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Digital India: Economic Opportunities and Challenges

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Abstract

The Digital India initiative represents a transformative vision to position India as a digitally empowered knowledge economy. This paper examines the economic opportunities and challenges associated with digital transformation across key sectors such as agriculture, education, healthcare, manufacturing, and governance. It highlights how information and communication technologies (ICT), artificial intelligence, digital infrastructure, and e-governance can enhance productivity, generate employment, foster entrepreneurship, and promote inclusive growth. At the same time, the study identifies critical barriers including inadequate digital infrastructure, unequal access to technology, low digital literacy, regulatory constraints, and regional disparities. By analysing policy frameworks, sectoral impacts, and the evolving digital entrepreneurship ecosystem, the paper argues that while Digital India holds immense potential to accelerate economic growth and global competitiveness, sustained investment, effective governance, and inclusive implementation are essential to realise its full benefits.

Keywords: Digital India, Digital Economy, Economic Growth, ICT, Employment Generation, Digital Infrastructure, E-Governance, Digital Inclusion, Entrepreneurship, Policy Challenges

Introduction

Digital India encompasses a vision to transform the nation into a digitally empowered knowledge economy, ensuring the country remains connected to modern global technology-driven developments. Structural poverty and unemployment constitute vital concerns, underscoring the critical need for growth that creates economic opportunities. “The need to create employment opportunities, accelerate economic development, creating a digital future” forms the thrust of the analysis conducted. Formal and informal sectors combined were engaged by the national sample survey office (NSSO), resulting in the understanding that in 2004–2005, globalisation sought to influence India’s national policies towards Mahatma Gandhi National Rural Employment Guarantee Schemes (MGNREGS), the national urban livelihood mission (NULM), and the National Rural Livelihood Mission (NRLM). The vision seeks to drive transformative growth by enabling the digital sector to contribute 20 percent to the economy and fostering the emergence of 100 unicorns over five years to stimulate employment. Understanding the economic opportunities arising from digital transformation—and the barriers to realisation—can contribute to an informed discussion on the Digital India vision. Hence, two primary inquiries deserve attention: first, which sectors stand to benefit significantly from digital transformation, and what potential gains can be expected; second, what challenges hinder scaling of digital initiatives to their full extent (Bajpai et al., 2018).

Historical and Policy Context

Prior to 1991, India experienced economic stagnation due to a bloated public sector and inefficient industrial policies. Liberal reforms, such as reduced import taxes and market deregulation, helped sustain high GDP growth driven by foreign investment and the services sector. Information and communication technology (ICT) was the key enabler, making India a leader in global services outsourcing and boosting its IT industry (Bajpai et al., 2018).

Development in hardware, electronics, and high-tech manufacturing elevated China’s economy, with artificial intelligence (AI) investments aiming to further boost manufacturing and global influence.

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ICT can promote inclusive growth by integrating users into the economy and democratizing services, but India still lags in infrastructure and key digital measures compared to China.

Ecosystem and Infrastructure for Digital Economy

The Digital India programme has on several occasions been touted as a game changer for the economy of the world's second-most populous country. The initiative, which seeks to bring the Government of India (GoI) closer to its citizens and improve service delivery through technology and digitisation, represents an audacious push for digital penetration within the Indian economy. The programme articulates the vision to transform each segment of the economy through digital technologies, such as Artificial Intelligence (AI) and Machine Learning, that can contribute to new business opportunities and improve growth and productivity. Four core themes—democratic governance, digital economy, digital infrastructure, and inclusive society—underline the transformative ambition of the initiative. The Digital India programme is unprecedented in scale, framing an ambitious vision to harness the power of information and communication technology (ICT) for transforming the lives and livelihoods of people at unprecedented scale. Digital India promotes an integrated approach towards the country's digital transformation, covering a wide range of developmental issues across sectors and levels. Digital India is based on the premise that the ongoing digital transformation across core sectors could generate substantial new opportunities for the economy, thereby enhancing growth, creating jobs, and improving quality of life. This section maps the ecosystem of technologies, products, and services that underpin digital transformation in India and assesses the basic capacity, redundancy, and regional spread of core components (A. Oloyede et al., 2023); (Aminullah et al., 2022).

Economic Opportunities from Digital Transformation

The economic opportunities from the Digital India programme are immense, but these will have to be realised in order to grow. The Digital India programme is expected to grow productivity by about 1% per annum by encouraging both new and improving existing businesses (Bajpai et al., 2018). It is also anticipated that every 1% increase in the digital uptake by sectors such as agriculture, education, health services and manufacturing leads to a productivity rise in these corresponding sectors by between 1% and 1.5% (B. Arewa, 2022). The Digital India initiative can generate just over 1.3 million jobs per year in the country until 2025. Entrepreneurs have been quick to innovate and

create around data, indicative of the potential of growth through support from the Digital India initiative. The opportunities for the Indian economy are staggering, and strongly contribute to the knowledge economy. The pandemic too has altered the way businesses operate, with increased awareness through focused campaigns on digital platforms, either directly through supplier or services provided digitally.

