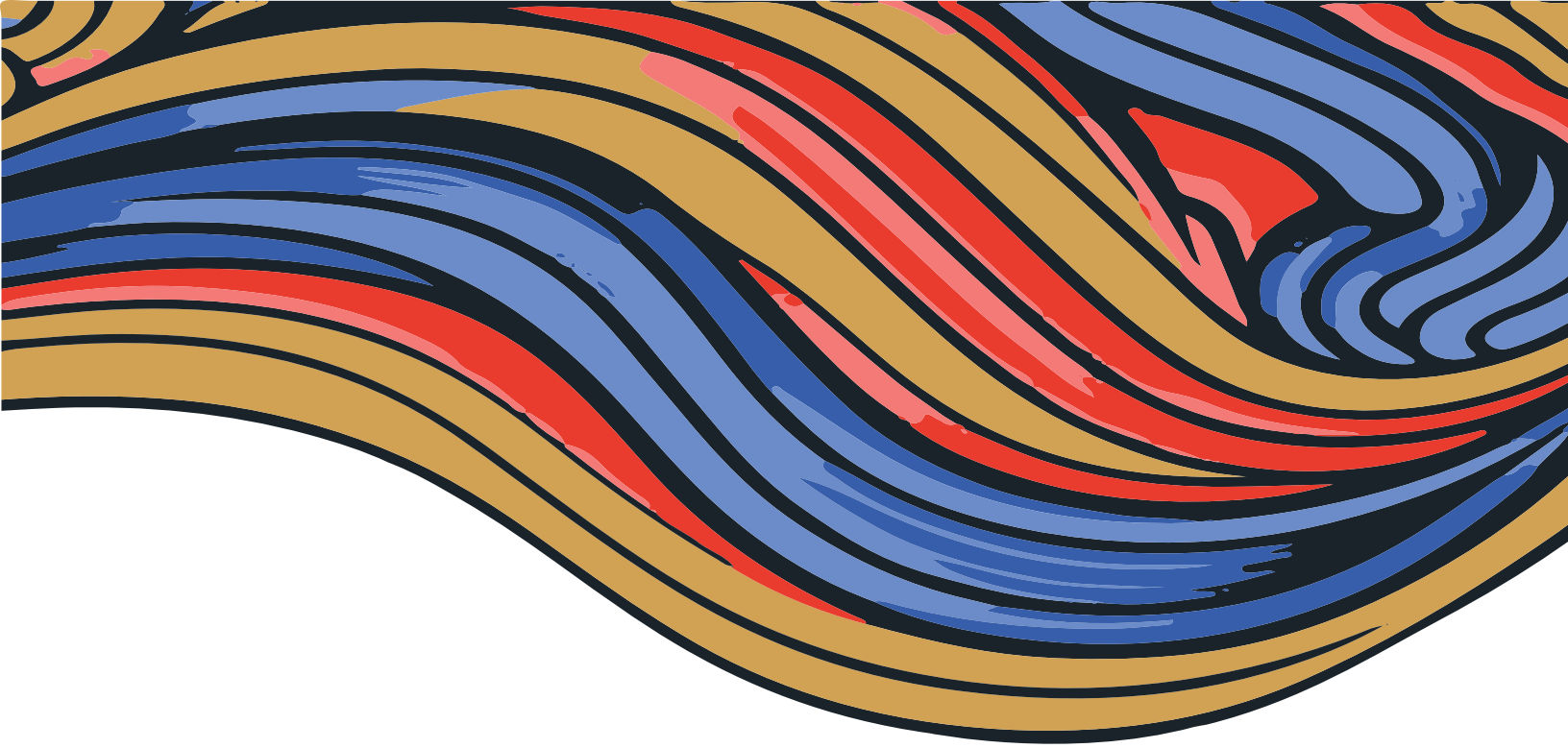

DATA DESERTS IN KENYA: THE SEARCH FOR AN OASIS

A research project focusing on the effects of the digital divide on vulnerable and minority groups in Kenya

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Executive Summary

The digital disparity in Kenya carries significant implications for the nation's progress and societal advancement. This report adopts a desk research methodology using qualitative and quantitative research material to base its analysis, findings and recommendations. In presenting best practices to the Kenyan Context, the study employs a comparative research methodology noting the lessons from India, Singapore, Australia, and the United States. Based on this methodology, the report may fail to capture real time developments with regard to access at the time of review and compilation.

Nevertheless, some of the recommendations proposed cut across the need for inclusive designs and policies to support activities such as digital literacy programs, Public-Private Partnerships and community engagement. These overarching proposals are intended to result in increased development of mobile and offline solutions, comprehensive nationwide broadband access and affordable internet access.

1.0 Introduction

Data deserts include areas, where certain groups do not have data regularly collected about them or areas characterised by a lack of access to high-quality data that are useful in generating social and economic benefits.[1] Data deserts also include communities or geographical areas that are locked out from accessing reliable and high-speed internet connectivity. In these spaces, internet infrastructure is often underdeveloped or non-existent, resulting in limited or no internet access for the residents. The digital divide highlights the gap between those who have access to and can effectively use digital technologies, including access to the internet, computers, smartphones and other digital devices and those who do not or struggle to access these spaces.[2] This report will capture the impact of data deserts in Kenya and recommend possible solutions for the digital divide.

1.1 Underpinnings of the digital divide

The digital disparity in Kenya carries significant implications for the nation's progress and societal advancement, encompassing the following aspects: first, narrowing this gap could propel heightened economic expansion and innovative activities. Gaining entry to digital resources, e-commerce, and virtual markets can foster novel business prospects and job avenues.[3] Second, accessing online educational reservoirs can amplify learning prospects for students, even those situated in remote locales. Conversely, the digital divide might impede students' access to quality education, consequently curbing the realisation of their full potentials.[4] Third, the realm of telemedicine and health-oriented information stands to augment healthcare accessibility, especially within underserved territories. In the absence of internet connectivity, vulnerable communities often miss out on additional crucial health information.[5] Fourth, digital rift has the potential to sustain societal disparities.[6] Individuals without access find themselves excluded from pivotal dialogues, choices, and openings. Fifth, the availability of online information plays a pivotal role in fostering well-informed democratic participation. The digital divide stands to restrict the full engagement of marginalised factions in civic pursuits. Lastly, the internet functions as a pivotal hub for ingenuity and exploration; closing this divide has the capacity to unlock inventive potential for both individuals and enterprises.[7]

2.0 Scope of the Project

This project comprehensively examines the legal and policy structures influencing digital access and data gathering concerning vulnerable and minority populations within Kenya. Additionally, it delves into the ramifications of the digital divide regarding vulnerable and minority groups' ability to access and use the internet and digital technologies across Kenya. Furthermore, it explores the adverse outcomes of excluding vulnerable and minority communities from the data landscape, specifically in Kenya. Lastly, informed by exemplary approaches from jurisdictions where data deserts have emerged due to the marginalisation of vulnerable and minority groups, the project puts forth recommendations.

