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RESEARCH ARTICLE

“DIGITAL PAYMENT GROWTH AND ECONOMIC GROWTH IN INDIA: AN EMPIRICAL ANALYSIS”

Dr. V VV Satyavathi and Dr. P. Shanmukha Rao

1. Lecturer in Commerce Government College (Autonomous), Rajahmundry East Godavari District Andhra Pradesh.

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Abstract

Digital payments have become an important part of India's financial system, with significant growth in the volume of digital transactions over the years. The present study examines the growth of digital payment volume and its relationship with economic growth in India using secondary data for the period 2011–12 to 2025–26. The study uses digital payment volume and real GDP growth as the major variables. Annual growth rates are calculated to examine the growth pattern of digital payments. Pearson's correlation is used to examine the relationship between digital payment volume and economic growth, while a One-Sample t-test is applied to assess the significance of annual growth in digital payment volume. The findings show that digital payment volume grew substantially and significantly, with an average annual growth rate of 47.84%. However, the Pearson correlation coefficient of 0.142 with a p-value of 0.615 indicates that the relationship between digital payment volume and real GDP growth is not statistically significant. The study concludes that although digital payments have expanded considerably in India, their growth alone does not establish a significant statistical relationship with overall economic growth. The study highlights the continuing importance of digital payment development while recognising that several other economic and structural factors influence economic growth.

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Introduction:-

Digital payments have emerged as an important component of India's rapidly transforming financial and economic environment. The increasing adoption of electronic modes of payment has changed the way individuals, businesses, and financial institutions conduct transactions. The growth of digital payment systems has been supported by developments in banking technology, internet and mobile connectivity, digital banking services, and initiatives aimed at promoting a less-cash economy.

In India, digital payment transactions have expanded considerably over the years through various payment channels, including mobile-based payments, electronic fund transfers, cards, and other digital payment mechanisms. The increasing volume of digital transactions reflects the growing acceptance of technology-enabled financial services

Corresponding Author:-Dr. V VV Satyavathi

Address:-Lecturer in Commerce Government College (Autonomous), Rajahmundry East Godavari District Andhra Pradesh.

and the changing payment behaviour of economic agents. This expansion has also strengthened the integration of digital technology with the banking and financial services sector.

Economic growth, generally reflected through the growth rate of real Gross Domestic Product (GDP), represents the overall expansion of economic activity in a country. A growing digital payment ecosystem may facilitate faster transactions, improve the efficiency of financial activities, reduce transaction-related costs, and support formal economic activity. Therefore, understanding whether the expansion of digital payments is associated with economic growth is relevant from a commerce and financial-services perspective.

Against this background, the present study examines the growth of digital payment volume and its relationship with economic growth in India. The study uses secondary data on digital payment volume and real GDP growth for 2011–12 to 2025–26, compiled from official sources. The study analyses the trend and annual growth of digital payments and statistically examines their relationship with economic growth. The findings are expected to provide empirical insight into the expansion of digital payments and its association with India's economic growth.

Review of Literature:-

Pradhan et al. (2021) examined the relationship between financial inclusion, ICT development and economic growth in India using data from 20 Indian states for the period 1991–2018. The study found evidence of temporal causality among ICT development, financial inclusion and economic growth, highlighting the importance of integrating digital infrastructure and financial development with economic growth strategies.

Li and Ruan (2024) examined digital payments and consumption in India using the 2016 demonetisation episode as a natural experiment. Their findings indicate that the shift towards digital payments had implications for consumer spending, providing evidence of the connection between digital payment adoption and economic behaviour.

Aguilar, Frost, Guerra, Kamin and Tombini (2024) investigated the relationship between digital payment adoption and economic growth across 101 emerging and developing economies. Their analysis found that greater use of digital payments was associated with higher subsequent GDP per capita growth and lower informal employment, suggesting that digital payment adoption can contribute to broader economic development.

Gupta, Anand and Gupta (2025) examined the relationship between wealth inequality and UPI adoption in India using district-level data and instrumental-variable quantile regression. The study found that income inequality influences digital payment adoption, with the effect being stronger in areas with higher levels of UPI adoption.

