

OPPORTUNITIES AND CHALLENGES OF DIGITAL ECONOMY WITH REFERNCE TO DEVELOPING COUNTRY PERSPECTIVE

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Abstract

A "digital economy" is one that relies heavily on electronic means of production and distribution. There are still very few job opportunities in developing country like India having a growing digital economy, there are a number of security and privacy issues plaguing the digital economy, with both internal and foreign threats being particularly acute in India. While India's e-Government service rollout is progressing reasonably, digital inclusion policies should be more actively included in this process to promote the closing of the digital divide. Several factors contribute to the adverse business climate, including a lack of knowledge and digital literacy, a limited selection of applications and services, and an inadequate Internet infrastructure. Investments in the information technology sector have been on the rise due to the government of India's goal for fast digitalization. India's Union Budget of 2022-23 aims to boost digitization through the issuance of a national digital currency by the Reserve Bank of India, direct digitalization in banking, education, and healthcare, and declaring data centers as national infrastructure, fostering a digital transformation in the country's economy. The paper is conceptual with the objective to address the challenges and opportunities of digital economy derived from secondary data. The research is discusses the outward linkages and impact of digitalization in India and relevance of digital economy.

Key words: Technology, digital economy, digitalization, Reserve Bank of India.

Introduction

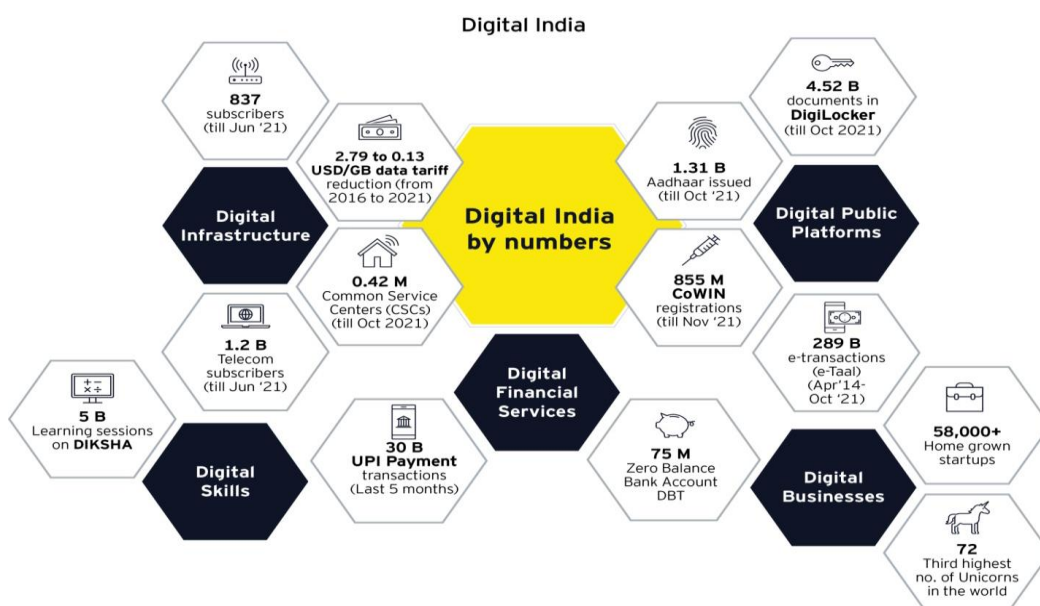
The term "digital economy," first introduced in the 1990s, has evolved alongside technological advancements to encompass digital technologies, products, and services across various sectors. Digitalization is inherently multidimensional. A comprehensive definition is necessary to encompass all activities utilizing digitized data within the digital economy (IMF, 2018). Research conducted collaboratively by Huawei and Oxford Economics estimated the global digital economy's value at approximately US\$11 trillion, representing 15.5% of global gross domestic product (GDP) in 2016. This figure is projected to grow to US\$23 trillion, accounting for 24.3% of global GDP by 2025.

According to the RBI report the total number of employees in India's core digital economy was estimated at 4.9 million in 2019 and 2020, according to the country's current population and the worker-population ratio from the Periodic Labor Force Survey, which stood at 38.2%. Consultancy and related activities involving computer programming accounts for the largest percentage of digital sector employment at 59.8%, followed by telecommunication services at 15.2%.

