

Broadband Disparities and Digital Divide: A Proposal for Inclusive Policy Reform

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Abstract: *Digital exclusion continues to restrict educational, economic, and civic opportunities in underserved communities, particularly in the Global South. This study examines how broadband infrastructure, affordability measures, digital literacy, governance, and socioeconomic conditions shape digital inclusion, with particular attention to Ghana and comparable settings. A mixed-methods design is proposed using secondary statistical and policy data, stakeholder interviews, and comparative case analysis. This study seeks to identify barriers to effective digital participation and assess approaches capable of improving equitable broadband access. The anticipated findings will inform recommendations concerning public-private collaboration, infrastructure investment, digital literacy, and inclusive program design. The study aims to contribute to practical system development for reducing persistent digital inequalities.*

Keywords: digital divide, digital inclusion, broadband access, digital equity, ICT policy, Ghana, Global South

1. Introduction - Purpose of Study

The scarcity of digital connectivity, broadband, and information computer technology products and services negatively impacts the Global South, primarily in Western Africa (da Silva Lopes & Leal, 2024; Gottschalk & Weise, 2023). Underrepresented groups in rural and urban areas lack access to reliable digital connectivity due to ineffective governance and structural barriers formed by corrupt bureaucracies in their line of power (Tsouli, 2023; Idzi & Gomes, 2022). The multilayered issue of digital exclusivity in rural areas is an ever-evolving political catastrophe that scholars continue to unwrap as modern technology in various sectors rapidly surfaces across the globe (Fang et al., 2019; Fallon & Boutilier, 2022). Digital exclusivity worsens economic disparities among underrepresented groups in developing nations, limits educational opportunities, and hinders access to essential services. This study will explore viable broadband infrastructure strategies. In the age of information and the Internet, marginalized groups remain stagnant in their pursuit of intergenerational well-being and economic mobility.

Due to digital exclusion, wealth generation opportunities are lower in underrepresented and marginalized communities. The rural and urban communities with these individuals – under twenty-five and the fifty-five-and-older senior population – lack digital literacy and an understanding of Artificial Intelligence, Blockchain, and digital financial services (ESCAP 80th Commission Session, Digital Inclusion Roundtable, 2024). Guideline delivery centered around the accessibility of ICT and broadband connectivity depends on strategic decision-making from top-level bureaucratic governments partnering with technology firms. Digital inclusivity and digital equity pose the key to wealth generation for individuals, businesses, and government in the 21st century (Gottschalk & Weise, 2023; da Silva Lopes & Leal, 2024). Digital skill gaps are prevalent in Western nations on the continent of Africa, specifically in the IT professional labor market. The costs of ICT products and services and language barriers among key stakeholders are

mitigating factors in economic mobility and the development of local citizens across the continent (Fallon & Boutilier, 2022; Fang et al., 2019).

This study aims to identify digital inequity among underdeveloped countries and understand the implications of governments suffering from fragmented technology governance. For instance, patterns of digital inequality concerning rurality and constitution in the country and continent are present within northern Ghana compared with the capital of Accra (Fallon & Boutilier, 2022). Northern Ghana contends with low levels of framing, educational attainment, income, and ICT connectivity (Fallon & Boutilier, 2022). Low population density (35 persons per km) makes electrical grids and satellite services unaffordable and inefficient in a resource-poor region (Fallon & Boutilier, 2022). In this context, ICTs are scarce and a luxury few can afford (Fallon & Boutilier, 2022). In contrast, residents of the capital, Accra, and its vicinities enjoy the nation's highest levels of electricity use and access to ICTs (Fallon & Boutilier, 2022). Data from 2017 shows that the rural-urban gap for internet use is 57% in Ghana (Fallon & Boutilier, 2022).

This study will examine cases of digital exclusivity among marginalized citizens in Ghana and a select group of communities that are part of the Global South. From an international perspective, most African people do not have access to digital channels, such as the Internet, broadband connectivity, and a strong technological framework. Variables at the various socioeconomic levels – such as gender, generational status, income, education attainment, and age – are key determinants or indicators of digital exclusivity (Fang et al., 2019; Fallon & Boutilier, 2022). Underdeveloped countries are bound to ineffective governance, outdated policies, and economic exploitation (Tsouli, 2023; Idzi & Gomes, 2022). Corruption among top-level bureaucrats inhibits its citizens from advancing themselves and contradicts the purpose of building a nation (Tsouli, 2023).

