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Research Article

A NARRATIVE REVIEW OF ECONOMIC, SOCIAL AND GOVERNANCE (ESG)-DRIVEN RURAL CONNECTIVITY IN DEVELOPING COUNTRIES' TELECOM SECTOR

***Prosper Mutswiri**

ZESA National Training Centre, 16676 Ganges Road, Belvedere, Harare, Zimbabwe

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Abstract

Aim: This paper reviews academic literature on environmental, social and governance (ESG) adoption within developing countries' telecom sector to expand rural connectivity. **Methodology**: A narrative review methodology was adopted. A systematic search was undertaken spanning electronic databases, web searches and reference harvesting to identify scholarly peer-reviewed articles. The capability approach provides the theoretical framework for analysis. **Results**: Findings show basic infrastructure rollout dominates over sophisticated affordability, needs-based and participatory ESG policies. Compliance and signaling, not intrinsic rural commitment, drive most initiatives facing financial, demand and coordination barriers. Still, progressive collaborations balancing viability and social impact signal increasing recognition of shared value. Context-specific solutions integrating regulation, financing, multi-stakeholder participation and grassroots insights can resolve tensions. **Conclusion**: Despite deficiencies, cautious optimism exists of gradual improvement in ESG integration and rural connectivity, needing further research on ideal strategies.

Keywords: Telecommunications, Rural connectivity, ESG, Digital divide, Capability approach, Shared value.

INTRODUCTION

Background and rationale

Over recent years, environmental, social, and governance (ESG) elements have become increasingly important in both corporate and investment spheres. ESG is the set of policies, disclosures, and performance criteria including environmental sustainability, social responsibility, and corporate governance into corporate operations and strategy (El-Sholkamy& Rahman, 2022). Stakeholder pressures and increasing awareness of ESG's worth in improving companies' long-term sustainability and societal outcomes drive its rise (Zhou *et al.,* 2024). Given the fundamental nature of connectivity services and the sector's significant influence on society, telecommunication firms are under particular pressure to implement strong ESG policies (Lin *et al.,* 2024; Henry, 2019). Through means of financial inclusion, healthcare delivery, education, market linkages, and more, increasing access to mobile and internet networks helps one towards the UN Sustainable Development Goals (Leung & You, 2023). Telecoms thus bear heightened responsibilities around bridging digital divides and serving marginalized communities often left behind by mainstream infrastructure development (Islam *et al.,* 2023; Henry, 2019). However, questions persist around the appropriate balance between profit motivations and social commitments for telcos operating as commercial entities while delivering a public good (Becchetti *et al.,* 2022; Henry, 2019). This review examines how ESG integration can assist telecom companies in expanding rural access and affordably serving marginalized communities while remaining financially sustainable.

Corresponding Author:** ***Prosper Mutswiri,
ZESA National Training Centre, 16676 Ganges Road, Belvedere, Harare, Zimbabwe.

Conceptual unpacking of esg in telecommunications

ESG in telecommunications encompasses a broad range of practices and policies aimed at addressing environmental impacts, social responsibilities, and governance structures within telecom operations. Environmental aspects include energy efficiency, carbon footprint reduction, and sustainable infrastructure deployment. Social dimensions cover digital inclusion, affordability initiatives, and community engagement in marginalized areas. Governance relates to transparency, accountability, and ethical business practices in service delivery and expansion decisions. Rural connectivity within an ESG framework extends beyond basic infrastructure deployment to consider holistic community needs, participatory governance models, and context-appropriate solutions that balance commercial viability with social impact. This includes considerations of affordability, relevant content, digital skills, and community agency in determining connectivity priorities.

Understanding telecom sector dynamics in developing countries

Developing country telecom landscapes are characterized by unique challenges including infrastructure deficits, affordability concerns, regulatory inconsistencies, and significant urban-rural divides. These constraints create both limitations and opportunities for innovative approaches to rural connectivity through ESG frameworks. These markets typically exhibit rapid mobile penetration growth albeit with persistent coverage and quality gaps in rural areas. Limited fixed-line infrastructure, prepaid service dominance, and significant variations in disposable income across regions further complicate universal service provision. The interplay between commercial imperatives and developmental objectives

creates tension in how operators approach rural markets traditionally seen as less profitable. ESG frameworks potentially offer mechanisms to bridge these divides through balanced approaches connecting business sustainability with social responsibility.