Major improvements in digitization will occur in India as a result of certain announcements made by the government in the recent Union Budget of 2022–23. There will soon be a national digital currency issued by the Reserve Bank of India (RBI), in addition to direct digitalization in the banking, education, and healthcare sectors. Not only that, but the government has declared data centers to be national infrastructure, putting them in a prime position to facilitate the growth of the digital economy. The proportion of India's GDP attributable to the digital economy has grown from 3.5% in 2014 to 10% in 2018 and is projected to reach over 20% by 2020–26. The government and ecosystem as a whole are experiencing a digital transformation.

Why Digitalization Matters?

Digitalization is a significant technical transformation that is ongoing, and how governments adopt these technologies will create the framework for the next several decades. It will boost economic efficiency and competitiveness by launching new firms and products and tackling issues such as boosting financial inclusion, enhancing governance, and eliminating inequities.



Source: https://www.ey.com/en_in/india-at-100/digitalizing-india-a-force-to-reckon-with

Digitalization is particularly significant for India, considering that over 60% of its large population resides in rural areas. Linking the nation enhances access to the advantages and opportunities of a contemporary economy for a broader population, thus reducing the economic disparity. The adoption of advanced technologies, including AI, machine learning, blockchain, and cloud computing, will enhance the efficiency of Indian businesses, enabling global competitiveness, exploration of new markets, development of innovative business models, and positioning for significant growth in the coming decades. India a developing country is experiencing rapid digitalization, influenced by several factors such as increasing broadband penetration, technological advancements, reduced data costs, and government initiatives aimed at enhancing digital infrastructure. This facilitated the development of the start-up ecosystem and entrepreneurship among the younger population, which has rapidly adopted and utilized digital technologies.

Backward and Forward Linkages

The ADB (2021) framework for measuring digital economy identifies backward and forward linkages associated with core digital economy. According to this framework, core digital products are classified into 5 product groups namely: hardware, software publishing, web publishing, telecommunications services, and specialized and support services. The digital economy is defined as the contribution of economic transactions involving digital products and industries to GDP (or Gross Value Added (GVA)). Digital products refer to goods and services that predominantly generate, process, or store digitized data. The ADB framework differentiates between the core digital economy and products that are either digitally enabling or digitally enabled. Digitally enabled products illustrate the backward linkages of the core digital economy, whereas digitally enabling products capture the forward linkages. Digitally enabling products encompass semiconductors, which serve as essential components in computer manufacturing due to their role in electrical conductivity; however, they lack a direct function concerning digitized data. Digitally enabled products encompass car manufacturing, integrating digital components into vehicles, including in-car entertainment, vehicle systems management, and self-driving capabilities. Digitally enabled sectors encompass media content and retail sales. According to the Reserve Bank of India, the industries exhibiting the highest forward linkages from the aggregate core digital economy in 2019 were construction (6.1%), renting of machinery and equipment (4.2%), food, beverages, and tobacco (3.8%), textiles and textile products (3.6%), and electrical and optical equipment (3.5%).

Objective of the Study

The main objective of the study is to analyze the trends, opportunities and challenges in digital economy of India.

Research Methodology

The data collected from various secondary sources such as journals, Government reports on Digital India, Websites, internet, articles, Newspapers, etc. Graph and percentile method has been used to analyze the data. The paper describes the importance of digital economy followed by digital trends and impact of digitalization in India. Further the paper discusses the pillars and important aspects of digital economy with role of government as initiatives. The final part of the paper focuses on the challenges and opportunities followed by the conclusion of the study.

Digital Trends

The major technological trends that will continue to transform the Indian IT industry in the present year are the Internet of Things, Artificial Intelligence, Blockchain Technologies, Cloud Adoption, and Data Security & Cyber Protection.

Internet of Things

The Internet of Things is a network of gadgets, automobiles, household appliances, and other objects that are equipped with sensors, software, electronics, and network connectivity so they may gather and share data. The Internet of Things will be deeply ingrained in people's daily lives by 2022. By 2022, there will be three times as many IoT-connected devices—25 billion total. By 2022, the majority of households and autos will have internet connections. IoT also makes it easier to automate and optimize company processes continuously, which can even boost worker productivity and engagement.