1.1 Potential Benefits

- Enhanced educational access and digital literacy in marginalized communities.
- Increased economic development through improved digital infrastructure.
- Greater inclusiveness in telehealth, remote work, and e-commerce.
- Policy recommendations to optimize governmental efforts in reducing the digital divide.

1.2 Research Question(s)

- How can governments – in western and sub-Saharan African countries – improve accessibility to high-speed Internet in rural, urban, and underrepresented areas?
- What impact have digital policies implemented by the United States government had on the digital divide in foreign countries?
- What are the resulting economic and social implications?

2. Literature Review - Existing Research on the Digital Divide

The concept of digital exclusion has evolved, and researchers continue to expand on the underlying ramifications of a lack of connectivity by examining multiple factors. A digital divide is prevalent when a gap forms between individuals, households, businesses, and geographic areas at different socioeconomic levels based on their opportunities to access ICT and use the Internet for various activities (Al Izki, F. & Weir, G., 2014). Scholars have explored the digital divide through various economic, political, and technological perspectives. According to UNESCO, a digital divide refers to the distinction between those with internet access and those without access. Individuals with access to the internet can use new services offered on the World Wide Web versus those excluded from the services and benefits provided. Studies indicate that a lack of infrastructure investment in rural and urban areas significantly contributes to digital disparities (Selwyn, 2020). Rural areas comprise places occupied by fewer than 2500 people in areas outside designated Census areas. Digital equity (Solomon, 2002) is a social justice goal. Digital equity involves five dimensions:

- Access to hardware, software, and connectivity to the Internet (Solomon, 2002)
- Access to meaningful, high-quality, culturally relevant content in local languages (Solomon, 2002)
- Access to creating, sharing, and exchanging digital content (Solomon, 2002)
- Access to educators who know how to use digital tools and resources (Solomon, 2002)
- Access to high-quality research on the application of digital technologies to enhance learning (Solomon, 2002)

Information collected from the Current Population Survey was cross-tabulated based on specific variables such as income, race, age, education attainment, and geographic

categories such as rural, urban, and central city or city centers. This approach provided a more expansive profile of universal service in the U.S. Examination, and surveys revealed the usage habits of PC/modem users when accessing online services. Usage habits provide an essential input for strategy development in the Information Age. Rural and central cities show a disproportionate amount of information "have-nots." People in these geographic locations have difficulties connecting to the National Information Infrastructure. Native Americans, rural Hispanics, and Black people possess the fewest telephones. In the central cities or urban city centers, Black people possess the fewest PCs. For a given level of education, central city households have the lowest penetration of telephones and computers, while rural and urban areas trail in terms of modem penetration.

Information exclusion is prevalent among various groups based on ethnic background, income, education attainment, and region. The overarching goal of this study is to uncover a global governance issue-the lack of power for marginalized groups to voice their struggles for digital inclusion, a fundamental human right. The lack of access to reliable internet services hinders better employment and opportunities for advancement, which impedes a country's economic mobility. The U.S. has provided surveys to its citizens on internet use for every household, with the aid of the Census Bureau, but this is not mirrored internationally among marginalized communities, highlighting the global nature of this issue.

The digital divide refers to the disparities in access to and effective use of information and communication technologies (ICTs) shaped by socioeconomic, geographical, racial, and gender factors. Early research focused on physical access (e.g., computers, Internet), while newer frameworks highlight more nuanced layers – such as digital literacy, inclusion, and usage quality (Fang et al., 2019). Lopes and Leal (2024) illustrate these complexities by studying Quilombola women in Brazil, revealing how intersectionality – particularly gender, race, and territorial marginalization exacerbates digital exclusion. Despite ICTs being critical for accessing health, education, and civic participation, Lopes and Leal (2024) found that eleven out of thirty-five communities in their study lacked the Internet, reinforcing systemic inequities and violating fundamental rights. Warschauer (2004) suggests that meaningful access to ICT encompasses far more than merely providing computers and internet connections.