PURPOSE

Objectives of the review

The overarching goal is to review scholarly literature on ESG-motivated rural connectivity initiatives within developing countries' telecommunication sectors across multiple dimensions including:

- ESG policies and practices telecom firms have adopted around rural infrastructure investment, social engagement and governance reforms
- Motivations and limitations shaping telecom operators' ESG strategies
- Policy, financing and multi-stakeholder mechanisms that can strengthen implementation to bridge digital divides

The goal is to clarify pathways for telecoms to leverage ESG practices in commercially viable ways that also increase availability and affordability of mobile/internet access across underserved rural populations.

Scope

The review focuses on literature examining ESG integration for rural connectivity specifically within developing countries and emerging markets telecom contexts. It investigates academic publications from 2015 onward spanning information systems, technology management, infrastructure development, public policy, development studies, sustainability, corporate responsibility, strategy, governance and other pertinent fields. Developed country studies were excluded given the vastly different institutional dynamics.

THEORETICAL FRAMEWORK

The capability approach as analytical lens

This review is underpinned by Amartya Sen's capability approach as an alternative conceptual lens to examine ESG-driven rural connectivity initiatives. The capability approach focuses on the real freedoms and opportunities (termed capabilities) that people have to achieve valued outcomes (termed functionings) like accessing information, expressing voice or participating politically (Walker &Unterhalter, 2007). In contrast with narrow metrics of income or infrastructure access, the approach emphasizes the full spectrum of "beings and doings" constituting human wellbeing and agency (Clark, 2005). The approach perfectly suits analysis of rural connectivity provision because it highlights that simply deploying mobile/internet infrastructure does not automatically translate into enhanced freedoms and realized benefits if broader preconditions for meaningful usage access across disadvantaged populations are not fulfilled (Kleine, 2013). Telecom network expansion constitutes just an input or means towards social justice ends like inclusive innovation, not an end in itself.

Application to rural connectivity and esg

Without complementary capabilities enhancing affordability, digital skills, relevant content, and governance participation, rural communities – especially women, elderly, disabled, illiterate and indigenous groups - may remain effectively excluded from connectivity's advantages despite physical coverage (Abdelaal, 2022). The capability approach fundamentally reorients policy assessment towards communities' own definitions of connectivity priorities based on their contextually negotiated values and aspirations to overcome marginality (Lyons, 2022). It presents access as essentially multi-dimensional, dependent on personal and group conversion factors determining technology use, not only technical network characteristics. Rather than passive homogeneous recipients of standardised solutions, a capability approach lens sees communities as heterogeneous with different functions that connectivity should improve (Kleine *et al.,* 2022). It breaks out broad ideas like "rural community" to show intra-group differences in access aspirations, constraints, and remediations across gender, ethnicity, age, and other identity markers that privilege some groups over others. Furthermore, the capability approach emphasises positive freedoms and agency as essential components of development alongside meeting basic needs (Alkire, 2002). Well-being requires choice and dignity. Hence user-centricity, participation and self-directedness become integral to capability-advancing connectivity interventions, not afterthoughts. Basically, the capability approach reorients analysis towards holistic assessment of how telecoms' ESG policies and practices extend freedoms and choice sets for diverse rural groups to achieve connectivity outcomes they have reason to value for overcoming marginality across economic, political, and socio-cultural dimensions.

METHODOLOGY

Review framework adopted

A systematic search was undertaken spanning electronic databases, web searches and reference harvesting to identify scholarly peer-reviewed articles examining the research problem. This review adheres to established guidelines that necessitate a structured methodology predicated on meticulously formulated questions, comprehensive search strategies, defined eligibility criteria, rigorous review and extraction processes, and the synthesis of patterns across a literature scope.

Search strategy

Databases including Web of Science, Scopus, EBSCO, JSTOR and Google Scholar were searched using combinations of relevant keywords: "telecom", "telco", "mobile operator", "connectivity", "infrastructure", "access", "digital divide", "rural", "marginalized communities", "underserved", "universal service", "ESG", "environmental social governance", "sustainability", "CSR", "social responsibility", "bridging divides", "affordability", "shared value", "bottom/base of pyramid", "strateg*", "adoption", "integration", "policies", "practices", "drivers", "motivations", "barriers", "limitations", "constraints", "challenges", "solutions", "models", "frameworks", "multi-stakeholder partnerships", collaborations", "governance", "regulation", "incentives", "financing", "investment funds", "sustainab*",

"viab*", "social business", etc. Searches were restricted to articles published since 2015 to focus on recent literature. Initial keyword searches yielded over 5000 articles. These were screened by reviewing titles and abstracts for relevance to the research problem. Just over 40 highly relevant articles were identified. Citation chaining was then used to harvest further pertinent sources from the reference lists of these articles. In total 27 academic sources directly informing the review were analyzed.

