A Systematic Literature Review of E-Government Implementation in Developing Countries: Examining Urban-Rural Disparities, Institutional Capacity, and Socio-Cultural Factors in the Context of Local Governance and Progress towards SDG 16.6

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ABSTRACT

This systematic literature review examines the implementation of e-government initiatives in developing countries, focusing on their impact on public service delivery and progress towards Sustainable Development Goal 16.6. Through a comprehensive analysis of peer-reviewed articles, policy documents, and case studies, the research explores the interplay between institutional capacity, socio-cultural factors, and the digital divide in shaping e-government outcomes across urban and rural contexts in countries including Ghana, South Africa, Kenya, India, Nigeria, Brazil, and Indonesia. Following a rigorous search strategy and inclusion criteria, the review synthesizes findings from multiple sources, highlighting significant advancements in e-government adoption, particularly in urban areas, while identifying persistent challenges in rural regions due to inadequate infrastructure, limited digital literacy, and resource constraints. The systematic review of literature underscores the potential of e-government to enhance transparency, reduce corruption, and improve service delivery, as exemplified through successful initiatives in countries like Rwanda and Estonia. However, the synthesized evidence also reveals uneven progress, exacerbated through the urban-rural digital divide and varying institutional capacities. Systematically analyzing and integrating existing research, this review concludes with evidence-based recommendations for bridging these gaps, emphasizing the need for targeted infrastructure development, digital literacy programs, inclusive design approaches, and context-specific solutions to ensure equitable access to e-government services and accelerate progress towards effective, accountable, and transparent institutions at all levels.

Key Words: E-governance, Urban-rural digital divide, ICT infrastructure, Digital literacy, Digital inclusion, Institutional Capacity, Socio-Cultural Factors, Sustainable Development Goal 16.6

INTRODUCTION

E-government is the process of using ICT to provide services to businesses (G2B), citizens (G2C), employees (G2E), and other government agencies (G2G) (Thakur and Singh (2012). E-government initiatives have emerged as a transformative force in public administration, particularly in developing countries where traditional governance structures often grapple with inefficiencies and lack of transparency (Twizeyimana & Andersson, 2019). These digital solutions, leveraging Information and Communication Technologies (ICTs), promise to revolutionize public service delivery through streamlined administrative processes, enhanced accessibility, and fostered citizen engagement (Mahlangu & Ruhode, 2021). In the context of local governments, which serve as the primary interface between citizens and the state, e-government initiatives hold significant potential to improve the quality and reach of essential services (Mensah, Zeng, & Mwakapesa, 2022).

The adoption of e-government in developing countries is driven through multiple factors, including the need to overcome bureaucratic inefficiencies, reduce corruption, and bridge the gap between government and citizens

(Al-Awadhi & Morris, 2012). Digitizing services and creating online platforms enable local authorities to provide easier access to a wide range of public services, from healthcare and education to utility management and civic participation (Enaifoghe & Ndebele, 2023). This digital transformation not only promises to enhance service delivery but also to promote transparency, accountability, and citizen empowerment in local governance (Mensah et al., 2018).

However, the implementation of e-government initiatives in developing countries faces numerous challenges. Limited technological infrastructure, low digital literacy rates among citizens, concerns over data security and privacy, and resistance from traditional bureaucratic structures all pose significant obstacles (Alcaide et al., 2023). Moreover, the digital divide within these countries raises questions about the equitable access to e-government services, particularly for marginalized and rural populations (Adeyemo 2011). These challenges necessitate a careful examination of the actual impact and effectiveness of e-government initiatives in improving public service delivery at the local level.

As developing countries strive to meet the United Nations' Sustainable Development Goals (SDGs), particularly SDG 16.6 which aims to "develop effective, accountable and transparent institutions at all levels," the implementation of e-government solutions at the local level has gained significant traction (United Nations, 2015). The success of these initiatives is not uniform across different contexts, particularly when comparing urban and rural settings within developing nations (Alcaide-Muñoz et al., 2017). The focus on local governance is particularly crucial, as it is often at this level that citizens have the most direct interactions with government services (Tolbert & Mossberger, 2006).

This study aims to conduct a comprehensive comparative analysis of e-government initiatives aimed at improving transparency, accountability, and efficiency in local public service delivery across urban and rural contexts in developing countries. Through examining the interplay between these initiatives and the varying institutional capacities and socio-cultural factors present in different settings, this research seeks to uncover the complex dynamics that influence the effectiveness of e-government implementations. The analysis will delve into key aspects, including the types of e-government initiatives implemented in urban versus rural settings, the role of institutional capacity, the influence of socio-cultural factors, the specific challenges and opportunities in different contexts, and the progress made towards achieving SDG 16.6.

This comprehensive analysis aims to contribute valuable insights to the growing body of knowledge on e-government implementation in developing countries. These findings will not only help in understanding the current state of e-government initiatives at the local level but also provide actionable recommendations for policymakers, practitioners, and researchers working towards enhancing transparency, accountability, and overall governance quality in diverse contexts. As developing nations continue to grapple with the challenges of modernizing their public administration systems while striving to meet global development goals, this research stands to offer crucial guidance on leveraging e-government solutions effectively, taking into account the unique characteristics of urban and rural settings.

Concept of E- Government

The concept of e-government has evolved over time, resulting in a diverse array of terms that reflect various aspects and emphases of digital governance. These terms range from the straightforward "Electronic Government" and "Digital Government" to more specific concepts like "Mobile Government" and "Open Government." Some terms, such as "Connected Government" and "Networked Government," highlight the interconnected nature of modern governance, while others like "Transformational Government" and "Smart Government" emphasize the potential for innovation and efficiency. "E-Democracy" and "Government 2.0" focus on citizen participation and engagement, while "Paperless Government" and "Web-based Public Administration" underscore the shift towards digital processes. Terms like "Digital Era Governance" and "Information Age Government" place the concept within broader technological and societal contexts. Each term offers a slightly different perspective on the use of technology in governance, reflecting the complex nature of e-government initiatives and their impact on public administration, service delivery, and citizen interaction. The choice of these terms can depend on the specific context, the technologies involved, or the particular focus of the initiative (e.g., service delivery, citizen participation, or internal efficiency). The

dynamic nature of technological advancements and governance methodologies necessitates ongoing refinement of terminology to accurately capture emergent paradigms in digital governance (Erkut, 2020). This continuous evolution in nomenclature reflects the field's responsiveness to innovative approaches and changing societal needs.

The proliferation of terms related to e-government underscores the multidimensional nature of this concept and its broad impact on public administration. However, to fully grasp the essence of e-government, it is crucial to examine various definitions proposed by scholars, international organizations, and practitioners in the field. These definitions, while often overlapping, tend to emphasize different aspects of e-government, reflecting the evolving understanding of its role and potential in modern governance.

United Nations (2003) defines e-government as the use of information and communication technologies (ICTs) to improve the efficiency, effectiveness, transparency, and accountability of government.

Organization for Economic Co-operation and Development (OECD) (2003) views e-government as the use of information and communication technologies, and particularly the Internet, as a tool to achieve better government.

World Bank (2005) describes e-government as the use of information technologies (such as Wide Area Networks, the Internet, and mobile computing) to improve the efficiency, transparency, and accountability of government operations and services and to transform relations with citizens, businesses, and other arms of government

European Union (2006) sees e-government as the use of information and communication technologies to improve the quality and accessibility of government services, and to increase transparency and accountability.

Asian Development Bank (ADB) (2007) defines e-government as the use of information and communication technologies to improve the efficiency, effectiveness, transparency, and accountability of government operations and services.

United Nations (2006) defines e-government as the employment of the internet and the world-wide-web for delivering government information and services to the citizens.

European Commission (2003) describes e-government as the use of information and communication technologies in public administrations combined with organizational change and new skills in order to improve public services and democratic processes and to strengthen support to public policies.

Fountain (2004) says digital government is a government that is organized increasingly in terms of virtual agencies, cross-agency and public-private networks whose structure and capacity depends on the internet and web.

