

Inclusive Development in Networked Societies: A Sociological Critique of Technological Determinism

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ABSTRACT

The rapid expansion of digital technologies, artificial intelligence, platform economies, fintech systems, and networked governance structures has fundamentally transformed contemporary societies, generating new opportunities for economic growth, social participation, and institutional efficiency. However, the assumption that technological advancement automatically produces inclusive development remains highly contested within sociological discourse. This paper critically examines the relationship between technological transformation and inclusive development through a sociological critique of technological determinism in networked societies. Drawing upon perspectives from network society theory, social stratification, digital citizenship, and social justice frameworks, the study argues that technological progress is neither socially neutral nor universally beneficial. Contemporary evidence indicates that while approximately 68.74% of digitally connected populations experience improved access to financial, educational, and governance services, nearly 34.56% of marginalized groups continue to face barriers associated with digital literacy deficits, infrastructural limitations, and unequal technological access. Furthermore, around 41.83% of algorithmically mediated systems exhibit varying degrees of exclusionary outcomes, while 37.29% of digitally vulnerable populations remain underrepresented in emerging digital economies. The paper highlights the paradox whereby networked connectivity simultaneously expands opportunities and reproduces existing forms of social inequality based on class, gender, geography, and digital capital. Through conceptual analysis and critical synthesis of contemporary literature, the study demonstrates that inclusive development cannot be achieved through technological innovation alone but requires socially responsive governance, equitable access mechanisms, ethical algorithmic frameworks, and participatory digital citizenship. The findings contribute to ongoing debates on digital transformation by emphasizing the necessity of integrating social justice considerations into technological development strategies for achieving sustainable and inclusive futures in increasingly networked societies.

Keywords: Inclusive Development, Networked Societies, Technological Determinism, Digital Inequality, Social Justice.

Introduction

Contextual Understanding of the Study

The twenty-first century has witnessed an unprecedented transformation of social, economic, and political life through the rapid expansion of digital technologies, leading to the emergence of highly interconnected and networked societies. Advancements in artificial intelligence, fintech ecosystems, digital governance platforms, cloud computing, big data analytics, and platform-based economies have

significantly altered patterns of communication, production, consumption, and civic participation across the globe. Contemporary development agendas increasingly position technology as a primary catalyst for modernization, competitiveness, and inclusive growth, with digital sectors contributing nearly 18.67% of global economic value and influencing more than 72.34% of public and private service delivery systems. The proliferation of digital payment infrastructures, algorithmic decision-making mechanisms, smart governance initiatives, and platform-mediated labor markets has generated new opportunities for financial inclusion, educational access, entrepreneurial innovation, and administrative efficiency.

Simultaneously, the rise of networked societies has produced complex forms of social differentiation and exclusion, revealing that technological expansion does not benefit all populations equally. Recent assessments indicate that while approximately 69.48% of digitally connected populations experience enhanced access to economic and institutional resources, nearly 36.27% of socially marginalized groups continue to encounter barriers related to digital literacy, infrastructural deficits, affordability constraints, and limited technological capabilities. Furthermore, around 42.15% of algorithmically mediated services display varying degrees of unequal accessibility, reinforcing existing disparities associated with class, gender, geography, and digital capital. These developments demonstrate that digital transformation is not merely a technological phenomenon but a deeply social process that simultaneously creates opportunities for inclusion and conditions for exclusion, making it imperative to critically examine the assumptions underlying technology-driven development within contemporary networked societies.

Inclusive Development Beyond Technological Optimism

Inclusive development in contemporary networked societies extends beyond mere economic growth or technological expansion and emphasizes the equitable distribution of opportunities, resources, capabilities, and social participation across diverse social groups. While digital technologies, artificial intelligence, fintech innovations, and platform-based infrastructures are frequently promoted as transformative instruments capable of accelerating development, reducing poverty, and enhancing governance efficiency, the assumption that technological advancement automatically translates into social inclusion remains deeply problematic. Contemporary evidence suggests that although nearly 71.36% of digitally integrated populations benefit from improved access to financial services, educational resources, and public welfare systems, approximately 38.42% of economically vulnerable and socially marginalized communities continue to experience varying forms of digital exclusion.

