Advancing Digital Inclusion: Bridging The Gap in A Tech-Driven Economy

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Abstract:

The digital economy has emerged as a key driver of global development by contributing to innovation, economic productivity, and employment creation. Still, many people are left behind and cannot enjoy its full benefits. A significant digital divide persists between individuals who have access to digital technologies and those who remain excluded, particularly in developing countries like India. This paper examines the key causes of digital inequality, including limited internet access, lack of affordability, and low digital literacy, which prevent millions from fully participating in today's technology-driven society. Bridging this gap is crucial to ensure inclusive development and equal opportunities for all. This study is based on secondary research from the World Bank, the International Telecommunication Union (ITU), and national digital development reports. It examines the causes and impacts of the digital divide while highlighting the urgent need for digital inclusion strategies. The study emphasizes four key areas: improving digital infrastructure, enhancing digital literacy, ensuring affordability of devices and connectivity, and supporting inclusive digital policies. Strengthening these components will be essential for narrowing the digital divide and ensuring equitable participation in a technology-driven economy.

Key words: Digital Economy, Digital Divide, Technology-Driven Economy, Inclusive development, Digital inclusion strategies, India

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INTRODUCTION

Digital technology has become an essential foundation of economic and social development in the 21st century. Digital platforms now play a central role in enabling access to education, healthcare, finance, commerce, and public services, reshaping how individuals interact with society and the global economy (World Bank, 2023). As the digital economy expands, participation in digital systems is no longer optional but a necessity for improving quality of life and securing socio-economic opportunities.

Despite rapid technological advancements, the benefits of digital transformation are not equally shared. The digital divide characterized by disparities in access to the internet, devices, and digital skills continues to be a significant challenge, particularly in developing countries like India (ITU, 2024). While India has emerged as one of the fastest-growing digital markets in the world, a sizable portion of its population remains digitally excluded due to socio-economic and geographical inequalities. Rural communities continue to face inadequate connectivity and infrastructure, while many low-income households struggle with affordability of digital services and devices (World Bank, 2023). Furthermore, a notable gender gap in digital access persists, with women less likely to use or benefit from technology due to social and cultural constraints (GSMA, 2022).

Recognizing the urgency of digital inclusion, the Government of India has launched multiple ambitious initiatives. Digital India aims to transform India into a digitally empowered society, while Bharat Net focuses on expanding high-speed broadband connectivity to rural regions. Additionally, the PMGDISHA programme seeks to

enhance digital literacy among marginalized groups (MeitY, n.d.). Although these initiatives represent significant progress, multiple studies suggest that stronger implementation and targeted support are required to overcome persistent barriers.

Achieving digital inclusion is crucial for ensuring equitable participation in the technology-driven economy. This study examines the causes and consequences of India's digital divide, evaluates ongoing policy efforts, and highlights strategic measures required to bridge existing gaps. A particular emphasis is placed on addressing affordability issues, strengthening rural digital infrastructure, and promoting inclusive digital literacy programmes. By tackling these challenges holistically, India can build a future where all citizens benefit from digital innovation, enabling improved livelihoods, enhanced economic growth, and greater social empowerment.

STATEMENT OF THE PROBLEM

Despite rapid digital infrastructure growth in India, access to digital technology remains highly unequal across different regions, communities, gender groups, and income levels. Rural and marginalized populations face barriers such as poor connectivity, high costs, limited device availability, and low digital literacy, which obstruct inclusion in the tech-Driven economy.

Although+ the government has launched programs like Digital India, Bharat Net, and PMGDISHA to bridge the digital divide, their implementation has been uneven and benefits have not fully reached the intended groups. Existing studies highlight a lack of deeper evaluation of these initiatives' real outcomes. Hence, this study addresses the gap by assessing policy effectiveness and identifying barriers that continue to hinder universal digital inclusion.

SIGNIFICANCE OF THE STUDY

Digital transformation has become essential for socio-economic growth in India, enabling access to education, healthcare, financial services, and employment opportunities. However, persistent digital inequality prevents millions of citizens from benefiting from these advancements. This study is significant as it highlights the underlying factors that contribute to digital exclusion and examines the real-world impact of government initiatives designed to promote digital inclusion. The findings of this study will contribute to existing research by evaluating the effectiveness of programmes such as Digital India, Bharat Net, and PMGDISHA in addressing connectivity gaps and improving digital literacy. By identifying implementation challenges and regional disparities, the study will offer valuable insights for policymakers to strengthen digital infrastructure, affordability, and skill development in underserved regions. This research also holds practical value for organizations, educators, and community development stakeholders working to enhance digital participation. By recommending strategies to bridge the digital divide, the study supports efforts to ensure equitable technological advancement, reduce socio-economic inequality, and promote inclusive digital growth across India. Ultimately, this study is significant as it aims to support a future in which digital access becomes a universal right and every citizen can actively participate in the digital economy.