Inclusion and exclusion criteria for literature

The sample focuses on studies examining ESG adoption for expanding rural connectivity specifically within developing countries and emerging markets telecom context. Developed country studies were excluded given the vastly different institutional dynamics. Research from information systems, technology management, infrastructure development, public policy, development studies, sustainability, corporate responsibility, strategy, governance and other pertinent fields forms part of the multidisciplinary sample.

Data extraction and thematic synthesis approach

Concept-centric synthesis was utilized to structure key insights and debates based on the main themes of interest: ESG policies/practices, motivations/limitations, solution strategies & frameworks spanning business models, partnerships, policy and financing. Each theme was analyzed separately to characterize viewpoints and empirical findings. These were then holistically compared to ascertain cross-cutting issues, tensions and interlinkages related to the overarching challenge of affordably increasing rural access through context-appropriate ESG strategies. Geographic trends were assessed by tallying the distribution of studies across global regions. Research designs were also reviewed to map predominant methodological approaches within current literature. Gaps in focus areas, methods and country contexts were identified to highlight avenues for extending scholarly understanding. Throughout the analysis, attention was paid to explicitly surfacing normative debates, contrasting arguments and limitations of prevailing perspectives.

RESULTS AND DISCUSSION

ESG policies and practices for rural connectivity

The study exposes a range of ESG strategies telecom companies have used to increase rural connectivity, although most of them still use only few strategies. Rather than complete strategies integrating social development and governance priorities across operations, most companies in developing countries concentrate narrowly on infrastructure rollout to meet basic coverage requirements (David *et al.,* 2024). Critics argue simplistic measures of rural access fail to address affordability, adoption and impacts (Sternberg & Ahearn, 2023; Kormos& Wisdom, 2021). Sophisticated ESG policies tackling digital literacy, community needs and multi-stakeholder participation are less evident. Where present, progressive ESG efforts tend to emphasize product innovations increasing rural service affordability through discounted pricing or low-tier packages bundled with value-added content. However, doubts exist regarding such models' financial viability and their ability to transition users to unsubsidized commercial offerings (Wang, 2024; Kormos& Wisdom, 2021). More transformative community-centric design integrating environmental sustainability is rare. Exceptional cases of telecoms co-developing context-specific rural solutions to drive shared value remain an emergent phenomenon (Pinheiro, 2023). According to research, telecom operators usually follow "light-green" ESG policies, emphasising basic compliance and reputation management above transformative change (Sternberg & Ahearn, 2023; Lembani *et al.,* 2020). Within the framework of infrastructure footprint, KPIs notably fail to assess end-user accessibility or the improvement of capabilities (David *et al.,* 2024). Critics contend that tokenised ESG actions ignore the ingrained inequality caused by profit margins and fail to challenge shareholder-centric corporate models. Still, some researchers find creative exceptions among telecom groups with comprehensive ability-centered indicators that evaluate realised performance concerning women's empowerment, digital literacy, and device ownership. Indicators meant to assess usage quality show the strategic importance of benefit realisation. Although they have certain shortcomings, their slow improvement from basic coverage criteria merits careful consideration.

Motivations and limitations shaping ESG strategies

Telecoms' limited rural and ESG attention is driven by regulatory coverage requirements and virtue-communication, not social obligations. Critics say ESG adoption is unpopular because business objectives favor shareholder primacy, short-term results, and urban markets. Dranev (2023) claims that a few industry leaders' voluntary actions are driven by economic considerations about reputation, political capital, and license to operate rather than rural development convictions. Early attempts reflect a progressive realization of the mutually beneficial potential of investing in inclusive connectivity and social capital beyond legal compliance, supporters argue. Lin et al. (2024) observe the gradual emergence of a values-driven, long-term business case that emphasizes shared prosperity, trust, and emotional connection. The asymmetrical development of this issue is impacted by organizational culture, leadership, and latitude to pursue strategic CSR despite business demands. Research shows that leadership vision and values motivate ESG objectives beyond compliance (Wojewska *et al.,* 2024). CEOs' personal development ideas, encouraged by NGOs, can inspire creative rural inclusion programs. Academics view "agency freedom" as the ability to pursue important goals in limited contexts. Critics say this voluntarism may lead to superficiality and instability, which are not inherent in corporate culture unless they are included.
In response to market demands, sector-wide attitudes that foster visionary leadership are needed yet difficult to encourage. These reforms may include giving telecom workers with direct experiences of marginality to raise awareness and knowledge (Alkire, 2016).