Challenges and Barriers to Implementation

India's Digital India initiative aims to transform the country into a digitally empowered society and knowledge economy. This research focuses on the economic opportunities and challenges that accompany this ambitious undertaking. While digital transformation has the potential to promote new business models, productivity gains, job creation, and global reach, there are factors that could impede progress. Specific opportunities and challenges in agriculture, education, healthcare, and manufacturing are also explored, as well as governance and regulatory issues, entrepreneurship, international competitiveness, and policy options. Digital technologies can facilitate cash transfers, internet access, and digital payments. India registered 531 million individual digital transactions in 2016–17, with a total value of over \$712 billion (Bajpai et al., 2018). However, obstacles still exist. Approximately one-third of households lack access to the internet and mobile telephony, and about 10 percent of the population remains without a mobile phone. These gaps are compounded by deficiencies in payment infrastructure and connectivity, slow broadband speeds, frequent interruptions in service, low digital literacy, limited ownership of digital devices, and other constraints. The first step in promoting a digital economy would be to develop a mapping of digital coverage.

Sectoral Impacts: Agriculture, Education, Healthcare, and Manufacturing

Fragile economies are naturally dependent on the glorious success of agricultural products. In India the agricultural sector engages a majority of the workforce. The outlook of the agricultural sector dictates the food greets on the farmer's table therefore with the growing technology around the world, it became crucial to boost this industry. The Government of India taking into account the importance of agriculture focuses on several initiatives under Digital India programme such as E-NAM, women entrepreneurship, digital lockers, Agro-Meteorological Advisory, Crop Insurance and Livestock Health Cards to motivate cultivation of crops through improved seeds to support their economic enterprise (Singh & Srivastava, 2019). The Government of India and many state governments have initiated numerous digital

education projects throughout the country for primary, secondary, and higher education, including the provision of pre-recorded audio-visual e-content and e-books for students via the National Mission of Education through Information and Communication Technology (NMEICT) (Bajpai & Biberman, 2019). The emphasis is on the delivery of quality e-content to connect the Digital India campaign with education. Significant resources have been allocated to the execution of the project. Several states, including Andhra Pradesh, Bihar, Chhattisgarh, Delhi, Haryana, Karnataka, Maharashtra, Odisha, Punjab, Tamil Nadu, Telangana, and Uttar Pradesh, have established state-specific portals providing access to free and open content-based educational resources for higher education.

Governance, Regulation, and Digital Inclusion

A well-functioning governance and regulatory system facilitated the transition of policies, programs, and projects from central to state and local-level public governance in India. Such systems benefit from a resultant higher degree of responsiveness and responsibility, thereby further fuelling the cumulative impact of digitalization on the level of corruption. Accountability and transparency are improved, as computerized systems reduce the number of intermediate agents in the interaction between recipients and providers of services and goods. With the existing conditions of over one hundred million people still not connected to the net, administrative procedures that offer services through digital means and that characterize governance systems remain less than ideal (Jeet Singh, 2008). Currently, more than 40% of the population remain excluded even from simple ICT tools. The governance, regulatory, and e-inclusion challenges resulting from this further ensure that the full leverage of the advantages offered by digitalization remain constrained. The concomitant problems refer to 320 million men and women, of which the majority resides within rural environments and less-educated settings, yet who are often described as being particularly interested in tapping into the new technologies (B. Arewa, 2022).

Digital Entrepreneurship and Innovation Ecosystem

India has undergone a significant transformation toward an entrepreneurial future over the last decade. Academic and policy discourse surrounding entrepreneurship tends to be sector- or domain-specific. The government has identified a priority for creating a robust sustainable Digital India initiative, as a part of its national agenda. Emerging opportunities derived from efforts to build an advanced and secure digital infrastructure make investment in entrepreneurship

both timely and pivotal for nation-building (Zhang et al., 2023). India is home to 77 active unicorns as of March 2022 and ranks third globally in terms of the number of new tech businesses, propelled by technical leapfrogging, transformational innovation in the startup ecosystem, and the establishment of targeted entrepreneurship schemes. The rapid diffusion of digital technologies across sectors has produced extensive economic uprooting and irrevocably changed the rules of doing business. New avenues have been opened for innovation and the creation of business models capable of achieving scale. The ubiquitous presence of digital technologies is fast-tracking the replacement of conventional business with an internet-led approach. The ongoing two-way linkage between India's tech startup ecosystems and global digital transformation bodes well for entrepreneurs with fresh ideas in sectors such as healthcare, edtech, agritech, fintech, AI, biotech, and logistics (Anwer AL-Shboul, 2024).