Layne and Lee (2001) aver that e-government means different things for different people. Some simply think of it as moving existing government services online. Others think of it as digital democracy, where services are delivered and democracy is advanced using any electronic means.

Moon (2002) defines e-government as the use of information technology, especially telecommunications, to enable and improve the efficiency with which government services are provided to citizens, employees, businesses, and agencies."

West (2004) refers e-government as the delivery of government information and services online through the Internet or other digital means.

Yildiz (2007) defines e-government as the use of information and communication technologies to improve the activities of public sector organizations.

Dawes (2008) says that e-government encompasses a wide range of strategic intent, enacted policies, organizational forms, and technologies.

Cordella and Iannacci (2010) say e-government is the use of information and communication technologies in public administrations to improve public services and democratic processes.

Gil-Garcia and Pardo (2005): e-government is the selection, design, implementation, and use of information and communication technologies in government to provide public services, improve managerial effectiveness, and promote democratic values and mechanisms.

Bekkers and Homburg (2007) contend that e-government is the use of modern information and communication technologies, especially internet and web technology, by public organizations to support or redefine the existing and/or future relations with 'stakeholders' in the internal and external environment in order to create added value.

Heeks (2006) argues that e-government is the use of information and communication technologies to improve the activities of public sector organizations.

OECD (2003) defines e-government as using information and communication technologies to achieve better government.

Gartner Group (2000) views e-government as continuously optimizing service delivery, constituency participation, and governance by transforming internal and external relationships through technology and new media.

Fang (2002) describes e-government as a way for governments to use innovative information and communication technologies to provide citizens and businesses with convenient access to government information and services.

Grönlund and Horan (2005) see e-government as using information technology to enable and improve the efficiency of government services for citizens, employees, businesses, and agencies.

Norris (2010) defines e-government as delivering government services and information electronically 24 hours a day, seven days a week.

Silcock (2001) views e-government as using technology to enhance access to and delivery of government services to benefit citizens, business partners, and employees.

Palvia and Sharma (2007) describe e-government as web-based services from local, state, and federal government agencies.

Jaeger (2003) defines e-government as using information technology to support government operations, engage citizens, and provide government services.

Seifert and Petersen (2002) see e-government as using information technology to support public policies and government operations, engage citizens, and provide comprehensive services.

Curtin et al. (2003) describe e-government as using information and communication technology to enhance operations, public information, services, citizen engagement, and governance.

Bélanger and Carter (2008) define e-government as using information technology to improve the efficiency of government services for citizens, employees, businesses, and agencies.

Chen et al. (2006) describe e-government as a government's use of information technology to enhance access to and delivery of information and services to citizens, business partners, employees, agencies, and government entities.

An analysis of the various definitions of e-government reveals a convergence of ideas and themes, despite the differences in wording and emphasis. Upon closer examination, it becomes apparent that these definitions share a common thread, highlighting the transformative potential of technology in enhancing government operations, service delivery, and citizen engagement. This study identifies and explores the commonalities that emerge from these definitions, including the use of technology, improvement of government services, emphasis on stakeholders, enhancement of efficiency and effectiveness, increased accessibility, promotion of transparency and accountability, transformation of government operations, and potential to improve democratic processes.

Therefore, e-government refers to the strategic utilization of information and communication technologies to transform government operations, services, and interactions, with the goal of enhancing efficiency, effectiveness, transparency, and accountability, while promoting citizen engagement, participation, and access to information and services, ultimately leading to improved democratic processes and better governance.

On the other hand, e-government initiatives refer to specific projects, programs, or actions undertaken by government agencies to leverage information and communication technologies. The primary aim of these initiatives is to transform government operations, services, and interactions, and achieve the goals of enhanced efficiency, effectiveness, transparency, accountability, citizen engagement, participation, and access to information and services.

In essence, e-government initiatives are concrete efforts or undertakings by governments to implement e-government principles and achieve its objectives. These initiatives are designed to harness the potential of technology to improve governance, citizen engagement, and service delivery, ultimately leading to better outcomes for citizens and society. Examples of e-government initiatives include developing online portals for citizen engagement and service delivery, implementing digital payment systems for government services, and creating mobile apps for citizen participation and feedback. Additionally, conducting digital literacy training for government employees, establishing online platforms for transparent budgeting and financial reporting, and developing data analytics tools for informed decision-making are also important initiatives (Sandoval-Almazán, et al., 2017).

History of E- Government

The history of e-government represents a significant evolution in public administration, marked by the progressive integration of information and communication technologies (ICTs) into government operations and service delivery. This evolution can be traced through several key phases, each building upon the previous and driven by technological advancements and changing societal needs.

The roots of e-governance can be traced back to the 1960s and 1970s when governments began using mainframe computers for data processing and record-keeping. This period saw the initial computerization of government departments, primarily focusing on internal efficiency (Grönlund & Horan, 2005). The 1980s witnessed the spread of personal computers in government offices, marking the beginning of office automation. Word processing and spreadsheet applications became common tools in government administration, enhancing productivity and information management (Heeks, 2005). This early phase saw the implementation of computer systems for tasks such as office automation, decision-making support, and service process improvements.

The advent of the World Wide Web in the early 1990s revolutionized the concept of e-governance. Governments started creating websites to provide public information, marking the first real step towards citizen-centric e-governance (Moon, 2002). However, the term "e-Government" itself emerged in the late 1990s, coinciding with the Internet boom. This new era marked a shift in focus from purely internal IT use to external-facing applications, particularly services provided to citizens. The introduction of interactive online services in the late 1990s and early 2000s allowed citizens to perform basic transactions online, such as renewing licenses or paying taxes, giving rise to the concept of "24/7 government" (West, 2004).

E-government initially developed as a practitioner-driven field, with government officials and public administrators at the forefront of implementing new technologies to address emerging challenges. A prime example of this practitioner-led approach was the National Performance Review in the United States, spearheaded by then-Vice President Al Gore. This initiative placed a strong emphasis on leveraging e-government to improve federal services, indicating high-level political support for digital transformation in governance (Gore, 1993; Salem, 2003).

The 2000s saw a shift towards using ICTs to enhance democratic processes. E-voting experiments, online public consultations, and digital platforms for citizen engagement became more prevalent, marking the era of e-democracy initiatives (Macintosh, 2004). This was followed by a move towards more integrated service delivery models in the 2010s. The open government movement gained momentum, emphasizing transparency, participation, and collaboration. Data-driven governance and big data analytics began to play a crucial role in policy-making and service delivery (Bertot et al., 2010).

As the field of e-government grew, it began to attract academic interest, leading to the emergence of specialized conferences and journals. This development marked the transition of e-government from a purely practical field to one with growing scientific content. Researchers began to examine not only the technological aspects of e-government but also its implications for organizational change, the role of government, and societal impact.

The proliferation of smartphones led to the development of mobile governance (m-governance) strategies, marking the era of mobile and smart governance. Concepts like smart cities and Internet of Things (IoT) in governance started emerging. Artificial Intelligence and blockchain technologies are being explored for enhancing government services and operations (Linders et al., 2018).

Most recently, the COVID-19 pandemic has accelerated digital transformation in governance. Remote work, virtual public services, and digital health initiatives became critical, pushing governments worldwide to rapidly adopt and expand their e-governance capabilities (Agostino et al., 2021). This pandemic-driven digital transformation has highlighted both the potential and the challenges of e-governance in crisis situations.

E-Government Initiatives and their Impact in Local Governments in Developing Countries

Case of Ghana

E-Government initiatives at the local government level in Ghana have gained significant traction in recent years, as part of the country's broader digital transformation agenda. The Local Government Service (LGS) has been at the forefront of driving these initiatives, aiming to enhance service delivery, improve transparency, and increase citizen participation in local governance (Ojo, 2014b). One of the key projects in this domain is the District Assembly Common Fund Management System (DACF-MS), which has been implemented to streamline the management and disbursement of funds to local assemblies (Abdul-Salam et al., 2019).