Haque, Azeez and Akhtar (2025) studied UPI adoption and financial inclusion in rural India using primary data from rural areas of Aligarh district. The study found that factors such as age, gender, education, occupation and income significantly influence the likelihood of UPI usage. The study highlights the role of digital payment systems in expanding access to formal financial services.

Mritunjay and Singh (2025) examined the relationship between financial inclusion, digital payment growth and macroeconomic outcomes in India using time-series data from 2015–16 to 2024–25. Their study used multivariate regression to examine the role of digital payment and financial inclusion indicators in explaining GDP per capita, providing recent empirical evidence on the connection between digitalisation and macroeconomic performance.

Motheram and Buteau (2026) examined the supply-side drivers of digital payment adoption across 711 Indian districts during 2020–2024. The study found substantial regional differences in UPI adoption and examined the roles of merchant networks and digital infrastructure in explaining these differences.

Sahu, Chakraborty and Banerjee (2025) examined the impact of UPI on ease of doing business in rural India. Their findings indicate that users perceived benefits such as easier transactions, greater customer reach, improved access to funds and greater transparency in monetary transactions.

Research Gap:-

The existing literature largely focuses on digital payment adoption, UPI usage, financial inclusion, consumption behaviour and regional adoption patterns. Comparatively, fewer studies examine the long-term relationship between total digital payment volume and real GDP growth in India using annual secondary data. The present study attempts to address this gap by analysing 15 financial years from 2011–12 to 2025–26 and examining both the growth of digital payment volume and its relationship with real GDP growth.

Research Methodology:-

The present study adopts a descriptive and analytical research design to examine the growth of digital payments and their relationship with economic growth in India. The study is based on secondary data collected from official sources, particularly the Reserve Bank of India (RBI) for digital payment volume and Government of India/MoSPI

for real GDP growth data. The study covers 15 financial years from 2011–12 to 2025–26. Digital Payment Volume (in crore) is considered the independent variable, while Real GDP Growth (%) is considered the dependent variable. The collected data are organised and analysed using Microsoft Excel. Annual growth rates are calculated to examine the growth pattern of digital payments. Pearson's correlation is used to examine the relationship between digital payment volume and economic growth, while a One-Sample t-test is used to assess whether the average annual growth in digital payment volume is statistically significant. The hypotheses are tested at a 5% level of significance ($\alpha = 0.05$).

Need for the Study:-

Digital payments are growing rapidly in India and have become an important part of the financial system. The increasing use of digital payments has changed the way individuals and businesses make transactions. It is therefore important to study the growth of digital payments and examine whether this growth is related to India's economic growth. The study also helps to understand the changing digital payment trends in India. Hence, the present study analyses the growth of digital payments and their relationship with economic growth in India using secondary data for 2011–12 to 2025–26.

Statement of the Problem:-

The rapid growth of digital payments has significantly changed the payment system in India. However, the extent to which the growth in digital payment volume is associated with the country's economic growth is not clearly established. Therefore, the present study attempts to examine the growth of digital payments and analyse their relationship with economic growth in India using secondary data for the period 2011–12 to 2025–26.

Significance of the Study:-

The study is significant because digital payments have become an important part of India's financial system. It helps to understand the growth and changing trends in digital payment volume in India. The study also examines whether the growth of digital payments is associated with economic growth, which provides useful insights into the role of digitalisation in the Indian economy. The findings may be useful to policymakers, banks, financial institutions, businesses, researchers, and students for understanding the development of digital payments and their economic relevance.

Objectives of the Study:-

1. To examine the growth and trends in digital payment volume in India.
2. To analyse the relationship between digital payment volume and economic growth in India.
3. To assess whether the growth in digital payment volume is statistically significant in India.

Limitations of the Study:-

1. The study is based entirely on secondary data obtained from official sources.
2. The study covers only the period 2011–12 to 2025–26.
3. The study considers only digital payment volume and real GDP growth and does not include other factors influencing economic growth.
4. The study is limited to India and does not provide a comparison with other countries.
5. The accuracy of the findings depends on the availability and reliability of the secondary data.
6. The statistical analysis is based on a limited number of annual observations, which may restrict the generalisation of the findings.

