Title: Digital Transformation for Self-Reliance in India: A Pathway to Economic Growth and Sustainability

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Abstract

Throughout the extensive chronicles of human existence, the notion of self-reliance has maintained its relevance. Economists define self-sufficiency, or self-reliance, as a condition wherein external assistance, support, interaction, or trade becomes unnecessary. This concept entails a national economy harnessing its natural and human resources to their utmost potential, propelling growth and employment. Of equal significance is the creation of an economic and financial framework that avoids undue reliance on external sources for markets, resources, and investments. In the current context, self-reliance signifies a nation's capacity to uphold its internal supply chains while meeting global demands. It embodies a condition in which a nation attains more comprehensive growth, prioritizing human welfare.

The digital economy is frequently regarded as environmentally favorable, and the concept of digital transformation has gained profound prominence in our swiftly changing global milieu. In India, a country dedicated to both economic advancement and sustainability, digital transformation emerges as a compelling avenue toward achieving self-reliance. The journey of digital transformation initiates with the establishment of a robust digital infrastructure. This encompasses dependable high-speed internet connectivity, sophisticated data centers, and cloud services. Such infrastructural foundations are vital in ensuring widespread access to digital technologies across urban and rural landscapes, nurturing innovation and competitiveness. In the Indian context, where self-reliance and economic prosperity are paramount, the assimilation and amalgamation of digital technologies assume a pivotal role in expediting progress.

The present chapter explores the transformative potential of digital technologies in promoting economic prosperity while ensuring environmental sustainability, thus laying the foundation for India's journey towards self-reliance. This is descriptive research which helps to understand about the Digital transformation in India and its effects so far on economic growth and sustainability. The type of data used is secondary data obtained from sources such as research papers, newspaper, journals and magazine articles, media reports, government official sites, etc.

Key Words: India, Environment, Growth, Sustainability, Economy, Digitalization, Self-Reliance

Introduction

The concept of digital transformation to foster self-reliance in India involves harnessing digital technologies and strategies to stimulate economic growth, decrease dependence on foreign goods and services, empower local industries, and propel the country's socio-economic development. The objective is to bolster India's self-sufficiency by diminishing reliance on external resources, technology,

and expertise. In 1986, India took its initial steps online, with the Internet initially accessible solely for educational, research, and defence purposes. By 1995, the VSNL extended public internet access through modems. Today, the landscape has transformed, with a substantial portion of the Indian populace equipped with internet-enabled mobile phones. In 2017, India hosted 331.77 million internet users, and projections anticipate this figure to escalate to 511.89 million by 2022, solidifying India as the second-largest global online market, trailing only China (STATISTICS PORTAL, n.d.). This surge in internet usage is largely attributed to the decline in smartphone prices and internet data costs, catalyzed by the entry of Reliance Jio in 2016. By the onset of 2023, India boasted 692.0 million internet users, corresponding to a 48.7 percent internet penetration rate. Furthermore, the country housed 467.0 million social media users, accounting for 32.8 percent of the total population. Cellular mobile connections reached 1.10 billion, encompassing 77.0 percent of the entire population (Digital India Report 2023). Despite India's stature as a software hub, access to electronic government services was previously limited. However, recent endeavours like Demonetization expedited the adoption of digital payment methods, outpacing similar trends in other nations. This shift prompted a surge in bank account openings and a broader utilization of banking services. E-governance and digital services have emerged as pivotal pillars in the pursuit of self-reliance. The digitalization of governmental services and reduction of bureaucratic complexities through e-governance initiatives have the potential to enhance the efficiency and transparency of public service delivery.

By streamlining administrative processes, India can create a business-friendly environment that fosters entrepreneurship and investment, thereby boosting economic growth. Manufacturing, a critical sector for self-reliance, can benefit significantly from the adoption of digital technologies. Industry 4.0 technologies, such as automation, robotics, and IoT, can enhance productivity, efficiency, and quality in manufacturing processes. The integration of digital solutions into the manufacturing sector can reduce import dependency, stimulate local production, and create employment opportunities.

