

## THE IMPACT OF DIGITALIZATION ON THE INDIAN ECONOMY: AN ANALYSIS

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### Abstract

A dynamic strategic endeavor, digitalization was started with the goal of making India a knowledge-based, digitally enabled economy. These days, any nation's economic and social change depends heavily on digitization. Millions of Indians' lives could be changed by digitalization, which has spurred efficiency, innovation, and growth across a range of industries. Digital technologies are changing industries and opening up new opportunities in a number of disciplines. These include digital payments, artificial intelligence (AI), blockchain, 5G connectivity, big data, and the Internet of Things (IoT) are restructuring industries and creating new opportunities in various fields. The money circulation and velocity of money are increasing due to the high density of digital transactions, leading to a multiplier effect on the Indian economy. This paper analyzes the impact of digitalization on the Indian economy, mainly concentrating on the impacts of digitalization on finance, industries, health care and agriculture, and also discusses the challenges faced by the digital system. Moreover, the study analyzes the key components of the digital economy in India. Digitalization in India presents challenges, including job displacement from automation, the digital divide, and cybersecurity risks.

**Key Words:** Artificial Intelligence (AI) Digitalization, Upis, Infrastructure, E-Commerce.

### 1. Introduction:

The Digital India program was launched on July 1st, 2015, by the Government of India Digital India initiative. The digital economy is defined as "economic activities supported and carried out with electronic or digital channels." Numerous nations' socio-economic progress has been altered by digital technologies. Digitalization reduces expenses, boosts productivity, and generates new employment opportunities across a range of industries. This essay investigates how the Indian economy has been affected by digitalization. Examines the difficulties facing the digital system and primarily evaluates the effects of digitalization on industry, governance, health care, agriculture, and finance. The research also examines the main elements of India's digital economy.

The broad use of cutting-edge information and communication technologies, including digital payments, artificial intelligence (AI), block chain and 5G connectivity, big data, and the Internet of Things (IoT), is transforming industries and opening up new opportunities in a number of fields. The digital economy is emerging as a robust ecosystem. This digital effort supports Bhasini's AI-driven time translation in 22 languages and collaborates with future trained workers to enable AI-driven expansion. The term "Digital India" refers to a campaign to digitalize the nation's economy, workforce, and telecommunications infrastructure in order to make it a knowledge economy with digital power. This approach has the ability to increase revenue and yield commendable results.

Digital India" denotes an initiative to increase the country's economy, workforce, and telecom infrastructure with digitalization. This strategy has the potential to generate more revenue and produce admirable outcomes. The aim of the program is to create a more digitally connected India and raise the living standard of the people (Dr. Suman preet Kaur Sajad Ahmad Mir-2022).

Digital India program integrates the government administrators and the people of India and also aims at ensuring that Government services are made available to citizens electronically by reducing paperwork, and it is an initiative to transform the country into a digitally empowered knowledge economy. The program has a positive impact on the lives of citizens and on businesses. (D.A. Gupta 2019)

The 'Digital India' program has emerged as a new progression in every sector and generates innovative accomplishments for GeNext. (K. Manikanta 2017) Enhancing UPI transaction integration across various sectors and facilitating high-value transactions. UPI's progress from a peer-to-peer transfer tool to a wide-ranging infrastructure for business payments and retail governance reflects its transformative effects in India's financial ecosystem. UPI has the most successful technology-driven innovations in the banking landscape, making the real-time payment market (See Mary Mathew, sarvey joseph et al.)

India now represents the second-largest internet user base in the world. The share of the digital economy contributed to GDP accounted for 12%. The study analyzes the different aspects of digitalization, including internet accessibility, e-commerce, technological adoption, digital payments, and governance, which provide access to a widespread market. By digitalization, rapid Economic growth can be achieved through innovative business models, enhanced productivity, streamlined governance, and improved service delivery. Digital economy creates new employment opportunities in software development in digital-related sectors, digital marketing, and Gig economy platforms like Zomato, Swiggy.

As per NSSO 2022 data, 76.2% of citizens in India have access to broadband internet facilities. Access in rural areas stands at 71.2%, whereas in urban areas it is significantly higher at 86.5%. This data shows the deep penetration of the internet in India, but there are high variations among the states, genders, castes, and classes. In some states, 90 percent of households have been utilizing broadband facilities, and others have below 70 percent. According to the CAMS report, 94.2 percent of urban people have mobile connections, and 83.9 people have used them in rural areas.