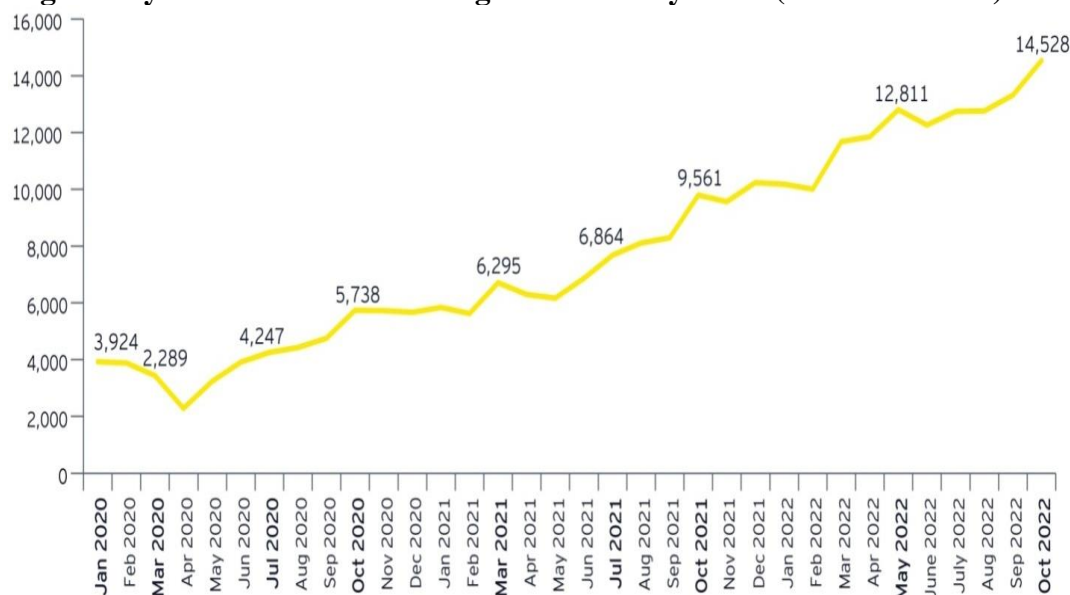
Blockchain Technologies

Distributed ledger technology, or blockchain, makes it possible to transfer digital data without allowing its duplication. Applications range from sophisticated computer programs to payment and banking systems; the database is large and scattered around the world. World spending on blockchain technology will reach \$9.7 billion in 2022, according to a forecast by trade organization IDC. When it comes to business software, blockchain is a game-changer. Supply chain monitoring is one of the most fascinating uses of blockchain technology since it allows one to trace things from their creation all the way through their storage in warehouses and eventual sale to consumers.

Digital infrastructure built on India Stack

India has adopted a distinct approach to the digitization of its economy compared to other affluent nations. India possesses an unrestricted internet, devoid of any firewall separating it from the global network. India has utilized the internet to develop a multitude of digital public goods and government services. This has enabled India to connect many citizens and offer a more democratic and inclusive digital network and infrastructure. The development of the UPI interface has profoundly altered behavior among Indians, resulting in a long-term positive influence on: Formalization of the digital economy in India – through cashless and paperless transactions; and deepening of financial inclusion by bringing in a number of small businesses and unbanked individuals into the formal economy by creating a financial record and credit history and allowing these businesses and individuals to access credit.

Digital Payment Trends – Total digital Retail Payments (in INR Billion)



Source: TRAI, RBI

Note: Others include ECS, AEPS, APBS, and BHIM

Provision of an alternate retail payment system and lowering of the dependence on existing card-based payment systems. Provision of an architecture for private players to innovate and develop new business models, for example, fin-tech and e-commerce solutions. As a result of development of this stack, the impact of the pandemic and the growing e-commerce market, digital payments have been exploding with UPI leading the surge in India, confirming its bright future in the country.

Economic Impact of Digitalization in India

The economic impact of digitalization can be seen across the Indian economy.

