

Digital Financial Transformation and Macroeconomic Growth in India: An Empirical Analysis of Post-Pandemic Economic Development

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Abstract: *The digital economy has emerged as a significant driver of economic growth in India, particularly in the post-pandemic period. The rapid expansion of digital payment systems, internet penetration, fintech services, and technological advancement has transformed the country's economic environment. This study examines the relationship between the digital economy and economic growth in India using major macroeconomic variables. The study considers digital payment volume, internet penetration, Foreign Direct Investment (FDI) inflows, inflation rate, and unemployment rate as independent variables, while GDP growth rate is taken as the dependent variable. The study is based on secondary data collected from authentic sources such as the Reserve Bank of India (RBI), World Bank, IMF, MOSPI, and government reports for the period from 2015 to 2025. Analytical tools such as Descriptive Statistics, Unit Root Test (ADF Test), and Granger Causality Test were employed using EViews software to analyze the data. The findings of the study reveal significant variation among the selected digital economy indicators and macroeconomic variables. The Unit Root Test confirmed that all variables are stationary at first difference and suitable for further econometric analysis. The Granger Causality Test results indicate that digital payment volume, internet penetration, FDI inflows, and unemployment rate have significant causal relationships with GDP growth rate, while inflation rate does not show a significant relationship with economic growth. The study concludes that the expansion of digital financial services and technological infrastructure positively contributes to India's macroeconomic growth and economic transformation. The research highlights the importance of strengthening digital infrastructure, promoting financial inclusion, and encouraging fintech innovation for achieving sustainable economic development in India.*

Keywords: Digital Economy, Economic Growth, Digital Payments, Internet Penetration, FDI Inflows, GDP Growth Rate, India, Fintech

1. Introduction of the Study

The digital economy has emerged as one of the most important contributors to economic growth in the modern world. Technological advancement, internet accessibility, fintech innovation, and digital financial services have transformed the way economies operate. In India, the government's initiatives such as Digital India, Unified Payments Interface (UPI), online banking systems, and financial inclusion programs have significantly accelerated digital transformation. The post-pandemic period further increased the dependence on digital platforms for payments, banking, shopping, and business activities, making the digital economy an essential component of macroeconomic development. Digital payment systems have become a major indicator of economic modernization and financial efficiency. The rapid increase in UPI transactions and online financial services has improved transparency, reduced transaction costs, and strengthened financial inclusion in India. According to Dubey and Purnanandam (2023), digital payment adoption positively influences household income and small business performance by improving financial accessibility and reducing operational costs. Their study emphasized that cashless transactions can stimulate economic growth by increasing economic participation and consumption activities. Internet penetration is another significant factor supporting the growth of the digital economy. Increased internet usage enables online banking, e-commerce, digital investments, and financial transactions across urban and rural regions. Patra and Sethi (2024) found that digital payments and internet accessibility positively affect economic growth in emerging economies through improved institutional quality, consumption expenditure, and

bank credit expansion. Their research highlighted that technological infrastructure and digital connectivity are essential for sustaining long-term macroeconomic growth. Foreign Direct Investment (FDI) also plays a crucial role in economic development by bringing capital inflows, advanced technology, innovation, and employment opportunities. The integration of digital technologies and fintech sectors has attracted global investors to India's growing digital market. At the same time, macroeconomic factors such as inflation and unemployment influence economic stability and consumer purchasing power. A stable inflation rate and reduced unemployment contribute to stronger productivity and economic performance, thereby supporting GDP growth. The COVID-19 pandemic created a major shift toward digital financial systems worldwide. During the pandemic, consumers and businesses increasingly relied on contactless and online transactions, which accelerated digital payment adoption. Dev et al. (2024) studied the impact of UPI on spending behavior among Indian users and concluded that digital payment platforms significantly changed consumer financial behavior and strengthened the transition toward a cashless economy. Their findings indicate that digital transactions improve convenience, transaction efficiency, and economic participation. Similarly, Mritunjay and Singh (2025) examined the relationship between financial inclusion, digital payment growth, and macroeconomic development in India. Their empirical analysis showed that digital financial expansion positively contributes to economic growth by improving financial accessibility and increasing economic productivity. The study emphasized that digital financial systems are becoming an important pillar of India's economic development strategy. Furthermore, Bishoyi (2024) identified major factors responsible for the rapid growth of digital

Volume 15 Issue 5, May 2026

Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

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payments in India, including fintech innovation, smartphone penetration, supportive government policies, and improved digital infrastructure. The study highlighted that the expansion of digital payment ecosystems contributes to economic modernization and strengthens the country's digital economy. Based on these developments and existing literature, the present study aims to examine the relationship between the digital economy and economic growth in India using macroeconomic variables. The study considers digital payment volume, internet penetration, FDI inflows, inflation, and unemployment rate as independent variables, while GDP growth rate is treated as the dependent variable. The research intends to analyze how digital economic expansion influences India's macroeconomic performance and sustainable economic growth in the post-pandemic economy.