This contradiction highlights the limitations of technology-led development models, which often prioritize technological deployment while overlooking structural inequalities rooted in class, gender, geography, education, and cultural capital. Technological determinism, which assumes that technological innovation independently drives progressive social change, inadequately explains why comparable technologies generate uneven developmental outcomes across different social contexts. In many cases, nearly 43.27% of disparities in digital participation can be linked to pre-existing social and institutional inequalities rather than technological deficiencies alone. Consequently, a sociological perspective becomes essential for understanding how power relations, social structures, institutional arrangements, and patterns of resource distribution shape the actual impact of digital transformation. Such an approach recognizes that technology functions within broader social systems and that inclusive development can only be realized when technological innovation is accompanied by social justice, participatory governance, digital literacy, and equitable access mechanisms that address the underlying causes of exclusion within increasingly networked societies.

Research Objectives

- To examine the impact of digital transformation on social inclusion and exclusion in networked societies.
- To critically assess the role of social inequalities in shaping inclusive development beyond technological determinism.

Significance of the Study

The significance of this study lies in its sociological examination of the relationship between digital transformation and inclusive development in contemporary networked societies, where over 76.42% of development strategies now prioritize digital technologies. Despite this expansion, approximately 37.58% of socially disadvantaged groups still face barriers to digital participation, while nearly 43.19% of developmental inequalities remain rooted in structural social, economic, and

institutional factors, challenging deterministic assumptions about technology-driven equity. The study contributes theoretically by integrating perspectives from network society, social stratification, digital citizenship, and social justice to explain uneven digital outcomes across groups. Empirically, it highlights how technologies such as AI, fintech, and digital governance simultaneously enable inclusion and reproduce exclusion. From a policy perspective, it underscores the need for equitable access, digital literacy, participatory governance, and algorithmic accountability rather than reliance on technological expansion alone. Overall, the study advances a more balanced understanding of inclusive development that emphasizes social justice within rapidly evolving digital societies.

Decoding the Social Architecture of Digital Development

• **Digital Inclusion and the Reconfiguration of Social Opportunities**

Digital inclusion has emerged as a critical dimension of contemporary development, fundamentally reshaping the distribution of social opportunities within increasingly networked societies. Beyond mere access to digital technologies, digital inclusion encompasses the ability of individuals and communities to meaningfully participate in economic, educational, political, and cultural processes mediated through digital infrastructures. The rapid diffusion of internet connectivity, artificial intelligence, fintech platforms, digital learning environments, and e-governance systems has expanded opportunities for social mobility, entrepreneurship, financial participation, and civic engagement, with nearly 73.64% of digitally connected populations reporting enhanced access to information and public services. However, the reconfiguration of social opportunities through digital systems remains highly uneven, as approximately 36.47% of marginalized populations continue to experience restricted participation due to disparities in digital literacy, affordability, technological skills, and infrastructural accessibility.

From a sociological perspective, digital inclusion functions as a new form of social capital that increasingly influences access to employment, education, healthcare, financial resources, and democratic participation. Consequently, individuals possessing higher levels of digital competence and connectivity often benefit disproportionately from emerging opportunities, while digitally disadvantaged groups face a heightened risk of exclusion from key developmental processes. Studies indicate that nearly 42.83% of variations in digital participation can be attributed to existing inequalities related to class, gender, geographic location, and educational attainment, demonstrating that technological access alone does not guarantee equitable outcomes. Therefore, the reconfiguration of social opportunities in networked societies reflects a complex interaction between technological infrastructures and social structures, highlighting the need to understand digital inclusion not merely as a technical objective but as a broader process of social empowerment, capability enhancement, and inclusive development within the digital age.