India accounts for nearly one-third of digital startup funding proceeds across emerging economies, and policies mandating the gradual transition of routine sectors to automation and digital services further increase the relevance of entrepreneurial involvement in advanced and digitalization-related activities. The proportion of India's digital economy equates to roughly 7% of gross domestic product, providing an additional imperative for onboarding digital entrepreneurs capable of exploiting the consequent economic gain. The country devotes substantial resources to developing digital entrepreneurs and has made appreciable headway, yet many critical challenges remain unaddressed. Access to low-cost funding, high-quality mentoring, talent retention, strategic linkage with educational institutions, and swift introduction of an experimental sandbox framework for digital hardware, software, and services are among the most pressing issues.

International Context and Competitiveness

Digital transformation is not merely an economic or technological phenomenon; it has important implications for international standing and competitiveness. It plays a vital role in fostering international trade relations and attracting foreign direct investment, which are crucial for enhancing India's economic growth and generating more jobs and business opportunities. As a result, many developing nations view India and China as models for driving digital transformation and economic growth through the systematic adoption of information and communication technology (ICT) in various domains, reinforcing India's global stature in the highly competitive digital economy sector (Bajpai & Biberman, 2019).

India is positioned favourably in the global digital services sector compared to other

countries. Among 66 countries, India ranks 7th on the Digital Services Trade Restrictiveness Index. The country ranked 11th among 139 countries in the World Economic Forum's Global Network Readiness Index 2020, up from 115th in 2016. India is 7th on the ICT Development Index, highlighted with its ranking of first for mobile-cellular subscriptions and 2nd for international Internet bandwidth per Internet user.

Policy Recommendations and Roadmap

Digital India's vision seeks to expand digital infrastructure to connect rural residents, allow the government to provide services online, and create participatory governance. Achieving this vision will allow India to benefit from a far-reaching digital transformation. The draft approach notes the immense scope: digital transformation of economic activity and citizen engagement could potentially lead to substantial gains, amounting to trillions of dollars in extra Gross Domestic Product, and the emergence of millions of new jobs (Bajpai et al., 2018).

Steady investments and reforms can accelerate the implementation of Digital India and enable the country to latch on to the next wave of digital growth. On the positive side, India also stands out in its commitment to open, inclusive, country-driven approaches to the digital economy with Digital India, making it more appealing to external stakeholders, and greatly strengthens the mandate of the initiative. It would be valuable to establish a robust monitoring system to assess progress against key metrics and the effectiveness of the outreach programme.

Delays in implementation could permit competitors to seize the potential gains from new digital technologies, as the window of opportunity may be limited. North America and China are already reaping substantial rewards, while, the EU is taking steps to accelerate digital growth. Digital transformation is now recognised as a key driver of economic growth and is shaping the future of systems the world over.

Conclusion

The findings presented above point to the transformative potential of the Digital India initiative. According to estimates undertaken by NASSCOM and the McKinsey Global Institute, digital transformation could extend India's GDP by \$630 billion to \$1 trillion by 2025, create a further 65 million jobs, and raise productivity by up to 40% (Bajpai & Biberman, 2019). Several industry-level studies suggest gains are already occurring in interconnected sectors such as agriculture, education, healthcare, and manufacturing; however, substantial barriers remain to be overcome before these opportunities can be fully realized and the associated benefits scaled-up nationwide. Prior investments in digital government, financial

inclusion, telecoms, and broadband have bolstered the enabling infrastructure. The financial and banking, media and entertainment, information technology, and telecommunications sectors have experienced rapid transformation along digital lines, leading to steep growth in both digital-commercial and digital-content services. The Indian digital-services sector takes the form of a classical taxis-and-telephones, or transport-and-infrastructure, model, wherein the wider digital economy acts as an increasingly important catalyst to growth and innovation. India possesses the key foundations for a successful digital transformation. A connected population of more than 600 million users already consumes significant quantities of digital goods and interactions through a rapidly expanding information technology and software infrastructure. Conditions exist for an inclusive and collaborative digital-economy ecosystem to emerge that aligns the principles of economic and social development with the desired goals of high growth, equity, and sustainability. The underpinnings of economic inclusivity, sector benefits, new-business models, emerging ecosystems, and productivity opportunities help to define India's Fourth Industrial Axis, a vital mechanism to ensure future economic continuity and success. However, actual implementation of a broad multi-staged digital-transformation strategy remains constrained by a multiplicity of factors across multiple dimensions—process red-tape, access impediments, bandwidth bottlenecks, and human infrastructure shortfalls, to name but a few—leading to considerable delays in obtaining submission approvals, granting access to requisite data, securing formal permissions to deploy essential growth-critical equipment, and hiring needed personnel for every stage of digital deployment.

Strengthening links between digital technology and economic development and job creation represents a critical next step for Digital India's advancement on the Fourth Industrial Axis. The initiative can deliver drastically enhanced productivity, new cost-efficient service delivery models, significantly lower transaction and marketplace costs, and wide-ranging societal inclusion. Projects seeking to develop new service-distribution and business-development models in agriculture, education, health care, and government delivery mechanisms play an essential role in identifying broad economy-wide enhancements.

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Conflicts of interest

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