



ROLE OF THE DIGITAL ECONOMY IN ACHIEVING SUSTAINABLE DEVELOPMENT GOALS IN INDIA

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ABSTRACT

The digital economy has emerged as a significant driver of sustainable development in India over the past decade. Rapid growth in internet connectivity, digital banking, financial technology and digital governance has transformed economic and social activities, contributing to the achievement of Sustainable Development Goals. This study examines the relationship between digital economy indicators and sustainable development performance in India using secondary data collected from official government and institutional sources for the period 2014-2024. The study is descriptive and analytical in nature and employs statistical tools such as trend analysis, CAGR and Pearson's correlation analysis. The findings reveal substantial expansion in key digital economy indicators during the study period. Internet subscribers increased from 25.15 crore in 2014 to 96.96 crore in 2024, while UPI transactions rose dramatically from 0.92 billion in 2017 to 172 billion in 2024. Similarly, PMJDY accounts increased from 7.90 crore to 53.13 crore, reflecting significant improvements in financial inclusion and access to banking services. India's SDG Index Score improved from 57 in 2018 to 71 in 2023-24, indicating steady progress toward sustainable development. CAGR analysis confirms rapid growth in internet penetration, digital payments and digital banking services. Correlation results indicate a statistically significant positive relationship between digital economy indicators and SDG performance, with internet subscribers exhibiting the highest correlation ($r = 0.9887$, $p = 0.001$). Since all p-values are less than 0.05, the results are statistically significant. study concludes that digitalization has significantly contributed to financial inclusion, governance efficiency and inclusive economic growth in India. However, challenges such as the digital divide, cyber security risks and low digital literacy remain. Strengthening digital infrastructure and promoting inclusive digital policies are essential for achieving Agenda 2030 and sustainable development objectives in India.

KEYWORDS: Digital Economy, Internet Subscribers, Jan Dhan Accounts, UPI and SDG, Index

1. INTRODUCTION

The digital economy refers to economic activities supported by digital technologies, internet-based services, digital communication systems and electronic transactions. In recent years, digitalization has transformed economies worldwide by improving productivity, governance efficiency, financial inclusion and accessibility to services. India experienced rapid digital transformation

after the launch of the Digital India Programme in 2015. Government initiatives such as Aadhaar, BharatNet, Jan Dhan Yojana, Unified Payments Interface (UPI), DigiLocker and Direct Benefit Transfer (DBT) significantly strengthened India's digital system. These initiatives improved digital governance, banking accessibility, healthcare services, educational outreach, entrepreneurial opportunities and transparency in

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public service delivery. Digital technologies have also enabled wider participation in economic activities and improved service accessibility among rural and economically weaker populations. India has committed to achieving the United Nations Sustainable Development Goals (SDGs) by 2030. The SDGs emphasize poverty reduction, quality education, gender equality, sustainable infrastructure, inclusive economic growth and innovation-led development.

The digital economy has emerged as an important mechanism for accelerating progress toward these developmental goals. According to NITI Aayog, India's SDG Index Score improved from 57 in 2018 to 71 in 2023-24. Simultaneously, digital economy indicators such as internet subscribers, UPI transactions, Jan Dhan accounts and digital banking transactions increased substantially. Therefore, examining the empirical relationship between digital economy expansion and Sustainable Development Goals has become an important area of economic research.

2. REVIEW OF LITERATURE

Kumar (2022) examined the role of digital governance in improving public service delivery in India and found that digital platforms significantly enhanced administrative transparency and governance efficiency. The study further highlighted that digital governance initiatives reduced bureaucratic delays, improved citizen access to government services and strengthened accountability in public administration.

The World Bank (2024) highlighted that digital financial services contribute significantly toward inclusive economic growth, poverty reduction and accessibility to financial systems in developing countries. The report emphasized that digital technologies facilitate greater financial inclusion, enhance economic opportunities and support sustainable development by improving access to essential services.

NITI Aayog (2024) reported substantial improvement in India's sustainable development performance due to increasing digital infrastructure, governance reforms and financial inclusion initiatives. The report further noted that expansion of internet connectivity,

digital service delivery and technology-driven governance mechanisms have played an important role in accelerating progress toward the Sustainable Development Goals (SDGs) in India.

3. RESEARCH GAP

Existing literature mainly focuses on digital payments, financial inclusion or SDG performance separately. Most studies are either conceptual or limited to individual dimensions of digitalization. Very few studies examine the integrated empirical relationship between multiple digital economy indicators and Sustainable Development Goals in India using recent post-digitalization data. Therefore, the present study attempts to fill this research gap by statistically analysing the relationship between digital economy growth and SDG achievement in India.