- India’s core digital economy share in GVA increased from 5.4% in 2014 to 8.5% in 2019, with a digitally dependent economy estimated to be around 22% of GDP in 2019.
- In absolute US dollar terms, India’s digital economy exhibited a growth rate of 15.6% over the period 2014 to 2019, which was 2.4 times faster than the growth of the overall Indian economy.
- Digital output multiplier has increased over time from 1.35 in 2014 to 1.52 in 2019, highlighting the role of investments to drive growth.
- 62.4m workers were employed in the digitally dependent economy in 2019.

Digitalization of government and governance

The Government of India has been systematically digitizing its interactions with citizens, facilitating the acquisition of permits, certificates, tax payments, and enhancing the efficiency of governance outcomes. The government has digitalized the acquisition of products and services by establishing a centrally managed marketplace, the Government e-Marketplace (GeM), which is one of the largest procurement platforms, boasting an annual gross merchandise value of US\$14.2 billion. The social dimensions of digitization, aimed at alleviating hardships during the epidemic, were facilitated by India's digital public infrastructure - COWIN, a governmental technology platform established to manage the implementation of the world's largest vaccination initiative.

Broadband usage has been surging, driving marketplaces

The growth of broadband usage in India has been remarkable. The number of mobile broadband (MBB) subscribers has risen from 345 million to 765 million in the last five years. Data traffic per user increased by 31% over the past five years, reaching 17GB as of December 2021. Consequently, India's data traffic usage from 2017 to 2021 ranked among the highest globally, exhibiting a compound annual growth rate (CAGR) of 53%. Generation Z in India engages in online activities for an average of 8 hours daily. The subsequent phase of smartphone adoption is occurring in rural India. India is projected to have the second largest population of online shoppers by 2030, estimated to be between 500 million and 600 million. Online marketplaces have experienced significant growth across various sectors of the economy. Given the observed behavioral change, it is reasonable to

conclude that these metrics will continue to increase significantly. The e-commerce market is projected to reach a size of US\$350 billion by 2030.

India's Progress in digitalization Over the Past Decade

	Parameters (in mn/bn)	FY14	FY16	FY17	FY18	FY22	FY23	FY24 (till Nov)	Impact
Jan Dhan (PMJDY)	Total beneficiaries (mn)		214.3		314.4	450.6	214.3		56% of the accounts belong to women
	Rural/semi-urban beneficiaries (mn)		132		185	301	132		
Aadhar (technology stack)	Aadhar numbers generated (mn)		999		1207	1330	1363		
	Aadhar-linked bank accountss (mn)		255		591.5	774	780		
	UPI transaction by volume (mn)			17.86	904.87	45967.53	83751.14	81399	
	UPI transaction by value (in INR bn)			69.52	1098.32	84175.73	139206.75	125164	
	CoWin registration (bn)						1.1		
	Digilocker users (mn)		1.2		12	139.4	223.86		
FASTag	Tag issuance (mn)		-		1.63	16.8	67.7		Saved approximately INR 700 billion in wasted fuel expenses caused by waiting at the toll plazas
	Toll revenue (in INR bn)	44.7			-	-	413.42		
	Waiting time at toll (seconds)		-		480	47			
BharatNet	Gram panchayats connected (thousand)			100 (Dec 2017)	-	-		210	
Open Network for Digital Commerce (ONDC)	Retail merchants enrolled*						800+	232000	
	Total transactions by volume (thousand)*						1.2	4700	

Source: Deloitte.com/insights

Since Fastag implementation in 2017, toll revenues have gone up 9.2 times to INR 413 billion in fiscal 2023, while over 10 years, average waiting times have come down from 734 seconds to 47 seconds, saving INR 700 billion worth of fuel. Ten years ago, banking penetration stood at around 25%. JAM Trinity, in nine years, it has risen to 80% and even helped close the gender gap in many accounts. Below Figure presents a summary of a few of the highlights in digitization over the past decade.

Pillars of Digital India

Broadband Highways: It includes three parts of broadband highways. They are:

- Urban Broadband
- Rural Broadband, and
- National Information Infrastructure.

Universal Access to Mobile Connectivity: This area includes an increase in mobile networks spread across the country. In addition, it includes the spread of connectivity to all uncovered villages.

Public Internet Access Program: In this program, it includes the setup of two segments. They are- Post Offices as multi-service centers and Common Service Centers.