Fallon and Boutilier (2022) argue that inclusion in digital spaces is not merely about accessibility but effective use, literacy, and competencies. Their research on Ghana's women's movement shows that while urban organizations had basic access, rural ones struggled with functionality, rendering them voiceless in critical advocacy efforts. They advocate distinguishing between "formal access" and "effective access" to assess digital inequality more accurately. Similarly, Fang et al. (2019) apply intersectionality and van Dijk's resources and appropriation theory to reveal how age, education, and income overlap to shape ICT access among older adults.

2.1 Government Policies and Global Perspectives

International studies on digital exclusion show patterns of inequitable treatment in areas of lower socioeconomic status and low income. Research development has grown among top-level bureaucrats as they build practical approaches to addressing digital inequity. For example, Finland's legal designation of broadband as a fundamental right has led to significant investments in connectivity. At the same time, South Korea's public-private partnerships have created some of the world's most advanced digital infrastructures (Kim & Park, 2019).

OECD countries have adopted varied strategies to address digital equity in education. The OECD Education Working Paper No. 299 (Gottschalk & Weise, 2023) reviews inclusive technology policies across member nations, highlighting efforts to provide devices, enhance frame, and train teachers. Digital exclusion efforts are troublesome for many bureaucratic nations because multiple international stakeholders impede the implementation phase. Corruption among elitist stakeholders is common, as those with the majority stake in large technological construction projects aim to control mass media expansion while building partnerships with technology conglomerates. Governments lack alignment, integrity, trust, and healthy cooperative relationships with broader inclusion frameworks.

In West Africa, Tsouli (2023) emphasizes the role of macroeconomic indicators such as per capita income, government effectiveness, and the rule of law in shaping the digital divide. His study on ECOWAS countries notes that infrastructural deficits and policy misalignment hamper efforts like e-government strategies and anti-corruption frameworks. Despite regional agreements (e.g., ECOWAS anti-corruption protocols), digital inequities persist due to poor implementation and monitoring.

Despite legal recognition of internet access as a human right in Brazil, systemic marginalization still bars Quilombola communities from digital inclusion. National development efforts have yet to integrate localized ICT access policies, particularly in rural or ethnically marginalized regions (Lopes & Leal, 2024).

Globally, digital inequality mirrors broader development disparities. While high-income countries integrate digital tools into every facet of life, large swaths of populations in low-income regions remain digitally invisible. According to the ITU, only 28% of Africans had internet access as of 2019, with stark gender and urban-rural gaps (Fallon & Boutilier, 2022). Gottschalk & Weise (2023) further point out that many digital equity strategies in OECD nations unintentionally replicate exclusionary practices, failing to address the needs of minorities, immigrant students, and those with special education needs. For example, some countries adopt one-size-fits-all platforms without ensuring local language availability or culturally responsive pedagogy. Studies from India, Kenya, and Venezuela (Camargo et al., 2022; Ritchie, 2022) suggest that ICTs can empower marginalized women through increased access to reproductive health information, economic opportunities, and social mobility. However, these benefits are not evenly

distributed and often depend on intersectional factors such as caste, geography, and digital literacy.

2.2 Socioeconomic Implications in the Global South

The inability to access reliable high-speed Internet negatively affects economic mobility, employment opportunities, and educational attainment (Hargittai, 2021). Research suggests bridging the digital divide can increase GDP growth and improve labor market outcomes (Qureshi, 2022). Yet, without targeted policy blueprint interventions, the digital divide risks reinforcing existing social hierarchies. As digital services evolve – from online banking to e-learning – those left behind are not just disconnected; they depart from full citizenship and societal participation (Fang et al., 2019; Fallon & Boutilier, 2022). A lack of digital connectivity prohibits citizens from effectively participating in job searches, communicating with family and friends, and voicing concerns on social issues in online discussion forums. The introduction of ICT and the World Wide Web has enhanced job participation. Classified sections and job postings in newspapers serve as formal sources for workforce development.