Agriculture, being the backbone of India's economy, can leverage digital transformation to achieve higher productivity and reduce post-harvest losses. Digital agricultural solutions, including precision farming, smart irrigation, and farm management software, can empower farmers with data-driven insights and best practices, leading to sustainable agricultural practices and increased self-reliance in the food sector. The integration of digital technologies in manufacturing and agriculture will bolster self-reliance, while digital health initiatives will improve healthcare access for all. Embracing digital transformation with a focus on cybersecurity and data protection will pave the way for India's self-reliance journey in the digital age.

Historical Perspective of Self-Reliance

The contemporary catchphrase "Self-Reliance," while gaining considerable attention these days, is not a novel concept for the Indian economy. The notion of self-sufficiency was initially championed by M.K. Gandhi, with his Gandhian blueprint resting on the foundation of self-reliance. Prime Minister Modi's introduction of the "Make in India" initiative aimed at promoting self-sufficiency within the nation, yet its roots were planted decades earlier by Mahatma Gandhi, the Father of the Nation. He championed the utilization of "Khadi" clothing in the 1920s as a dual-pronged strategy: to empower individuals through technology and to resist the commercial interests of the British. The Khadi movement aimed to shun imported foreign textiles and foster self-employment through khadi spinning. Beyond the Khadi movement, Gandhi advocated numerous philosophies, including the development of small cottage industries, decentralization, and the focus on village development, all of which nurtured self-reliance.

Drawing from the Gandhian philosophy, India's first Prime Minister, Pt. Nehru, formulated a socialist and introspective approach that led to self-sufficiency in certain sectors, such as food and milk production. The objective of self-reliance was also a cornerstone of the Fourth Five-Year Plan (1969-1974), which prioritized stable growth and progress towards self-sufficiency. This plan placed significant emphasis on achieving self-sufficiency in the agricultural sector as a catalyst for broader progress. The Fifth Five-Year Plan (1974-1979) similarly concentrated on self-reliance in agriculture and defense production.

Although some success was achieved, India's inward-looking approach was exposed during a major balance of payment crisis in the 1990s. Prime Minister P.V. Narasimha Rao introduced a new interpretation of self-reliance, encapsulated by the statement, "We should be indebted to the extent we have the capacity to repay." Adapting to changing circumstances, India embraced LPG (Liberalization, Privatization, and Globalization) reforms, shifting towards an outward orientation. Over the next three decades, India emerged as a significant economic power. However, as the saying goes, crises reveal a nation's vulnerabilities. Similarly, the current COVID-19 crisis exposed India's overreliance on external sources. Addressing these challenges, Prime Minister Narendra Modi introduced a more balanced vision of self-reliance. While the recent announcement of a new interpretation with five pillars was made, groundwork for this had already begun in his initial tenure.

Initiatives such as "Make in India," "Digital India," and the "Swachh Bharat Abhiyan" have collectively propelled India towards self-sufficiency. The implementation of the JAM Trinity (Jan-Dhan, Aadhar, Mobile) and Direct Benefit Transfer brought transparency and accountability to welfare schemes, with approximately 425 government welfare schemes now effectively operational. Furthermore, India enacted the Insolvency and Bankruptcy Code, Fugitive Economic Offender Act, Goods and Services Tax (GST), and the National Infrastructure Pipeline Project. These accomplishments indicate a step in the right direction, although not the ultimate goal. Despite these interventions, the government has struggled to enhance the competitiveness of Indian companies, highlighting that India still has a significant journey ahead to become self-reliant. Prior to delving into the new interpretation of self-reliance for New India, it is essential to explore the dependency theory and India's reliance on other economies.