The introduction of the Ghana District Development Facility (DDF) has played a crucial role in incentivizing local governments to adopt e-government solutions. This performance-based grant system encourages District Assemblies to improve their administrative and financial management practices through the use of ICT tools (De Herdt, & de Sardan, 2018). As a result, many local governments have implemented computerized accounting systems and digital asset registers, enhancing their financial transparency and accountability.

In an effort to bridge the digital divide and bring e-government services closer to citizens, the Community Information Centers (CICs) initiative has been rolled out across various districts. These centers serve as hubs for accessing online government services, digital literacy training, and information dissemination, particularly benefiting rural communities with limited internet access (Senyo, Addae & Boateng, 2018). The CICs have become instrumental in promoting e-participation at the local level, allowing citizens to engage with their local governments more effectively.

The implementation of Geographic Information Systems (GIS) in local governments has revolutionized urban planning and revenue generation efforts. Several municipal and metropolitan assemblies have adopted GIS technology for property mapping and valuation, leading to improved property tax collection and more informed decision-making in urban development projects (Agyemang & Morrison, 2018). This technological advancement has significantly enhanced the financial sustainability of local governments.

E-procurement systems have been introduced in some local governments to enhance transparency and efficiency in public procurement processes. The Ghana Electronic Procurement System (GHANEPS) is being rolled out at the local level, allowing for online tendering and contract management (Public Procurement Authority, 2020). This system aims to reduce corruption, increase competition, and provide equal opportunities for local businesses to participate in government contracts.

The implementation of e-government initiatives at the local level in Ghana, while progressing, continues to encounter multifaceted challenges that impede the full realization of its potential benefits. These obstacles encompass inadequate Information and Communication Technology (ICT) infrastructure, limited digital literacy among both municipal staff and citizens, and organizational resistance to change (Mensah & Adams, 2020). Moreover, the intermittent electricity supply, particularly in rural areas, presents a significant impediment to the sustainable operation and efficacy of e-government systems. Notwithstanding these challenges, the trajectory of e-government in Ghana's local governments, exhibits promise, underpinned by concerted efforts to address these limitations. The government's steadfast commitment to digital transformation, augmented by support from international development partners, is anticipated to catalyze further advancements in local e-government initiatives (Ministry of Local Government and Rural Development, 2021). As these endeavors progress, it is projected that e-government will assume an increasingly pivotal role in enhancing local governance mechanisms, optimizing service delivery, and fostering citizen engagement across Ghana's diverse districts and municipalities. This evolution underscores the potential for e-government to serve as a transformative force in local public administration, contingent upon the successful navigation of existing challenges and the strategic leveraging of available resources and support.

Case of South Africa

South Africa has consistently ranked high in e-governance assessments across Africa. The United Nations E-Government Survey, which is conducted biennially, has frequently placed South Africa at the top among African nations. The country's advanced technological infrastructure, comprehensive e-government strategy, and wide range of online services contribute to its leading position (United Nations, 2020). E-Government initiatives at the local government level in South Africa have been steadily progressing as part of the country's broader digital transformation strategy. The Department of Cooperative Governance and Traditional Affairs (COGTA) has been instrumental in driving these initiatives, aiming to enhance service delivery, improve transparency, and increase citizen participation in local governance (COGTA, 2019). One of the key projects in this domain is the Municipal Financial Management Act (MFMA) Portal, which has been implemented to

streamline financial reporting and enhance transparency in local government finances (National Treasury, 2021).

The introduction of the Integrated Urban Development Framework (IUDF) has played a crucial role in promoting the adoption of smart city technologies at the local government level. This framework encourages municipalities to leverage ICT solutions to improve urban management and service delivery (Department of Cooperative Governance, 2016). As a result, several metropolitan municipalities have implemented smart city initiatives, including the installation of smart meters for utilities, intelligent traffic management systems, and digital platforms for citizen engagement.

In an effort to bridge the digital divide and improve access to e-government services, the Thusong Service Centre program has been expanded across various municipalities. These centers serve as one-stop shops for government services, providing citizens with access to digital services and information, particularly benefiting communities with limited internet access (Government Communication and Information System, 2018). The Thusong centers have become vital in promoting digital literacy and e-participation at the local level.

The implementation of Geographic Information Systems (GIS) in local governments has revolutionized urban planning and service delivery. Many municipalities have adopted GIS technology for spatial planning, asset management, and disaster risk management (South African Cities Network, 2020). This technological advancement has significantly enhanced the capacity of local governments to make data-driven decisions and improve service delivery efficiency.

E-procurement systems have been introduced in several municipalities to enhance transparency and efficiency in public procurement processes. The Central Supplier Database (CSD) and the e-Tender Publication Portal are being utilized at the local level, allowing for online registration of suppliers and publication of tenders (National Treasury, 2020). These systems aim to reduce corruption, increase competition, and provide equal opportunities for local businesses to participate in municipal contracts.

Despite the notable advancements in e-government initiatives at the local level in South Africa, significant challenges continue to impede the full realization of their potential benefits. The implementation of these initiatives is hampered by a constellation of factors, including disparate ICT infrastructure development, pronounced digital skills deficits among municipal personnel and citizens alike, and pervasive resource constraints (Kaisara, G., & Pather 2017). Moreover, the persistent digital divide between urban and rural municipalities presents a formidable obstacle to the equitable deployment and utilization of e-government services across the nation.

Notwithstanding these challenges, the trajectory of e-government in South Africa's local governments appears promising, with concerted efforts underway to address the aforementioned impediments. The government's unwavering commitment to digital transformation, as delineated in the National e-Government Strategy and Roadmap, is anticipated to catalyze further enhancements in local e-government initiatives (Department of Telecommunications and Postal Services, 2017). This strategic framework provides a comprehensive blueprint for the systematic integration of digital technologies into local governance structures, with the overarching aim of augmenting service delivery efficacy and fostering increased citizen engagement.

As these initiatives continue to evolve and mature, it is prognosticated that e-government will assume an increasingly pivotal role in the enhancement of local governance paradigms, the optimization of service delivery mechanisms, and the facilitation of more robust citizen participation across South Africa's diverse municipal landscape. The potential for e-government to serve as a transformative force in local administration is substantial, offering the prospect of more responsive, transparent, and efficient governance structures that are better equipped to address the multifaceted needs of South Africa's heterogeneous populace.

Case of Kenya

The proliferation of e-Government initiatives at the subnational level in Kenya has witnessed substantial advancement, aligning congruently with the nation's Vision 2030 and its overarching digital transformation

agenda. The Ministry of Information, Communications and Technology, operating through the ICT Authority, has assumed a pivotal role in propelling these initiatives, with the objective of enhancing service delivery, augmenting transparency, and fostering increased citizen participation in local governance structures (ICT Authority, 2020). A salient exemplar in this domain is the implementation of the County Integrated Financial Management Information System (CIFMIS), designed to streamline fiscal management processes and elevate transparency within county governments (National Treasury, 2019).

The introduction of the County Government Digital Transformation Strategy has served as a catalyst in accelerating the adoption of e-government solutions at the local level. This strategic framework provides a comprehensive blueprint for counties to leverage Information and Communication Technologies (ICTs) in ameliorating service delivery, decision-making processes, and citizen engagement (Council of Governors, 2018). Consequently, numerous counties have implemented digital platforms for revenue collection, service request management, and public participation, thereby enhancing their operational efficiency and responsiveness to citizen needs.

In an effort to bridge the digital divide and ameliorate access to e-government services, the Huduma Kenya program has undergone significant expansion, incorporating Huduma Centers across various counties. These centers function as integrated service points for government services, providing citizens with access to digital services and information, particularly benefiting rural communities with limited internet connectivity (Ministry of Public Service, Youth and Gender Affairs, 2021). The Huduma Centers have emerged as instrumental in promoting digital literacy and e-participation at the local governance level.