Barriers to effective ESG implementation

Research signals ESG efforts expanding rural access often struggle with challenges of high infrastructure costs, limited rural demand, deficient supporting infrastructure, inadequate digital skills and entrenched institutional logics fixated on short-term financial returns (Leung & You, 2023; Kuika Watat& Jonathan, 2020). Telecoms remain bound by viability constraints given infrastructure investments may fail to stimulate commensurate revenue growth if surrounding deficiencies are not addressed in a coordinated way across

sectors. Critics thus argue isolated corporate initiatives disconnected from broader systemic capacity building will inevitably struggle to transform constrained realities in disadvantaged regions. Zimbabwean organizations, like many in developing countries, are severely limited by old, narrow-based digital infrastructure that has resulted from decades of underinvestment. These firms are trying to use advanced technologies that rely on extensive data flows, cloud architecture, and intensive analytics that are not available domestically. These wired connectivity gaps are linked to frequent power outages due to hydropower dependency, which hinders the development of new technologies that need reliable energy. Policy limits are shown by bureaucratic legacy platforms, organizational silos, and patchwork integration, which hinder coordinated improvements or new procurement in areas where systems operate. However mobile penetration allows for modular adoption that fits the current situation while also pursuing long-term infrastructure development.

Community engagement and participatory approaches

In terms of community engagement, findings reveal telecoms' efforts to incorporate rural insights into ESG initiatives remain largely superficial and limited (Naysary& Shrestha, 2024; Lembani *et al.,* 2020). Firms rarely undertake participatory needs assessments, co-design processes or governance mechanisms to structurally include marginalized groups in shaping infrastructure rollout, product development and adoption strategies. Settled norms of rural citizens as passive recipients of connectivity determined by external experts remain largely intact. Token consultations are conducted by some operators in response to specific controversies over siting impacts. Yet research indicates telecoms lack capacities and strategic commitment for meaningful engagement with rural stakeholders that reframes them as partners and co-creators in contextual solutions design (Wojewska *et al.,* 2024). Critiques suggest such arm's length detached postures reflect cultural dispositions that unconsciously discount marginalized groups' assets and aspirations. Calls exist for decolonizing telecom mindsets through leadership awareness building and incentives promoting cultural humility, power sharing and elevating oppressed voices. However, literature also highlights counter-trends of gradually broadening rural participation through early multi-stakeholder initiatives that institutionalize processes for structured input and representation of disadvantaged communities within telecom decision-making. For example, there are reports of operators establishing digital centres as focal points combining community feedback, participatory monitoring systems, and rural advisory panels. Though scattered and new, these ideas point to possible evolution towards including user-driven insights and co-creative partnerships inside ESG strategies for affordable rural connectivity.

Governance and regulatory frameworks

Regarding governance, results show that, without significant input or responsibility systems for underprivileged groups targeted by ESG connectivity programs, telecom operator behaviour is mostly guided by formal rules and centralised policies (Islam *et al.,* 2023; Lembani *et al.,* 2020). Studies show that issues with rural access usually result from the governance structures of telecommunications, which include elements including universal service levies, spectrum allocation policies, and licence renewing procedures. Regardless, the conflict results from the high universal service standards mixed with the restrictions of commercial viability. Potential answers cover financing connected to outcomes, incentives-based subsidies, and laws supporting contextual innovation. However, it is not clear if top-down systems inspire enough attention outside of constrained coverage criteria to improve standards, costs, and community agency in rural connectivity. Promoting sustainable access development by means of distributed and participatory governance guarantees that policies and alliances coincide with grassroots needs by means of organised channels for user input. Still rare, however, are laboratories that successfully highlight regulatory innovation while addressing viability and representation issues, so underscoring a field needing both academic and policy attention. The debate on the management of rural connectivity mostly reflects a technocratic perspective, mostly free of regard for marginalisation. The study points up positive legislative developments as well as major institutional flaws in terms of participatory responsibility.