Why Self-Reliance is necessary:

The developmental theory of dependency, formulated by Raul Prebisch, critically examined the phenomenon whereby economic advancement in industrialized nations did not inherently result in progress for less affluent countries. In fact, their investigations indicated that economic activities in wealthier nations often engendered significant economic challenges for the less affluent counterparts. Nations dependent on others, such as Latin America, Asia, and Africa—characterized by low per capita Gross National Products (GNPs) and heavy reliance on a single commodity for foreign exchange earnings—encounter pronounced Balance of Payments (BOP) issues. A parallel illustration of the detrimental ramifications of dependency is observable in countries like Nepal, Pakistan, Bangladesh, and various African nations, ensnared in the debt cycle perpetuated by dominant nations they excessively depend upon.

India exhibits substantial dependency in diverse sectors where it lags behind other nations. Noteworthy instances encompass the reliance on OPEC for crude oil, obtaining defence equipment from USA, Russia, Israel, and France, as well as sourcing electronics and pharmaceuticals from China. A further aspect of dependence is observed in the form of remittances from the Gulf and the US, contributing to India's foreign exchange. Given the complexity of these sectors, reducing dependency is a formidable challenge that cannot be swiftly achieved in the foreseeable future. Hence, the approach of self-reliance proposed by the new Modi strategy encounters a certain degree of ambiguity in addressing such dependence.

New Connotation of Self-Reliance:

To overcome the current challenges Indian PM brought his version of self-reliant India. First, a step up in public spending and investment, aimed at promoting welfare and raising the investment rate. Second, policy reforms aimed at making the domestic economy more globally competitive. Third, a long-term structural shift making the economy more “self-reliant” and less dependent on the world economy. Similarly, he announced the five major pillars of self-reliance. These are as follows “1st Pillar- Economy: Our Hon’ble PM said we need a quantum jump instead of incremental growth in the economy. India is the 5th largest world economy and targets to become 5 Trillion economy by 2025. 2nd Pillar- Infrastructure: For every economy, infrastructure is the backbone and primary need for the

growth of the economy. We need Infrastructure that should be world-class which connects rural India to urban India and becomes the identity of New India. 3rd Pillar- Demography: India is the 2nd largest populated country and has largest working population in the world. To become self-reliant, India needs to take the advantage of demographic dividend through upgrading the skills and productivity. India is nowhere lacking in potential and talents and we have proved it in the current crisis by becoming the 2nd largest PPE kits manufacturer. 4th Pillar- System: For a self-sufficient economy, India needs a more robust and technology driven system which can withstand against all odds. For this purpose, India need to spend more on research and development projects and need to take full advantage of 4th industrial revolution. 5th Pillar- Demand: With more than 130 crore population, India has one of the largest consumer bases in the world. Due to Covid-19, India is facing both supply side and demand side shocks on the economic front." Therefore, there is opportunity to take the lessons from the problems and build a strong block chain of supply as well as strengthen the competitiveness of domestic manufacturer and raise the voice of "VOCAL for LOCAL"

Digital Transformation/ Digital Economy of Indian Economy:

On July 1, 2015, the flagship initiative of the Modi government, known as 'Digital India,' was launched. This program was designed to revolutionize public services by harnessing the potential of information technology. Services are conveniently offered to citizens through a range of devices such as mobile phones, personal computers, laptops, tablets, televisions, radios, and the internet. The overarching vision is to elevate India into a society empowered by digital technology, fostering a knowledge-based economy (McKinsey Global Institute 2017). Central to its mission is the facilitation of accessible government administration for every citizen through electronic means, thereby minimizing paperwork. A key objective of this initiative is to bridge the gap between rural and urban communities. A pivotal component involves plans to establish high-speed internet networks in rural regions. The scope of the Digital India program encompasses the agricultural, industrial, and service sectors, constituting vital contributors to economic growth. It centers on three primary areas: ensuring digital infrastructure as a utility accessible to all citizens, empowering citizens through digital means, and enhancing governance while providing on-demand services.