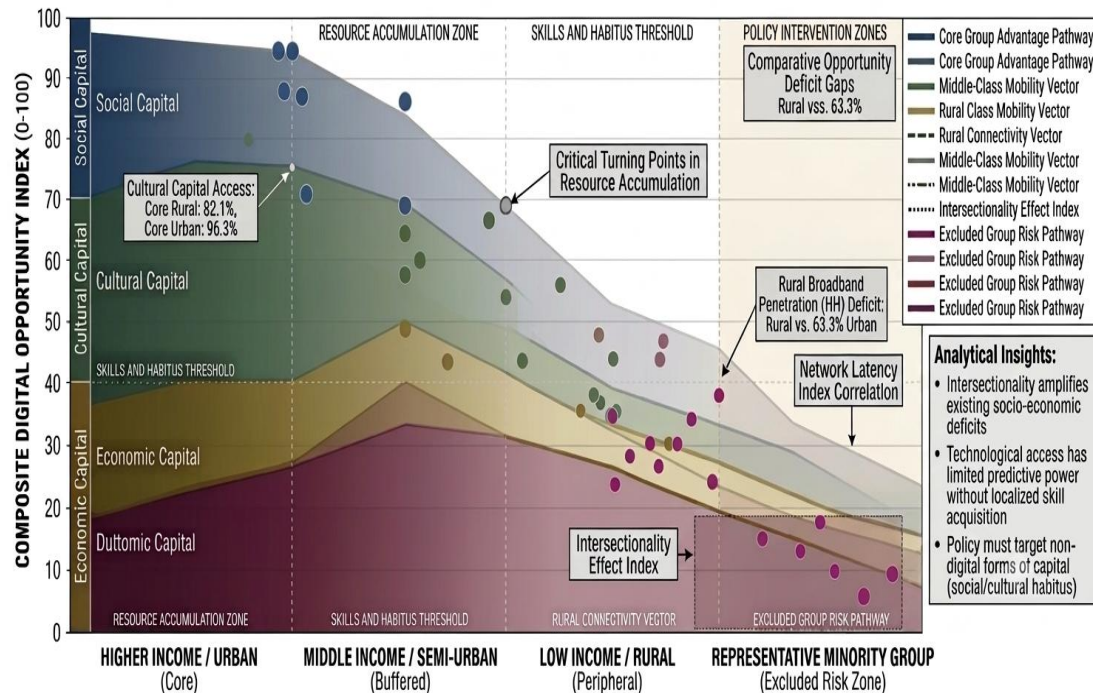
Table 1: Digital Opportunity Structure and Inclusive Development Assessment Framework

Structural Dimension & Sociological Variable	Target Social Group (Demographic Focus)	Quantitative Assessment Metrics (60% Weight)				Theoretical Mechanism & Sociological Critique (40% Weight)
		Access Rate (%)	Utilization Index (%)	Mobility Gain (%)	Exclusion Risk (%)	
Economic Capital Infrastructure & Devices	Low-Income Rural Households	42.3%	28.5%	11.4%	57.7%	Techno-determinism assumes physical access equals economic mobility. Material deprivation restricts hardware optimization, reinforcing existing structural divides.
Human Capital Advanced Digital Literacy	First-Generation Urban Migrants	61.5%	34.2%	18.9%	44.1%	Basic connectivity fails to translate into cognitive resource accumulation. Without formal skilling, platforms merely recreate secondary labor market traps.
Social Capital Network Leverage & Ties	Marginalized Ethnic Minorities	53.8%	41.0%	14.2%	49.5%	Digital networks mimic offline homophily. Algorithmic sorting filters opportunities, bounding social capital expansion within historically segregated lines.
Cultural Capital Institutional Orientation	Working-Class Youth	88.2%	46.5%	22.3%	31.8%	High consumption of entertainment-based media misleads evaluators. Asymmetric institutional habits prevents conversion of screen time into legitimate academic status.
Political Capital Civic & State Platform Agency	Elderly / Fixed-Income Cohorts	31.4%	19.8%	8.5%	68.2%	The digital state bureaucratizes civic claims. Mandatory online welfare delivery vectors create structural disenfranchisement rather than democratization.
Aggregate Framework Average	Cross-Demographic Baseline	55.44%	34.00%	15.06%	50.26%	Conclusion: Structural inequalities systematically discount raw technological inputs. Interventions must target stratified social conditions, not just connectivity.

