi-Fi" in the capital, Addis Ababa (Warner, Mekonnen, and Habte, 2023). Community-level digital literacy programs aim to empower citizens. While in the early stages, Ethiopia's efforts focus

on expanding access and digital skills, with potential socio-economic benefits. Senegal has implemented the "Plan Senegal Emergent," emphasizing digital literacy and education. Projects like the "NUMERIC" program target youth, promoting digital skills development. Senegal's commitment to digital education aligns with its broader economic development goals. Egypt's "Digital Egypt" initiative emphasizes digital literacy, with programs like "Hour of Code" targeting youth. Investment in educational technology aims to modernize the education system. Digital literacy initiatives contribute to a more skilled workforce and improved access to educational resources.

Nigeria's tech ecosystem, particularly in Lagos, has witnessed significant growth. Initiatives like the Tony Elumelu Foundation support tech entrepreneurs, fostering innovation. Nigeria's vibrant start-up scene contributes to job creation and economic diversification. Nairobi, Kenya's capital, has earned the nickname "Silicon Savannah." The government supports innovation through initiatives like Konza Techno City, aiming to create a technology hub. Kenya's innovation ecosystem attracts global attention, with start-ups contributing to economic growth and technological advancements.

While each country's digital inclusion journey is unique, a common thread emerges: the recognition of digital technology's transformative power. Governments, communities, and private entities are actively collaborating to bridge the digital divide, recognizing that inclusive digital access is foundational for sustainable development in the 21st century. The comparative analysis highlights the importance of context-specific strategies and ongoing collaboration to achieve meaningful digital inclusion across diverse African nations.

2.2. Digital Inclusion in the USA

The United States, a technological powerhouse, has made significant strides in digital inclusion. However, persistent challenges and disparities necessitate ongoing efforts to ensure that all citizens can harness the benefits of the digital age. This exploration of digital inclusion in the USA delves into key aspects, initiatives, and future considerations.

Despite widespread internet connectivity in urban areas, rural regions face challenges in accessing high-speed broadband. This urban-rural divide impacts education, healthcare, and economic opportunities for those in remote communities. The cost of broadband services remains a barrier for some households, particularly in low-income communities. Affordability is a critical factor influencing digital access and participation.

The government Initiatives are here presented. The Federal Communications Commission (FCC) oversees initiatives like the Connect America Fund and the Rural Digital Opportunity Fund, aiming to expand broadband access in underserved areas (Bauer, 2023). BroadbandUSA - this program, led by the National Telecommunications and Information Administration (NTIA), provides resources, best practices, and technical assistance to communities working to enhance broadband infrastructure.

The private Sector Contributions are here presented. Major internet Service Providers (ISPs) are engaged in efforts to extend broadband coverage. Programs like Comcast's Internet Essentials offer discounted internet services to low-income households. Tech giants and corporations contribute to digital inclusion through philanthropy and corporate social responsibility initiatives. Support for educational programs and community technology centers is common. Non-profit organizations and community centers offer digital literacy training to bridge the skills gap. Programs like EveryoneOn focus on empowering individuals with essential digital skills. Schools and educational institutions are incorporating technology into learning. However, disparities in access to devices and internet connectivity among students remain a challenge. The Lifeline program provides discounted phone and internet services to eligible low-income households. The initiative recognizes the essential role of connectivity in everyday life. Various ISPs offer discounted plans and programs targeted at making internet services more accessible to low-income families and individuals.

Future Considerations include 5G Technology Deployment. The deployment of 5G technology holds the potential to revolutionize connectivity, providing faster and more reliable internet services. However, ensuring equitable access to 5G remains a consideration. As digital participation increases, issues of cybersecurity and privacy become paramount (Adebukola et al., 2022, Sule, Zennaro & Thomas, 2021). Future digital inclusion efforts need to address these concerns to build trust in digital technologies. Initiatives focusing on smart city concepts and the integration of the Internet of Things (IoT) are gaining momentum. These innovations aim to enhance urban living but require careful consideration of inclusivity.

In conclusion, while the USA has achieved widespread digital connectivity, challenges persist, particularly in ensuring equitable access across socio-economic divides and geographic regions. Ongoing collaborative efforts between

government, private sector entities, and communities are crucial for addressing these challenges and fostering a more inclusive digital landscape in the United States. The future of digital inclusion in the USA hinges on the ability to navigate emerging technologies, promote affordability, and empower individuals with the skills needed to thrive in an increasingly digital society.