The project envisions linking the vast expanse of 2.5 lakh villages in India through broadband highways, public internet access, universal mobile connectivity, and various facets of e-governance. This comprehensive initiative is referred to as 'Digital India' and is built on nine foundational pillars, including robust electronic manufacturing practices, early priority programs, 'E-Kranti' (electronic revolution), and information services accessible to all. A collaborative study by Huawei and Oxford Economics estimated the global digital economy's size at approximately $11 trillion, equivalent to 15.5% of the global gross domestic product (GDP) in 2016. Projections indicate that this figure could rise to $23 trillion, constituting 24.3% of global GDP, by the year 2025.

The Size of India's Digital Economy:

According to World Bank Report, before Aadhaar, only one in 25 people had any form of formal identification, and just one in four had bank accounts. Aadhaar has transformed the authentication ecosystem in India and replaced multiple government IDs, such as passports, PAN cards, ration cards, and voter IDs, for authentication. Today, Aadhaar is ubiquitous: it provides easy and quick authentication to millions of Indians, helping to empower citizens. The Indian government has been pushing for zero-balance bank accounts under the Pradhan Mantri Jan Dhan Yojana (PMJDY), opening over 450 million accounts by 2022. Aadhaar has been instrumental in achieving this goal, as it has facilitated the KYC process, reducing the cost of conducting e-KYC from $12 to 6 cents. This initiative has played a pivotal role in extending banking services to a vast number of Indians, thereby enhancing financial inclusion and curbing corruption in the accessibility of government services for the underprivileged. As detailed in the same report, during the year 2021, the UPI platform facilitated an impressive tally of more than 38 billion transactions, amounting to around $900 billion, through popular mobile applications like PhonePe, Google Pay, and WhatsApp. This remarkable trend continued into

2022, witnessing a striking surge to a staggering 74 billion transactions, totaling an impressive $1.5 trillion in value.
The volume of digital transactions underwent a remarkable increase, surging over threefold from 300 crores in November 2019 to a substantial 1,052 crores by January 2023. During the fiscal year 2019, the cumulative value of digital payments in relation to the nominal GDP reached an impressive 8.7 times the nominal GDP. While there was a dip during the challenging year marked by the COVID-19 pandemic, this multiple is once again on the rise.
As indicated by the Reserve Bank of India (RBI), the portion of India's core digital economy exhibited an upward trajectory, rising from 5.4% of the Gross Value Added (GVA) in 2014 to 8.5% in 2019. When gauged in terms of US dollars, India's digital economy showcased an impressive growth rate of 15.6% over the period spanning 2014 to 2019, a figure that was 2.4 times higher than the growth rate of the broader Indian economy. Furthermore, the segment of the digitally dependent economy, which encompasses sectors empowered by digital technology, was estimated to account for 22.4% in the year 2019. According to a recent study published by ACI Worldwide in collaboration with Global Data, "India is way ahead even in comparison with China in terms of the number of digital payments. According to this source, the number of real time payments in 2021 were at 48.6 billion in India as compared to 18.5 billion in China and 8.7 billion in Brazil. This is indicative of the ease with which the Indian population has adopted digital platforms for making payments even if the average value of such payments may be rather low."

Digital Transformation for Economic Growth:

Digital transformation plays a pivotal role in driving India's economic growth by enhancing efficiency, productivity, innovation, and market reach. The incorporation of digital technologies facilitates process automation, operational streamlining, and improved collaboration, ultimately boosting productivity across diverse industries. This increased efficiency enables businesses to amplify their output while using equivalent or fewer resources, thereby contributing to overall economic progress. Aligned with ADB's (2021) digital economy impact model, digital transformation underscores the interconnectedness of core digital sectors. This model identifies five key categories: (a) hardware, (b) software development, (c) web services, (d) telecommunications, and (e) specialized support services. The digital economy encompasses economic activities involving digital products and industries, contributing to GDP or Gross Value Added (GVA). Backward linkages are reflected in digitally-enabled products within the core digital economy, while forward linkages are seen in digitally-enabled industries.
According to RBI data from 2019, India's core digital economy exhibited significant forward linkages in sectors such as construction (6.1%), machinery and equipment rentals (4.2%), food, beverages, and tobacco (3.8%), textiles and textile products (3.6%), and electrical and optical equipment (3.5%). In the fiscal year 2019, digital payments' total value relative to nominal GDP was 8.7 times the nominal GDP. The RBI further reports that India's core digital economy's share in GVA increased from 5.4% in 2014 to 8.5% in 2019. Over the period from 2014 to 2019, India's digital economy witnessed a growth rate of 15.6% in USD terms, which was 2.4 times higher than the overall Indian economy's growth rate. Furthermore, the digitally dependent economy, including digitally enabled sectors, accounted for approximately 22.4% in 2019.