4. OBJECTIVES OF THE STUDY

- To examine the growth trends of digital economy indicators in India during 2014–2024.
- To analyse the relationship between digital economy indicators and SDG performance in India.

5. HYPOTHESIS

H_0 : There is no significant relationship between digital economy indicators and Sustainable Development Goals in India.

H_1 : There is a significant positive relationship between digital economy indicators and Sustainable Development Goals in India.

6. RESEARCH METHODOLOGY

The present study is descriptive and analytical in nature and is entirely based on secondary data collected from various official government and institutional sources. The required data were obtained from NITI Aayog SDG India Index Reports, Reserve Bank of India (RBI), National Payments Corporation of India (NPCI), Telecom Regulatory Authority of India (TRAI), PMJDY Portal, Ministry of Electronics and Information Technology and World Bank Database. The study covers the period from 2014 to 2024 in order to examine the growth of the digital economy and its contribution toward Sustainable Development Goals in India during the post-digitalization period. The SDG Index Score has been used as the dependent indicator representing sustainable development

performance, while internet subscribers, UPI transactions, Jan Dhan accounts and digital banking transactions have been considered as major digital economy indicators for empirical analysis. Various statistical tools such as trend analysis, percentage analysis, CAGR and correlation analysis have been

applied to analyse growth patterns and examine the relationship between digital economy expansion and sustainable development performance in India. Pearson's correlation coefficient method was used to examine the relationship between digital economy indicators and SDG performance in India.

7. DATA ANALYSIS AND INTERPRETATION

Table 1: Trends in Digital Economy and Sustainable Development Indicators in India (2014-2024)

Year	Internet Subscribers (Crore)	UPI Transactions (Billion)	Jan Dhan Accounts (Crore)	Digital Banking Transactions (Billion)	SDG Index Score
2014	25.15	-	7.90	3.10	-
2015	30.20	-	14.72	4.25	-
2016	34.26	0.02	22.89	6.40	-
2017	42.21	0.92	28.17	9.85	-
2018	49.00	5.35	31.44	15.30	57
2019	56.00	12.52	36.79	22.40	60
2020	74.30	22.30	40.35	34.70	66
2021	82.00	38.74	43.04	48.90	66
2022	83.70	74.05	47.84	67.30	67
2023	93.60	117.64	50.89	88.60	71
2024	96.96	172.00	53.13	110.20	71

Source: TRAI Reports, NPCI Statistics, PMJDY Reports, RBI Payment System Indicators and NITI Aayog SDG India Index Reports (2014-2024).

Note: Internet Subscribers and Jan Dhan Accounts are measured in crore, while UPI Transactions and Digital Banking Transactions are measured in billion.

The data presented in Table No. 1 indicate substantial growth in digital economy indicators in India during the study period. Internet subscribers increased continuously from 25.15 crore in 2014 to 96.96 crore in 2024, reflecting rapid expansion in digital connectivity and internet accessibility across the country. This growth was driven by affordable smartphones, expansion of broadband networks and government initiatives such as Digital India. UPI transactions witnessed remarkable growth from 0.92 billion transactions in 2017 to 172 billion transactions in 2024, reflecting increasing adoption of digital payment systems and cashless transactions in India. The rapid increase in UPI transactions can be attributed to widespread smartphone usage, growth of fintech applications, government support for digital payments and the shift toward contactless transactions during and after the COVID-19 pandemic. Jan Dhan accounts increased significantly from 7.90 crore in 2014 to 53.13 crore in 2024, indicating major improvement in financial inclusion and banking accessibility. This growth reflects the

success of the Pradhan Mantri Jan Dhan Yojana (PMJDY), direct benefit transfer schemes and efforts to integrate previously unbanked populations into the formal financial system. Similarly, digital banking transactions increased substantially from 3.10 billion in 2014 to 110.20 billion in 2024, demonstrating rapid digitalization of banking services and financial transactions. The increase was supported by greater internet penetration, mobile banking adoption, technological advancements in banking services and changing consumer preferences toward online transactions.

India's SDG Index Score improved from 57 in 2018 to 71 in 2023-24, reflecting positive progress toward sustainable development in areas such as poverty reduction, governance efficiency, infrastructure development and inclusive economic growth. The improvement can be attributed to strengthened digital infrastructure, enhanced public service delivery, financial inclusion initiatives and sustained government efforts toward achieving the Sustainable

Development Goals. Overall, the table demonstrates a strong upward trend in digital economy indicators and sustainable development performance in India during the post-digitalization period.