## **2. Objectives of the study:**

1. To examine the Impact of the digital economy in different fields of India
2. To analyze the main components of the digital economy in India
3. To identify challenges faced in the digital economy of India.
4. To provide recommendations for the effective implementation Digital India program.

## **3. Research Methodology:**

The study draws on the secondary data sources to analyze the impact of the digital economy of India. The paper is primarily based on the statistics retrieved from the internet via journals, research papers and government reports, and official websites relevant to the topic.

## **4. Impact of digitalization on various fields**

The paper examines the effects of digitalization and mainly focuses on employment, GDP contribution, education, healthcare, and finance in India.

### **4.1 Impact on GDP Contribution:**

India's digital economy accounted for 11.74 of the country's GDP (INR 31.64 lakhs crore or USD 402 billion) in 2022-23. Digital economy raised from 108 dollars to 223 billion dollars 2014 and 2019, at CAGR of 15.6%, while the overall economy grew at a CAGR OF 4.9% during the same period. Some projections shows that digitalization could potentially boost India's GDP up to 1 trillion dollars by 2025. As per the report of RBI, the Digital economy will extent 1/5<sup>th</sup> of GDP by 2026.

### **4.2 Impact on Employment:**

The digital economy employed 14.67 million workers (2.55% of the workers) in 2022-23. The digital economy has been creating more job opportunities for data scientists, AI and machine learning engineers, digital marketing professionals, and cybersecurity specialists. The e-shram portal is implemented by the Ministry of Labor and Employment to manage the database of unorganized workers. 30.52 crore e-shram cards were issued by the year 2024. The introduction of Artificial Intelligence in many sectors have adversely impact on job market.

### **4.3 Impact on Education:**

E-learning platforms have become more accessible due to the Digital India Program (dip), improving education and skill development. According to IMARK group in 2023, the e-learning market in India was valued at USD 7.3 billion. The market is expected to grow at a CAGR of 12% (IMARK group). The online education market in India is estimated to grow by US 2.28 billion dollars. Diksha, SWAYAM, and NDLM are key digital platforms providing online educational services in India.

### **4.4 Impact on Healthcare:**

A study in the International Journal of Advanced Health Science and Technology found that digital transformation in health care has led to improved patient outcomes, increased efficiency, and enhanced patient engagement. Digital technologies such as Telemedicine, electronic health records, AI, and mobile health Apps have improved the health conditions of patients. Expanded access to healthcare services to underserved rural people a digital-first approach will make it easier for healthcare providers to prioritize preventive care. Five Startups have digitalized stores, improving access to medicines in remote areas, with over five million consultations conducted. Ayushman Bharat Digital Mission, E-sanjeevani, and CoWin Platforms are current digital initiatives in the healthcare sector in India.

### **4.5 Impact on Agriculture:**

E-Nam, PM Kisan portal and soil health care cards are introduced for achieving high productivity in agriculture sector. Electronic Agriculture Market (e NAM) bridges the gap between farmers and buyers with digital services. AI power-driven tools are being used in exactitude farming to enhance crop yields and optimize supply chains. Financial services can be supported by digital infrastructure a variety of channels, including the Internet, mobile devices, ATMs, point-of-sale services, UPI, etc. All facets of the population may find financial services more accessible as a result. Through digital

platforms, farmers' and elderly retirees' accounts get direct deposits of digital delivery services like subsidies and pensions. The Reserve Bank of India data states that 425.7 crore digital transactions took place in March 2021. Between March 2020 and March 2021, the value of digital transactions grew from 206.06 lakhs crore to 302.71 lakhs crore. Between 2019 and 2021, India's digital payment volume grew at a compound annual growth rate (CAGR) of 58.9% in terms of volume

#### 4.6 Impact on Finance

Financial services can be supported by digital infrastructure a variety of channels, including the Internet, mobile devices, ATMs, point-of-sale services, UPI, etc. All facets of the population may find financial services more accessible as a result. Through digital platforms, farmers' and elderly retirees' accounts get direct deposits of digital delivery services like subsidies and pensions. The Reserve Bank of India data states that 425.7 crore digital transactions took place in March 2021. Between March 2020 and March 2021, the value of digital transactions grew from 206.06 lakhs crore to 302.71 lakhs crore. Between 2019 and 2021, India's digital payment volume grew at a compound annual growth rate (CAGR) of 58.9% in terms of volume.