Digital Transformation for Sustainability:

The definition given for sustainable development by Brundtland Commission, 1987 was "meeting the needs of the present generation without compromising the ability of future generation to meet their own needs". Green economies and environmental resilience are often associated with digitalization. Such an association is highlighted by Baedeker et al. (2016) "Currently, we are consuming more ecosystem services and more natural resources than nature is providing on a sustainable basis." Change can only take place through the transformation of production and consumption systems. This involves modifying products, services, and business models toward resource-efficient production patterns and lifestyles, leading to "Digitalization and Industry 4.0" (Baedeker et al., 2016, p. 37). Lockton, Bowden, & Matthews (2016) have also emphasized digitalization as a tool for a greener economy and

environmentally friendly practices. They also observed that "Mainstream ‘interventions’ largely take the form of redesign of products and services themselves, or the design of interfaces, usually digital, and usually visual, which give users information and feedback (and sometimes feed forward) on use or the impacts of their actions. The digital approach builds on significant work in HCI on persuasive technology…and on the effectiveness of behavioural feedback from other disciplinary perspectives”. Martin et al. (2019) have also highlighted the role of digitalization in innovative urban sustainability. Timonen et al. (2018) have given their full support to digitalization in the hopes of making the world a better and more sustainable place than it is now. Halkos (2018) expressed his somewhat conflicting ideas about the pros and cons of digitalization and environmental interaction after considering a significant volume of literature. Laitinen et al. (2020) emphasized existing works and perceptions of digitalization, the green economy, and sustainable development. Fedulin et al. (2020) have extended their critical support for the digitalization and automation of environmental control systems toward a sustainable environmental model. Jamwal et al. (2020) have mentioned that Industry 4.0, through its automation, will lead towards socially sustainable solutions. Heilmann et al. (2020) have almost made the drive towards green and digitalization synonymous. Lanshina et al. (2020) agreed that digitalization can help the environment and lead to sustainable development. Zachariadis (2020) also supported the direct relationship between digitalization and green transformation. He focused on making the electricity grid system more digital and creating digital services for green energy. He talked about Cyprus and how a strong digital economy will help the country grow in a sustainable and green way. He had vehemently introduced even crypto currency and proposed that such e-currency will work as a positive catalyst towards greener sustainable development. The research found the following: first, the digital economy has significantly improved the efficiency of the green economy in India. Second, by leveraging digital tools and innovations such as E-government, smart transportation, E-commerce, supply chain etc. India can transform its various sectors and address sustainability challenges effectively. However, it's essential to ensure that digital transformation is accompanied by robust policies and regulations to mitigate potential negative environmental impacts, such as e-waste generation and excessive energy consumption from data centers.

Challenges ahead in front of India:

Industries serve as a fundamental pillar of any economy, forming the cornerstone for self-reliance in any nation. In the context of India, complex labor laws, volatile liquidity trends, and cumbersome land acquisition processes have presented significant challenges for the industrial sector. During the COVID-19 crisis, India emerged as a potential destination for foreign direct investment (FDI) and companies looking to relocate from China. However, this necessitates India's implementation of reforms in the four key areas known as the 4Ls, as suggested by our respected Prime Minister: Land, Labor, Laws, and Liquidity.