This paper's understanding of vulnerable and minority groups refers to individuals who have significantly been left out of socioeconomic and civil-political development over time and those with limited access to digital data. The latter encapsulates the need for digital literacy in the dawn of increased data flows across the African continent and the general shift by governments towards e-government services. Without proper digital inclusivity, this shift may be

[1] Neumann, N., Tucker, C., Kaplan, L., Mislove, A. and Sapiezynski, P., 2022. Data Deserts and Black Boxes: The Impact of Socio-Economic Status on Consumer Profiling. Mimeo, MIT.
[2] Fuchs, C. and Horak, E., 2008. Africa and the digital divide. Telematics and informatics, 25(2), pp.99-116.
[3] Brannstrom, I., 2012. Gender and digital divide 2000–2008 in two low-income economies in Sub-Saharan Africa: Kenya and Somalia in official statistics. Government Information Quarterly, 29(1), pp.60-67.
[4] Odongo, A.O. and Rono, G.C., 2016, March. Kenya digital and cultural divide. In Proceedings of the 9th International Conference on Theory and Practice of Electronic Governance (pp. 85-94).
[5] Jay Bhatt, DO, MPH, MPA, and Priya Bathija, JD, MHSA, 'Ensuring Access to Quality Health Care in Vulnerable Communities' Journal of Academic Medicine 93 (9) September 2018, 1272-1273 <https://europepmc.org/backend/ptpmcrender.fcgi?accid=PMC6112847&blobtype=pdf > Accessed on 6 September 2024.
[6] Tierney, William M., Joseph K. Rotich, Faye E. Smith, John Bii, Robert M. Einterz, and Terry J. Hannan. "Crossing the" digital divide:" implementing an electronic medical record system in a rural Kenyan health centre to support clinical care and research." In Proceedings of the AMIA Symposium, p. 792. American Medical Informatics Association, 2002.
[7] Kasusse, M., 2005. Bridging the digital divide in Sub-Saharan Africa: The rural challenge in Uganda. The International Information & Library Review, 37(3), pp.147-158.

prone to creating a new understanding to marginalisation.

3.0 Methodology

This study adopts a desk research methodology using qualitative and quantitative research material to base its analysis, findings and recommendations. These include relevant research publications such as books, journals, websites, blog posts, and reports on Digital Access Rights globally and in the Kenyan context. From this, the study presents its findings on the extent of digital access in Kenya and the existing challenges to inform legal and policy discussions on realising these rights to vulnerable and minority populations within Kenya. In presenting best practices to the Kenyan context, the study employs a comparative research methodology noting the lessons from India, Singapore, Australia, and the United States. Based on this methodology, the report may fail to capture real time developments regarding access at the time of review and compilation.

4.0 Legal and Policy Frameworks that Impact Digital Connectivity and Data Collection for Vulnerable and Minority Groups in Kenya

Legal and policy frameworks are crucial in shaping digital connectivity and data collection practices for vulnerable and minority groups in Kenya.[8] These frameworks, including the Constitution of Kenya, the Data Protection Act[9] and the Computer Misuse and Cybercrimes Act,[10] play a significant role in regulating cyber access and the protection of sensitive data. They can either facilitate or hinder access to digital technologies and the protection of sensitive data. This section examines these critical legal instruments, beginning with the Constitution of Kenya and proceeding through the Data Protection Act and the Computer Misuse and Cybercrimes Act.

4.1 The Constitution of Kenya 2010

Article 35 of the Constitution of Kenya provides for the right to access information.[11] This right extends to any information held by the State and any other person, which is required for the exercise or protection of any right or fundamental freedom.[12] As later canvassed in this report, e-government services contain important government information, including those necessary for the exercise of socioeconomic rights, such as housing, social security and education, as envisaged in Article 43 of the Constitution.[13] To use this platform, citizens ought to have access to the internet, which is often a great hindrance given the limited internet penetration rates in Kenya.[14] These users, who are unable to access government services, are often left out of access to vital government information such as the Directorate of Immigration Services, Higher Education Loans Board (HELB) and Boma Yangu.[15] Tying this back to Article 35, such an act greatly contravenes the provisions of Article 35 (1) (a) given that this denial sidelines them from accessing socio-economic rights as outlined above.

4.2 Data Protection Act of 2019

This Act came into force on November 25, 2019, and its provisions establish a legal framework for regulating the processing of personal data and safeguarding individuals' privacy rights, which are enforced by the Office of the Data Protection Commissioner.[16] This law collectively establishes requirements for data security measures, data

[8] Aikins, S.K., 2019. Determinants of digital divide in Africa and policy implications. International Journal of Public Administration in the Digital Age (IJPADA), 6(1), pp.64-79.
[9] Data Protection Act No. 24 of 2019
[10] Computer Misuse and Cybercrimes Act No. 5 of 2018.
[11] Constitution of Kenya (2010), Article 35.
[12] Constitution of Kenya (2010), Article 35 (1)(a) and (b).
[13] Office of the President, 'E-Government Strategy: The Strategic Framework, Administrative Structure, Training Requirements and Standardisation Framework' Ministry of Information and Communication Technology (ICT), March 2004. See also Constitution of Kenya (2010), Article 43.
[14] Khaemba S.N, Muketha G.M. and Matoke N, 2017. Factors Affecting Citizen Readiness for E-government Services in Kenya Journal of Research in Engineering and Applied Sciences, 2(2), pp.64.
[15] E-citizen, Government of Kenya services simplified All your government records unified <https://accounts.ecitizen.go.ke/en> Accessed on 24 June 2024.
[16] Data Protection Act No. 24 of 2019, Preamble.

processing, and the protection of personal information, influencing how digital connectivity and data collection practices are carried out, particularly concerning vulnerable populations.[17]

However, challenges such as the lack of national data protection certification standards and constrained ODPC independence persist in effectively implementing and enforcing these provisions, highlighting the need for continuous improvement and vigilance in safeguarding the digital rights of all Kenyan citizens, especially those most vulnerable. In its 2024 report, KICA noted that these challenges have clawed back the efforts made to advance sectoral focus on private data handlers within a broad area of focus such as finance, telecommunications, education and health.[18]

Strengthening collaboration between government agencies, civil society organisations, and the private sector is essential for developing comprehensive and effective policies that prioritise cybersecurity and protect the data privacy and security of vulnerable and minority groups in Kenya.[19] To better understand the impact of data, it is prudent to canvas; i) the new modes of government service delivery and ii) the interplay of the same with systemic barriers and data processing techniques.

4.3 The Computer Misuse and Cybercrimes (CMCA) Act (No. 5 of 2018)

Broadly speaking, cybersecurity regulations are critical for protecting data from breaches and ensuring the safety of digital services.[20] The provisions of this statute intersect significantly with the move towards governing digital connectivity and data collection for all persons including vulnerable and minority groups in Kenya.[21] To better understand its objectives, the CMCA was enacted by Parliament in 2018, to address cybercrimes, including unauthorised access to computer systems, data interference, computer fraud, and cyber harassment.[22] This legislation plays a vital role in safeguarding digital connectivity and protecting personal data from cyber threats, thus impacting vulnerable and minority groups who may be at higher risk of cyber exploitation.[23]

Given the overarching need to protect personal data, the CMCA's punitive approach criminalises, among other offences, unauthorised access[24], interference[25], and interception[26] of ICT systems. To achieve this intended reality, Part II of the CMCA establishes the National Computer and Cybercrimes Coordination Committee, dubbed the NC4. The NC4 has been keen to promote public collaboration in the formulation of the Computer Misuse and Cybercrimes Act regulations in an exercise conducted in September 2023.[27] This reflects the government's proactive nature to consult the public on policies governing digital information access. Nonetheless, to narrow the NC4's relevance to this paper's research scope, the Committee advises the Kenyan government on matters relating to blockchain technology, critical infrastructure, mobile money and trust accounts.[28] Digital access to services such as mobile money is essential for Kenyans in the quest to eradicate significant levels of poverty among vulnerable groups across Sub-Saharan Africa.[29]