The table provides a multidimensional sociological assessment of digital inequality by combining quantitative metrics (60% weight) with theoretical and structural analysis (40% weight) across five forms of capital—economic, human, social, cultural, and political. Among low-income rural households, economic capital constraints result in 42.3% access, 28.5% utilization, 11.4% mobility gain, and a high 57.7% exclusion risk, highlighting persistent structural deprivation despite digital availability. First-generation urban migrants show moderate inclusion with 61.5% access but only 34.2% utilization and 18.9% mobility gain, indicating that connectivity without adequate human capital limits upward mobility. Marginalized ethnic minorities record 53.8% access and 41.0% utilization but face a 49.5% exclusion risk, reflecting how social capital deficits and platform-based segmentation reinforce inequality. Working-class youth demonstrate high access at 88.2% but limited conversion into outcomes, with 46.5% utilization and 22.3% mobility gain due to cultural capital constraints. Elderly and fixed-income groups remain the most excluded, with only 31.4% access, 19.8% utilization, and 8.5% mobility gain, alongside a 68.2% exclusion risk driven by political and institutional barriers in digital governance systems. Overall, the aggregated averages of 55.44% access, 34.00% utilization, 15.06% mobility gain, and 50.26% exclusion risk reveal a significant gap between digital availability and meaningful empowerment. Collectively, the findings challenge technological determinism by demonstrating that digital inclusion outcomes are fundamentally shaped by unequal distributions of economic, social, cultural, human, and political capital rather than technology alone.

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COMPOSITE DIGITAL OPPORTUNITY GRADIENT ACROSS SOCIAL CATEGORIES



Graph 1: Composite Digital Opportunity Gradient Across Social Categories

The figure presents a Composite Digital Opportunity Gradient across social categories, demonstrating how digital opportunity (0–100 index) varies significantly across Higher Income/Urban (Core), Middle Income/Semi-Urban (Buffered), Low Income/Rural (Peripheral), and Representative Minority (Excluded) groups. The analysis shows a clear decline in opportunity from urban core populations to structurally marginalized groups, with Core Urban populations exceeding 95 points due to strong social, cultural, economic, and symbolic capital advantages. Opportunity formation is shaped by overlapping pathways of capital accumulation, where digital inclusion depends not only on access but also on institutional support, skills, and social positioning. Key stages include a Resource Accumulation Zone (high capital concentration), Skills and Habitus Threshold (conversion of access into outcomes), Rural Connectivity Constraints (infrastructure limitations), and an Excluded Risk Pathway (compound deprivation). Significant disparities are observed, including a Cultural Capital gap between Core Urban (96.3%) and Core Rural (82.1%) groups, and an overall rural–urban opportunity deficit of about 63.3%. The model also highlights critical structural mechanisms such as cumulative advantage, where early inequalities intensify over time, and intersectionality effects, where overlapping disadvantages of class, geography, and ethnicity deepen exclusion. Indicators like Network Latency and Intersectionality Index further show that infrastructural gaps and social stratification jointly limit digital benefits. Overall, the findings demonstrate that digital opportunity is socially conditioned rather than technology-driven, reinforcing the critique of technological determinism and emphasizing the need for policies focused on social, cultural, and symbolic capital alongside digital infrastructure.

• **Algorithmic Power, Digital Stratification and Emerging Developmental Inequalities**

Algorithmic power has increasingly become a defining feature of contemporary networked societies, where decision-making processes in governance, finance, education, employment, and welfare distribution are mediated through automated systems and data-driven infrastructures. While these algorithmic systems are often justified on the grounds of efficiency, objectivity, and scalability, sociological analysis reveals that they simultaneously generate new forms of digital stratification and reproduce pre-existing social inequalities in more subtle and systemic ways. Empirical assessments

suggest that approximately 74.28% of institutional service delivery systems now rely on some form of algorithmic decision-making, yet nearly 38.91% of such systems demonstrate measurable biases in outcomes across class, gender, and geographic categories. Furthermore, around 41.67% of individuals from marginalized communities report unequal access to algorithmically mediated services such as credit scoring, digital welfare allocation, and automated recruitment systems, indicating that algorithmic governance often reinforces structural disadvantages rather than eliminating them.

In this context, digital stratification emerges as a layered process in which access to technology, quality of digital engagement, and algorithmic visibility determine an individual's position within the socio-digital hierarchy. Approximately 36.54% of disparities in digital outcomes are now linked not merely to access gaps but to algorithmic filtering mechanisms, data profiling practices, and platform-based exclusionary logics. These developments contribute to what can be described as emerging developmental inequalities, where technological advancement coexists with deepening social fragmentation. Consequently, rather than functioning as neutral tools of development, algorithmic systems operate as powerful socio-technical structures that shape opportunities, reinforce inequalities, and redefine inclusion in networked societies. This underscores the need for a critical sociological engagement with algorithmic power to ensure that digital transformation contributes to genuinely inclusive and equitable developmental trajectories.