Addressing exclusion and marginalization

The results show that women and other intersectionally marginalised groups have more limited connectivity, which spans security, differences in digital skills, and content on platforms that fails to resonate with their experiences (Lin *et al.,* 2024). Critics argue that basic universal access policies ignore issues of identity and misallocate resources in favour of already privileged groups, so failing to address gender risks. Targeted prosecutorial programs like quotas, however, can reinforce essentialist stereotypes that hide the diversity among groups and marginalise impacted populations from the decision-making process (Ibrahim &Alkire, 2007). Capability perspective suggests balanced design combining special measures to meet different needs while expanding chances for marginalised communities – especially women and young people – to significantly participate in rural connectivity governance at all levels as change agents and experts of their reality (Walker, 2021). The study also highlights arguments on possible effects of connectivity on rural ways of life. Some indigenous people express worry about the erasure of cultural values including interpersonal storytelling and communal bonds resulting from mobile or internet adoption (Islam *et al.,* 2023). Others, on the other hand, point out positive possibilities to enhance conventional knowledge exchange and identity development. Results are dependent on local control. Overall results show the need of including pluralist viewpoints and non-western ideas of development inside apparently global connectivity. Sensitivity to bottom-up definitions of valued ways of life can help to avoid mistaken ideas of progress. Greater research is needed on connectivity model alignment with communal mores, dignity and ecologies (Nussbaum, 2011).

Emerging solutions and strategies

Yet academics also observe gradual maturation of creative solutions to align infrastructure deployment, service pricing, adjacent infrastructure development and multi-stakeholder capacity building needed to address sustainability barriers (Tanjung, 2021). For example, emerging cross-sector partnerships with governments, utilities and communities leverage complementary capabilities to enhance rural affordability, revenues, infrastructure utilization and coordinated development. Novel models to reconcile financial

limitations with social ambitions include infrastructure leasing frameworks, inclusive innovation processes and incentive-based regulation that calibrates mandates with viability support. However, research indicates optimal solutions balancing connectivity expansion with operator sustainability have yet to be robustly defined for varied contexts (El-Sholkamy& Rahman, 2022; Lembani *et al.,* 2020). This signals the need for further investigation to develop tailored roadmaps integrating regulatory policies, business models and financing vehicles that allow telecoms across diverse country settings to scale ESG initiatives improving rural access in financially viable ways. Research signals divided scholarly opinion on neo-colonial risks of tokenistic ESG practices that fail to challenge existing power hierarchies relegating marginalized groups as recipients not partners. Critics of critical theory contend that rather than actually distributing control towards self-determined development, surface-level rural "inclusion" projects framed by privileged outsiders often instrumentally extract knowledge, data and legitimacy for external interests (Carmody, 2012; Kupriyanova *et al.,* 2019).

Emerging economy ESG-driven connectivity framework

Based on systematic analysis of the 27 papers reviewed, an integrated framework can be proposed that maps the complex dynamics of ESG-driven rural connectivity in developing countries. The framework would identify four key interconnected components: contextual factors, core implementation challenges, strategic enablers, and adoption outcomes. The contextual environment encompasses economic conditions and the policy landscape. Such contextual factors influence core implementation challenges, which correspondingly manifest across infrastructure, human capital, financial, regulatory as well as social dimensions. Strategic enablers represent evidence-based pathways derived from successful cases across the emerging economy domain. Expected outcomes span economic benefits, social impact and sustainable growth, effectively highlighting the multifaceted potential that successful ESG integration wields for rural connectivity.