### 5. Analysis of key components of the digital Economy in India

The study analyzed the growth trends of digital infrastructure, Digital transactions, UPI Transactions and discussed the role of E-Commerce and artificial Intelligence on the Indian economy during the period from 2016 -2017 to 2023 and 2024 -2025.

#### 5.1 Digital Infrastructure:

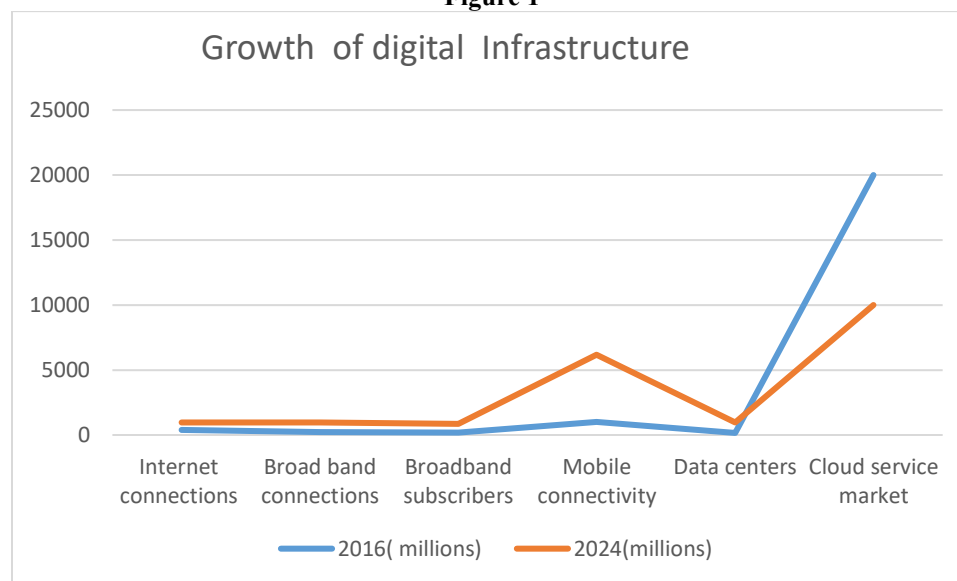
Digital infrastructure serves as the key component of the digital economy, data centers, encircling broadband networks, cloud computing platforms. Infrastructure enable the storage, processing, and transmission of amount of data and efficient operations across different sectors.

**Table 1. Growth of Digital infrastructure (2016 and 2024)**

Digital infrastructure	2016 (in millions)	2024 (in millions)	Percentage change
Internet connections (both wireline and wireless)	391	969.6	148
Broad band connections	236.09	949.2	302
Broadband subscribers	171.71	856 million	398.5
Mobile connectivity	988.14	6,15836	62,212
Data centers	158 mw	950 mw (138 data centers)	501.27
Cloud service market	2 billion dollars	5.2 billion by 2023	160

Source: [www.digitalindia.gov.in](http://www.digitalindia.gov.in) India, TRAI, NASCOM

**Figure 1**



The above table 1 and figure 1 indicating that the digital infrastructure has increased tremendously in India during the period from 2016 to 2024. The internet connections grew by 148 percent during the study period, followed by Broadband connections

302 percent, Broadband subscribers 398.5 percent, mobile connectivity 62,212, Data centers 501.27 and Cloud service market 160 percent. The data in the table witnessed the highest growth rate registered in Mobile connectivity.