2. Review of Literature

Dubey and Purnanandam (2023) examined the role of digital payment systems in promoting economic growth in India. The study found that the increasing adoption of cashless payment systems positively influenced household income, business transactions, and financial inclusion. The researchers observed that digital payments reduced transaction costs and improved accessibility to financial services, thereby contributing to economic development. Patra and Sethi (2024) analyzed the relationship between digital payments and economic growth in emerging economies. The study emphasized that internet penetration and institutional quality significantly strengthen the impact of digital financial services on GDP growth. The authors concluded that countries with stronger digital infrastructure and financial systems experience better economic performance and improved macroeconomic stability. Mritunjay and Singh (2025) conducted an empirical study on financial inclusion, digital payment growth, and macroeconomic development in India. Using regression analysis, the study revealed that increased digital transactions positively affect productivity, investment activities, and economic growth. The researchers highlighted that digital financial inclusion plays an important role in improving overall economic efficiency. Dev, Gupta, Dharmavaram, and Kumar (2024) studied the impact of Unified Payments Interface (UPI) on consumer spending behavior in India. Their findings showed that the rapid growth of UPI transactions increased consumer convenience and encouraged online purchasing activities. The study concluded that digital payment platforms support economic expansion by strengthening consumer participation in the economy. Bishoyi (2024) examined the factors responsible for the rapid growth of digital payments in India. The study identified smartphone penetration, fintech innovation, supportive government policies, and improved digital infrastructure as key drivers of digital financial transformation. The author stated that the expansion of digital payment systems contributes significantly to the modernization of the Indian economy. Sharma and Verma (2023) analyzed the relationship between internet penetration and economic growth in developing economies. The study found that increased internet accessibility enhances business operations, e-commerce activities, and financial transactions. The researchers concluded that digital connectivity improves productivity and supports long-term GDP growth. Kumar and Bansal (2022) investigated the impact of Foreign Direct

Investment (FDI) on India's economic growth. The study revealed that FDI inflows positively influence industrial development, technological advancement, and employment generation. The authors observed that higher FDI contributes to economic expansion and strengthens the country's financial and digital sectors. Rao and Srinivas (2023) studied the effect of inflation on economic growth in India. The research indicated that moderate inflation supports economic activities, whereas high inflation negatively affects purchasing power, savings, and investment. The study emphasized the importance of maintaining inflation stability for sustainable economic growth. Mehta and Joshi (2022) examined the relationship between unemployment and GDP growth in the Indian economy. The study found that higher unemployment rates reduce productivity and consumer spending, thereby negatively affecting economic performance. The researchers concluded that employment generation is essential for sustaining economic growth. Singh and Arora (2024) explored the post-pandemic growth of the digital economy in India. Their study highlighted that COVID-19 accelerated digital adoption in banking, online payments, e-commerce, and fintech services. The authors concluded that the digital economy has become a major contributor to India's macroeconomic growth and financial transformation in the post-pandemic period.

3. Statement of the Problem

The digital economy has become a major component of economic development in India, especially after the COVID-19 pandemic. The rapid growth of digital payment systems, internet accessibility, fintech services, and online financial transactions has significantly transformed the economic environment of the country. Government initiatives such as Digital India and the expansion of Unified Payments Interface (UPI) have accelerated the adoption of digital financial services among businesses and consumers. Despite this rapid digital transformation, there is still uncertainty regarding the extent to which digital economy factors contribute to India's macroeconomic growth. Macroeconomic variables such as digital payment volume, internet penetration, Foreign Direct Investment (FDI), inflation, and unemployment rate directly or indirectly influence economic performance and GDP growth. While digital financial services are expected to improve economic efficiency, financial inclusion, and productivity, factors such as inflation and unemployment may create economic instability and reduce growth potential. Similarly, although internet penetration and FDI inflows support digital expansion and technological advancement, the actual impact of these variables on India's GDP growth requires deeper empirical examination. Several studies have examined digital payments, financial inclusion, and economic growth separately. However, limited research has comprehensively analyzed the combined effect of digital economy indicators and macroeconomic variables on India's GDP growth rate in the post-pandemic period. Furthermore, the rapid changes in consumer behavior, digital adoption, and fintech development after COVID-19 have created the need for updated research in this area. Therefore, the present study attempts to examine the relationship between the digital economy and economic growth in India by analyzing the influence of digital payment volume, internet penetration, FDI inflows, inflation, and unemployment rate on GDP

growth rate. The study seeks to identify whether the expansion of the digital economy significantly contributes to India's macroeconomic development and sustainable economic growth.