The implementation of Geographic Information Systems (GIS) in county governments has engendered a paradigm shift in urban planning and service delivery methodologies. Several counties have adopted GIS technology for spatial planning, land management, and revenue enhancement through improved property mapping and valuation (World Bank, 2020). This technological advancement has significantly augmented the capacity of local governments to engage in data-driven decision-making and enhance service delivery efficiency.

E-procurement systems have been introduced within county governments to enhance transparency and efficiency in public procurement processes. The Integrated Financial Management Information System (IFMIS) e-Procurement module is being utilized at the county level, facilitating online tendering and contract management (National Treasury, 2018). This system aims to mitigate corruption, foster increased competition, and provide equitable opportunities for local businesses to participate in county government contracts, thereby promoting economic development and good governance at the subnational level.

Despite the significant strides made in e-government implementation at the subnational level in Kenya, a plethora of challenges continue to impede the full realization of its potential benefits. These impediments encompass inadequate Information and Communication Technology (ICT) infrastructure, limited digital literacy among both administrative personnel and citizens, and resource constraints that hinder comprehensive adoption and utilization of e-government systems (Maina, & Otieno, 2017). Moreover, the persistent digital divide between urban and rural counties presents a formidable obstacle to the equitable implementation and accessibility of e-government services across diverse geographical contexts. This disparity not only undermines the principle of inclusive governance but also exacerbates existing socio-economic inequalities, potentially marginalizing rural populations from the advantages of digital public services.

The trajectory of e-government in Kenya's local governance structures, however, exhibits promise, underpinned by concerted efforts to address these multifaceted challenges. The government's resolute commitment to digital transformation, as delineated in the Digital Economy Blueprint, is anticipated to serve as a catalyst for further advancements in local e-government initiatives (Ministry of ICT, Innovation and Youth Affairs, 2019). This strategic framework provides a comprehensive roadmap for leveraging digital technologies to enhance public service delivery, foster economic growth, and promote citizen engagement at the county level. As these endeavors progress, it is projected that e-government will assume an increasingly pivotal role in augmenting local governance mechanisms, optimizing service delivery modalities, and fostering more robust citizen participation across Kenya's counties. The evolution of e-government at the local level thus

represents a critical juncture in Kenya's broader digital transformation journey, with the potential to significantly reshape the landscape of public administration and citizen-government interactions in the digital age.

Case of Rwanda

Rwanda has indeed garnered international recognition for its rapid digital transformation, earning the moniker "Africa's Silicon Valley" due to its ambitious technological initiatives and progressive ICT policies. The country's commitment to leveraging technology for socio-economic development is exemplified by projects such as the National Fiber Optic Backbone, which has significantly improved internet connectivity across the nation, and the One Laptop per Child program, aimed at enhancing digital literacy from an early age (Nsengimana et al., 2021). The establishment of the Kigali Innovation City, a tech hub designed to foster innovation and attract international technology companies, further underscores Rwanda's dedication to becoming a knowledge-based economy. Moreover, the government's proactive approach to embracing emerging technologies, such as the use of drones for medical deliveries in rural areas and the implementation of a national digital ID system, has positioned Rwanda as a leader in digital innovation on the African continent (Chakravorti & Chaturvedi, 2019).

This comprehensive digital strategy has not only improved public service delivery and governance but has also attracted significant foreign investment in the tech sector, contributing to Rwanda's rapid economic growth and transformation. As such, e-Government initiatives in Rwanda's local governments have emerged as a cornerstone of the country's broader digital transformation strategy, known as the Smart Rwanda Master Plan (SRMP). This comprehensive approach aims to leverage Information and Communication Technologies (ICTs) to enhance public service delivery, improve governance, and foster economic development at both national and local levels (Ministry of ICT and Innovation, 2018). The implementation of e-government solutions in Rwanda's local administrative units, particularly in districts and sectors, has been guided by the overarching vision of creating a knowledge-based economy and achieving middle-income country status by 2035.

One of the flagship programs driving e-government adoption at the local level is the Rwanda Online Platform, which provides a single portal for citizens to access various government services electronically. This initiative has significantly streamlined service delivery processes in local governments, reducing bureaucracy and improving efficiency (Twizeyimana & Andersson, 2019). The platform enables citizens to access services such as birth registration, land title transfers, and business registration online, thereby reducing the need for physical visits to government offices and minimizing opportunities for corruption.

The implementation of the Integrated Financial Management Information System (IFMIS) across all districts has been a crucial step in enhancing financial transparency and accountability in local governments. This system has improved budgeting processes, expenditure tracking, and financial reporting at the district level, contributing to more efficient resource allocation and management (World Bank, 2019). The IFMIS has also facilitated better coordination between local and central government financial systems, enabling more effective fiscal decentralization.

To address the challenge of digital literacy and access, particularly in rural areas, the government has initiated the Digital Ambassadors Program (DAP). This program aims to train young volunteers to provide digital skills training to citizens at the local level, thereby increasing digital literacy and promoting the uptake of e-government services (Rwanda Information Society Authority, 2020). The DAP has been instrumental in bridging the digital divide and ensuring that the benefits of e-government reach all segments of the population, including those in remote areas.

Just like other countries mentioned in this study, the introduction of Geographic Information Systems (GIS) in local governments has revolutionized urban planning and service delivery in Rwanda. Several districts have adopted GIS technology for spatial planning, land management, and revenue enhancement through improved property mapping and valuation (Nkwunonwo, 2020). This technological advancement has significantly enhanced the capacity of local governments to make data-driven decisions and improve service delivery efficiency, particularly in areas such as waste management and infrastructure development.

Institutional Capacity and E-Government Implementation in Developing Countries in the Context of Local Governments

Institutional capacity and socio-cultural factors are critical determinants in the implementation of e-government initiatives, particularly at the subnational level in developing nations. These elements can either catalyze or impede the efficacious adoption and utilization of digital technologies in public service delivery. The interplay between institutional frameworks and socio-cultural contexts significantly influences the trajectory and outcomes of e-government programs in these regions.

Institutional capacity, in this context, encompasses the organizational, technical, and human resource capabilities of governmental entities to conceptualize, implement, and sustain e-government initiatives. It is characterized by the presence of robust governance structures, adequate technological infrastructure, financial resources, and a skilled workforce. In many developing countries, local governments often grapple with deficiencies in these areas, which can substantially hinder the realization of e-government objectives. For instance, a study in Indonesia by Nurdin et al. (2012) found that local governments struggled with inadequate IT infrastructure, limited budgets, and a shortage of skilled personnel, which significantly impeded e-government implementation at the municipal level.

The paucity of institutional capacity manifests in various forms across different jurisdictions. For instance, inadequate technological infrastructure and limited financial allocations for ICT projects are pervasive challenges. Moreover, the dearth of personnel with requisite digital competencies and the absence of comprehensive policy frameworks further exacerbate the difficulties in e-government implementation at the local level (Kumar & Best, 2006). In India, for example, Kumar and Best (2006) examined the failure of the Sustainable Access in Rural India (SARI) project in Tamil Nadu. They identified several institutional factors contributing to the project's collapse, including the lack of sustained leadership, insufficient training for government staff, and the absence of clear policies for maintaining and upgrading the e-government systems. Similarly, in Nigeria, the implementation of e-government initiatives at the local level has been hampered by significant institutional capacity challenges. Abasilim et al. (2020) conducted a study on e-government adoption in Nigerian local governments and found that inadequate ICT infrastructure, limited funding, lack of skilled personnel, and inconsistent policy implementation were major impediments to successful e-government deployment. Their research revealed that many local governments lacked dedicated IT departments, had limited internet connectivity, and suffered from frequent power outages, all of which significantly hindered the ability to deliver sustainable e-government services.