2.3. Comparative Analysis of Digital Inclusion in Africa and the USA

Both Africa and the USA face challenges in bridging the digital divide between urban and rural areas, impacting access to education, healthcare, and economic opportunities. Affordability remains a common challenge in both regions, where certain populations, especially in low-income communities, may struggle to access and afford reliable internet services. Both African countries and the USA have implemented government-led initiatives to enhance digital inclusion (Mwaura, 2024, Maduka et al., 2023, Okunade et al., 2023). Programs focus on infrastructure development, affordability, and digital literacy. While the USA has well-established technology infrastructure, some African countries face infrastructure challenges, requiring innovative solutions like community networks and satellite technologies. Economic disparities in the USA are more nuanced, with challenges such as the "homework gap" affecting students in low-income households. In Africa, economic gaps are often broader, affecting entire communities. The USA has a mature and diverse technology ecosystem, embracing emerging technologies like 5G. In contrast, African countries may prioritize foundational connectivity before widespread adoption of advanced technologies. Diverse cultures influence digital adoption in Africa. Cultural nuances may impact the acceptance and integration of digital technologies, requiring tailored approaches. In the USA technologically mature culture facilitates rapid adoption, but cultural factors also contribute to challenges, such as digital literacy gaps in certain demographic groups (Dzandu, Pathak, & de Cesare, 2022, Ramasawmy et. al., 2022, Vassilakopoulou & Hustad, 2023).

Economic diversity across countries affects digital inclusion efforts in Africa. Limited resources may hinder infrastructure development in some regions. In the USA, economic factors contribute to disparities in access, with affordability being a significant challenge for low-income communities. Varied political landscapes influence the prioritization and implementation of digital inclusion policies in Africa. Stable governance is crucial for sustained efforts. In the USA, political decisions impact the regulatory environment, affecting initiatives like net neutrality and broadband expansion.

Both regions have seen success with community-driven solutions. Africa's community networks and the USA's grassroots initiatives demonstrate the power of local engagement. Both regions emphasize the need for digital literacy. Efforts to empower individuals with essential digital skills contribute to more inclusive participation in the digital society. Successful digital inclusion initiatives in both Africa and the USA often involve collaboration between governments, private sector entities, and non-profit organizations.

Global digital inclusion policies should be adaptable and sensitive to regional contexts. A one-size-fits-all approach may not effectively address diverse challenges. Continued global investment in digital infrastructure, especially in regions with limited connectivity, is crucial for fostering digital inclusion on a broader scale. Global efforts should prioritize inclusive digital education programs that address the digital literacy gap and ensure that individuals are equipped with the skills needed for the digital era. Encouraging innovation in technology deployment and community-driven solutions can inspire effective strategies for digital inclusion that can be adapted globally (Bondie, et. al, 2019, Bravo et. al., 2021, Ikechukwu et al., 2019, Perez-Escolar & Canet, 2023).

A comparative analysis of digital inclusion in Africa and the USA highlights both shared challenges and diverse approaches. The lessons learned underscore the importance of tailored, context-specific strategies and the need for ongoing collaboration among governments, private sector entities, and communities to achieve meaningful digital inclusion on a global scale.

2.4. Challenges and Future Directions of Digital Inclusion in Africa and the USA

The current challenge in Africa includes limited or inadequate technology infrastructure, particularly in rural and remote areas, hampers widespread internet access. The future consideration includes addressing infrastructure gaps through innovative solutions like community networks, satellite technologies, and partnerships with tech companies (Gwaka, Haseki & Yoo, 2023, Mapiye et. al., 2023, Kamat, & Nasnodkar, 2019).

However, in the USA, the current challenge involves the urban-rural digital divide persists, impacting access to high-speed broadband in rural areas. And the future consideration includes the ongoing investments in rural broadband infrastructure and leveraging emerging technologies like 5G to bridge connectivity gaps.

The current challenge in Africa is mainly affordability remains a significant obstacle for many, hindering access to internet services and digital devices. And the future consideration involves implementing policies and initiatives to reduce the cost of internet services and devices, such as subsidized plans and device distribution programs. However, in the USA, the current challenge involves the "homework gap" affects students in low-income households who lack access to reliable internet services at home. And the future consideration involves expanding affordable connectivity programs, such as the Lifeline program, and advocating for policies that address the digital divide in education.

Current challenge in Africa is that there is varied levels of digital literacy across populations, impacting the ability to fully benefit from digital technologies. The future consideration involves implementing comprehensive digital literacy programs, particularly in rural and underserved areas, to empower individuals with essential skills.

In the USA, current challenge involves disparities in digital literacy, particularly among older adults and certain demographic groups, affecting their ability to engage in digital society. Future consideration involves Expanding digital literacy initiatives and integrating digital skills into formal education to ensure a digitally competent population.

In conclusion, addressing the challenges and advancing digital inclusion in Africa and the USA requires a multifaceted and collaborative approach. By investing in infrastructure, prioritizing affordability, enhancing digital literacy, and embracing innovative technologies, both regions can work towards a more inclusive and connected digital future.

3. Recommendations for Future Initiatives in Digital Inclusion in Africa and the USA

The following are some of the key recommendations for Africa. Africa needs to develop and implement comprehensive national digital inclusion strategies that prioritize infrastructure development, affordability, and digital literacy. Review and update regulatory frameworks to encourage private sector investment, competition, and innovation in the digital space while ensuring consumer protection. Integrate digital literacy and technology education into national curricula to ensure that students are equipped with essential digital skills from an early age. Establish and strengthen policies that promote affordable internet access, such as subsidies for low-income households and tax incentives for internet service providers.