8. CAGR ANALYSIS OF DIGITAL ECONOMY INDICATORS IN INDIA (2014-2024)

The CAGR analysis was conducted to measure the annual growth performance of major digital economy indicators in India during the study period.

$$\text{CAGR} = \left[\left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\frac{1}{n}} - 1 \right] \times 100$$

Where: **Ending Value** = Final Year Value
Beginning Value = Initial Year Value
n = Number of Years

Table 2: CAGR of Digital Economy Indicators in India

Indicators	Beginning Year Value	Ending Year Value	Period	CAGR (%)
Internet Subscribers	25.15 Crore (2014)	96.96 Crore (2024)	2014-2024	14.45 %
UPI Transactions	0.92 Billion (2017)	172 Billion (2024)	2017-2024	111.12 %
Jan Dhan Accounts	7.90 Crore (2014)	53.13 Crore (2024)	2014-2024	21.00 %
Digital Banking Transactions	3.10 Billion (2014)	110.20 Billion (2024)	2014-2024	42.92 %
SDG Index Score	57 (2018)	71 (2023-24)	2018-2024	4.49 %

Table No. 2 presents the CAGR analysis which reveals substantial growth in digital economy indicators in India during the study period. UPI transactions recorded the highest CAGR of 111.12 %, reflecting extraordinary expansion in digital payment systems and rapid adoption of cashless transactions in India. Digital banking transactions recorded a CAGR of 42.92 %, demonstrating significant digitalization in banking activities and increasing use of online financial services. Jan Dhan accounts witnessed a CAGR of 21.00 %, indicating continuous improvement in financial inclusion and banking accessibility among economically weaker sections of society. Internet subscribers recorded a CAGR of 14.45 %, reflecting rapid expansion in internet connectivity and digital

infrastructure across the country. The SDG Index Score also recorded positive annual growth of 4.49 %, indicating gradual improvement in sustainable development performance in India. Overall, the CAGR analysis confirms that India experienced rapid digital economic transformation during the post-digitalization period, which positively contributed toward achieving Sustainable Development Goals.

9. CORRELATION ANALYSIS

Table 3: Correlation Analysis between Digital Economy Indicators and SDG Performance in India

Sr. No.	Digital Economy Indicators	Correlation Coefficient (r) with SDG Score	p-value	N
1	Internet Subscribers	0.9887	0.001	7
2	UPI Transactions	0.8442	0.017	7
3	Jan Dhan Accounts	0.9642	0.001	7
4	Digital Banking Transactions	0.9117	0.004	7

Table No. 3 presents the Pearson correlation analysis between selected digital economy indicators and the SDG Index Score in India during the period 2018–2024. The results reveal strong positive relationships between all digital economy indicators and sustainable development performance. Internet subscribers exhibit the highest correlation with SDG Score ($r = 0.9887$, $p = 0.001$), indicating a very strong positive association between digital connectivity and sustainable development outcomes. Jan Dhan accounts also demonstrate a very strong positive relationship ($r = 0.9642$, $p = 0.001$), reflecting the importance of financial inclusion in supporting sustainable development. Similarly, digital banking transactions show a strong positive correlation ($r = 0.9117$, $p = 0.004$), suggesting that increased adoption of digital financial services is closely associated with improvements in SDG performance. UPI transactions record a strong positive correlation ($r = 0.8442$, $p = 0.017$), indicating that the rapid expansion of digital payment systems is linked with sustainable economic and social development. Since the p-values for all indicators are less than the 5 percent significance level ($p < 0.05$), the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, the study concludes that there is a statistically significant positive relationship between digital

economy indicators and Sustainable Development Goal performance in India.

10. HYPOTHESIS TESTING

Pearson correlation analysis was conducted between selected digital economy indicators and the SDG Index Score for the period 2018-2024. The results reveal strong positive correlations between Internet Subscribers ($r = 0.9887$, $p = 0.001$), UPI Transactions ($r = 0.8442$, $p = 0.017$), Jan Dhan Accounts ($r = 0.9642$, $p = 0.001$) and Digital Banking Transactions ($r = 0.9117$, $p = 0.004$) with the SDG Index Score. The p-values for all digital economy indicators are less than the 5 percent level of significance ($p < 0.05$), indicating that the observed relationships are statistically significant. Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, the study confirms a statistically significant positive relationship between digital economy indicators and SDG performance in India.