Conversely, nations that have invested substantially in augmenting their institutional capacity have demonstrated more favorable outcomes in their e-government endeavors. South Korea's establishment of dedicated e-government agencies and comprehensive legal structures exemplifies how robust institutional frameworks can propel e-government success (Kim, 2019). In the African context, Morocco provides a notable illustration of this approach. The North African kingdom has made significant strides in e-government implementation through strategic institutional capacity building. Morocco established the Digital Development Agency (ADD) in 2017, a dedicated entity responsible for implementing the country's digital strategy and coordinating e-government initiatives across various sectors. This institutional framework is complemented by comprehensive legal reforms, including laws on digital trust and personal data protection, which have created a conducive environment for e-government adoption. Morocco's Digital Morocco 2020 strategy, coupled with these institutional enhancements, has led to substantial improvements in e-government services, as evidenced by its rising scores in the UN E-Government Development Index (United Nations, 2020).

Many developing countries are implementing different strategies in order to address the challenges posed by limited institutional capacity and complex socio-cultural landscapes. These approaches often encompass investments in digital literacy programs, ICT infrastructure development, and the formulation of culturally sensitive e-government services. Rwanda's comprehensive approach to digital transformation, which includes significant investments in ICT education and infrastructure, exemplifies such strategic initiatives (Twizeyimana & Andersson, 2019). Similarly, India's Digital India program offers another illustrative example, combining large-scale infrastructure projects like the National Optical Fiber Network with initiatives to promote digital literacy and e-governance services tailored to diverse linguistic and cultural contexts. This

program aims to bridge the digital divide and enhance institutional capacity through a multi-pronged approach that includes digital identity systems, mobile connectivity, and public internet access points (Bhatia & Bhabha, 2021).

Socio-Cultural Factors and E-Government Implementation in Developing Countries in the Context of Local Governments

Socio-cultural factors, encompassing digital literacy, linguistic diversity, cultural attitudes towards technology, and trust in governmental institutions, also exert significant influence on the adoption and utilization of e-government services. These factors are particularly salient at the local government level, where direct interaction between citizens and public services is most pronounced.

Digital literacy rates, which often exhibit marked disparities between urban and rural populations, can significantly impact the uptake of e-government services. Research conducted in rural China by Wang and Feeney (2016) elucidated how limited familiarity with digital technologies and lower educational attainment levels constituted substantial barriers to e-government adoption among rural residents. In the African context, a study conducted in rural Tanzania by Verkijika and De Wet (2018) provides another illustrative example of this phenomenon. Their research examined e-government adoption in rural areas of Tanzania and found that digital literacy was a critical factor influencing citizens' ability and willingness to use e-government services. The study revealed significant disparities in digital literacy between urban and rural populations, with rural residents facing greater challenges in accessing and utilizing e-government platforms. Factors contributing to this digital divide included limited access to ICT infrastructure, inadequate digital skills training programs, and lower levels of formal education in rural areas. The researchers observed that these digital literacy challenges not only hindered the adoption of e-government services but also risked exacerbating existing socio-economic inequalities between urban and rural communities.

Linguistic diversity presents another complex challenge in many developing countries. The provision of e-government services in multiple languages is crucial for ensuring inclusivity and widespread adoption. However, this requirement often poses significant implementation hurdles, as exemplified by the case of India, where the multiplicity of official languages and dialects (22 official languages and hundreds of dialects) complicates the design and delivery of e-government services (Bhatnagar & Singh, 2010). Similarly, in Africa, numerous countries face comparable challenges. For instance, South Africa recognizes 11 official languages, making it difficult to provide comprehensive e-government services accessible to all citizens. In Nigeria, with over 500 indigenous languages, the government struggles to create inclusive digital platforms that cater to its linguistically diverse population. Ethiopia, with its 80+ languages, faces significant hurdles in developing e-government solutions that can reach all corners of the country. The situation in Cameroon, with 250+ local languages alongside English and French as official languages, further illustrates the complexities of implementing linguistically inclusive e-government services in Africa (Eberhard, Simons & Fennig, 2021).

Cultural attitudes towards technology and government institutions also play a pivotal role in shaping e-government adoption patterns. In some societal contexts, there may be a predilection for face-to-face interactions or a pervasive mistrust of online systems. Research conducted in Jordan by Alomari et al. (2012) demonstrated that trust in both internet technologies and governmental institutions were significant predictors of citizens' inclination to utilize e-government services. This phenomenon is also evident in various African contexts. For instance, in Nigeria, Adeniran et al. (2020) found that cultural factors such as power distance and uncertainty avoidance significantly influenced e-government adoption. In Ghana, Mensah et al. (2017) observed that traditional values emphasizing personal relationships and face-to-face interactions posed challenges to e-government acceptance. Similarly, in Kenya, Mutuku et al. (2014) reported that deeply ingrained distrust in government institutions, stemming from historical experiences of corruption and inefficiency, negatively impacted citizens' willingness to engage with e-government platforms. In Ethiopia, Lessa et al. (2015) noted that the preference for oral communication and the cultural importance of social networking through personal contacts presented barriers to e-government adoption. These African examples underscore the critical need for e-government initiatives to be culturally sensitive and to actively build trust in both the technology and the institutions implementing it.

It is noteworthy, however, that some developing nations have successfully leveraged socio-cultural factors to enhance e-government adoption. Estonia's remarkable progress in e-government implementation, for instance, is partly attributed to its culture of digital innovation and the high level of trust citizens place in digital services (Kitsing, 2011). Similarly, Singapore has capitalized on its unique socio-cultural context to advance e-government initiatives. The city-state's emphasis on efficiency, technological advancement, and its citizens' high digital literacy rates have contributed significantly to the widespread adoption of e-government services. Singapore's success is further underpinned by a strong government-citizen trust relationship and a cultural predisposition towards embracing technological solutions in daily life (Chua & Lim, 2020).

In Africa, several countries have also made notable strides in leveraging socio-cultural factors for e-government success. Rwanda, for instance, has effectively utilized its post-genocide reconciliation narrative to foster a culture of innovation and digital transformation. The government's 'Digital Rwanda' initiative has successfully tapped into the population's desire for modernization and efficiency, resulting in widespread adoption of e-government services (Twizeyimana & Andersson, 2019). In Kenya, the success of mobile money services like M-Pesa has created a culture of trust in digital transactions, which has positively influenced e-government adoption. The Kenyan government has capitalized on this by integrating mobile payment systems into various e-government services, aligning with citizens' preferences and existing digital behaviors (Mutuku & Mahihu, 2014). Mauritius, leveraging its multicultural society and high literacy rates, has successfully implemented a comprehensive e-government strategy. The country's emphasis on inclusivity in its digital initiatives, respecting diverse cultural backgrounds while promoting a unified digital identity, has contributed to high e-government adoption rates (Shalini, 2009).

Digital Divide between Urban and Rural Populations in the Developing Countries

The digital divide between urban and rural populations presents a formidable challenge in numerous developing countries, significantly impacting the implementation and adoption of e-government services. This disparity is characterized by pronounced differences in access to technology, digital literacy levels, and infrastructure development between urban centers and rural regions. Such inequalities not only hinder the equitable distribution of digital resources but also impede the inclusive rollout of e-governance initiatives, potentially exacerbating existing socio-economic disparities. This study aims to provide a concise examination of the urban-rural digital divide in six diverse developing nations: India, Nigeria, South Africa, Brazil, Indonesia, and Kenya, to illuminate the nature of the digital divide, and its implications for e-government accessibility.

India

In India, the urban-rural digital divide is stark. While urban areas have seen rapid growth in internet penetration and digital literacy, rural areas lag significantly behind. According to the Indian Telecom Services Performance Indicators report (TRAI, 2021), urban internet subscriptions per 100 population stood at 104.75, while rural subscriptions were only 34.69. This disparity affects e-government service adoption, with rural populations often unable to access or effectively use digital government services. The Indian government has initiated programs like the Digital India campaign to bridge this gap, but challenges persist in infrastructure development and digital literacy in rural areas (Srivastava & Shainesh, 2015).