For the USA, here are some recommendations. Enact and support legislation that focuses on expanding broadband infrastructure in underserved rural and urban areas, addressing the digital divide. Establish a dedicated national office for digital inclusion to coordinate and monitor initiatives, advocate for policy changes, and ensure accountability in achieving digital inclusion goals. Provide incentives for internet service providers to invest in infrastructure in underserved areas through tax breaks, grants, or partnerships with local governments. Expand and promote programs like the Lifeline program, offering discounted internet services to low-income households, and explore new initiatives to enhance affordability.

Africa needs to invest in community-driven network projects that utilize innovative technologies like mesh networks and low Earth orbit (LEO) satellites to bring affordable connectivity to remote areas. And explore and invest in solar-powered connectivity solutions to address energy challenges in off-grid regions, ensuring sustainable and reliable access to digital services. Develop and promote mobile-based solutions for digital services, leveraging the widespread use of mobile devices to enhance access to healthcare, education, and financial services.

For the USA, there is need for 5G Technology Integration. Accelerate the deployment and integration of 5G technology to enhance high-speed internet access, particularly in urban areas, and support the development of smart city initiatives. Establish and support technology innovation hubs and incubators in underserved communities to foster local entrepreneurship, innovation, and the development of technology solutions. Promote the development and adoption of digital health innovations, including telemedicine and health monitoring applications, to improve healthcare access and outcomes.

Africa need to facilitate and encourage public-private partnerships for digital infrastructure development, leveraging the expertise and resources of both sectors to expand connectivity. Foster regional collaboration to address cross-border connectivity challenges, creating a framework for harmonized policies and infrastructure development. Engage with international organizations, NGOs, and development partners to access funding, expertise, and support for digital inclusion initiatives on a continental scale.

The USA needs to establish multi-stakeholder initiatives involving government, private sector entities, NGOs, and communities to collaboratively address digital inclusion challenges. Implement community-driven digital inclusion programs that involve local residents in decision-making processes, ensuring that initiatives are culturally relevant and

community-specific. Engage in knowledge exchange and collaboration with other countries and global organizations to share best practices and learnings in digital inclusion strategies.

In conclusion, successful digital inclusion initiatives in Africa and the USA require a holistic approach that encompasses policy reforms, technological innovations, and collaborative strategies. By addressing these aspects, both regions can work towards building more inclusive and connected societies, ensuring that the benefits of the digital age reach all segments of the population.

4. Conclusion

The review of digital inclusion initiatives in Africa and the USA underscores the significance of addressing the connectivity gap to ensure equitable participation in the digital era. Both regions face unique challenges shaped by their diverse socio-economic, cultural, and infrastructural landscapes, necessitating tailored strategies for effective digital inclusion. While both Africa and the USA share common challenges such as urban-rural disparities and affordability barriers, the nature and extent of these challenges differ. Infrastructure development, economic factors, and technological adoption vary, influencing the digital inclusion landscape in distinctive ways.

Government-led initiatives play a pivotal role in driving digital inclusion. Policies, regulatory reforms, and targeted programs in both regions aim to expand infrastructure, enhance affordability, and promote digital literacy. Community-driven initiatives emerge as a powerful force in addressing digital inclusion challenges. Whether through community networks in Africa or grassroots programs in the USA, local engagement proves essential for success. Innovative technologies, such as mobile-based solutions, solar-powered connectivity, and 5G integration, are recognized as crucial tools for overcoming infrastructure limitations and advancing digital access in both regions. Collaboration emerges as a key theme, emphasizing the importance of partnerships between governments, private sector entities, non-profit organizations, and local communities. Multi-stakeholder engagement and knowledge-sharing contribute to holistic and sustainable digital inclusion.

Future initiatives should prioritize policy reforms that promote affordability, infrastructure development, and digital literacy. Adaptive and context-sensitive policies will be essential to address evolving challenges. Leveraging technological advancements, including 5G, IoT, and innovative community-driven solutions, will be crucial for expanding connectivity and ensuring that the benefits of the digital age reach all segments of the population. Strengthening collaborative partnerships at local, national, and international levels will facilitate the exchange of best practices, resources, and expertise. Public-private collaborations and community engagement programs will play a vital role. Prioritizing inclusive education that integrates digital literacy into curricula will empower individuals with the skills needed for active digital participation. Initiatives should target vulnerable populations, ensuring that no one is left behind.

Future digital inclusion efforts must align with broader goals of sustainable and inclusive development. This involves considering environmental sustainability, economic empowerment, and social equity in the deployment of digital technologies.

In conclusion, the journey towards bridging the connectivity gap in Africa and the USA is dynamic and multifaceted. Through collaborative, innovative, and context-aware strategies, both regions can navigate the challenges and seize the opportunities presented by the digital age. The pursuit of digital inclusion is not merely a matter of connecting people; it is a commitment to fostering empowerment, equality, and shared prosperity in an increasingly interconnected world.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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