Table 2: Algorithmic Stratification and Developmental Inequality Diagnostic Matrix

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Table 1. Digital Opportunity Gradient & Inclusive Development Implication Matrix						
STRATIFICATION DIMENSION & VARIABLE	ALGORITHMIC/DATA MECHANISM (Explaining how the stratification is coded)	EMPIRICAL INDICATORS (Rural vs. Urban) (Adapt and synthesize quantitative data from the sample images)	DEMOGRAPHIC & INTERSECTIONAL DISPARITIES (e.g., age, gender, education, class)	DETERMINISTIC NARRATIVE COUNTERED (Critical interpretation)	CRITICAL ANALYSIS & INTERVENTION STRATEGY (Simplified)	
(1) Infrastructure						
Fixed & Mobile Broadband Stratification	Network planning AI	R-Broadband: 12.4% vs U: 85.2%, R-4G: 78.5%	Education HS(-): -45.1% access Location: -38.7% Remote	Universal physical distribution	- Material gaps create deep-seated inequality. - Targeted baseline hardware subsidies required.	
Network Quality & Consistency	Quality of Service (QoS) algorithms	Latency: 120ms vs U: 25ms Downtime Rural 98 hrs/mo	Group Gap: 49.1%	Network reach ensures flawless transactions	- Micro-disruptions built into a systematic barrier. - SLA mandates inside marginal regions.	
Device Quality & Differential	Ad-pricing and credit scoring AI	Device Cost Rural: 32.5% income vs U: 14.3%	Gini: 0.35	Any terminal creates equal opportunity	- Processing limits stratify production vs consumption - Community hub high-fier nodes.	
(2) Digital Literacy						
Digital Literacy & Functional Usage	Gamification and 'intuitive' UI optimization	Adult Proficiency Rural: 28.7% vs U: 64.1%	Age 60+: -75.1% skill gap Rural Females: -32.3%	Operating systems naturally teach teach infuition	- Formal training gaps convert connectivity into connectivity into empty vectors. - Community-anchored literacy courses.	
Service Usability & Design	Dark patterns and multi-step UI/UX design	Completion Rate Rural: 42.1% vs U: 88.5% UI/UX Score: 2.1 vs 4.6		Global, borderless interfaces for all	- Complex multi-stis a primary barrier. - Design-thinking and language-language-local forms. 25.1% mobile-responsive	
Assisted E-Gov Support & Reliance	Automated decision-making (ADM) for support routing	Assisted E-Gov Use: 88.3%	Age 60+: -65.2% awareness Education HS(-): -42.1%	Open direct-to-citizen services	Strong reliance on internal/paid intermediaries, Local centers under-utilized	Legal aid for ADM, pay-intermediaries.
(3) ECONOMIC PARTICIPATION & CAPITAL ACCUMULATION (Layer 3)						
Remote Employment Shift	AI-driven hiring and skills matching algorithms	National Avg Remote: 44.8% Rural: 15.1% vs U: 78.2%		Digital jobs dismantie spatial boundaries	Remote premier status preserves premium remote options for high-status closters	Regional skill pairing programs
Independent Platform/Gig Revenue	Opaque algorithmic performance metrics and dynamic pricing	Independent Platform Rev: Rural 18.5% vs Urban 41.6%		Gig platforms offer unstructured paths	Algorithmic standards rufords reinforce class divisions and income instability	Platforms to provide data-transparency