[17] Data Guidance, 'Kenya - Data Protection Overview' Data Guidance, February 2024 < https://www.dataguidance.com/notes/kenya-data-protection-overview> Accessed 15 May 2024.
[18] Kenya ICT Action Network (KICTANet), '5 Years of The Data Protection Act in Kenya 2019 - 2024: Reflections and Considerations for the Future', Kenya ICT Action Network (KICTANet), May 19, 2024, page 27<https://www.kictanet.or.ke/new-report-identifies-achievements-challenges-and-recommendations-to-enhance-data-protection-in-kenya/ > Accessed on 6 September 2024.
[19] KICTANet, 'Five Years of Kenya's Data Protection Act: Reflections and considerations for the future' Kenya ICT Action Network (KICTANet), 19 May 2024 <tinyurl.com/rrafdrdt > Accessed 9 July 2024.
[20] Layne Z, 2019. The Modern Threat: Data Breaches, Security Measures, and a Call for Changes. North Carolina Banking Institute 23(1) , pp. 174.
[21] Computer Misuse and Cybercrimes Act No. 5 of 2018.
22Computer Misuse and Cybercrimes Act No. 5 of 2018, Preamble.
23Mutemi M, 'TAMING THE INTERNET: The good, the bad and the ugly parts of the Computer Misuse and Cybercrimes Act 2018', The Elephant, May 24 2018,< https://www.theelephant.info/analysis/2018/05/24/taming-the-internet-the-good-the-bad-and-the-ugly-parts-of-the-computer-misuse-and-cybercrimes-act-2018/ > Accessed on 6 September 2024.
[24] Computer Misuse and Cybercrimes Act (2018), Section 14.
[25] Computer Misuse and Cybercrimes Act (2018), Section 16.
[26] Computer Misuse and Cybercrimes Act (2018), Section 17.
[27] James Mbaka, 'State seeks public views on cyber security regulations', The Star News, 12 September 2023 <https://www.the-star.co.ke/news/realtime/2023-09-12-state-seeks-public-views-on-cyber-security-regulations> accessed 16 May 2024.
[28] Computer Misuse and Cybercrimes Act No. 5 of 2018, Section 6 (1)(a).
[29] Kiiti N and Mutinda JW, 2022. *The Use of Mobile-Money Technology among Vulnerable Populations in Kenya: Opportunities and Challenges for Poverty Reduction*, New York, OUP, Chapter 3 <https://www.degruyter.com/document/doi/10.1515/9781785336546-007/html?lang=en > Accessed on 24 June 2024..

Given the essential nature and spread of mobile money transactions, these areas are inextricably linked to promoting digital literacy in Kenya. For context, the 2024 State of the Industry Report on Mobile Money by GSMA (the Global System for Mobile Communications Association) noted that the value of Mobile Money adoption had shot up by 12% to USD 1.75 billion in 2023.[30] Moreover, while this report did not explicitly mention the overall mobile money adoption rate by these communities, it did indicate that increased digital financial literacy among vulnerable groups is pivotal for increased mobile money penetration.[31] Having earlier outlined the significance of mobile money as a digital service for poverty eradication, its diminished uptake speaks to the need for awareness programs to address this digital data desert.

This statistic paints a vivid portrait of the scale of digital literacy from a mobile money approach in Kenya. While there exists a significant gender gap in mobile phone access across different African jurisdictions, the same may not be entirely true in the Kenyan context. Men and Women in Kenya enjoy similar accessibility with only a 2%-10% deviation across three categories: mobile ownership, mobile money awareness and mobile money account ownership.[32]

4.4 Universal Service Obligations (USO) and National Broadband Plans

USOs are regulatory mechanisms that require telecommunication service providers to ensure universal access to affordable and quality communication services.[33] For example, Kenya's National Broadband Strategy (2018-2023) aimed to provide affordable internet access to underserved areas, including rural regions where vulnerable

Strengthening collaboration between government agencies, civil society organisations, and the private sector is essential for developing comprehensive and effective policies that prioritise cybersecurity and protect the data privacy and security of vulnerable and minority groups in Kenya.

[30]Global System for Mobile Communications Association, 2024 State of the Industry Report on Mobile Money, 2024, 7<https://www.gsma.com/sotir/wp-content/uploads/2024/03/GSMA-SOTIR-2024_Report.pdf> accessed 15 May 2024.
[31]Ibid, pp. 54. The report's captured women, persons with disabilities, youth, the elderly and rural residents as vulnerable consumers.
[32]Global System for Mobile Communications Association, *2024 State of the Industry Report on Mobile Money*, 2024, 62 <https://www.gsma.com/sotir/wp-content/uploads/2024/03/GSMA-SOTIR-2024_Report.pdf> accessed 15 May 2024
[33] Calvo, A.G., 2012. Universal service policies in the context of national broadband plans.

communities often reside.[34] This is due to the inherent nature and volume of digital data that is accessible online, especially for those residing in areas of low broadband connectivity. The Strategy was developed by the Ministry of Information and Communication Technology. One of the key flagship projects was the last mile connectivity, which aimed to achieve 100% connectivity by 2023.[35] The Strategy also aimed to promote the designing and manufacturing of broadband devices in Kenya. On connectivity, as of January 2024, there were approximately 63.9 million registered mobile connections which corresponds to 118.7 percent of the country's population.[36]

Presently, all relevant activities towards building up on the strengths of this strategy have been adopted in the Strategic Plan for 2023-2027 developed by the Ministry of Information and Communication Technology and the Digital Economy.[37] As part of the Key Result Area (KRA) 2, the Government of Kenya aims to establish a Digital superhighway, broadcasting and Telecommunications infrastructure to promote broadband access. This will increase the population with broadband subscriptions from 33.32 million to 45 million by the mid-term (2025) and to 55 million by the end term reporting period (2027).[38]

A February 2024 Economic Survey Report by the Kenya National Bureau of Statistics (KNBS) into Kenya's Information, Communication and Technology sector noted that the total utilised bandwidth increased from 6.5 million Mbps in 2022 to 11.0 million Mbps in 2023.[39] This is evidenced by the fact that there was 10,995,900 total utilised bandwidth from an overall 17,293,743 total bandwidth available. While this report fails to categorise the research data set based on locality, these statistics point towards diminished national access including those of marginalised and vulnerable communities.

[34]Ministry of Information and Communication Technology, 'Kenya National Broadband Strategy' Ministry of ICT, 2018-2023 <https://www.ict.go.ke/wp-content/uploads/2019/05/National-Broadband-Strategy-2023-FINAL.pdf> Accessed 25 July 2024
[35]*Ibid,* Page 11.
[36]Natalie Cowling, 'Total number of mobile connections in Kenya from 2021 to 2024' Statistica<https://www.statista.com/statistics/1246821/number-of-mobile-connections-kenya/#:~:text=Kenya%20registered%20approximately%2063.9%20million,an%20increase%20in%20mobile%20connections> accessed 5 May 2024
[37]Ministry of Information and Communication Technology and the Digital Economy, 'Strategic Plan 2023-2027' Government of Kenya 2023 < https://ict.go.ke/wp-content/uploads/2024/02/STRATEGIC-PLAN-2023-2027.pdf> Accessed 25 July 2024.
[38] *Ibid,* Page 43
[39] Kenya National Bureau of Statistics, 'Economic Survey 2024' KNBS, 2024, Page 332 < https://www.knbs.or.ke/wp-content/uploads/2024/05/2024-Economic-Survey.pdf > Accessed 6 September 2024

The statistics are represented in the table below:

	2019	2020	2021	2022*	2023*
Capacity in Megabits Per Second (Mbps)					
Undersea Bandwidth Capacity	6,241,840	8,085,970	10,886,2005	11,965,540	17,290,905
Satellite Bandwidth Capacity[1]	5,520	5,460	5,330	2,513	2,838
1. Total Available Bandwith Capacity	**6,247,360**	**8,091,430**	**10,891,530**	**11,968,053**	**17,293,7743**
Utilized Bandwidth in Mbps					
Undersea Bandwidth Capacity	2,17,560	4,008,010	4,816,990	6,467,360	10,995,452
Satellite Bandwidth Capacity[1]	2,700	2,580	2,560	105	448
2. Total Utilized Bandwidth	**2,720,260**	**4,010,590**	**4,819,550**	**6,467,465**	**10,995,900**
Broadband Subscriptions[2]					
Cooper line (Dial-up, DSL and xDSL)	751	835	848	812	179
Fibre to the Home	20,03	340,271	410,762	566,901	754,983
Fibre to the Office	65,715	60,079	67,198	75,791	73,308
Cable modem	158,1	178,224	193,809	193,709	198,351
Other fixed wired broadband	1,690	804	561	777	116