PRACTICAL IMPLICATIONS

The results of the review draw attention to several important areas of interest for legislators, telecoms companies as well as community activists seeking to make sustainable use of ESG strategies improving rural connectivity. Telecommunication has to surpass minimal infrastructure coverage and surface-based consultations. A need arises to build context-specific alliances that generate shared value by combining grassroots participation, in the process creating affordability solutions, and the growth of nearby industries including renewable energy, agribusiness, digital skills development, and promotion of locally generated content. Industry groups wield the much needed power to shape rural connectivity as the basis for regional development, thereby effectively transcending just regulatory compliance. Legislators also carry the obligation to effectively lead regulatory innovations including results-based subsidies which are meant to improve affordability, coordinated pro-poor licensing and participatory monitoring. These initiatives should be designed in a manner such that they concentrate on lowering viability limits and increasing user voices inside well-balanced systems that match ambition with environmental sustainability. Further to this, the building of infrastructure fit for a community calls for telecom-oriented investment money combining commercial and concessional funds. Moreover, devolved governance models which create distributed systems to guarantee inclusive rural input in policy-making, monitoring, and knowledge-exchange among projects are needed. Through the means of distributed systems, this method institutionalises participation and enhances coordination threefold. To add on, local infomediaries and civil society groups are quite important facilitators as these also build trust, inspire grassroots connectivity goals and further codify underprivileged points of view. Such a strategy stresses non-technical factors crucial for acceptance. The different innovation roles can be set up to produce locally sensitive ESG solutions which attempt to strike a mix between social empowerment, knowledge integration and importantly above all, feasibility. This presented strategy genuinely seeks to improve rural connectivity for inclusive development through the means of cooperative efforts among several roles of innovation.

VALUE OF RESEARCH

This research synthesis makes many significant contributions for policy debates on connectivity enhancing capabilities. Particularly, the study emphasises underappreciated elements essential for fair mobilisation of benefits that are sometimes hidden in mainstream discourse: participation, empowerment, and tailoring of interventions depending on different constraints confronting vulnerable subgroups outside of general rural communities. Emphasising these understudied areas provides more complete evaluation criteria including technical aspects affecting connectivity results together with cultural resonance and problems of economic justice. Moreover highlighting tensions but also complementarities between grassroots, corporate, and policy points of view is the indication of priorities for balancing financial sustainability, regulation, and social empowerment towards just rural digitalisation. Not only geographically supporting specific solutions, the review clarifies balanced insights for co-creation of contextual roadmaps integrating viability, values, and representation. Moreover, framing access in terms of capabilities stresses neglected tools for marginalised groups to express connectivity constraints from their own reason-based perspectives and shape infrastructure development serving their valuable aspirations. This shifts the focus to mobilisecounterpower for enhancing rural connectivity in order to channel plural visions of justice and welfare against centralised provision of standardised connectivity.

Conclusion

Examining current literature on ESG integration within the telecom sector of developing countries targeted at improving rural connectivity reveals a complex terrain of diverse initiatives struggling with the difficulties of balancing commercial viability and social development priorities. Apart from the inadequate infrastructure coverage, many operators lack sophisticated ESG policies addressing problems of affordability, grassroots needs, and multi-stakeholder governance. Even so, drivers often give compliance top priority over a true dedication to rural areas. Progressive strategies are changing to show growing awareness of the mutually beneficial value resulting from context-specific collaborations anchored in local communities. These alliances balance profitability with a significant social impact at the base of the pyramid, consequently enabling revenue growth, risk

management, and competitive advantage for telephone companies. Although perfect answers depend on particular situations, the application of incentives, financial support, and cooperative capacity-building tools can efficiently solve major issues with regard to costs, demand, and coordination problems over time. Notwithstanding the present restrictions of rural involvement in infrastructure decision-making and monitoring, the emerging trends of advisory panels, co-design processes, and multistakeholder platforms that institutionalise grassroots voices provide a basis for cautious optimism when supported by effective leadership, appropriate regulations, and active participation of civil society. Policy-wise, top-down universal service requirements and licencing changes continue to be the main emphasis. Lower-tier niche innovations, however, highlight the possibilities of alternative participatory governance models that more successfully include financial, technical, and social elements of reaching sustainable access in rural areas. Given that basic conditions related to profitability, empowerment, and policy coordination are sufficiently addressed, the review shows a generally uneven but favourably directed trend in the integration of ESG throughout the telecom sector, especially in improving affordable connectivity for rural communities. Nonetheless, more study is needed on ideal context-specific strategies that successfully balance these needs. While also linking grassroots projects to national policy debates, identified areas that demand further scholarly investigation include the implications for informal ICT providers in rural settings, the prioritising of infrastructure development from a marginal perspective, and the design of appropriate participatory accountability mechanisms within polycentric governance structures that are matched with local reality. Dealing with these gaps through the implementation of active multidisciplinary research covering ethics, culture, and the balancing of various interests will improve universal access models by including sustainability and social justice issues outside the limited technical boundaries of connectivity. Future inclusive connectivity demands a multifaceted approach.

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