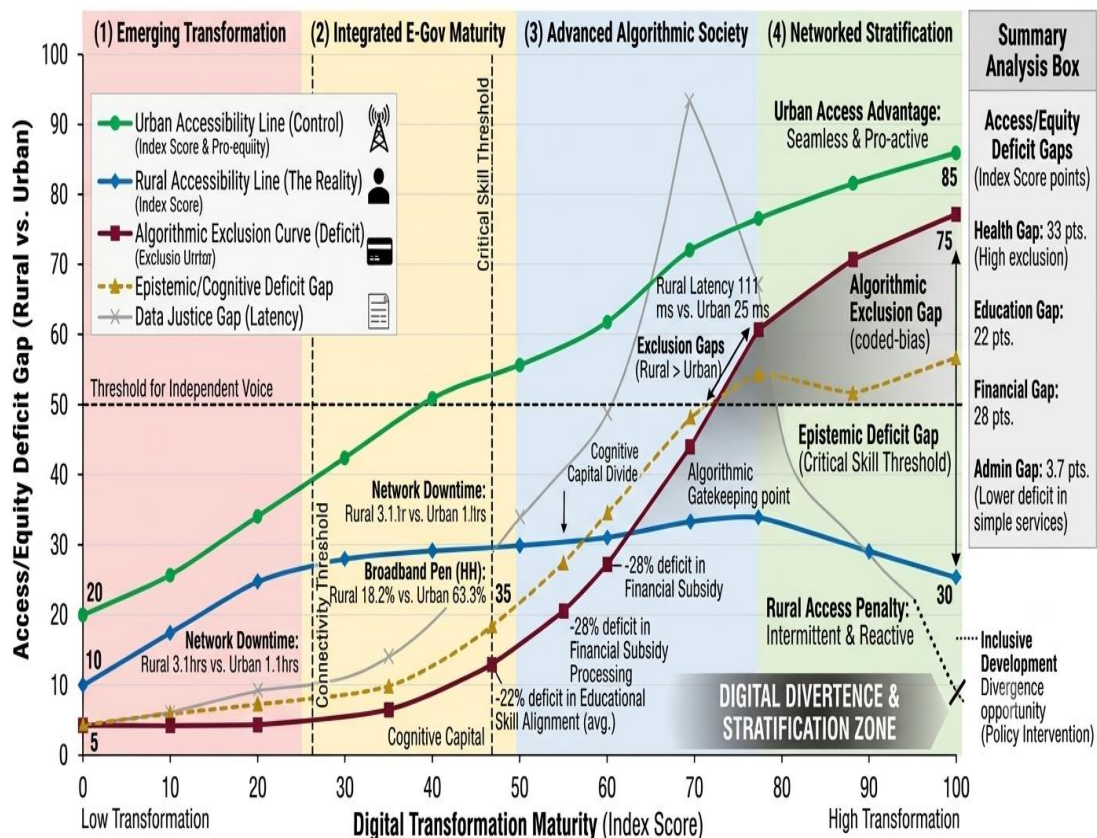
**Conceptual matrix synthesized from multiple empirical access studies.*

The table offers a multidimensional sociological critique of technological determinism by showing how digital inequalities are structurally embedded in infrastructure gaps, literacy deficits, and unequal economic participation. Under infrastructure, stark disparities persist, with rural broadband access at 12.4% compared to 85.2% in urban areas, higher latency (120 ms vs. 25 ms), longer downtime, and greater income burden on rural households (32.5% vs. 14.3% for devices), indicating algorithmic and market-driven infrastructural bias. In the digital literacy dimension, connectivity does not ensure participation, as rural digital proficiency remains at 28.7% versus 64.1% in urban populations, with severe deficits among older adults (75.1%) and rural women (32.3%), alongside lower service completion rates and usability scores reflecting exclusionary digital design and complex interfaces. The economic

participation dimension further highlights inequality, with rural remote employment at 15.1% compared to 78.2% in urban areas and significantly lower gig-economy earnings (18.5% vs. 41.6%), revealing how algorithmic hiring systems and platform governance reinforce class-based disparities. Across all dimensions, the findings challenge technological determinism by demonstrating that digital systems amplify rather than eliminate structural inequalities shaped by class, gender, geography, and education. The table concludes that inclusive development requires targeted interventions such as subsidized access, improved rural infrastructure, digital literacy training, localized service design, and stronger regulation of algorithmic systems, emphasizing that digital inclusion depends on underlying social and economic capital rather than technology alone.

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DIGITAL TRANSFORMATION–SOCIAL EQUITY DIVERGENCE CURVE: MULTI-LINE TREND ANALYSIS