Table 1: This table represents the total usage of broadband services in Kenya over the 2019-2023 period.[40]

[40]Kenya National Bureau of Statistics, 'Economic Survey 2024' KNBS, 2024, Table 14.6, Page 332
< https://www.knbs.or.ke/wp-content/uploads/2024/05/2024-Economic-Survey.pdf > Accessed 6 September 2024

4.5 The National Digital Master Plan 2022-2032[41]

The National Digital Master Plan 2022-2032 outlines four flagship pillars. They include digital infrastructure; Digital government service, products and data management; Digital skills, and Digital Innovation; enterprise and digital business[42]. Under digital infrastructure, there are flagship programmes such as installing 100,000kms of high-speed fibre optic infrastructure to provide internet to government offices, schools and metro cities. Part of the plan dubbed "Internet Mashinani" is to establish 25,000 internet hotspots across the country to provide internet services to youth, entrepreneurs and innovators.[43] Regarding the Kenya Digital Economy Acceleration Project, the Kenyan government has received US$ 390 million to roll out the preliminary stages, which aim to achieve high-speed Internet and improved e-government service delivery (for selected government services).[44]

With regard to vulnerable and marginalised communities, this plan has stimulated economic growth and promoted social inclusion.[45] Information and Communication Technologies have been effective platforms to facilitate knowledge sharing, skills development, transfer of innovative e-government solutions and capacity building for sustainable development. This has promoted e-government service deliveries and generated important benefits cutting across health, employment and education.[46]

The Digital Master Plan represents a progressive step forward from its predecessor, the Master Plan 2014-2017. This plan was rooted in earlier national ICT policies and introduced a conceptual model categorising ICT elements into foundations and pillars. However, it faced implementation challenges due to resource constraints and institutional reform delays.[47] The master plan aligns with Kenya Vision 2030, building upon previous initiatives and emphasising the transition to a digital economy. The two strategic themes, foundational and cross-cutting, seek to realise a more inclusive digital space.[48]

Furthermore, initiatives like Konza City, Kenya's Silicon Valley, paperless government offices, and robust cloud services signify a leap into a tech-forward future.[49] This transformation commits to 'zero' the digital divide and realises improved teaching and learning, online government services, and active citizen participation in economic development. Ultimately, Kenya seeks to be a global centre for innovation, cementing its position as a digital trailblazer in the region. To this end, the Ministry of Education established Digischool to provide interactive, relevant digital content based on a competency-based curriculum.[50] The Digischool website offers a breakdown of schools by county, including details such as the total number of schools, those with installations pending, the percentage already installed, as well as the number of learner devices, teacher devices, routers, and projectors.[51]

Kenya faces challenges in bridging data deserts over the next decade despite ambitious digital transformation plans outlined in the National Digital Master Plan (2022-2032). Key hurdles include resource constraints, institutional reform delays, and equitable access to broadband infrastructure,

[41] See Kenya National Digital Master Plan 2022-2032, https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf
[42] Ibid, Page 16
[43] James Wanzala, 'State to set up 25,000 free Wi-Fi hotspots' December 03, 2022, Standard Media,, <https://www.standardmedia.co.ke/business/business/article/2001462293/state-to-set-up-25000-free-wi-fi-hotspots > accessed on 5 May 2024.
[44] Njogu H, 'Building a Robust Digital Economy in Kenya', KIPPRA, 30 June 2023 < https://kippra.or.ke/building-a-robust-digital-economy-in-kenya/#:~:text=To%20improve%20affordability%20and%20availability,to%20innovators%2C%20youth%20and%20entrepreneurs.> Accessed 21 July 2024.
[45] Ministry of ICT, Innovation and Youth Affairs, 'Kenya National Digital Master Plan 2022-2032', page 48 <https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf > Accessed 21 July 2024.
[46] Ministry of ICT, Innovation and Youth Affairs, 'Kenya National Digital Master Plan 2022-2032', page 49 <https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf > Accessed 21 July 2024
[47] Ministry of ICT, Innovation and Youth Affairs, 'Kenya National Digital Master Plan 2022-2032', page 22-23 <https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf > Accessed 21 July 2024
[48] The Foundational themes entails policy, legal and regulatory framework, research and development while the cross-cutting themes include information security cyber management, and emerging technologies.
[49] Nzioka T, 'Kenya, Korea launch third Konza Technopolis project', The Star Newspaper, 6 March 2024 < https://www.the-star.co.ke/news/real-time/2024-03-06-kenya-korea-launch-third-konza-technopolis-project/> Accessed 21 July 2024.
[50] About Digischool, https://www.digischool.go.ke/ accessed 20 September 2023.
[51] DLP COUNTY SUMMARY, https://www.digischool.go.ke/dlp_summary/county_summary accessed 20 September 2023.

especially in remote areas.[52] Tailored digital literacy programs, inclusive design principles in digital platforms, and the creation of local content in diverse languages are crucial but require sustained investment and collaboration across sectors. This plan also seeks to establish 1450 Community Digital Multipurpose Centres, one in every ward, to further bridge the digital divide and onboard vulnerable and marginalised communities.[53]

Moreover, Kenya also has digital literacy policies focusing on providing education and training to improve individuals' digital skills. Addressing the digital literacy gap in Kenya is crucial since many individuals lack the proficiency needed to navigate digital technologies effectively. For instance, the Ministry of ICT and the Digital Economy embraced initiatives like the Digital Skills Programme.[54] This initiative plays a significant role in enhancing digital literacy by providing targeted training and education, as evidenced by over 80,000 public primary school teachers being trained in readiness for a technology-inspired approach to learning.[55] The Kenyan government has these Digital Literacy Programmes such as *DigiSchool*, which not only bolster basic digital competencies but also emphasise information literacy and data protection.[56] By acquiring these skills, individuals can better protect their personal data and engage with digital tools responsibly, mitigating potential risks associated with online activities.

Addressing the digital literacy gap in Kenya is crucial since many individuals lack the proficiency needed to navigate digital technologies effectively.

Furthermore, fostering a culture of digital literacy is essential for promoting inclusivity in the digital realm, particularly among vulnerable and minority groups. Through initiatives like the Digital Skills Programme, individuals with disabilities, the elderly, and underserved communities can gain the

[52]Ministry of ICT, Innovation and Youth Affairs, 'Kenya National Digital Master Plan 2022-2032', page 49 <https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf > Accessed 6 September 2024
[53]Ministry of ICT, Innovation and Youth Affairs, 'Kenya National Digital Master Plan 2022-2032', page 49 <https://cms.icta.go.ke/sites/default/files/2022-04/Kenya%20Digital%20Masterplan%202022-2032%20Online%20Version.pdf > Accessed 6 September 2024
[54]Ministry of Information, Communication and Technology and the Digital Economy Economy, 'Digital Literacy Programme(DLP)' <https://ict.go.ke/digital-literacy-programmedlp/ >
[55]e-Governance Academy, 'Kenya Digital Readiness Study, https://ega.ee/wp-content/uploads/2022/07/Kenya-Digital-Readiness-Study.pdf accessed 8 February 2024.
[56]ibid, 38.

knowledge necessary to participate more actively in the digital economy.[57] By emphasising information literacy and data protection within these initiatives, marginalised groups are empowered to navigate digital spaces securely and contribute meaningfully to the digital transformation. All this points towards the legal-regulatory approach employed by different stakeholders in Kenya, most notably the Kenyan government, in reconciling the need to achieve digital literacy but also proactively mitigating possible drawbacks such as inaccessibility, discrimination and cybercrimes.