The digital divide prevents many activists and organizations from participating in meaningful protests to injustice and therefore having a voice within the broader national movement (Fallon & Boutilier, 2022). Access does not say anything about the quality or utility of ICT use, as the experiences of activists in northern Ghana demonstrate (Fallon & Boutilier, 2022). For northern activists, weak foundations and lack of effective access to the internet and e-mail significantly curtailed their movement inclusion (Fallon & Boutilier, 2022). Because their access was formal but not effective, they relied either on snail mail or on personal communications to advance movement goals (Fallon & Boutilier, 2022). Activists' inability to voice their concerns on matters such as domestic violence and suppression violates a fundamental human right of free speech. All organizations, whether in Accra or northern Ghana, are doing important work and recognize the value of passing the Domestic Violence Act (Fallon & Boutilier, 2022). However, their effective access to ICTs influences their opportunities to shape the national agenda and to serve their local constituents (Fallon & Boutilier, 2022). Because of the digital divide, activists in northern Ghana find little space for their priorities online (Fallon & Boutilier, 2022). The unintended result is an emphasis on codes and procedures — emphasized by those in southern Ghana — over redistribution and practical provisions (emphasized by those in northern Ghana) (Manuh & Anyidoho, 2015).

Economically, digital exclusion perpetuates cycles of poverty, corruption, and inequality. Tsouli (2023) found that internet penetration increased by 1% among internet users, which reduced corruption (0.05-0.06%) in West African countries, suggesting transparency improves corruption control metrics when citizens are digitally connected. From a supply chain and corporate perspective, digital transformation enhances performance and coordination, particularly in SMEs (Jing & Fan, 2024). However, such benefits depend on access to reliable structure, human capital, and digital competencies often lacking in rural or

marginalized areas. Socially, digital technologies can amplify marginalized voices – especially women and ethnic minorities – when accessible. ICTs can serve as empowerment, education, and health tools only when communities have the organization, training, and cultural readiness to use them (Kwami, 2020; Rajkhowa & Qaim, 2022).

Underdeveloped nations are the result of economic exploitation by top-level bureaucrats. Higher learning institutions are bringing awareness to the digital divide as scholars recognize it as a legitimate factor in widening the wealth gap among different socioeconomic levels. Investing in ICT infrastructure enhances economic outcomes for various citizens from different socioeconomic backgrounds. ICT use is unequal based on gender, and the disparities have negative implications for women's development and their participation in society (Rotondi et al., 2020; Simoes et al., 2011) (Kwami, 2020; Rocillo & Gomes, 2022). Kwami (2020) stresses that ICT is essential for social and economic development and a tool to fight for gender equality, such as the discrimination that hangs over African women in Ghana. Gender and social inequality are significant factors in digital exclusivity, education, economic mobility, and human capital development. The Quilombola territories are subjected to social inequality, precarious access to essential services like sanitation, roads, and electricity, and digital exclusion (Deldina, 2020).

Despite the economic prominence, the most vulnerable groups' limited access to the Internet shows capitalism's contradictions (Martins et al., 2021). While the monetary system generates wealth and resources, it fails to ensure equal access to those benefits. The lack of strategies promoting digital equity increases men's and women's vulnerability during the information age. Wealth creation is obsolete in the modern information age without access to broadband internet, computers, modems, and smartphones. Groups in higher-income geographical territories have greater accessibility to technology infrastructure, broadband internet, and digital finance services. There are fifteen million households that lack internet access in Brazil, and the service cost is the most frequently cited reason (59%) (GI, 2023). The geography of inequality is evident within the cities as quality services expand to commercial and residential areas where the economic elites live. Suburbs, favelas, and communities where blacks live lack basic digital connectivity, which directly impacts their pursuit of intergenerational well-being and wealth creation. There is a geography of inequality concerning ICT or access to public services.

Policymakers and street-level bureaucrats such as educators, administrators, and local officials fail to understand the importance of closing the digital divide in education as an essential element of the national strategy to prepare students with twenty-first-century skills needed in a global society. The Geneva Declaration of Principles, which was adopted at the World Summit on the Information Society (Geneva, 2003, p. 1), foresaw an "information society" where

everyone can create, access, utilize, and share information and knowledge (Souter, 2004). The rapid growth of digital libraries and repositories is not without issues and challenges related to access to content (see Chapter 2.3). Still, here, the emphasis is on access to content creation opportunities. Even the most capable and interested teachers kept having access problems to essential equipment and connectivity (e.g., delayed arrival of sufficient bandwidth, upgraded firewalls and antivirus software reducing computer processing power, reconfiguration of computers on a routine basis, or the arrival of new personnel, and competing choices regarding desktop video conferencing systems), the cumulative effect of which posed significant challenges to engaging in collaborative planning among teachers and implementation with students from different schools.