E-Governance: To Reform the Government via Technology: It contains the development and change of governance through digital knowledge. The changes are in:

- Simplify forms of application
- Use of online media like Sales quotes software to get essential Government record services
- Incorporate and manage services like UIDAI, Payment Gateway, Mobile Platform, etc.
- To use records instead of paper-built guides and registers
- Workflow automation within the Government
- Protest Redressal via IT infrastructure

E-Kranti: It includes 10 more missions that were given to NeGP. These missions are important to support the Digital India program. Some of these are:

- Technology for Farmers
- Technology for Financial Inclusion
- Technology for Planning
- E-Healthcare

- Technology for Security
- Technology for Justice
- Technology for Cyber Security
- E-Education

One of the features of Digital India is to strengthen the way of information for countries. It (informative way) will be strengthened with: Open basis programs and applications, and Support of open data stages.

Electronics Manufacturing: This program includes making of effort in the way of reaching zero imports in electronic devices. These items are VSATs and Set-Top Boxes. It also includes FABS, Mobiles, Consumer electronics, and many more.

IT for Jobs: It enables the individuals to train for IT sector jobs. The individual is the ones from smaller villages or cities.

Early Harvest Programs: This area includes many programs which are as follows:

- A national gateway for Lost and Found children
- Wi-Fi in all universities
- Wi-Fi spots for public
- Mass messaging apps and platforms to expand the Government program information
- SMS notification for disaster alerts
- E-greetings in place of Government greetings, etc.
- Biometric attendances in offices of Government
- E-Books in place of books

Information for All: The Government started the development of an open data platform. Furthermore, the platform offers data related to various projects to all common people. This is done through the internet platform (data.gov.in).

Relevance of Digital Economy

The Ministry of Electronics and Information Technology (MeitY) held the second in-person meeting of the G20 Digital Economy Working Group (DEWG) in Hyderabad from 17th-19th April 2023. The first meeting took place in February 2023, setting the stage for future productive deliberations. India is working on creating global standards of cyber law, recognizing the potential for technology and the internet to be both positive and negative.

The Significance and Increasing Scope of the Digital Economy: The digital economy is gaining prominence and impacting various aspects of economic activity globally. It emphasizes that the digital economy is no longer limited to a specific sector but is permeating every corner of the economy.

India's Recognition of the Digital Economy: India's awareness of the growing importance of the digital economy is highlighted by its G20 presidency and the meetings held to understand the opportunities and challenges associated with it.

The Influence of the Digital Economy on Manufacturing: It is stated that even traditional manufacturing sectors are being influenced and transformed by the digital economy. This implies that the integration of digital technologies and processes is enhancing and modifying manufacturing activities.

Three Crucial Aspects:

- The importance of developing robust digital infrastructure.
- The significance of cyber security measures to ensure the protection of digital systems and data.
- Need to create and train a skilled workforce that can contribute to India's position in the digital economy.

Initiatives Taken by the Government of India

Major Digital Initiatives: The Indian government has launched several digital initiatives aimed at promoting the growth of the digital economy. Some of them include: Bharat Net Project: Aimed at connecting all villages in India with high-speed broadband by 2023. Start-up India Program: Aimed at promoting entrepreneurship and creating a conducive ecosystem for start-ups. The Digital

Saksharta Abhiyan (DISHA) Program: Launched in 2016, aims to make at least one member of every household digitally literate.

E-Rupee and Conditional Transfers: Recent trend of e-rupee and conditional transfers, which are expected to be game-changers for both business and governance. The use of digital vouchers or e-rupee for conditional transfers to MSMEs (Micro, Small, and Medium Enterprises) and other segments of the business ecosystem can have a significant multiplier effect on the economy.

Financial Inclusion: About 75% of adults worldwide have access to formal banking services, while in India, this percentage has already reached around 85%. The ability to save, spend, and borrow digitally has macroeconomic implications for a resource-rich country like India, as it allows for tapping into household financial savings and foreign savings to finance deficits for corporations and governments.

The Make in India and Digital India: These programs have played a significant role in promoting the growth of the digital economy. The Make in India program aims to promote manufacturing in India, while the Digital India program aims to promote the adoption of digital technologies. The two programs complement each other, with Make in India promoting the production of digital devices, while Digital India promotes the adoption of digital services.