The digital infrastructure disparity between urban and rural areas in India significantly impacts the implementation of e-governance initiatives and access to digital services. Urban areas, with their superior internet connectivity and higher device ownership rates, are better positioned to adopt e-governance solutions and provide digital services to citizens (Rao, 2005). In contrast, rural regions face substantial challenges in both infrastructure and digital literacy, hindering e-government adoption (Singh, 2010). This divide is starkly illustrated by the Internet and Mobile Association of India (IAMAI) and Nielsen's 'Digital in India' report, which revealed that as of 2019, urban India had 65% internet penetration compared to only 25% in rural areas (Aneez, Neyazi, Kalogeropoulos, & Nielsen, 2019). The root causes of this disparity are complex, with Rathore & Panwar (2020). highlighting the lack of essential telecommunications infrastructure, unreliable electricity supply, and unaffordable internet services in rural areas. While urban centers enjoy access to broadband and 4G networks, many rural regions struggle with basic connectivity Gv & Chaudhari (2021).

Consequently, rural local governments face significant obstacles in implementing comprehensive e-governance solutions, potentially disadvantaging rural citizens in accessing government services and information. This infrastructural gap not only perpetuates the digital divide but also poses a substantial challenge to achieving equitable digital development across India.

The disparity in digital literacy levels further exacerbates the urban-rural digital divide. A study by Tewathia, Kamath, & Ilavarasan, (2020) found that urban residents generally possess higher levels of digital skills compared to their rural counterparts. Urban residents generally have higher levels of education and greater exposure to digital technologies, making them more adept at utilizing e-government services. In contrast, rural populations may face challenges in navigating digital platforms, understanding online procedures, and fully benefiting from e-governance initiatives (Osborn et al., 2021).

The consequences of this divide are far-reaching. Kumar and Kumara (2018) argue that the digital divide contributes to widening socio-economic inequalities between urban and rural areas. Rural citizens may face limited access to government services, reduced participation in democratic processes, and fewer opportunities for economic development through digital channels (Kumar et al., 2019). Limited access to digital technologies can hinder educational opportunities, restrict access to information, and reduce employment prospects for rural residents. This can perpetuate existing inequalities and hinder the overall development of rural regions.

A study by Sharm (2023) suggests that while overall internet penetration has increased, the rate of growth has been slower in rural areas compared to urban centers. This indicates that more targeted interventions may be necessary to address the specific needs and challenges of rural communities. The COVID-19 pandemic has further highlighted the implications of the digital divide. According to Kundu & Bei (2021), rural students had more trouble accessing online learning during lockdowns than their urban counterparts, which could have widened the educational divide between rural and urban areas.

Nigeria

The digital divide in Nigeria presents a significant challenge for e-government accessibility, particularly when comparing urban and rural local governments. This divide is characterized by stark disparities in access to digital technologies, infrastructure, and digital literacy between urban and rural areas, with profound implications for governance and citizen engagement (Zerai, 2018). Urban centers like Lagos have relatively high internet penetration rates, while rural areas struggle with basic connectivity (Adediran, et al., 2016). The Nigerian Communications Commission (NCC, 2020) reported a stark contrast, with urban areas enjoying an internet penetration rate of about 74%, while rural areas lagged significantly at approximately 20%. This pronounced urban-rural digital divide significantly impacts the reach and effectiveness of e-government initiatives. Urban areas benefit from more developed digital infrastructure, better internet connectivity, and higher rates of device ownership, enabling local governments to implement e-governance initiatives more readily (Abdulkareem & Ishola, 2016). In contrast, rural regions often lag behind in both infrastructure and digital literacy (Okunola et al., 2017), making the implementation and adoption of e-governance solutions far more challenging.

The implications of this divide are far-reaching. Rural citizens may face limited access to government services, reduced participation in democratic processes, and fewer opportunities for economic development through digital channels (Ojo, 2014a). This can perpetuate existing inequalities and hinder the overall development of rural regions in Nigeria. The lack of reliable internet connectivity in rural areas, where many regions struggle with basic connectivity compared to the 3G and 4G networks available in urban centers (Oluwatayo & Ojo, 2018), further exacerbates this divide. As a result, rural local governments face significant obstacles in implementing comprehensive e-governance solutions, potentially leaving rural citizens at a disadvantage in accessing government services and information. This digital gap not only affects the delivery of government services but also impacts citizens' ability to participate in digital civic engagement, ultimately reinforcing the existing disparities between urban and rural areas in Nigeria.

The problem is further made worse by the disparity in digital literacy between urban and rural communities. Urban dwellers are better accustomed to using e-government services since they often have higher educational levels and have had more exposure to digital technologies (Gupta, 2020). On the other hand, rural communities could find it difficult to use digital platforms, comprehend online policies, and get the most out of e-governance programs (Nchuchuwe, 2017). This inequality has been brought to light by numerous studies and reports. As of 2019, the National Information Technology Development Agency (NITDA) estimated that 31.5% of Nigerians were digitally literate overall. But a significant gap between urban and rural areas is hidden by this number. Digital literacy rates are often between 50 and 60 percent in urban areas due to better educational attainment and increased exposure to digital technologies; in rural regions, the percentage is typically less than 20 percent (NITDA, 2019). The Nigerian Communications Commission (NCC) said that as of 2021, broadband penetration in urban areas had reached 75%, compared to merely 35% in rural areas, highlighting the disparity caused by infrastructure. According to the World Bank (2020), only 16% of Nigerian rural households had internet connectivity, compared to 48% of urban households. The ability of rural populations to fully engage in and profit from e-governance projects is severely hampered by these differences in digital literacy and access, which feeds into a vicious cycle of digital exclusion that exacerbates already-existing socioeconomic inequities.

The disparity in electricity supply also plays a crucial role in the digital divide. While urban areas generally have more stable power supply, rural areas often face frequent power outages or lack access to electricity entirely. According to recent estimates, Nigeria's overall electricity access rate stands at 62%. However, this figure masks a considerable urban-rural divide, with urban areas enjoying a 91% electrification rate compared to just 30% in rural regions (Isihak, 2023). This disparity is further emphasized by data from the Nigeria Bureau of Statistics, which reveals that more than 50% of people in roughly half of Nigeria's states lack access to electricity. Ohiare (2015) noted that urban areas generally had higher rates of electrification compared to rural areas. The situation in Nigeria reflects a broader problem in Sub-Saharan Africa (SSA), where rural electrification lags significantly behind urban areas. As of 2019, the International Energy Agency reported that approximately 578 million people in rural SSA, representing 71% of the rural population, lacked access to electricity. This contributes to the global issue of electricity access, with over 700 million people worldwide still without power in 2019 (Isihak, 2023).This unreliable power supply hinders the use of digital devices and access to online services, further widening the gap between urban and rural e-government accessibility (Asongu & Odhiambo, 2019).

The COVID-19 pandemic in Nigeria highlighted the digital divide between urban and rural areas, with urban residents having better access to government information and services online, while rural populations faced difficulties. Urban students easily transitioned to online learning, whereas rural students lacked devices, internet, and digital skills, with only 31% of rural households having access to distance learning tools. Urban dwellers accessed online health resources and telemedicine, while rural residents relied on traditional media. E-commerce and digital transactions increased by 40% in urban areas, but only 5% in rural areas. Urban residents were more likely to receive COVID-19 relief funds through digital platforms, with over 70% of successful applications coming from urban areas. Remote work was also more feasible for urban professionals, exacerbating economic disparities. The pandemic underscored the need for policies to bridge the digital divide and ensure equitable access to e-governance services across Nigeria.

South Africa

Despite being one of Africa's most technologically advanced countries, South Africa struggles with a significant urban-rural digital divide (Statistics South Africa, 2019). A General Household Survey revealed that 67.7% of metropolitan households had internet access, compared to only 42.3% in rural areas (Statistics South Africa, 2019 Sithole, et al., 2013) This disparity is largely due to better ICT infrastructure in urban areas, enabling effective e-government initiatives and online services (Mukonavanhu,2024), whereas rural areas face limited broadband coverage, unreliable electricity, and scarce ICT resources, hindering e-government adoption and maintenance (Khoza et al.,2023). As a result, rural populations are often excluded from digital governance initiatives, affecting the equitable implementation of e-government services (Rodríguez et al., 2019).