REVIEW OF LITERATURE

The Ministry of Electronics and Information Technology (MeitY, 2024) reports that the government continues to expand digital infrastructure, promote electronics manufacturing, and implement initiatives under Digital India to improve e-governance, digital literacy, and inclusive access. However, gaps persist in digital accessibility, affordability, and usage, particularly among rural and marginalized communities. Under the PMGDISHA scheme, more than 6.39 crore rural citizens have been trained in basic digital skills as of March 2024, demonstrating substantial outreach (MeitY, n.d.). Still, secondary sources highlight that digital literacy training alone is not sufficient to ensure meaningful participation in the digital economy.

Rapid digitalization has transformed how societies access education, healthcare, employment, and governance worldwide. Yet, despite improvements in connectivity, deep disparities remain — especially in developing countries. The World

Bank (2024) notes that although 1.5 billion new users joined the internet between 2018 and 2022, the benefits of digital transformation remain unevenly distributed across socio-economic groups. This divide continues to expand between populations who are digitally empowered and those who remain digitally excluded.

Infrastructure inequality is one of the major barriers to digital access. ITU (2024) highlights those rural regions in low- and middle-income countries experience weak network quality, slower broadband speeds, and higher data costs. These challenges are evident in India as well, where rural areas suffer limited connectivity compared to urban locations. ITU emphasizes that meaningful connectivity requires not only internet access but also reliable service quality to support digital learning, e-governance, and financial participation.

Affordability is another significant barrier. The World Bank (2024) reports that individuals from lower-income households face high costs of devices and data services, restricting their ability to participate in digital employment, e-commerce, and online services — thus reinforcing economic inequality.

Gender-based disparities also remain a major concern. GSMA (2023) finds that women in low- and middle-income countries are 19% less likely to use mobile internet and 7% less likely to own a mobile phone than men. In India, around 90 million women remain offline, highlighting structural and socio-cultural barriers to equitable digital access. GSMA identifies affordability, low digital literacy, and restrictive social norms as key challenges and stresses that improving women's access will yield strong economic and social benefits.

The reviewed literature confirms that digital inequality in India is influenced by multiple interconnected factors including infrastructure limitations, affordability constraints, gender disparities, and insufficiently targeted policy implementation. Although progress has been made through national initiatives, challenges remain in ensuring equitable digital access for marginalized communities. This study addresses these gaps by examining disparities and evaluating policy effectiveness to propose strategies for a more inclusive digital future in India.

OBJECTIVES

1. To identify the major socio-economic, geographical, and gender-based determinants contributing to digital inequality in India.
2. To evaluate the effectiveness of government initiatives such as Digital India, Bharat Net, and PMGDISHA in promoting digital inclusion among marginalized communities
3. To propose strategies and policy recommendations to enhance digital access, affordability, and skills across underserved regions and populations in India.

METHODOLOGY

This study uses a secondary research approach, relying on published data and literature related to digital inclusion in India. Information was collected from credible sources such as the World Bank, the International Telecommunication This study uses a secondary research approach, relying on published data and literature related to digital inclusion in India. Information was collected from credible sources such as the World Bank, the International Telecommunication Union (ITU), GSMA, and the Ministry of Electronics and Information Technology (MeitY).These sources provide statistical insights and policy details relevant to the digital divide. A qualitative content analysis was conducted to examine key barriers such as infrastructure limitations, affordability issues, and digital literacy challenges. Government initiatives and their impacts were also reviewed to understand ongoing efforts to improve digital access. As this study depends solely on secondary data, no primary data collection was involved. The findings were synthesized to draw conclusions about strategies needed to strengthen digital inclusion in India.

LIMITATIONS OF THE STUDY

This study is based entirely on secondary data, which limits access to real-time information and primary user perceptions. The findings rely on the accuracy and availability of reports from international and government sources, which may vary in reporting periods. Since the study focuses only on India, the results cannot be generalized to other countries. Additionally, digital inequality is a

rapidly changing issue, so some data may become outdated quickly.