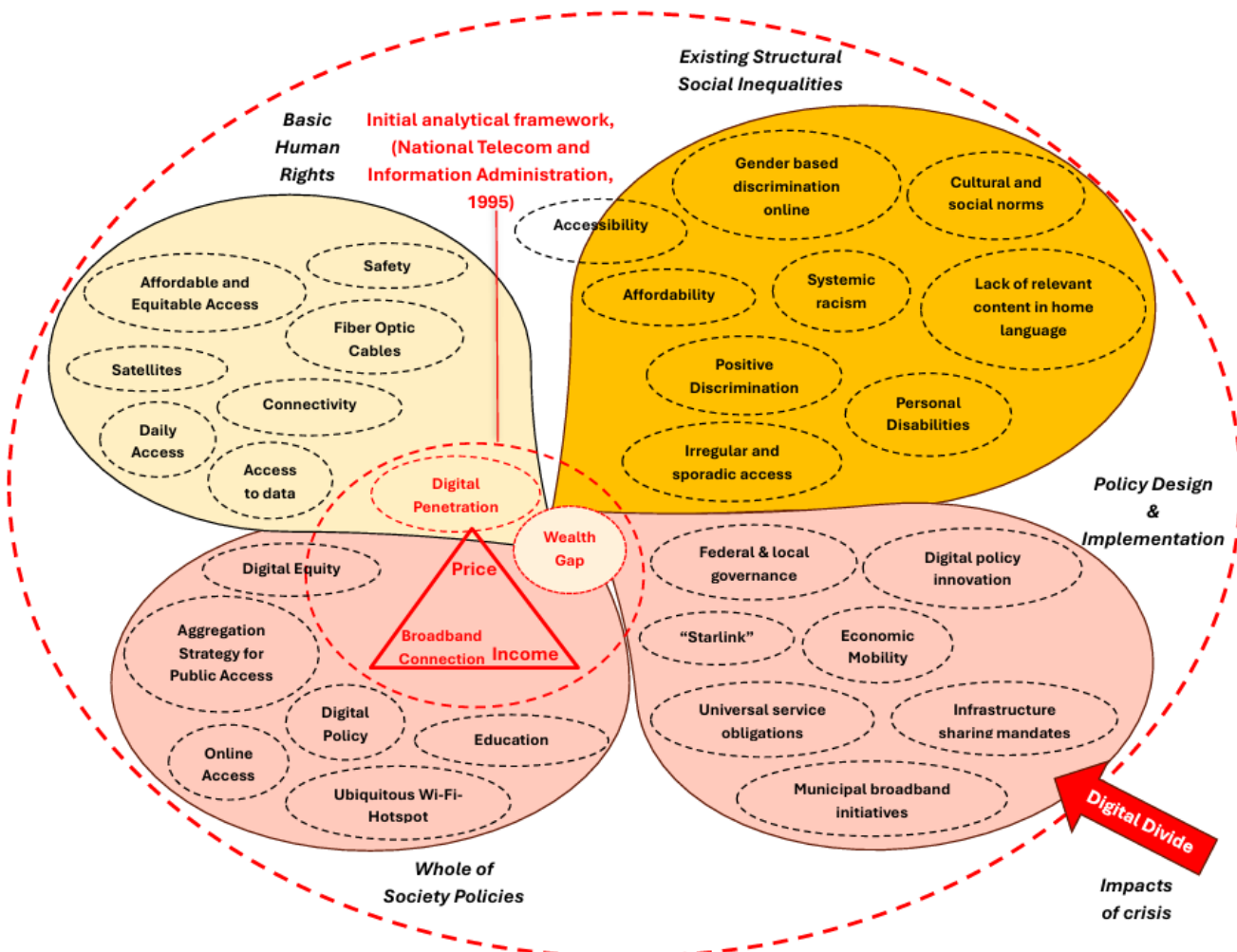
Cultural preservation and urban development through innovative digital solution content in local languages is a significant challenge confronting many countries across the globe. There are also a growing number of public/private initiatives, such as SchoolNet Africa (<http://www.schoolnet africa.net>) and the eGranary Digital Library (<http://www.widernet.org/digital library>) that have emerged to develop and/or provide access to high-quality educational content in local languages. Institutions offering open educational resources (e.g., open courseware initiatives, MIT, UNESCO) and open-source software (Open Office, GIMP, Tux Paint, Nvu) for individual and community empowerment is the employed strategy that will bring native language platforms to marginalized groups.