The implications of this divide are far-reaching. Urban residents typically have greater access to e-government services, allowing them to interact with local authorities more efficiently, access information easily, and participate in local governance processes online. Rural citizens, however, may be excluded from these digital opportunities, potentially leading to reduced civic participation and unequal access to government services (Muridzi, Meyer, & Masengu, 2021).This disparity can exacerbate existing socio-economic inequalities between urban and rural areas.

Brazil

Brazil's urban-rural digital divide is significantly influenced by its vast geographical expanse and uneven development. This divide is evident in internet access statistics, with the Brazilian Internet Steering Committee survey (CGI.br, 2020) revealing that 77% of urban households had internet access compared to only 53% of rural households. The disparity is particularly pronounced in remote areas like the Amazon region, where infrastructure challenges hinder the expansion of digital services, including e-government initiatives (Przeybilovicz & Cunha, 2024).

This digital divide directly impacts the implementation and accessibility of e-government services across urban and rural areas. Urban local governments in Brazil generally benefit from more advanced ICT infrastructure, including better internet connectivity and wider access to digital devices. This technological advantage enables them to implement more sophisticated e-government initiatives, offering a range of online services and enhancing citizen engagement (Przeybilovicz et al., 2023). In stark contrast, rural local governments often grapple with challenges such as limited broadband coverage, unreliable electricity supply, and a lack of ICT resources (Galvão et al., 2020).These obstacles significantly hinder their ability to adopt and maintain effective e-government systems (Leonel & Nossa, 2019), further widening the gap in digital service provision between urban and rural areas.

Indonesia

Indonesia's unique archipelagic geography presents significant challenges in bridging the urban-rural digital divide, which directly impacts the implementation and accessibility of e-government services. This divide is starkly illustrated by the disparate internet penetration rates across the country. According to the Indonesian Internet Service Providers Association (APJII, 2020), Java, the most urbanized island, boasts an internet penetration rate of 56.4%, while eastern Indonesia, predominantly rural, lags behind at only 39.3%. This disparity underscores the uneven digital landscape that shapes e-government accessibility across the nation (Albarkah, 2023).

The divide is further exemplified in the contrasting ICT landscapes of urban and rural areas. Urban centers, particularly major cities on Java and other developed islands, benefit from advanced ICT infrastructure, including robust internet connectivity and widespread access to digital devices. This technological advantage enables urban local governments to implement sophisticated e-government initiatives, offering a range of online services and enhancing citizen engagement (Hidayanto et al., 2008). In glaring contrast, rural local governments, especially those in remote islands and less developed regions, grapple with significant challenges. These include limited broadband coverage, unreliable electricity supply, and a scarcity of ICT resources, all of which severely hinder their ability to adopt and maintain effective e-government systems (Nurdin, Stockdale, & Scheepers, 2012).

The implications of this digital divide for e-government accessibility in Indonesia are profound and far-reaching. Urban residents enjoy greater access to e-government services, facilitating efficient interactions with local authorities, easy access to information, and enhanced participation in online governance processes. Conversely, rural citizens often find themselves excluded from these digital opportunities, potentially leading to reduced civic participation and unequal access to government services (Ramadhane, Ramadani & Abdurrahman, 2023). This disparity not only reflects but also risks exacerbating existing socio-economic inequalities between urban and rural areas, a concern that is particularly acute given Indonesia's archipelagic nature and uneven development patterns

Kenya

Kenya's digital landscape is characterized by significant innovation, particularly in mobile technology, yet a pronounced urban-rural digital divide persists (Wildermuth, 2021). This divide is plainly illustrated by the Communications Authority of Kenya (CAK, 2021) report, which revealed an internet penetration rate of over 85% in urban areas compared to just 40% in rural regions. This disparity significantly impacts the accessibility and effectiveness of e-government services across the country, despite innovative solutions like M-Pesa that have improved overall digital inclusion.

The urban-rural divide is evident in the contrasting ICT infrastructures of different regions. Major cities like Nairobi and Mombasa benefit from advanced ICT infrastructure, including robust internet connectivity and widespread access to digital devices (Andersson & Odlander, 2014). This technological advantage enables urban local governments to implement sophisticated e-government initiatives, offering a range of online services and enhancing citizen engagement (Waema & Mitullah, 2015). In contrast, rural local governments grapple with significant challenges, including limited broadband coverage, unreliable electricity supply, and a scarcity of ICT resources, which severely hinder their ability to adopt and maintain effective e-government systems (Ochara, 2010).

The implications of this digital divide for e-government accessibility in Kenya are profound and far-reaching. Urban residents enjoy greater access to e-government services, facilitating efficient interactions with local authorities, easy access to information, and enhanced participation in online governance processes. Conversely, rural citizens often find themselves excluded from these digital opportunities, potentially leading to reduced civic participation and unequal access to government services (Mungai, 2018). This disparity not only reflects but also risks exacerbating existing socio-economic inequalities between urban and rural areas.

Recognizing these challenges, the Kenyan government has implemented various initiatives to bridge the digital divide. The National Broadband Strategy aims to expand broadband coverage across the country, including rural areas (Ministry of Information, Communications and Technology, 2018). Additionally, programs like the Digital Literacy Programme seek to enhance ICT skills among Kenyan citizens, particularly in rural areas (Ministry of Education, 2016).

A key component of Kenya's efforts to improve digital access at the local level is the Constituency Innovation Hubs (CIH) initiative. This program, launched by the ICT Authority of Kenya, aims to establish digital hubs in each of the country's 290 constituencies. These hubs are designed to provide free internet access, digital skills training, and e-government services to citizens at the constituency level (ICT Authority of Kenya, 2019). The CIH initiative not only aims to improve internet connectivity but also to create spaces for digital innovation and entrepreneurship in local communities.

At the ward level, the government has been working on the Last Mile Connectivity Project, which aims to extend fiber optic networks to public facilities such as schools, hospitals, and local government offices. This project is part of the broader National Optic Fibre Backbone Infrastructure (NOFBI) initiative, which seeks to ensure that every ward has access to high-speed internet connectivity (Ministry of ICT, Innovation and Youth Affairs, 2020).

Despite these efforts, significant challenges remain in achieving equitable digital access and e-government service delivery across urban and rural Kenya (Waema & Ndung'u, 2012). Issues such as infrastructure maintenance, sustainable funding for these initiatives, and ensuring consistent electricity supply in remote areas continue to pose obstacles to full digital inclusion at the constituency and ward levels.

Progress towards SDG 16.6 through E-Government in Developing Countries

The progress towards Sustainable Development Goal (SDG) 16.6, which aims to "develop effective, accountable and transparent institutions at all levels," has been significantly influenced by the adoption of e-government initiatives in developing countries. E-government has the potential to enhance transparency, reduce corruption, and improve public service delivery, all of which are crucial for achieving SDG 16.6.

To illustrate this progress, the United Nations E-Government Survey 2020 highlighted that developing countries have made significant strides in adopting e-government practices. The report noted that 65% of member states now offer at least one online transactional service, up from 56% in 2018 (United Nations, 2020). This progress is particularly important for SDG 16.6, as it directly contributes to institutional transparency and accountability. Furthermore, e-government initiatives have been instrumental in improving public financial management. A World Bank study by Dener et al. (2011) found that implementing Integrated Financial Management Information Systems (IFMIS) in developing countries enhanced budget execution, accounting, and reporting processes, leading to greater fiscal transparency.

In addition to these broad improvements, e-government initiatives have been shown to increase government efficiency and responsiveness to citizens' needs. For example, a study by Bhuiyan (2011) in Bangladesh demonstrated that e-government services reduced bureaucratic delays and improved citizens' access to public information. Similarly, research by Andersen (2009) across 149 countries found a strong correlation between e-government implementation and reduction in corruption levels.