ANALYSIS OF THE STUDY
TABLE.1 SOCIO-ECONOMIC INEQUALITY IN DIGITAL DIVIDE

INDICATOR	RICHEST 20%HOUSEHOLDS	POOREST 20%HOUSEHOLDS
Computer access	27%	2.7%
Internet access	50%	8.9%

Source: Indian inequality report (2022)

The table clearly illustrates the socio-economic inequality that exists in terms of digital access in India. It compares the richest 20 percent of households with the poorest 20 percent using two key indicators: computer access and internet access. The data shows that 27% of the richest households have access to computers, whereas only 2.7% of the poorest households possess such facilities. Similarly, more than 50% of the households in the highest income group have access to the internet, while only 8.9% of the lowest income group has the same. This striking disparity highlights how income levels continue to influence who can benefit from digital technologies. As a result, poorer communities remain digitally excluded, which further limits their access to education, employment opportunities, and essential online services. Therefore, the table clearly indicates that digital growth in India is uneven and continues to widen the divide between the rich and the poor.

TABLE.2 RURAL URBAN DIVIDE

AREA	INTERNET USERS
Urban	67%
Rural	31%

Source: Indian inequality report (2022)

According to the Indian Inequality Report (2022), around 67% of the population in urban areas uses the internet, whereas only 31% of the rural population has access to the internet. This shows that people living in urban areas are more than twice as likely to have digital access compared to those living in rural regions. The major reasons behind this divide include limited digital infrastructure, poor network connectivity, lower income levels, and lack of digital literacy in rural areas. As a result, rural communities face greater challenges in accessing online education, employment opportunities, healthcare information, and government services. Therefore, the table clearly indicates that geographical location plays a significant role in shaping digital inclusion in India.

TABLE.3 GENDER DIGITAL DIVIDE

INDICATOR	VALUE
% Of men (15-49 years) who ever used the internet	57.1%
% of women (15-49) who ever used the internet	33.3%
Gender gap internet use men v/s women	About 24%
Rural v/s urban internet use (men)	Rural: 48.7% Urban :72.5%
Rural v/s urban internet use (women)	Rural: 24.6% Urban: 51.8%

Source: National Family health survey 2019-2021

The table highlights major gender and rural–urban disparities in internet usage in India. Men have significantly higher access to the internet (57.1%) compared to women (33.3%). Urban residents are far more digitally connected than those in rural areas, especially women — only 24.6% of rural women use the internet versus 51.8% in urban areas. Overall, the data clearly indicates that women in rural regions remain the most digitally excluded group, showing a need for focused measures to ensure inclusive digital access.

RURAL- URBAN COMPARISON OF DIGITAL INCLUSION INDICATORS IN INDIA

Indicator	Linked initiative	Rural (%)	Urban (%)	Gap (Urban-Rural)	Interpretation
Internet penetration	Digital India	37%	70%	33%	Significant adoption gap persists

					despite overall growth
Active internet users (share of total population)	Digital India	35%	72%	37%	Usage intensity much higher in urban areas
Broadband availability	Bharat net	80%	100	20%	Infrastructure gap narrowing
Household internet access	Bharat net/ digital India	31%	69%	38%	Access at household level still uneven
Basic digital literacy	PMGDISHA	38%	65%	27%	Skill divide remains substantial
Online financial transactions usage	Digital India	28%	60%	32%	Digital economy participation unequal

Source: TRAI (2022),MeitY(2023),DoT (2023), NSSO(2022), ITU(2022)

FINDINGS

The discussion highlights that digital growth does not automatically ensure digital inclusion. Although internet penetration has increased, access remains unequal across rural areas, women, and low-income groups. The digital divide is influenced not only by infrastructure gaps but also by affordability, digital literacy, and socio-cultural barriers. Rural populations face connectivity challenges, while women experience additional restrictions due to economic and social factors. Moreover, having access alone is insufficient without the skills needed for meaningful digital use. As essential services such as education, banking, healthcare, and governance become digital, exclusion risks deepening existing inequalities. Therefore, inclusive digital policies must address infrastructure, affordability, skills development, and gender equity to ensure that technological advancement supports broad-based socio-economic development rather than widening disparities.

POLICY RECOMMENDATIONS AND SUGGESTIONS

To enhance the effectiveness of Digital India, Bharat Net, and PMGDISHA in promoting digital inclusion among marginalized communities, policy efforts must move beyond infrastructure expansion toward an integrated access–affordability–ability framework. Although Bharat Net has strengthened rural broadband infrastructure, greater emphasis is needed on last-mile connectivity through public–private partnerships, community Wi-Fi models, and local service providers to ensure household-level access. Affordability barriers should be addressed through subsidized data plans, low-cost smartphones, and targeted digital vouchers for low-income households.

Digital literacy initiatives such as PMGDISHA require qualitative enhancement rather than focusing solely on certification numbers. Training should extend beyond basic operational skills to include financial literacy, e-governance access, telemedicine usage, and cybersecurity awareness. Special attention must be given to women, Scheduled Castes, Scheduled Tribes, minorities, elderly individuals, and persons with disabilities. Integrating digital education into school curricula and rural livelihood programs can promote sustainability.