Impacts of the Digital Economy

Demographic Advantage: The demographic dividend is a crucial element in fully harnessing the promise of the digital economy. In India, a substantial population proficient in English and adept with technology has enabled the implementation of digital systems such as the UPI (Unified Payments Interface) and DBT (Direct Benefit Transfer), resulting in favorable economic outcomes. Delivering digital information and services in vernacular languages can improve accessibility and inclusivity, allowing a broader demographic to engage with the digital economy.

Extension of Various Services: The digital economy provides an opportunity to re-evaluate and open up the services sector both internally and globally. Many developed countries, including G20 members, have been cautious about liberalizing the services sector. However, the digital economy can enable the extension of services like medical services and educational services. For instance, the UMANG mobile app is a Government of India all-in-one single, unified, secure, multi-channel, multi-lingual, multi-service mobile app.

Cross-border Provision of Services: The digital economy possesses the capacity to change cross-border service delivery. Utilizing digital platforms and technologies, qualified professionals can provide their services worldwide, transcending geographical limitations. This has the capacity to transform the services sector and yield substantial advantages for both providers and receivers of services. The G20 can facilitate the realization of the digital economy's revolutionary potential in the services sector by promoting openness and eliminating barriers, so creating a more linked and efficient global marketplace. **Additional Notable Effects:** The digital economy has profoundly influenced both the economy and society. It has generated employment, enhanced productivity, stimulated local commerce, and facilitated more access to services and opportunities for individuals. The expansion of the digital economy has resulted in the establishment of novel business models and industries, including e-commerce and digital payments.

Future Aspects and Opportunities

Smaller businesses aren't leveraging digital tools as much as larger businesses: The post-pandemic gap in digital tool use increased to 26% for online sales, 33% for websites, 12% for online marketing, and 21% for social media presence.

Identifying a country's unique drivers of digital momentum is necessary: Considering factors such as the current state of digital economy and country size, growth drivers for digital economy must be identified and amplified. While developed economies need to priorities on innovation, developing economies should focus on institution.

Strengthening Transaction Security: Implementing effective checks and balances is crucial to mitigate these challenges. One positive example is the use of One-Time Passwords (OTPs) in India,

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which provides users with a short window of time to verify their transactions. Such measures help enhance security and provide an opportunity for users to reconsider their actions.

Financial Inclusion and Security in the Digital Era: The connectivity advancements brought about by initiatives like the JAM Trinity (Jan Dhan Yojana, Aadhaar, Mobile) have improved financial inclusion, allowing previously unbanked individuals to access digital services. Internet banking and ATM transactions have also made banking more convenient. However, each of these advancements carries its own risks, making it essential to ensure that transactions occur in a secure and vigilant manner.

Approaches to Enhance Transaction Security: To address these challenges, various schemes have been implemented. Apart from OTP, some experiments involve changing the layout of the numeric keypad to prevent patterns and patterns on the keyboard, creating an alert for users. Additionally, when transactions exceed a certain threshold or deviate from normal patterns, call centers may reach out to customers for verification.

Enhancing Cyber Security: Overall, the key focus is to ensure that the digital economy operates with a high level of security, safeguarding the interests of end consumers. Vigilance, proactive measures, and continuous assessment of the challenges associated with the swift movement of funds are vital for a safe digital transaction environment worldwide.

Digital Public Infrastructure and Digital Skilling: Digital public infrastructure and digital skilling are closely connected. They are viewed as two sides of the same coin, where the creation of public infrastructure must be accompanied by a skilled workforce capable of utilizing and benefiting from it.

Benefits of Digital Transformation in India

Economic growth and job creation: Digitalization fosters innovation and entrepreneurship, leading to the creation of new businesses and job opportunities in the technology and digital sectors.

Improved governance: Digital platforms enable more transparent and efficient governance, reducing corruption and improving the delivery of public services.

Financial inclusion: Digital technologies enable affordable and accessible financial services, helping to include more people in the formal banking system and encouraging saving and investment.

Data-driven decision-making: Digital transformation generates vast amounts of data that can be analyzed to make data-driven decisions in various sectors, leading to better planning and resource allocation.

Increased efficiency: Digital technologies streamline processes, reduce paperwork, and automate tasks, leading to improved efficiency in government services, businesses, and various sectors.