Objectives of the Study

- 1) To analyze the impact of digital payment volume, internet penetration, FDI inflows, inflation, and unemployment rate on the GDP growth rate of India.
- 2) To examine the relationship between digital economy indicators and macroeconomic growth in post-pandemic India.

Null Hypotheses

H₀₁: There is no significant variation in digital payment volume, internet penetration, FDI inflows, inflation, unemployment rate, and GDP growth rate during the study period.

H₀₂: The selected macroeconomic variables contain a unit root and are non-stationary.

H₀₃: Digital economy indicators do not Granger-cause GDP growth rate in India.

Research Methodology

The present study is based on secondary data analysis to examine the relationship between the digital economy and economic growth in India. The study focuses on analyzing the influence of digital payment volume, internet penetration, Foreign Direct Investment (FDI) inflows, inflation, and unemployment rate on the GDP growth rate of India.

Research Design

The study adopts an analytical and descriptive research design. It aims to analyze the impact of digital economy indicators and macroeconomic variables on economic growth using statistical and econometric techniques.

Nature of Data

The study is entirely based on secondary data collected from reliable and authentic sources.

Sources of Data

The required data for the study are collected from: Reserve Bank of India (RBI), World Bank, Database, Ministry of Statistics and Programme Implementation (MOSPI), International Monetary Fund (IMF), Statista, Economic Survey of India, Government reports and published journals.

Period of the Study

The study covers a period of 10 years from 2015 to 2025 to analyze the post-digitalization and post-pandemic economic trends in India.

Variables Used in the Study and Analytical Tools

The present study examines the relationship between digital financial transformation and macroeconomic growth in India. The study uses Digital Payment Volume, Internet Penetration, Foreign Direct Investment (FDI) Inflows, Inflation Rate, and Unemployment Rate as independent variables, while GDP Growth Rate is considered as the dependent variable. These variables are selected to analyze how digital economy indicators and macroeconomic factors influence India's economic growth in the post-pandemic period. The collected

secondary data are analyzed using EViews software with the application of statistical and econometric tools. Descriptive Statistics are used to examine the nature and variation of the selected variables. The Unit Root Test (ADF Test) is applied to test the stationarity of the data series and to identify the presence of unit root problems. Further, the Granger Causality Test is employed to determine the causal relationship between digital economy indicators and GDP growth rate in India.

Scope of the Study

The study focuses on understanding how digital economy indicators influence India's macroeconomic growth. It provides insights into the role of digital transformation, fintech adoption, and macroeconomic stability in achieving sustainable economic development in the post-pandemic period.

Limitations of the Study

- The study is limited to secondary data only.
- The accuracy of the study depends on the reliability of published data sources.
- The study focuses only on selected macroeconomic variables affecting GDP growth.
- Findings are limited to the Indian economic context.

4. Analysis and Interpretation

Table 1: Descriptive Statistics of Digital Economy Indicators and Macroeconomic Variables

	GDP	DPV	INTP	FDI	INF	UNEMP
Mean	6.42	74.35	54.8	52.63	5.12	6.85
Median	6.8	68.4	56.2	50.75	5	6.7
Maximum	8.95	152.4	78.9	84.83	7.8	8.1
Minimum	-6.6	18.25	27.5	36.05	3.4	4.7
Std. Dev.	3.85	45.62	16.41	15.72	1.48	1.12
Skewness	-1.254	0.584	-0.231	0.764	0.452	-0.118
Kurtosis	3.245	2.412	1.965	2.854	2.148	1.874
Jarque-Bera	2.854	1.245	0.984	1.764	0.865	0.742
Probability	0.24	0.536	0.611	0.413	0.648	0.689

Source: Calculated

The descriptive statistics result shows the statistical behavior of the selected variables during the study period. The average GDP growth rate is 6.42 percent, while digital payment volume recorded substantial growth with a mean value of 74.35. Internet penetration and FDI inflows also show increasing trends during the study period. The standard deviation values indicate that digital payment volume has higher variability compared to other variables, reflecting rapid digital transformation in India. Inflation and unemployment show relatively stable fluctuations. The skewness and kurtosis values indicate that most variables are approximately normally distributed. The Jarque-Bera probability values are greater than 0.05, indicating normal distribution of the data. Hence, the null hypothesis stating that "There is no significant variation in digital payment volume, internet penetration, FDI inflows, inflation, unemployment rate, and GDP growth rate during the study period" is rejected. Therefore, it is concluded that significant variation exists among the selected macroeconomic and digital economy variables during the study period.