5.0 The Adoption of E-Government Services

5.1 The dawn of E-government services

E-government initiatives aim to make government services accessible online, as demonstrated by the Kenyan example of the E-Citizen platform, but lack of inclusion can exclude vulnerable groups from benefiting.[58] Kenya's e-Citizen platform was introduced in 2014.[59] This initiative marks a significant milestone in the nation's digital transformation and e-Government service delivery endeavours.[60] This online portal acts as a centralised hub, consolidating services from numerous government agencies significantly improving efficiency in government service delivery to its citizens.[61] It offers citizens and businesses convenient access to a plethora of services, streamlining processes and minimising bureaucratic obstacles. With e-Citizen, individuals can access and pay for services from anywhere with an internet connection, eliminating the need for physical visits to government offices and bridging geographical and mobility barriers.[62]

The platform's primary strengths lie in enhancing accessibility and convenience for users across Kenya. By facilitating efficient completion of tasks like passport applications, business permit requests, and tax filing, e-Citizen saves time and reduces paperwork burdens. Moreover, it prioritises the security of user data through robust measures, ensuring trust and confidence in online transactions.[63] Additionally, e-Citizen promotes digital literacy and skills development among citizens, empowering them to participate in the digital economy and bridging the digital divide.[64]

Furthermore, e-government services facilitated by platforms like e-Citizen have had a profound impact on vulnerable and minority groups in Kenya. These services have improved accessibility, reduced discrimination, enabled efficient data collection and analysis, customised service delivery, promoted participation and engagement, and fostered transparency and accountability.[65] However, the adoption of e-government services involves both enablers and barriers that exclude vulnerable groups from benefiting. Enablers such as a robust ICT infrastructure and supportive government policies drive uptake, while barriers like high costs, security concerns, outdated regulations, and resistance to change impede adoption.[66] This is further elaborated by an inspection of the different factors at play in this new dawn of government service delivery.

5.2 The interplay with systemic biases and data processing techniques

The rollout of e-government services has necessitated mass digital registration exercises characterised by voluminous amounts of data collected across different registration centres and government offices. During the registration exercises, there have arisen concerns about systemic biases in the context of e-government services.[67] The systemic

[57]ibid.
[58]Government of Kenya, 'Remarks by His Excellency Hon. William Samoei Ruto PhD EGH, The President of the Republic of Kenya and Cimmander in Chief of the Defence Forces During the Launch of the e-citizen platform' GOK, Page 2-4 <https://www.president.go.ke/wp-content/uploads/DURING-THE-LAUNCH-OF-THE-E-CITIZEN-PLATFORM.pdf> Accessed 9th July 2024/
[59]The National Treasury & Economic Planning, 'Government digital payments (e-citizen)', 2021 < https://www.treasury.go.ke/government-digital-payments-ecitizen/#:~:text=2725%20of%20April%2024%2C%202014,in%20a%20Gazette%20Notice%20No.> Accessed 9th July 2024.
[60]WMO Advocates, 'Evaluation of the impact of the E-citizen Platform,' https://wmoadvocates.com/articles/evaluation-of-the-impact-of-the-ecitizen-platfrom/ accessed 8 February 2024.
[61]eCitizen, 'What digital ID offers: Efficiency' Government of Kenya <https://did.ecitizen.go.ke/ > Accessed 9th July 2024.
[62]ibid.
[63]Ombati C, 'PS Bitok: Ecitizen targets Sh1 billion from 30 million subscribers' The Star Newspaper, May 08, 2024 < https://www.the-star.co.ke/news/realtime/2024-05-08-ps-bitok-ecitizen-targets-sh1-billion-from-30-million-subscribers/ > Accessed on 6 September 2024
[64]ibid.
[65]ibid.
[66]ibid.
[67]Mutung'u, G. (2021). Digital Identity in Kenya: Case study conducted as part of a ten-country exploration of socio-digital ID systems in parts of Africa (Towards the Evaluation of Digital ID Ecosystems in Africa: Findings from Ten Countries) [Case study]. Research ICT Africa (RIA). https://researchictafrica.net/publication/digital-identity-in-kenya-case-study-conducted-as-part-of-a-ten-country-exploration-of-socio-digital-id-systems-in-parts-of-africa/

biases stem from the government's undue consideration of the citizens' biometric information and physical attributes that are collected from the citizens before they are issued digital identification. Some of the biometric information collected include earlobe and hand geometry, as well as voice waves to aid their issuance of digital IDs.[68]

In Kenya, the transition to a digital identification system included initiatives like the *Huduma Namba* project (National Integrated Identity Management System), which aimed to create a single source of truth for personal data and streamline access to government services.[69] The undue regard of these elements of a citizen's biometric information in the implementation of e-government services often raises concerns about privacy and discrimination.[70]

This was seen to be crucial for accessing government and private services, yet it faced challenges regarding inclusion and privacy, particularly for vulnerable and minority groups.[71] These concerns stemmed from the requirement of individuals to submit biometric information such as earlobe and hand geometry, as well as voice waves to aid their issuance of digital IDs.[72] This criterion, for instance, fingerprints, excludes members of marginalised communities, such as the Nubian Community in Kenya, whose fingerprints may not be readily discernible. Thus, these communities are further excluded from socioeconomic and civil-political life. This further entrenches the indirect discrimination towards them when their personal attributes interact with the criteria employed for registration.[73]

Data processing techniques have equally been known to entrench the digital divide, which refers to the gap between persons with continuous and uninterrupted access to the Internet and those without.[74] This situation often arises due to several factors, among them geographical location.[75] In the Kenyan context, this refers to the persons whose data is not regularly collected and processed due to scarce data generation. This situation thus breeds the continued exclusion of the personal information of the vulnerable and marginalised communities.

Legal and policy frameworks surrounding national identification systems and biometric data collection play a crucial role in shaping digital connectivity and data collection efforts, with initiatives like the *Maisha Namba* aiming to streamline access to services. However, systemic biases and data processing techniques have hampered the inclusion of personal information of persons from vulnerable and marginalised communities.

6.0 The Digital Divide and Its Effects on Vulnerable and Minority Groups in Kenya

The preceding chapter aptly captures Kenya's legal-regulatory environment and forms a sufficient foundation for an analysis of the present outlook on digital inaccessibility in Kenya. The digital divide, particularly concerning access to and utilisation of the internet and digital technologies, has significant effects on vulnerable and minority groups. These effects exacerbate existing social, economic, and educational disparities, making it challenging for these groups to fully participate in the digital age. Here are some

[68]Mutung'u, G. (2021). Digital Identity in Kenya: Case study conducted as part of a ten-country exploration of socio-digital ID systems in parts of Africa (Towards the Evaluation of Digital ID Ecosystems in Africa: Findings from Ten Countries) [Case study]. Research ICT Africa (RIA). https://researchictafrica.net/publication/digital-identity-in-kenya-case-study-conducted-as-part-of-a-ten-country-exploration-of-socio-digital-id-systems-in-parts-of-africa/

[69]Privacy International, 'Kenyan Court Ruling on Huduma Namba Identity System: the Good, the Bad and the Lessons,' <https://privacyinternational.org/long-read/3373/kenyan-court-ruling-huduma-namba-identity-system-good-bad-and-lessons> accessed 8 February 2024.

[70] Breckenridge, K., 2005. The biometric state: The promise and peril of digital government in the new South Africa. Journal of Southern African Studies, 31(2), pp.267-282.

[71] ibid.

[72]Mutung'u, G. (2021). Digital Identity in Kenya: Case study conducted as part of a ten-country exploration of socio-digital ID systems in parts of Africa (Towards the Evaluation of Digital ID Ecosystems in Africa: Findings from Ten Countries) [Case study]. Research ICT Africa (RIA). https://researchictafrica.net/publication/digital-identity-in-kenya-case-study-conducted-as-part-of-a-ten-country-exploration-of-socio-digital-id-systems-in-parts-of-africa/

[73]Kiilu N, 'Indirect Discrimination: Huduma Namba (Digital Identification) and the Plight of the Nubian Community in Kenya' Strathmore Law Review, 2022, page 30 < https://journal.strathmore.edu/index.php/lawreview/article/view/188/179> Accessed 21 July 2024.