Addressing the usage divide is equally important. Government digital platforms must be multilingual, user-friendly, and accessible through voice-based interfaces to support low-literacy users. Strengthening cybersecurity awareness and grievance redressal systems will help build trust among first-time users.

Finally, digital inclusion policies should adopt data-driven monitoring with rural–urban and socio-economic disaggregation. Evaluations must focus on outcomes such as employment, income generation, education, and financial inclusion. Aligning digital initiatives with broader socio-

economic development programs will ensure that digital transformation promotes equity rather than reinforcing existing inequalities.

CONCLUSION

Digital inclusion is no longer a technological issue alone; it is a socio-economic necessity in a rapidly evolving tech-driven economy. While India has made significant progress in expanding internet connectivity and digital services, substantial gaps remain across rural areas, gender groups, and income levels.

The persistence of digital inequality risks deepening socio-economic disparities and limiting inclusive growth. Bridging the digital divide requires a multi-dimensional approach involving infrastructure development, affordability measures, digital literacy enhancement, and inclusive policy frameworks.

A digitally inclusive economy can enhance educational opportunities, financial inclusion, employment generation, and governance efficiency. Therefore, advancing digital inclusion must be treated as a central pillar of sustainable and equitable development.

REFERENCES

Agarwal, S., & Singh, A. (2022). Digital public infrastructure and financial inclusion in India. Economic & Political Weekly, 57(12), 45–53.

Antonio, A., & Tuffley, D. (2014). The gender digital divide in developing countries. Future Internet, 6(4), 673–687. https://doi.org/10.3390/fi6040673

Chaudhuri, A., Flamm, K., & Horrigan, J. (2005). An analysis of the determinants of internet access. Telecommunications Policy, 29(9–10), 731–755.

Comptroller and Auditor General of India. (2021). Report on implementation of BharatNet project. Government of India.

Department of Telecommunications. (2022). BharatNet progress report. Government of India.

DiMaggio, P., & Hargittai, E. (2001). From the "digital divide" to "digital inequality": Studying internet use as penetration increases. Princeton Center for Arts and Cultural Policy Studies Working Paper.

Drèze, J., & Sen, A. (2013). An uncertain glory: India and its contradictions. Princeton University Press.

GSMA. (2023). The mobile gender gap report 2023. GSMA.

Hargittai, E. (2002). Second-level digital divide: Differences in people's online skills. First Monday, 7(4). https://doi.org/10.5210/fm.v7i4.942

International Telecommunication Union. (2022). Measuring digital development: Facts and figures. ITU.

Kumar, R., & Best, M. L. (2006). Impact and sustainability of e-government services in developing countries: Lessons from India. The Information Society, 22(4), 231–240.

Ministry of Electronics & Information Technology. (2015). Digital India programme. Government of India.

Ministry of Electronics & Information Technology. (2017). Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) guidelines. Government of India.

National Statistical Office. (2021). Multiple indicator survey on digital access in India. Ministry of Statistics and Programme Implementation.

NITI Aayog. (2021). Digital inclusion and financial empowerment in India. Government of India.

OECD. (2019). Measuring the digital transformation: A roadmap for the future. OECD Publishing.

Oxfam India. (2022). India inequality report 2022: Digital divide. Oxfam India.

Piketty, T. (2014). Capital in the twenty-first century. Harvard University Press.

Rao, S. S. (2005). Bridging digital divide: Efforts in India. Telematics and Informatics, 22(4), 361–375.

Reserve Bank of India. (2023). Report on trends and progress of banking in India. RBI.

Sarkar, S. (2020). Digital divide in India: Measurement, determinants and policy implications. Indian Journal of Human Development, 14(2), 191–206.

Selwyn, N. (2004). Reconsidering political and popular understandings of the digital divide. New Media & Society, 6(3), 341–362. https://doi.org/10.1177/1461444804042519

Sen, A. (1999). Development as freedom. Oxford University Press.

Telecom Regulatory Authority of India. (2023). The Indian telecom services performance indicators report. TRAI.

UNESCO. (2018). Digital literacy in education systems. UNESCO.

UN Women. (2021). Bridging the gender digital divide in India. United Nations.

van Deursen, A., & van Dijk, J. (2014). The digital divide shifts to differences in usage. New Media & Society, 16(3), 507–526. https://doi.org/10.1177/1461444813487959□

van Dijk, J. (2020). The digital divide. Polity Press.

World Bank. (2021). Digital development overview: India. World Bank Group.