Enhanced access to services: Digitalization expands access to services, especially in remote and underserved areas, making healthcare, education, banking, and government services more accessible to the population.

E-commerce growth: Digital platforms and e-commerce have facilitated the growth of online retail, connecting buyers and sellers across the country and driving economic activity.

Role of Stakeholders in Ensuring a Smooth and Inclusive Transition

1 Government: The government plays a crucial role in creating an enabling environment for digital transformation by investing in digital infrastructure, formulating supportive policies and regulations, and promoting digital literacy and inclusion through various initiatives.

2 Private sector: Businesses, startups, and technology companies drive innovation and investment in digital technologies, offering products and services that cater to the diverse needs of the population.

3 Civil society organizations: NGOs and community-based organizations can work to bridge the digital divide by providing digital literacy training and promoting digital inclusion among marginalized communities.

4 Educational institutions: Schools, colleges, and universities must adapt their curriculum to equip students with digital skills and knowledge relevant to the evolving job market.

5 Financial institutions: Banks and financial service providers play a crucial role in promoting financial inclusion by expanding digital banking services and facilitating the adoption of digital payment methods.

6 Technology providers: Companies that offer digital solutions and technologies should focus on user-friendly designs, security, and scalability to ensure their products are accessible and effective.

7 Media and communication channels: Media platforms can raise awareness about digital opportunities, educate the public on digital literacy, and showcase successful case studies of digital transformation.

8 Regulators: Regulators need to strike a balance between promoting innovation and safeguarding consumer interests by establishing clear and adaptive policies for the digital economy.

Overall, a collaborative effort involving all stakeholders is necessary to address the challenges and ensure that digital transformation in India is inclusive, secure, and benefits all segments of society.

Challenges for Digital Economy

Addressing Priorities in the Digital Economy: In the context of the digital economy, there are three priority areas that need to be addressed: digital public infrastructure, digital skilling, and cyber-security. There have been notable achievements in these areas. India has established a robust digital public infrastructure and has made significant progress in digital skilling initiatives. Cyber security has also been a focus, although challenges remain. The Information Technology Act of 2000 defines Critical Information Infrastructure as a computer resource, the incapacitation or destruction of which shall have debilitating impact on national security, economy, public health or safety.

Safety and Security: However, challenges persist in ensuring the safety and security of digital transactions, particularly in the financial sector. The rapid speed at which transactions occur in the digital realm can be concerning. Correcting errors or addressing fraudulent activities can be extremely challenging due to the swift movement of money.

Importance of Skilled Manpower: Neglecting the development of a skilled workforce in the digital domain can hinder the full potential of digital public infrastructure. Strengthening educational institutions to produce digitally literate workers is crucial to fully leverage the advantages of digital infrastructure.

Technological Backwardness: One of the key challenges is the digital divide, with many people in rural areas still lacking access to digital services. The digital economy has also created new forms of inequality, with some people benefiting more than others.

Concluding Remarks

India is a rapidly advancing digital economy, and all global technological trends will therefore influence the Indian IT sector. As stated, digitization will permeate all sectors in 2022, transforming each firm into an IT enterprise. Advanced and immersive technologies, including AI, AR (Augmented Reality), ML, and IoT, will become mainstream and significantly enhance corporate productivity. The corporate sector and government must collaboratively tackle these issues to ensure the Internet remains a secure environment without hindering its commercial growth. The digital revolution, referred to as 'The Internet Economy' or the Internet of Everything (IoE), is anticipated to create new market growth prospects, employment, and emerge as the most significant business opportunity for humanity in the next 30 to 40 years. We must be prepared, as an economy and a community, to adapt to change and seize the opportunities presented by the digital economy. Novel and developing digital technologies are transforming the operational dynamics of industries and businesses. The market is frequently adapting well to digital revolution. The enduring consequences of Demonetization still to be determined. It is anticipated that it will enhance the Indian economy in the long term by augmenting tax compliance and financial inclusion, hence boosting the overall economic condition. The digital economy's impact on India's GDP has risen. In 2014, it constituted 4-4.5% of GDP and is projected to exceed 20% by 2026, according to a report from the Hindustan Times citing the finance ministry. The transition to digital payment methods can enhance GDP by augmenting the availability of cash for lending and diminishing transaction costs.

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