3. Research Method

Utilizing a mixed-methods approach while integrating qualitative and quantitative data to analyze the impact of digital infrastructure policies in underserved communities serves as an effective strategy to drive key conversation among the readers of this study. Intersectional approaches apply when addressing people, their diversity, and their needs in digital spaces. As technology advances, needs evolve and require reassessment from top-level bureaucrats, end-users, citizens, and the in-between. Promoting digital inclusion should be based on evidence and data. When measuring the data collected and used, study participants will disaggregate it by ability, migration, displacement, socioeconomic status, age, location (beyond urban/rural), Indigenous identity, education, and income to understand its variability.

Recognizing the intersectional nature of exclusion requires policy intervention to rectify its leading causes. Today, research is developing in the following areas:

- Types of access to computers and the Internet
- Classroom activity with online tools and resources
- Learning outcomes as innovative practices
- Community progress as teachers and learners adopt digital tools and resources.

Table 1: Conceptual framework of the digital divide and the socioeconomic implications

High-quality research often includes quantitative studies involving large numbers of participants and pre-post testing associated with short-term experimentation. There is also an emerging trend toward ethnographic studies involving in-depth observation and/or analysis of a few subjects. The former provides descriptive low-end information applied on a large-scale basis. In contrast, the latter offers higher-end but small-scale information from detailed observations or interviews with limited generalizability. Both types of research have value in terms of completeness, according to the highest standards of rigor.

In places where the digital divide is the most pronounced, such as northern Ghana, there is typically a lack of access to high-quality research. One strategy for fostering research in these settings is creating networked communities inclusive of experts, competent teachers, and beginning and prospective teachers (Czerniewicz and Carr, 2005; Lamon et al., 2008). Research development involves multi-institution collaborations to support innovative and enduring onsite/online digital-technology experimentation (see Kash and Rycroft, 1999).

4. Methodological Protocol

Setting

- The research will focus on case studies from rural international models in developed and developing nations

Participants

- Policymakers involved in digital infrastructure development
- Community leaders and residents from underserved areas
- Internet service providers (ISPs) and technology firms

Quantitative Sources

- National and international surveys (e.g., Census Bureau, ITU)
- Internet penetration and usage statistics (Ghana, Brazil)
- Adult literacy rates
- Broadband coverage maps
- Cross-tabulated demographic data (income, race, education, religion)

Qualitative Sources

- Stakeholder/government/ISP interviews (planned and cited studies)

- Ethnographic studies (Ghana, Brazil)
- Thematic coding/analysis of interviews
- Comparative case studies

Recruitment Strategy

An appropriate recruitment strategy would start by connecting with grassroots organizations to acquire willing participants in leading positions of change. These citizens will effectively communicate their concerns through a bottom-up approach and meaningfully articulate how digital inequity affects them. Marginalized groups lack the leading positions of change in designing, developing, evaluating, and assessing digital devices, services, and policies tied to their identity and native language.

Interview Procedure

Interviews will consist of a small number of subjects—stakeholders, government officials, information technology providers, and ISP representatives—while incorporating an ethnographic approach to gather personal sentiments about the critical issues of digital inequity and digital exclusion.

Sampling

- Purposive and stratified sampling
- Random sampling

Instruments

- Structured surveys/questionnaires
- Semi-structured interview guides
- Document analysis protocol
- Observation Checklists

Statistical Tests

- Descriptive statistics
- Chi-square tests of independence
- Logistic regression
- ANOVA or t-Tests
- Correlation analysis

Models

- Van Dijk's Access-Skills-Usage-Outcomes Model
- Intersectionality Models
- Convergent or Explanatory Sequential Models
- Case Study Comparative Model
- Logistic Regression Model
- Digital Divide Frameworks

5. Data Collection Sources & Analysis

Obtain surveys to assess trends - such as adult literacy rates, digital technology adoption in schools, internet usage statistics, internet penetration statistics, percentage of web content by language, and broadband coverage maps - over the past two decades.

Conduct an outlook on said trends based on new infrastructure developments within Western nations and the Sub-Saharan south of the continent of Africa and marginalized municipalities of the Global South.