## 5.2 Digital Transactions:

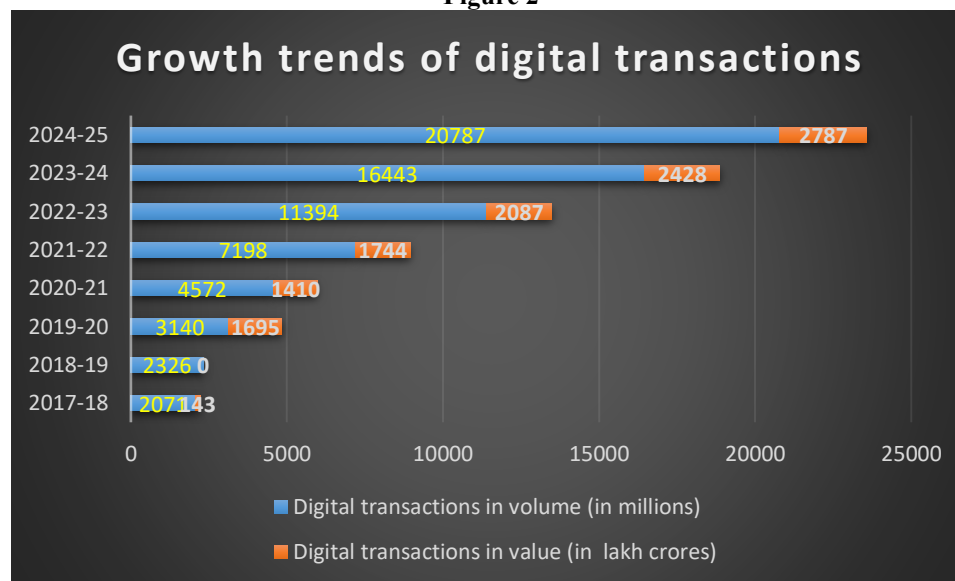
Digital transactions are crucial components of the digital economy that have improved cashless transactions. Digital platforms such as unified Payment interface, Paytem, and RuPay are emerging payment systems. These platforms make transactions quicker, Safer, and more accessible. Digital transactions decrease leakages in the government's direct benefit transfers, curtail circulation of fake currency, and find out unaccounted transactions accurately. A digital payment environment eases the operational costs of the financial system. The money circulation and velocity of money are increasing due to the high density of digital transactions, leading to a multiplier effect on the Indian economy

**Table 2: Growth trends of digital transactions in India (2017-18 to 2024-25)**

Year	Digital transactions in volume (in millions)	Digital transactions in value (in lakh crores)
2017-18	2071	143.1
2018-19	2326.02	NA
2019-20	3140	1695
2020-21	4572	1410
2021-22	7197.68	1744.01
2022-23	11393.82	2086.85
2023-24	16443.02	2428.24
2024-25	20787	2787

RBI report, [www. Business standard](http://www.business-standard)

**Figure 2**



The data in table 2 and figure 2 shows that the growth of digital truncations have been growing tremendously and continuously in terms of volume and value during the period from 2017-18 to 2024-25.

## 6. 3 UPI Transactions:

7.

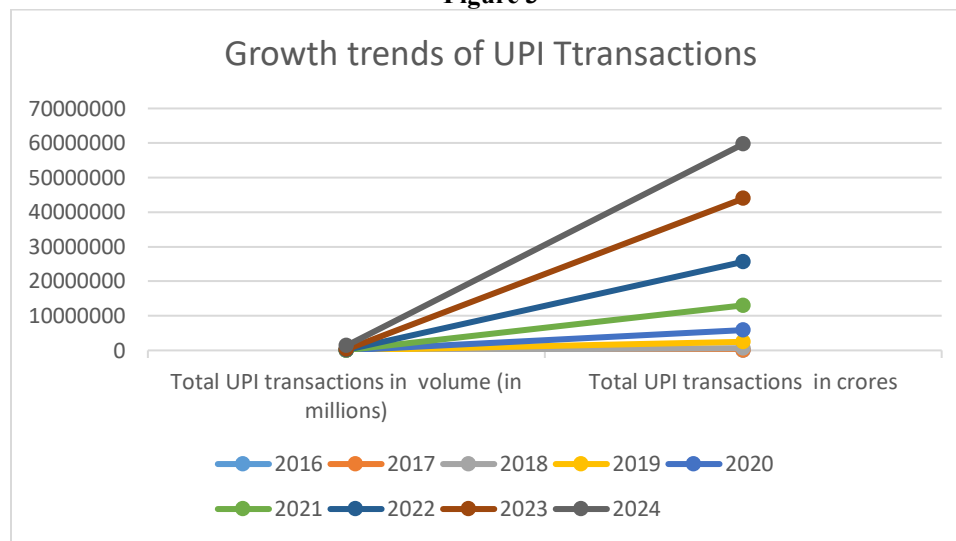
**Table 3: Growth of UPI transactions in India in volume and value (from 2016 to 2024)**

Year	Total UPI transactions in volume (in millions)	Total UPI transactions in values (in crores)
2016	2.65	893.07
2017	429.15	57020.87
2018	15571.2	585710.45

2019	10787.54	1836638.18
2020	1888.89	3387744.72
2021	38744.55	7159285.8
2022	74044.48	12595077.87
2023	117677.97	18284406.82
2024	1083369	15788817.25