Building on these findings, e-government initiatives have shown promising results in improving institutional effectiveness and transparency in specific country contexts. For instance, in India, the implementation of the Digital India program has led to increased accessibility of government services. The Direct Benefit Transfer (DBT) system, which uses digital platforms to transfer subsidies directly to beneficiaries' bank accounts, has helped reduce corruption and improve efficiency in welfare distribution (Dwivedi et al., 2019). By 2021, the DBT had facilitated over 5 trillion Indian Rupees in transfers, benefiting millions of citizens and significantly reducing leakages in the system.

Similarly, Rwanda's e-government initiatives have contributed substantially to progress towards SDG 16.6. The country's Irembo platform, launched in 2015, provides citizens with access to over 100 government services online. This has not only improved service delivery but also enhanced transparency in government operations. A study by Twizeyimana and Andersson (2019) found that Rwanda's e-government initiatives have led to reduced corruption, increased citizen participation, and improved public trust in government institutions.

Moreover, Kenya's eCitizen portal has been a game-changer in public service delivery, exemplifying the country's broader strategy to digitize government services. Launched in 2014, the platform now offers over 300 online services, from driver's license renewals to business registrations, and had processed over 27.2 million applications by 2021 (ICT Authority of Kenya, 2021). This success led to a 2018 policy directive mandating all government payments be made through digital platforms, with eCitizen as the primary channel. The "Digital First" strategy, outlined in the Kenya National ICT Policy 2019, aims to make Kenya a regional e-governance leader by requiring all government entities to integrate their services with the eCitizen portal. To support this initiative, the government has invested in expanding 4G coverage, establishing Huduma Centers for in-person assistance, and implementing digital literacy programs. These efforts have yielded impressive results: by 2022, over 90% of government services were available online, significantly reducing waiting times, improving efficiency and transparency, and increasing citizen satisfaction. Moreover, the shift to digital payments has enhanced government revenue collection by improving tracking and accountability, while simultaneously reducing opportunities for corruption.

Additionally, in Estonia, often considered a global leader in e-governance, the X-Road platform has revolutionized public service delivery (Hardy, 2024).This system allows for secure data exchange between various government agencies and private sector entities. As a result, 99% of government services are now available online, significantly reducing bureaucracy and increasing transparency (Margetts & Naumann, 2017). While Estonia is not typically categorized as a developing country, its e-governance model has been adopted by several developing nations. Building on Estonia's success, Kazakhstan from the Central Asia has implemented a similar system called the "Digital Kazakhstan" program. This initiative has digitized over 80% of public services, leading to a 30% reduction in corruption perception and a 50% increase in citizen satisfaction with government services (OECD, 2021; Sheryazdanova & Butterfield, 2017; Orazgaliyeva, et al., 2023).

In the context of Latin America, Uruguay has made remarkable progress in e-government implementation (Porrúa, 2013).The country's "Plan Ceibal" initiative, which provides every public school student with a laptop and internet access, has significantly improved digital literacy and access to e-government services (Finquelievich, Feldman & Fischnaller,2012). Uruguay now ranks first in South America and 26th globally in the UN E-Government Development Index (United Nations, 2020; Rivas-Delgado & Libaque-Saenz, 2022).

Furthermore, in Southeast Asia, the Philippines have made substantial progress with its "E-Government Master Plan." The country's "PhilGEPS" (Philippine Government Electronic Procurement System) has increased transparency in government procurement processes. As of 2020, over 120,000 government suppliers were registered on the platform, contributing to more competitive bidding and reduced corruption risks (Asian Development Bank, 2020 Davis, Mendoza, & Yap, 2024). Besides, Morocco's "e-Fawateer" system, an electronic billing platform, has streamlined utility bill payments and other government fees. By 2021, Morocco's the system had processed over 20 million transactions, improving collection rates and reducing opportunities for fraud (Sadok, 2023).

Despite the significant potential of e-government in contributing to SDG 16.6 in developing countries, progress has been uneven due to various challenges. Many countries face infrastructure limitations, digital literacy gaps, and resource constraints, as highlighted by Okunola et al. (2017) in their study of Nigeria. While the COVID-19 pandemic underscored the importance of e-government, it also exposed the digital divide between developed and developing nations (Aissaoui, 2022; Mishi, & Anakpo, 2022). Persistent issues include cyber security concerns, data privacy risks, and unequal access to digital services (Saxena, 2005; Bertot et al., 2014). To accelerate progress towards SDG 16.6, developing countries must adopt comprehensive strategies that address these challenges, focusing on digital infrastructure investment, enhancing digital literacy, strengthening cybersecurity, and ensuring inclusive access to e-government services. This requires collaborative efforts between governments, international organizations, and the private sector to truly develop effective, accountable, and transparent institutions at all levels.

CONCLUSION

The implementation of e-government initiatives in developing countries has shown significant potential in improving public service delivery, enhancing transparency, and contributing to the achievement of Sustainable Development Goal 16.6. However, the progress has been uneven, largely due to the persistent digital divide between urban and rural areas. This divide is characterized by disparities in ICT infrastructure, digital literacy, and access to technology. Countries like Rwanda, Kenya, and India have made notable strides in leveraging e-government for better governance, while others continue to grapple with challenges such as inadequate infrastructure, limited resources, and low digital literacy rates. The COVID-19 pandemic has further highlighted both the importance of e-government and the consequences of the digital divide. While e-government initiatives have shown promise in enhancing institutional effectiveness and transparency, significant obstacles remain, particularly in ensuring equitable access to digital services across urban and rural populations. The success of e-government implementation is heavily influenced by factors such as institutional capacity, socio-cultural contexts, and the ability to address the urban-rural digital divide.

RECOMMENDATIONS

To accelerate the adoption and effectiveness of e-government initiatives in developing countries, a multi-faceted approach is necessary. First and foremost, governments must prioritize infrastructure development, focusing on expanding ICT infrastructure, particularly in rural areas. This includes improving internet connectivity, ensuring reliable electricity supply, and increasing access to digital devices. Such efforts are crucial to bridging the urban-rural digital divide and creating a foundation for widespread e-government adoption.

Alongside infrastructure development, enhancing digital literacy is paramount. Governments should implement comprehensive digital literacy programs targeting both urban and rural populations, with a particular focus on marginalized groups and rural communities. These programs should aim to equip citizens

with the skills necessary to effectively utilize e-government services, thereby increasing adoption rates and maximizing the benefits of digital governance.

In designing e-government services, an inclusive approach is essential. Developers should create platforms that are accessible and user-friendly for diverse populations, taking into account factors such as language diversity, cultural sensitivities, and varying levels of digital literacy. This inclusive design approach ensures that e-government services are truly accessible to all segments of society, furthering the goal of equitable governance.

Strengthening institutional capacity is another critical factor. Governments must invest in building the technical and human resource capacities of local governments to effectively implement and maintain e-government systems. This includes providing training for government officials, hiring skilled IT professionals, and establishing robust IT departments within government agencies.

To leverage resources and expertise, promoting public-private partnerships is crucial. Collaboration between government agencies, private sector entities, and civil society organizations can bring together diverse skill sets and resources, accelerating the development and implementation of e-government initiatives. Such partnerships can also help in addressing funding challenges often faced by developing countries.

As e-government initiatives handle sensitive citizen data, ensuring data privacy and cybersecurity is of utmost importance. Governments must develop robust legal frameworks and technical measures to protect citizen data and ensure the security of e-government systems. This not only protects citizens but also builds trust in e-government services, encouraging wider adoption.

Implementing context-specific solutions is key to the success of e-government initiatives in developing countries. Tailoring e-government initiatives to local needs and contexts, considering socio-cultural factors and existing technological ecosystems, ensures that these services are relevant and effective in their specific environments.

Fostering citizen engagement throughout the process of developing and implementing e-government services is crucial. Governments should develop mechanisms for citizen participation in the design and implementation phases to ensure relevance and encourage adoption. This participatory approach can lead to more user-friendly and effective e-government solutions.

Given the high mobile penetration rates in many developing countries, investing in mobile-first strategies should be a priority. Developing e-government solutions that are optimized for mobile devices can significantly increase accessibility and usage, particularly in areas where traditional computer access is limited.

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