[74]Favaretto M, De Clercq E and Elger B, 'Big Data and discrimination: perils, promises and solutions. A systematic review' Journal of Big Data, 2019< https://journalofbigdata.springeropen.com/articles/10.1186/s40537-019-0177-4> Accessed 21 July 2024.

[75]This report centers on geographical location given the remote localities of teh vulnerable and marginalised groups canvassed herein. See Okello F, 'Bridging Kenya's Digital Divide: Context, Barriers and Strategies' Center for International Governance Innovation, 2023, page 1, <https://www.cigionline.org/static/documents/DPH-Paper-Okello.pdf> Accessed 21 July 2024.

key effects:

6.1 Limited Educational Opportunities

Without access to the internet, vulnerable and minority groups in Africa may have limited access to online educational resources, e-learning platforms, and digital libraries.[76] In Kenya, around 70.7% of Kenyan people living in rural areas are thus prone to the lack of internet access, widening the digital divide.[77] This glaring disparity exacerbates existing educational inequalities and leaves vulnerable communities at a distinct disadvantage, preventing them from acquiring essential digital skills vital in the modern learning landscape.

6.2 Economic Disadvantage

The digital divide creates economic disparities as vulnerable and minority groups miss out on the opportunities offered by the digital economy.[78] Access to online job platforms, remote work opportunities, and digital entrepreneurship is limited, hindering their ability to participate in economic activities that could improve their livelihoods. According to the African Development Bank Group, despite the region's impressive mobile phone penetration rates, the potential of digital technologies to drive economic growth remains largely untapped.[79] In urban slums and rural areas alike, limited access to the digital economy obstructs access to online job platforms, remote work opportunities, and financial services, further entrenching economic inequality.[80]

Legal and policy frameworks surrounding national identification systems and biometric data collection play a crucial role in shaping digital connectivity and data collection efforts, with initiatives like the Maisha Namba aiming to streamline access to services.

6.3 Limited Healthcare Access

The internet has transformed healthcare with telemedicine and access to health information. Without internet access, vulnerable groups may struggle to access vital health information and remote healthcare services, impacting

[76]Fuchs, C. and Horak, E., 2008. Africa and the digital divide. Telematics and informatics, 25(2), pp.99-116.
[77]Okello F, 'Bridging Kenya's Digital Divide: Context, Barriers and Strategies' Center for International Governance Innovation, 2023, page 3, <https://www.cigionline.org/static/documents/DPH-Paper-Okello.pdf> Accessed 21 July 2024.
[78]Mignamissi, D., 2021. Digital divide and financial development in Africa. Telecommunications Policy, 45(9), p.102199.
[79]African Development Bank, 'Digital technologies key to inclusive growth in Africa - African Union Commissioner' https://www.afdb.org/en/news-and-events/digital-technologies-key-inclusive-growth-africa-african-union-commissioner-60818 accessed 31 August 2023.
[80]Mignamissi, D., 2021. Digital divide and financial development in Africa. Telecommunications Policy, 45(9), p.102199.

their overall health outcomes.[81]

In a blog by the United Nations Development Programme (UNDP), the critical issue of digital connectivity in remote areas is highlighted as a significant barrier that leaves vulnerable groups disconnected from crucial health information and resources, ultimately exacerbating disparities in health outcomes.[82]

7.0 Consequential Exclusion of Vulnerable and Minority Groups in Kenya's Data Ecosystem

In Kenya, certain groups face significant challenges in accessing the internet and digital technologies due to various factors, including their geographic location, socioeconomic status, cultural barriers, and historical marginalisation. Here are some of the groups that are particularly affected:

7.1 Rural Communities

Rural areas in Kenya often suffer from data deserts, with limited or no access to reliable internet connectivity.[83] This impacts the Borana, Gabra, Maasai, Pokot, Rendille, Samburu, Somali Turkana and other pastoralist and agricultural communities grappling with limited or no internet connectivity.[84] At the start of 2024, 29.8 percent of Kenya's population lived in urban centres, while 70.2 percent lived in rural areas.[85] This statistic shows that a majority of the Kenyan population lives in rural areas and, therefore, have a higher likelihood of being set back in internet access and connectivity which unfortunately enables the digital divide to grow further. InfraCo Africa's Mawingu project noted that only 15% of rural households have internet access further evidencing the underlying digital gap between their counterparts in urban areas.[86] This leads to data deserts in many rural areas in Kenya thus hindering access to online education, healthcare services, and economic prospects.

7.2 Urban Slum Dwellers/ Low-Income Urban Communities

Communities living in urban slums, such as Kibera in Nairobi, also face challenges related to the digital divide.[87] Limited access to affordable internet and digital devices affects their ability to access information, education, and job opportunities, perpetuating the cycle of poverty. According to the World Bank, in 2019, about 36.1% of the Kenyan population lived below the national poverty line, making it difficult for some urban residents to afford internet access and digital devices.[88]

7.3 Persons with Disabilities

People with disabilities, both in rural and urban areas, encounter barriers to digital access. This includes physical limitations in using digital devices, limited digital content accessibility and the lack of assistive technologies, making it challenging for them to fully participate in the digital ecosystem.[89] In Kenya, the technology coverage of persons with disabilities has seen improvements rising to an overall mobile phone penetration 82%.[90]

[81] Sarkar, U., Karter, A.J., Liu, J.Y., Adler, N.E., Nguyen, R., López, A. and Schillinger, D., 2011. Social disparities in internet patient portal use in diabetes: evidence that the digital divide extends beyond access. Journal of the American Medical Informatics Association, 18(3), pp.318-321.

[82] Opp R, 'The evolving digital divide', United Nations Development Programme (UNDP), July 14, 2021<https://www.undp.org/blog/evolving-digital-divide > Accessed 6 September 2024.

[83] Odongo, A.O. and Rono, G.C., 2016, March. Kenya digital and cultural divide. In *Proceedings of the 9th International Conference on Theory and Practice of Electronic Governance* (pp. 85-94).

[84] Life Africa Trust, 'Accounting for pastoralists,' http://www.pastoralpeoples.org/wp-content/uploads/2020/09/Accounting4pastoralists-KE.pdf accessed 20 September 2023.

[85] Data Reportal, 'Digital 2024: Kenya,' <https://datareportal.com/reports/digital-2024-kenya > Accessed 6 September 2024.

[86] InfraCo Africa, 'Kenya: Mawingu Expanding access to affordable internet' InfraCo Africa, 2024 <https://infracoafrica.com/project/mawingu/#:~:text=With%20only%2015%25%20of%20rural,education%2C%20healthcare%20and%20business%20development > Accessed 6 September 2024.

[87] Wamuyu, P.K., 2017. Bridging the digital divide among low-income urban communities. Leveraging use of Community Technology Centers. Telematics and Informatics, 34(8), pp.1709-1720.

[88] The World Bank Group, 'Poverty and Equity Brief: Subsaharan Africa, Kenya' The World Bank Group, April 2020 <https://databankfiles.worldbank.org/public/ddpext_download/poverty/33EF03BB-9722-4AE2-ABC7-AA2972D68AFE/Global_POVEQ_KEN.pdf> Accessed 6 September 2024.

[89] Qureshi, S., 2014. Overcoming technological determinism in understanding the digital divide: where do we go from here? *Information Technology for Development*, *20*(3), pp.215-217.

[90] Barbareschi G, 'Bridging the Divide: Exploring the use of digital and physical technology to aid mobility impaired people living in an informal settlement' University College London (UCL), page 2<https://discovery.ucl.ac.uk/id/eprint/10110232/1/ASSETS_Long_cameraready_V3.docx.pdf > Accessed 21 July 2024.