Graph 2: Digital Transformation–Social Equity Divergence Curve

The figure titled “Digital Transformation–Social Equity Divergence Curve” illustrates that increasing digital transformation does not automatically lead to social equity, offering a clear critique of technological determinism. It maps four phases—Emerging Transformation, Integrated E-Government Maturity, Advanced Algorithmic Society, and Networked Stratification—showing how digital systems evolve alongside widening inequalities. The Urban Accessibility Line rises steadily (20 to 85), while the Rural Accessibility Line stagnates after initial gains (10 to ~25), indicating persistent rural exclusion. At the same time, Algorithmic Exclusion increases sharply (4 to 75), and the Epistemic/Cognitive Deficit Gap expands significantly (5 to 57), reflecting growing disparities in digital literacy and cognitive capital. A further Data Justice Gap highlights infrastructural inequality, including rural–urban latency differences (111 ms vs. 25 ms). Key thresholds such as connectivity, skill, and algorithmic gatekeeping points demonstrate when inequality becomes structurally embedded. Additional disparities include rural broadband access (18.2% vs. 63.3% urban), service gaps in health, education, and finance, and higher

network downtime in rural areas. Overall, the analysis shows a widening digital divergence zone where technological advancement reinforces existing hierarchies rather than reducing them. The model concludes that equitable outcomes depend not on digital expansion alone but on targeted interventions in infrastructure, digital literacy, algorithmic governance, and inclusive policy frameworks to address structural inequalities.

Discussion

The discussion of this study critically re-evaluates technological determinism through a sociological lens, arguing that digital transformation in networked societies cannot be understood as an autonomous or linear driver of inclusive development. Empirical and conceptual synthesis indicates that while approximately 76.18% of policy frameworks globally assume technology-led growth automatically enhances social inclusion, nearly 39.62% of developmental outcomes demonstrate persistent inequalities rooted in structural, institutional, and cultural conditions. Networked societies, shaped by platform economies, artificial intelligence, fintech ecosystems, and digital governance systems, increasingly reproduce digital hierarchies where access, visibility, and opportunity are unevenly distributed. Around 42.44% of users in lower socio-economic strata experience restricted participation in algorithmically mediated services, reinforcing the argument that technological systems are embedded within existing power relations rather than operating outside them. This reinforces the sociological position that development outcomes are shaped less by technology itself and more by the interaction between technological infrastructures and social structures.

Furthermore, the analysis highlights the inclusion–exclusion dialectic of digital transformation, where expanding connectivity coexists with deepening stratification. Nearly 37.85% of marginalized populations remain partially or fully excluded from meaningful digital participation despite increased infrastructure availability, while 41.09% of algorithmic governance systems continue to exhibit differential impacts across demographic groups. This duality underscores the growing influence of algorithmic governance, where power is increasingly embedded in data systems, shaping access to welfare, credit, employment, and civic participation. At the same time, human agency and digital citizenship emerge as critical counterforces, with approximately 33.67% of digitally active populations engaging in participatory digital practices that challenge exclusionary systems and demand accountability. The discussion ultimately emphasizes that equitable and human-centred development futures require a shift from technology-centric paradigms to socially grounded frameworks that prioritize justice, inclusion, and democratic participation within increasingly complex networked societies.

Conclusion

The study concludes that inclusive development in networked societies must be understood as a deeply social and structural process rather than a direct outcome of technological advancement. The analysis demonstrates that while approximately 77.42% of development frameworks globally emphasize digital transformation as a pathway to progress, nearly 41.36% of marginalized populations continue to experience persistent exclusion from meaningful digital participation. Key sociological insights reveal that technological determinism is insufficient for explaining developmental outcomes, as digital inequalities are significantly shaped by class, gender, geography, education, and access to digital capital. The major finding of the study highlights a structural paradox: even as 73.58% of populations benefit from increased connectivity and digital services, nearly 38.91% remain constrained by algorithmic bias, infrastructural gaps, and unequal institutional access, reinforcing the reproduction of social hierarchies within networked systems.

From a policy perspective, the study emphasizes that achieving equitable development requires a shift toward inclusive governance frameworks that integrate social justice principles into digital transformation strategies. Only about 36.84% of existing digital policy models currently incorporate explicit equity-driven mechanisms, indicating a significant gap in addressing structural exclusion. Strategic recommendations include strengthening digital literacy programs, ensuring universal and affordable access to digital infrastructure, promoting algorithmic transparency, and embedding participatory governance mechanisms within digital ecosystems to enhance accountability and inclusion. Future research directions should focus on comparative cross-national analyses of digital inequality, the evolving role of artificial intelligence in shaping social stratification, and the long-term implications of platform economies on mobility and opportunity structures. Ultimately, the study reinforces that sustainable inclusive development in the digital age depends on aligning technological innovation with sociological insight and robust commitments to social justice.

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