Source: National Payment Corporation of India (NPCI) -2024

**Figure 3**



The data in the table3 and figure 3 indicating that incessant rising in UPI transactions in India between 2016 and 2024, both in terms of volume (in millions) and value (in crores). With UPI developing as a key platform for facilitating real-time transactions, the aforementioned anticipated period denotes a transformative phase for India's retail digital payments system. The table's data demonstrates that the number of digital payment transactions is steadily increasing. In terms of value, the greatest trades in 2023 totaled 18284406.82 crores, while the lowest was RS INR 893.07 crores in 2016. Regarding the steadily rising number of transactions. 2024. According to reports mentioned in the table, the largest number of transactions totaled 1083369 million crores.

#### 5.4 E-Commerce:

E- Commerce is held by businesses like JioMart, Amazon, and Flipkart. Customers can get competitive and appropriate pricing from these online sites. Through the use of smartphones and the internet, these platforms also enable small companies and craftsmen to offer them a digital marketplace. India's retail e-commerce business is currently worth 83 billion dollars since 2022, India's e-commerce market has seen 125 million new customers. Digital payments are expanding quickly, with a growth rate of 23.8%.

#### 5.5 Artificial Intelligence:

In India, artificial intelligence is changing a number of sectors, including retail, e-commerce, and telecommunications. AI Big Data is essential to the digital economy because it enables businesses to link data for productivity, creativity, and decision-making in the fields of transportation, Healthcare, Agriculture, and Governance. Predictive analytics and resource optimization are done with AI and big data techniques. According to an estimate, artificial intelligence is expected to boost India's economy by 967 billion dollars by 2035. With the potential to raise GDP by 10%. According to Ashok Kumar and Shrinivas' 2024 estimate, artificial intelligence might generate \$1 trillion over the next seven years (from 2025).

### 8. Challenges faced by the digital economy in India

A number of obstacles are impeding the advancement of the digital economy. Major issues facing the Indian economy include job displacement, cyberattacks, digital illiteracy, and the Digital Divide between males and females, between urban and rural remote locations, and between different kinds of people. Additionally, Lack of cyber security specialists, slow internet speed, a shortage of Wi-Fi hotspots, online safety procedures, and a shortage of workers with the necessary training in digital technologies. For the Digital India Mission to be sustainable and to guarantee that all citizens have equitable access to digital

empowerment, these issues must be resolved.  
Indian transactions

## 7. Suggestions:

- Stakeholders should concentrate on research and development efforts in emerging technologies such as block chain and quantum computing.
- Encourage partnerships between academic institutions, public research institutes, and the priority.
- Promoted online and offering financing for mentorship, incubation initiatives, etc.
- More focus on digital literacy which would be close the gap between urban and rural by usage of digital technology.
- Increasing the proportion of digital transactions in India can be achieved by providing free internet connectivity in isolated rural areas.
- Create strong guidelines and instruments to assess and improve life quality
- Generating robust data security to ensure data privacy security by making strong data protection laws and regulations to safeguard the privacy of the users.
- Increase optical fiber networks in rural areas and provide speed internet

## 8. Conclusion:

According to the study's findings, India's digital infrastructure and transactions grew significantly between 2016 and 2024. The study found that the fast expansion of GDP, widening the employment opportunities, improved online education platforms, rising digital agricultural marketing services, extended healthcare technologies, and Accessing robust digital financial services are positively impacted by digitalization. Digital technologies permeate every area of the economy and generate millions of employment for qualified workers who are currently unemployed and underemployed. According to the study, widespread adoption of digital tools increases output, reduces inefficiencies, and opens up new business opportunities, especially in the areas of automation, e-commerce, and digital marketing. The economy benefits from digitalization since it is more effective, competitive, and encourages India's digital infrastructure plays a significant role in the country's inclusive growth.

Digital initiatives such as Bharat Net, Digital India, AI, big data, black chain, and 5G offer a thriving digital ecosystem that has contributed to the expansion of the Indian economy. Unlocking the full potential of digital transformation requires addressing issues like skill development, the digital divide, and cybersecurity. "The public, private, and people's (PPP) cooperation is essential to the digital economy's development in India. Collaborations between the digital industry, academia, and public research organizations must also be encouraged in order to close the gap between rural and urban areas. In order to understand how automation and artificial intelligence are displacing jobs, it is crucial to offer continuous learning opportunities for digital education and worker reskilling.

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