- The data collection phase will involve sourcing government surveys, policy documents on data privacy & governance, and publicly accessible statistical data.
- Statistical analysis of survey data to determine correlations between internet access and economic growth

6. Thematic Coding Procedures

The use of data analysis software (NVivo, MAXQDA, Atlas.ti) will help identify policy effectiveness and challenges in technology infrastructure during the qualitative interview process.

- Steps for Thematic Coding Procedure
 - Familiarization
 - Initial Coding
 - Collating Codes into Themes
 - Reviewing and Refining Themes
 - Defining and Naming Themes
 - Reporting

Key Terms (Thematic Coding): Digital Skill Gaps, Digital Exclusion, Digital Inclusion, Economic Mobility, ICT Infrastructure, Affordability/Cost Barriers, Policy and Governance, Corruption/Bureaucratic Barriers, Intersectionality, Marginalized Groups, Access to Devices/Internet, Literacy (Digital and General), Language Barriers, Human Rights, Geographic Disparities, Education/Workforce Development, Social and Civic Participation, Public/Private Partnerships, International Comparisons, Case Studies, Perceptions/Attitudes towards Technology, Government Initiatives/Programs, Social Capital, Barriers to Adoption, Outcomes of Digital Exclusion

7. Ethical Approval/Informed-Consent Procedures

These procedures ensure that the research protects participants of the study and meets the standards for social science research.

- Institutional Review Board (IRB)/Ethics Committee Approval
 - Required for all data collection from human subjects
- Informed Consent Process
 - Written/oral consent, clear explanation of rights and purpose
- Confidentiality and Anonymity
 - Anonymization, secure data storage, privacy assurances
- Cultural Sensitivity and Local Context
 - Adapted materials, respect for local norms
- Transparency and Voluntary Participation
 - Emphasized in recruitment and consent process

8. Policy Recommendations

Governments should partner with telecommunications companies, tech firms, educational institutions, and non-profits to build sustainable, inclusive digital infrastructure. The OECD (Gottschalk & Weise, 2023) notes that successful national efforts in digital equity rely on strategic multi-stakeholder engagement. For example, in many OECD countries, PPPs have facilitated the deployment of educational platforms and the provision of devices to underserved schools. Similarly, Jing & Fan (2024) show how China's government policies supporting digital transformation in manufacturing were amplified by industry involvement, demonstrating how coordinated investment enhances both social and economic returns.

8.1 Arguments for Digital Inclusion Efforts by Internet Providers

ICT companies and broadband providers will see long-term growth once investments in technology infrastructure are made in rural and urban areas. Tax breaks offer incentives for technology companies and improve economic mobility for the federal government simultaneously. Establishing infrastructure-sharing mandates will strengthen government relations with internet providers long-term, as broadband infrastructure becomes a priority. Foster collaboration between ed-tech companies and school districts to deploy accessible learning platforms. Recruit natives of underdeveloped communities into key representative roles in organizations for digital literacy outreach and training. Retaining natives in positions of influence can positively impact the outcome of digital product adoption among fellow citizens. — Incorporate products and services in their native tongue.

The absence of high-speed broadband in Quilombola territories in Brazil (da Silva Lopes & Leal, 2024) rendered entire communities unable to access healthcare, education, and civic services, highlighting a clear violation of digital and human rights. Similarly, Fallon & Boutilier (2022) found that rural Ghanaian women's organizations lacked digital access among national-level advocacy groups due to poor internet access. Moreover, Tsouli (2023) demonstrated that improved internet penetration significantly enhances transparency in ECOWAS countries by facilitating access to anti-corruption tools and e-governance platforms.

8.2 Arguments for Digital Adoption at the Federal Level

Fang et al. (2019) reveal that digital privilege forms from overlapping identities – age, income, and education – and that targeted supports are essential to address these inequities. Government subsidies help close these gaps by enabling access and sustained usage, which OECD reports identify as foundational for digital inclusion. Access alone is insufficient; economic feasibility plays a significant role in delivering resources to the underserved. The gender gap in mobile phone and internet use in Ghana is driven by cost, geography, and infrastructural barriers (Fallon & Boutilier, 2022), showing that subsidies must also account for localized challenges.