7.4 Women and Girls

Gender disparities are present in digital access, with women and girls facing additional barriers to using the internet and digital technologies due to cultural norms, limited resources, and gender-based discrimination.[91] Within urban poor regions across ten cities, the study indicates that women face a 50% lower likelihood of being online compared to men, and their likelihood of utilising the internet for economic and political empowerment is reduced by 30-50%.[92] These disparities stem from various underlying factors, including prohibitive costs, limited digital proficiency, a dearth of content that resonates with and empowers women, and obstacles impeding women's ability to communicate freely and privately online. Consequently, this division obstructs women's entry to crucial services, information, and active engagement in civic matters, thereby perpetuating gender inequalities within society.

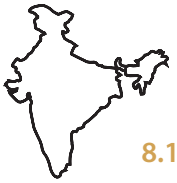
7.5 Refugees and Internally Displaced Persons

Kenya hosts a significant number of refugees from neighbouring countries. Displaced populations often struggle to access digital technologies and the internet due to their uncertain living conditions and lack of proper infrastructure in refugee camps and informal settlements, which limits their access to information and educational opportunities.[93] Kenya hosts a significant refugee population. As of December 31, 2021, the United Nations High Commissioner for Refugees (UNHCR) estimated that Kenya hosts over 540,000 refugees and asylum-seekers, with women and children comprising 77% of this population.[94] As of October 2023, the UNHCR's data indicates that there are an estimated 16,800 stateless individuals residing in Kenya.[95] Displaced populations often struggle to access digital technologies and the internet due to their uncertain living conditions and lack of proper infrastructure in refugee camps and informal settlements hence limiting their access to information and educational opportunities.[96]

8.0 Best Practices for Addressing Data Deserts in Vulnerable and Minority Groups: Lessons from India, Singapore, Australia, and the United States

Several countries and regions have implemented best practices for digital inclusion to bridge the digital divide and promote access to digital technologies for vulnerable and minority groups. India, Singapore, Australia, and the United States were selected as examples due to their notable successes in addressing digital inclusion among vulnerable and minority groups. These countries demonstrate innovative approaches, scalability, adaptability, and effective policy frameworks and partnerships in driving digital inclusion efforts. Studying these examples can offer valuable insights for policymakers aiming to tackle digital deserts in vulnerable and minority groups within their own contexts.

[91]Brännström, I., 2012. Gender and digital divide 2000–2008 in two low-income economies in Sub-Saharan Africa: Kenya and Somalia in official statistics. *Government Information Quarterly*, *29*(1), pp.60-67.
[92]World Wide Web Foundation, 'Input to the Office of the United Nations High Commissioner for Human Rights (OHCHR): Bridging the gender digital divide from a human rights perspective' https://www.ohchr.org/sites/default/files/Documents/Issues/Women/WRGS/GenderDigital/WWW_Foundation.pdf accessed 31 August 2023.
[93]Kaguara, A., 2012. Digital divide; the glaring reality.
[94]UNHCR, 'Kenya,' https://www.unhcr.org/countries/kenya accessed 7 February 2024.
[95]UNHCR| Kenya, 'Stateless persons,' https://www.unhcr.org/ke/stateless-persons#:~:text=As%20of%20October%202023%2C%20the,persons%20in%20Kenya%20is%2016%2C800. accessed 7 February 2024.
[96]Alencar A, 'Technology Can Be Transformative for Refugees, but It Can Also Hold Them Back' Migration Policy, 27 Jul 2023 < https://www.migrationpolicy.org/article/digital-technology-refugees> Accessed 25 July 2024. See also Martin-Shields C, 'Digitalization in Displacement Contexts: Technology and the implementation of the Global Compact on Refugees' UNHCR, 8 June 2021 < https://www.unhcr.org/people-forced-to-flee-book/wp-content/uploads/sites/137/2021/10/Charles-Martin-Shields_Digitalization-in-Displacement-Contexts-Technology-and-the-implementation-of-the-Global-Compact-on-Refugees.pdf> Accessed 25 July 2024.



8.1 India: Digital India Initiative

India's Digital India initiative is a comprehensive program launched by the government to transform the country into a digitally empowered society.[97] This initiative was launched in 2015 and has effectively reduced the digital divide by expanding internet access and digital services, especially in rural areas.[98] The initiative aims to provide access to digital services, internet connectivity, and digital literacy to all citizens, including those in rural and marginalised areas. From the nine pillars that make up this initiative, the project further aims to train 265,000 persons on information security under the Information Security & Education Awareness Phase (ISEA) Programme. Moreover, 540 additional services are targeted to be availed through the Unified Mobile Application for New-age Governance (UMANG) app platform up from the 1,700 services already available on UMANG.[99]

The initiative includes the establishment of Common Service Centers (CSCs) and the promotion of local language content. These centres serve as access points for digital services and training, bringing technology closer to communities that previously lacked such resources.[100] With regard to impact to vulnerable and marginalised communities, close to 80 % of the total CSOs in India have been established in rural areas. This percentage arises from the 429,390 CSOs in rural India as compared to 541, 240 CSOs nationwide as at May 2024.[101]

By establishing CSCs in remote areas, Digital India has empowered individuals with access to essential online services, ranging from government schemes to e-commerce platforms. Kenya could learn from India's approach by implementing similar initiatives, such as setting up CSCs, promoting local language content, and improving access to affordable smartphones. These strategies can help Kenya enhance digital inclusion and empower its population in the digital era.

8.2 Singapore: Infocomm Media Development Authority (IMDA) Initiatives

Singapore's Infocomm Media Development Authority (IMDA) has various initiatives to promote digital inclusion.[102] The Silver Infocomm Initiative (SII) was established in November 2007 to bridge the digital gap among individuals aged 50 and above by addressing disparities in education, language, and technology proficiency.[103] Through various programs like the Silver IT Fest, Silver IT Care, Silver Infocomm Wellness Ambassadors, Silver Infocomm Junctions, and Intergenerational IT Bootcamp, SII aims to enhance seniors' IT literacy, empower them to utilise technology effectively, and encourage intergenerational bonding.[104] Since its inception, SII has facilitated over 107,000 training opportunities, with initiatives ranging from hands-on workshops to IT clinics and community collaborations.[105] With its comprehensive curriculum covering basic computer skills to advanced digital lifestyle topics, SII continues to play a vital role in promoting digital inclusion among seniors in Singapore.

[97] Agrawal, A., Khan, R.A. and Ansari, M.T.J., 2022. Empowering Indian citizens through the secure e-governance: The digital India initiative context. In Emerging Technologies in Data Mining and Information Security: Proceedings of IEMIS 2022, Volume 3 (pp. 3-11). Singapore: Springer Nature Singapore.

[98] Vikaspedia, 'Introduction to Digital India,' <https://vikaspedia.in/e-governance/digital-india/introduction-to-digital-india> accessed 6 February 2024.

[99] Vikaspedia, 'Introduction to Digital India,' <https://vikaspedia.in/e-governance/digital-india/introduction-to-digital-india> accessed 6 February 2024

[100] Common Services Centres, 'Welcome to Common Services Centres' < https://csc.gov.in/> Accessed 25 July 2024.

[101] Common Services Centres, 'Welcome to Common Services Centres' < https://csc.gov.in/> Accessed 25 July 2024.

[102] Seow, P., Looi, C.K., How, M.L., Wadhwa, B. and Wu, L.K., 2019. Educational policy and implementation of computational thinking and programming: Case study of Singapore. Computational thinking education, pp.345-361.

[103] Infocomm Development Authority of Singapore, ' FACTSHEET: Silver Infocomm Initiative' https://www.imda.gov.sg/-/media/imda/files/inner/about-us/newsroom/media-releases/2016/0329_seniors-and-students-foster-new-bonds-through-it-bootcamp/2---silver-infocomm-initiative-factsheet-mar-2016.pdf accessed 7 February 2024.

[104] ibid.

[105] ibid.