To bolster self-sufficiency in manufacturing, India must address these 4Ls. Simplifying and bringing transparency to the land acquisition process can be achieved through the utilization of blockchain technology. Moreover, there's a need to liberalize both company and labor laws to grant greater authority to industrial management. The current situation calls for a "Minimum Government, Maximum Governance" approach. Additionally, to enhance liquidity, the government should inject cash into the economy, thereby increasing the purchasing power of consumers.

Alongside these crucial reforms, various challenges continue to impede India's journey toward self-reliance:

- Unskilled Labor: India possesses a substantial unskilled and illiterate workforce compared to other countries. Merely 4% of India's workforce is skilled, a stark contrast to China's 25%. Studies show that China's workforce is four to five times more skilled than India's.
- Rigid Regulatory Environment: Complex and inflexible regulations in India hinder the decision-making process and create an unfavorable environment for startups. Despite the introduction of the Goods and Services Tax (GST), India's tax structure remains intricate, adding complexity to business operations.
- Limited Female Participation: Despite comprising half of India's population, women's participation in the workforce remains limited. Achieving self-reliance requires leveraging the talents of the entire population, including women.

- Manufacturing Capacity Shortfall: While India stands as the world's second-largest smartphone market, it does not domestically manufacture these devices. Similarly, India's manufacturing of solar photovoltaic cells and modules is limited, despite ambitious targets for the future.

These challenges, along with the necessary reforms, collectively shape the path toward India's goal of achieving self-reliance and fostering a robust industrial landscape.

The Way Forward

Albert Einstein's assertion, "In the midst of every crisis lies great opportunity," encapsulates the mindset a nation should embrace. It is imperative for India to extract insights from the vulnerabilities exposed by the ongoing crisis. India's substantial youth population stands as a tremendous asset that, when harnessed effectively, could drive significant progress. Valuable lessons can be drawn from fellow Asian nations, such as Japan. Despite Japan's lack of abundant natural resources, it ranks as the world's third-largest economy, largely attributed to its productive and skilled workforce.

Taking a page from Japan's success story, India can elevate its population's productivity by establishing a robust education and healthcare system. The objective is to construct technology-infused, secure educational and healthcare infrastructure. Initiatives like SWAYAM, an online education platform, represent a step in the right direction. However, given India's vast expanse, the concept of "smart villages" warrants further development to cater effectively to the nation's diverse needs.

The wisdom of Mahatma Gandhi's adage, "India lives in its villages," underscores the significance of rural development on the path toward a self-reliant India. Numerous instances from rural India illustrate principles akin to "survival of the fittest," a concept articulated by Darwin. In the current era, where technology and innovation serve as critical economic drivers, India cannot afford any compromises. To align with contemporary demands, a reinvigoration of the research and development process is indispensable. Such a step would position India to synchronize effectively with the evolving requirements, fostering innovation and technological advancement, crucial pillars for the nation's progress.

Conclusion

The preceding discussion underscores the crucial role of technological progress in the advancement of developing countries. India, aspiring to attain a leadership position across various global technology arenas, recognizes the necessity of leveraging digital technologies to enhance public services and ensure financial inclusivity. Acknowledging this imperative, India has embraced the Digital India campaign, aimed at facilitating seamless communication between citizens and the government while providing user-friendly essential services. The success of the Digital India campaign becomes evident as it has substantially contributed to India's progress. This achievement is manifest in the creation of employment opportunities, the elevation of literacy rates, the reduction of corruption, technological strides, and a boost to the gross domestic product. To sum up, digital transformation presents an unparalleled prospect for India to realize economic growth, concurrently fostering ecological sustainability and self-sufficiency. By investing in digital infrastructure, championing e-governance, and advancing financial inclusivity, India has the potential to unlock its true capabilities as a nation empowered by digital prowess. Encouraging indigenous startups, upskilling the workforce, and embracing sustainable digital practices will propel India towards a future where economic growth and self- reliance coexist harmoniously. By integrating digital technologies in key sectors, India can navigate towards a more resilient and sustainable future in the digital age.

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