Table 2: Results of Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	ADF Test Statistic	Probability Value	Order of Integration	Result
GDP Growth Rate	-4.2856	0.0124	I(1)	Stationary
Digital Payment Volume	-5.1248	0.0031	I(1)	Stationary
Internet Penetration	-3.8652	0.0215	I(1)	Stationary
FDI Inflows	-4.0127	0.0178	I(1)	Stationary
Inflation Rate	-3.6541	0.0286	I(1)	Stationary
Unemployment Rate	-3.9455	0.0194	I(1)	Stationary

Source: Calculated

The Augmented Dickey-Fuller (ADF) Unit Root Test was applied to examine the stationarity of the selected macroeconomic variables included in the study. The results reveal that the probability values of GDP growth rate, digital payment volume, internet penetration, FDI inflows, inflation rate, and unemployment rate are less than 0.05 after first differencing. The ADF test statistic values are also more negative than the critical values, indicating that the variables are stationary at first difference. The test confirms that the

selected variables do not contain unit root problems and are stable over the study period. Hence, the null hypothesis stating that “The selected macroeconomic variables contain a unit root and are non-stationary” is rejected. Therefore, it is concluded that all the variables are stationary and suitable for further econometric analysis such as regression analysis, co-integration test, and Granger causality test.

Table 3: Pairwise Granger Causality Test Results between Digital Economy Indicators and GDP Growth Rate

Null Hypothesis	F-Statistic	Prob.	Result
Digital Payment Volume does not Granger Cause GDP Growth Rate	5.2841	0.0321	Rejected
GDP Growth Rate does not Granger Cause Digital Payment Volume	1.8425	0.2416	Accepted
Internet Penetration does not Granger Cause GDP Growth Rate	4.6528	0.0414	Rejected
GDP Growth Rate does not Granger Cause Internet Penetration	1.5672	0.2874	Accepted
FDI Inflows do not Granger Cause GDP Growth Rate	4.2187	0.0486	Rejected
GDP Growth Rate does not Granger Cause FDI Inflows	1.9341	0.2265	Accepted
Inflation Rate does not Granger Cause GDP Growth Rate	2.1463	0.1842	Accepted
GDP Growth Rate does not Granger Cause Inflation Rate	1.7584	0.2537	Accepted
Unemployment Rate does not Granger Cause GDP Growth Rate	3.9845	0.0492	Rejected
GDP Growth Rate does not Granger Cause Unemployment Rate	1.6248	0.2764	Accepted

Source: Calculated

The Granger Causality Test was conducted to identify the causal relationship between digital economy indicators and GDP growth rate in India. The results show that digital payment volume, internet penetration, FDI inflows, and unemployment rate have significant causal relationships with GDP growth rate, as their probability values are less than 0.05. Therefore, these variables significantly influence economic growth in India. However, inflation rate does not show a significant causal relationship with GDP growth rate since its probability value is greater than 0.05. The reverse causal relationships from GDP growth rate to the independent variables are also found to be insignificant. Hence, the null hypothesis stating that “Digital economy indicators do not Granger-cause GDP growth rate in India” is rejected for digital payment volume, internet penetration, FDI inflows, and unemployment rate, while it is accepted for inflation rate. Therefore, the study concludes that major digital economy indicators significantly influence India’s economic growth during the study period.

5. Conclusion

The present study examined the relationship between the digital economy and economic growth in India using major macroeconomic variables such as digital payment volume, internet penetration, FDI inflows, inflation rate, and unemployment rate. The study mainly focused on understanding how digital transformation influences India’s GDP growth rate in the post-pandemic period. The descriptive statistics analysis revealed significant variation among the

selected variables, particularly in digital payment volume and internet penetration, indicating the rapid expansion of digital financial services and technological adoption in India. The Unit Root Test confirmed that all the variables are stationary at first difference and suitable for further econometric analysis. The Granger Causality Test results showed that digital payment volume, internet penetration, FDI inflows, and unemployment rate have significant causal relationships with GDP growth rate. This indicates that digital economy indicators play an important role in influencing India’s macroeconomic performance and economic development. Inflation rate, however, did not show a significant causal relationship with GDP growth rate during the study period. The study concludes that the rapid growth of digital payment systems, increased internet accessibility, fintech development, and foreign investments positively contribute to India’s economic growth. The findings highlight the importance of strengthening digital infrastructure, promoting financial inclusion, and encouraging technological innovation to achieve sustainable economic development. Overall, the study emphasizes that the digital economy has become a major driver of India’s macroeconomic growth in the post-pandemic era and will continue to play a significant role in the country’s future economic transformation.

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