11. MAJOR FINDINGS OF THE STUDY

Digital economy indicators in India have shown continuous and substantial growth after implementation of the Digital India Programme.

- Internet subscribers increased significantly from 25.15 crore in 2014 to 96.96 crore in 2024, reflecting rapid expansion in digital connectivity and internet accessibility across India.
- UPI transactions increased remarkably from 0.92 billion in 2017 to 172 billion in 2024, indicating extraordinary growth in digital payment systems and cashless transactions.
- Jan Dhan accounts increased from 7.90 crore in 2014 to 53.13 crore in 2024, demonstrating considerable improvement in financial inclusion and banking accessibility among economically weaker populations.
- Digital banking transactions increased from 3.10 billion in 2014 to 110.20 billion in 2024, reflecting rapid digitalization of banking activities and financial services.
- CAGR analysis confirms rapid annual growth in internet penetration, financial inclusion, digital banking and digital payment systems during the study period.
- Correlation analysis reveals strong positive association between digital economy indicators and SDG performance in India.

- Internet subscribers recorded the highest correlation coefficient ($r = 0.9887$) with SDG Score, followed by Jan Dhan accounts ($r = 0.9642$) and digital banking transactions ($r = 0.9117$).
- Digitalization contributed significantly toward governance transparency, financial accessibility, infrastructure development, poverty reduction and inclusive economic growth.
- Digital divide, cyber security concerns and low digital literacy continue to remain major challenges affecting inclusive digital transformation in India.

12. POLICY SUGGESTIONS

- The government should strengthen rural digital infrastructure to ensure inclusive digital accessibility across all regions.
- Digital literacy programmes should be expanded to improve technological awareness among rural and economically weaker populations.
- Strong cyber security frameworks should be developed to enhance public trust in digital financial systems.
- Public-private partnerships should be encouraged for promoting fintech innovation and digital governance initiatives.
- Greater investment in broadband infrastructure and affordable internet services is essential for inclusive digital transformation.
- Digital policies should focus on reducing regional and socio-economic digital inequalities for balanced sustainable development.

13. LIMITATIONS OF THE STUDY

The study is limited to secondary data collected from official government and institutional sources and selected digital economy indicators due to availability of consistent data. The analysis is confined to India and covers the period from 2014 to 2024. Future studies may incorporate primary data and advanced econometric techniques for broader analysis of digital economy and sustainable development relationships.

14. CONCLUSION

The study concludes that the digital economy has emerged as a major driver of sustainable development in India during the post-digitalization period. Rapid growth in internet connectivity, digital payment systems, digital banking services

and financial inclusion has substantially contributed toward achieving Sustainable Development Goals in the country. The empirical findings reveal a strong positive relationship between digital economy indicators and SDG performance in India. The correlation analysis indicates a statistically significant relationship ($p < 0.05$), leading to rejection of the null hypothesis (H_0) and acceptance of the alternative hypothesis (H_1), confirming a significant positive relationship between digital economy indicators and SDG performance in India. Internet subscribers increased from 25.15 crore in 2014 to 96.96 crore in 2024, while digital banking transactions increased remarkably from 3.10 billion to 110.20 billion during the same period. Similarly, UPI transactions expanded rapidly from 0.92 billion in 2017 to 172 billion in 2024, reflecting extraordinary adoption of digital financial services and cashless transactions. India's SDG Index Score improved from 57 in 2018 to 71 in 2023-24, indicating substantial progress toward sustainable development performance. The CAGR analysis confirms accelerated annual growth in major digital economy indicators, while correlation analysis establishes strong positive association between digitalization and sustainable development outcomes. Internet subscribers recorded the highest correlation coefficient ($r = 0.9887$) with SDG Score, followed by Jan Dhan accounts ($r = 0.9642$) and digital banking transactions ($r = 0.9117$), indicating that digital connectivity and financial inclusion significantly support sustainable development performance in India. The findings suggest that digitalization is positively associated with progress toward SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation and Infrastructure). Expansion of digital governance, internet accessibility and digital financial services has improved governance transparency, economic participation, financial inclusion and accessibility to public services in India.

However, challenges such as digital inequality, cyber security risks and low digital literacy continue to affect inclusive digital development. Therefore, strengthening digital infrastructure, expanding digital awareness, improving rural internet accessibility and promoting inclusive digital policies are essential for achieving Agenda 2030 and sustainable economic development in India. The study finally concludes

that the digital economy can serve as an effective policy instrument for accelerating inclusive and sustainable economic growth in emerging economies like India.

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