- Top-level bureaucrats' prioritization of national infrastructure employment of fiber-optic cables positively enhances digital usage outcomes in underserved areas.
- Mandate universal service obligations (USOs) for internet providers.
- Promote municipal broadband initiatives where private providers fail to reach.

Literature frames ICT access as essential to health, education, economic mobility, and civic participation. Without internet access, vulnerable citizens cannot effectively contribute to society's core functions. Private companies often avoid low-income or rural areas due to low-profit margins. Public investment and regulation are necessary to ensure equitable distribution of resources (Fallon & Boutilier, 2022; Tsouli, 2023). Studies show that barring digital services compounds marginalization along gender, racial, geographic, and class lines. Effective policy must tackle these structural issues using intersectional frameworks (Fang et al., 2019; da Silva Lopes & Leal, 2024). Internet adoption leads to improved administration, economic productivity, and transparency. The ROI of digital infrastructure extends well beyond connectivity – it fuels entrepreneurship, education, and democratic resilience (Tsouli, 2023; Jing & Fan, 2024).

8.3 Arguments for Digital Inclusion based on Demographic Makeup

Governments should pass enforceable legislation recognizing internet access as a public utility and fundamental right, alongside digital literacy mandates and inclusion benchmarks. As emphasized in Brazil's national policies and reaffirmed by international institutions like the United Nations and OAS (da Silva Lopes & Leal, 2024), Internet access is a gateway to other human rights. Yet enforcement is often weak or non-existent without legislative mandates. The OECD (2023) found that many equity-focused digital policies fail due to a lack of enforcement or accountability. Meanwhile, Tsouli (2023) calls for integrating legal tools into ICT policies to combat corruption and empower citizen oversight.

- Diversify capital pool to cover broadband, mobile data, and devices.
- Create subsidy tiers for different demographics.
- Ensure transparency and ease of access in subsidy application processes.

8.4 Arguments for Digital Inclusion in Policy Design in Education

Enact laws declaring broadband as an essential utility akin to electricity or water. Without broadband, there are no practical ways to use ICT products and services, especially without modems, digital connectivity, and reliable IT infrastructure. Citizens in urban and rural communities are oftentimes displaced and cannot access free Wi-Fi services or public computers at institutions such as universities or public libraries. Mobility concerns and the reliability of available products and services can impede internet usage rates among marginalized citizens. Without access to

reliable Internet, these individuals cannot apply for job opportunities, connect with family and friends, and, most importantly, contribute to the community's economic mobility efforts. Content creation has become an evolving area of focus for the digital services sector and tech policy in the U.S. under the Trump Administration.

Education systems are required to integrate digital literacy as a core subject. Without this incorporation, children stand a chance of experiencing skill gaps and advanced placement in key roles centered around STEM, artificial intelligence, robotics, and engineering. Today, educational programs heavily rely on modern digital tools, machine learning, and algorithms.

- Monitor and report annually on progress toward digital inclusion benchmarks.

9. Conclusion

Article 9 of the Convention on Human Rights of Persons with Disabilities states that "parties shall take appropriate measures to ensure to persons with disabilities, access, on an equal basis with others... to information and communications, including technologies and systems" (Zawadzka, 2022).

Digital exclusion extends beyond physical internet connectivity and reflects interconnected barriers involving affordability, infrastructure, digital skills, governance, geography, and socioeconomic inequality. Addressing these barriers requires policies that combine reliable broadband infrastructure with affordable access, digital literacy, locally relevant content, and meaningful participation by underserved communities. Governments, educational institutions, technology providers, and community stakeholders therefore have complementary roles in developing inclusive digital systems. Policies should also recognize that different populations experience digital exclusion differently and should incorporate intersectional and locally responsive approaches. Strengthening these areas can improve educational opportunity, economic participation, civic engagement, and access to essential services while supporting a more equitable digital environment.

Undue sector-specific taxation disproportionately affects rural and urban citizens in underdeveloped countries. These citizens lack the disposable income necessary to mitigate the rising cost of ICTs, digital financial services, subscriptions for content creation, broadband connectivity, and electricity costs. Based on limited access to data and information regarding job opportunities in their territories, some marginalized communities have yet to maximize their true earning potential.

Reversing the harmful effects of debarment requires policymakers to invest in initiatives centering around inclusive technology governance, content creation based on native languages, and building trust in public service and technology firms.

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