8.3 Australia: National Digital Inclusion Roadmap

The National Digital Inclusion Roadmap launched in October 2020 in Australia highlights notable successes and innovative approaches in addressing digital inclusion among vulnerable and minority groups.[106] Programs like Digital Springboard, Tech Savvy Seniors, and Go Digi have successfully provided digital skills training to marginalised populations. Innovative strategies include the development of a Digital Capabilities Framework and the emphasis on accessibility standards compliance. The roadmap advocates for a whole-of-government strategy, consistent resource identification, and partnerships between government, private sector, and community organisations to drive scalable, adaptable, and effective digital inclusion efforts. These initiatives showcase a collaborative and comprehensive approach to ensuring all Australians have the necessary skills and access to participate fully in the digital world.

8.4 United States: ConnectHome Initiative

The ConnectHome initiative, launched by the U.S. Department of Housing and Urban Development (HUD), has successfully addressed digital inclusion among vulnerable and minority groups through innovative approaches, such as youth-led digital literacy training and comprehensive training programs for children and parents.[107] By fostering community partnerships and stakeholder engagement, ConnectHome sites have expanded training opportunities and focused on enhancing residents' digital literacy skills.[108] The initiative's emphasis on scalability, adaptability, and sustainability is evident in its plans to expand to additional families, identify new funding sources, and provide free or low-cost internet access.[109]

Several countries and regions have implemented best practices for digital inclusion to bridge the digital divide and promote access to digital technologies for vulnerable and minority groups.

[106] Australian Digital Inclusion Alliance, 'A National Digital Inclusion Roadmap,' https://www.digitalinclusion.org.au/wp-content/uploads/2020/10/ADIA-A-National-Digital-Inclusion-Roadmap.pdf accessed 7 February 2024.
[107] U.S. Department of Housing and Urban Development, 'ConnectHome Initiative', https://www.huduser.gov/portal/sites/default/files/pdf/ConnectHome-Initiative.pdf accessed 7 February 2024.
[108] ibid
[109] FACT SHEET: ConnectHome: Coming Together to Ensure Digital Opportunity for All Americans https://obamawhitehouse.archives.gov/sites/default/files/docs/wh_connect_home_fact_sheet.pdf accessed 7 February 2024.

9.0 Key Recommendations for Kenya

Based on best practices from other global jurisdictions that have addressed data deserts and the exclusion of vulnerable and minority groups from the data ecosystem, several recommendations can be made to improve the situation. These recommendations aim to bridge the digital divide and create a more inclusive digital environment for all communities. Here are some key recommendations:

9.1 Invest in Broadband Infrastructure

Governments and private stakeholders should invest in building and expanding broadband infrastructure to underserved areas. This will improve internet connectivity and reduce data deserts, allowing vulnerable and minority groups to access digital technologies and online services.

9.2 Affordable Internet Access

Ensure that internet access is affordable for all communities, especially vulnerable and low-income groups. This can be achieved through subsidies, reduced tariffs, or community-based internet access initiatives.

9.3 Digital Literacy Programs

To implement comprehensive digital literacy programs in Kenya, collaboration between various entities is essential. Partnering with local NGOs, community centres, and government agencies like the Ministry of Information, Communications, and Technology and the Digital Economy can ensure effective outreach to vulnerable and minority groups. These programs should offer tailored curriculum covering basic digital skills, internet safety, and resource access.

Training workshops, conducted by qualified instructors in accessible community locations, should provide hands-on learning experiences for participants. Ongoing support and resources should be available to reinforce learning and address challenges. Monitoring and evaluation are crucial for program effectiveness, with feedback informing necessary adjustments.

Furthermore, private sector entities and international organisations can contribute through funding and support, augmenting the program's reach and impact. Collaboration among stakeholders is vital for successful implementation and sustainable outcomes in advancing digital literacy across Kenya's diverse communities.

9.4 Local Content Creation

Encourage and support the creation of local digital content in multiple languages that reflect the cultural diversity of communities. This will increase the relevance and accessibility of online information for marginalised groups.

9.5 Public-Private Partnerships

Foster collaborations between governments, private companies, NGOs, and community organisations to address the digital divide. Public-private partnerships can lead to more effective and sustainable solutions.

9.6 Inclusive Design and Digital Policies

Inclusive digital policies are those that specifically address the needs and challenges faced by vulnerable and minority groups, promoting their participation in the digital economy and society.[110] Governments, in collaboration with private entities and NGOs, should prioritise investing in broadband infrastructure to expand reliable internet access. To make connectivity a reality for marginalised communities, affordable internet access schemes and community-based initiatives should be established. Tailored digital literacy programs are vital, empowering vulnerable groups with skills to navigate the digital world effectively and safely. Inclusive design principles should guide the creation of digital platforms, ensuring accessibility for all users, including those with disabilities. Additionally, crafting local content in diverse languages serves to reflect cultural richness and relevance, thereby enhancing the accessibility of digital resources.

[110]Friederici, N., Ojanpera, S. and Graham, M., 2017. The impact of connectivity in Africa: Grand visions and the mirage of inclusive digital development. The Electronic Journal of Information Systems in Developing Countries, 79(1), pp.1-20.

9.7 Community Engagement

Involve community leaders and representatives from vulnerable and minority groups in the decision-making process regarding digital initiatives. This ensures that projects are relevant and tailored to the specific needs of each community.

9.8 Data Collection and Research

Conduct data collection and research to understand the specific challenges faced by different marginalised groups. This data can inform evidence-based policies and interventions.

9.9 Mobile and Offline Solutions

Utilise mobile-based technologies and offline solutions to reach communities with limited internet access. Mobile applications, SMS services, and offline content can be valuable tools to bridge the gap.

9.10 Incentives for Digital Inclusion

Offer incentives to companies and organisations that actively work to include vulnerable and minority groups in the data ecosystem. Recognizing and rewarding efforts

towards inclusion can drive positive change.

9.11 Digital Rights and Privacy Protection

Ensure that digital rights and privacy of vulnerable and minority groups are protected. Implement policies and regulations that safeguard their data and prevent digital exploitation.

9.12 Monitoring and Evaluation

Continuously monitor the impact of digital inclusion initiatives and evaluate their effectiveness. Regular assessments will help identify areas for improvement and guide future strategies.

By implementing these recommendations, countries can make significant strides towards reducing data deserts and creating a more equitable and inclusive data ecosystem that benefits all communities, including vulnerable and minority groups. It requires a multi-stakeholder approach, commitment, and sustained effort to bridge the digital divide effectively.

10.0 Conclusion

In conclusion, the intricate web of data deserts, digital disparities, and the consequential exclusion of vulnerable and minority groups underscores the urgent need for comprehensive and targeted interventions across Kenya. The multifaceted impact of data deserts and the digital divide on education, economic empowerment, healthcare, social integration, and civic participation cannot be underestimated.

To address these challenges, it is imperative to draw inspiration from successful initiatives around the world. Models such as India's Digital India, Singapore's IMDA initiatives, and Australia's National Digital Inclusion Roadmap offer valuable lessons in fostering digital inclusion through infrastructure development, digital literacy, and community engagement. Therefore, a comprehensive approach is recommended. This entails not only investing in broadband infrastructure and affordable access but also prioritising digital literacy programs tailored to the needs of marginalised groups. Collaboration through public-private partnerships and involving local communities in decision-making processes will enhance the relevance and effectiveness of initiatives. Moreover, the creation of local content in diverse languages and adherence to inclusive design principles will ensure that digital resources are accessible and relevant to all members of society.

Monitoring and evaluation are paramount in measuring the impact of these interventions, allowing for necessary adjustments and refinements. Protecting digital rights and privacy is equally crucial in safeguarding vulnerable communities from potential exploitation. As we move forward, governments, private entities, NGOs, and communities must unite in a shared commitment to bridge the digital divide, eliminate data deserts, and ensure that the transformative power of digital technologies is accessible to every individual, regardless of their background or circumstances. This endeavour is not just a technological one; it's a moral imperative that upholds the principles of equality, empowerment, and progress for all. By embracing these principles and acting collectively, we can build a more inclusive, connected, and promising future for Kenya and beyond.

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