Data Analysis and Testing of Hypotheses:-**Data Analysis:-**

The study is based on secondary data relating to digital payment volume and real GDP growth in India for the period 2011–12 to 2025–26. The data were compiled from official Reserve Bank of India (RBI) and Government of India sources and were organised and analysed.

Table 1: Year-wise Digital Payment Volume and Real GDP Growth in India (2011–12 to 2025–26)

Financial Year	Digital Payment Volume (Crore Transactions)	Real GDP Growth (%)
2011-12	125.18	6.2
2012-13	169.65	5.5
2013-14	245.4	6.4
2014-15	352.09	7.4
2015-16	595.02	8
2016-17	976.65	8.3
2017-18	1,459.02	6.8
2018-19	2,343.39	6.5
2019-20	3,434.55	3.9
2020-21	4,374.45	-5.8
2021-22	7,197.68	9.7
2022-23	11,393.82	7
2023-24	16,443.02	7.2
2024-25	22,198.15	7.1
2025-26	28,174.47	7.6

Source: Reserve Bank of India (RBI) and Government of India/MoSPI.

Table 1 presents the year-wise digital payment volume and real GDP growth in India during the study period. These 15 observations were used for analysing the relationship between digital payment volume and economic growth.

Table 2: Annual Growth Rate of Digital Payment Volume in India (2012–13 to 2025–26)

Financial Year	Annual Growth Rate (%)
2012-13	35.52
2013-14	44.65
2014-15	43.47
2015-16	69.00
2016-17	64.14
2017-18	49.39
2018-19	60.61
2019-20	46.56
2020-21	27.37
2021-22	64.54
2022-23	58.29
2023-24	44.31
2024-25	35.00
2025-26	26.92

Source: Author's calculation based on the secondary data obtained from RBI and Government of India/MoSPI.

Table2 shows the annual growth in digital payment volume from 2012–13 to 2025–26. The growth rates are used for further descriptive and statistical analysis.

Table 3. Variables and Statistical Techniques Used

Variable / Aspect	Measure	Statistical Technique
Digital Payment Volume	Volume in crore transactions	Descriptive Analysis
Growth in Digital Payments	Annual Growth Rate (%)	Growth Rate Analysis
Economic Growth	Real GDP Growth (%)	Descriptive Analysis
Relationship between Digital Payment Volume and GDP Growth	Pearson's Correlation Coefficient	Pearson Correlation
Significance of Digital Payment Growth	Mean Annual Growth Rate	One-Sample t-test

Trend Analysis of Digital Payment Volume:-

The annual digital payment volume was analysed to examine the growth and changing trend of digital payments in India. The annual growth rate was calculated using the following formula:

$$\text{Annual Growth Rate (\%)} = [(\text{Current Year Volume} - \text{Previous Year Volume}) / \text{Previous Year Volume}] \times 100$$

The study covers 15 financial years from 2011–12 to 2025–26. Since the growth rate for 2011–12 requires the preceding year's value, annual growth rates were calculated from 2012–13 onwards, resulting in 14 annual growth observations.

Table 4.Descriptive Statistics of Digital Payment Growth

Statistic	Value
Number of Observations	14
Mean Annual Growth (%)	47.84
Standard Deviation	13.82
Minimum Annual Growth (%)	26.92
Maximum Annual Growth (%)	69.00

The results indicate that digital payment volume recorded substantial growth during the study period, with an average annual growth rate of approximately 47.84%.

Relationship between Digital Payment Volume and Economic Growth:-

Pearson's correlation coefficient was used to examine whether digital payment volume and real GDP growth were significantly related.

Table 5. Pearson Correlation Analysis

Variables	N	Pearson's r	p-value	Decision
Digital Payment Volume & Real GDP Growth	15	0.142	0.615	Fail to Reject H_{01}

The Pearson correlation coefficient of **0.142** indicates a very weak positive relationship between digital payment volume and real GDP growth. However, the p-value of **0.615** is greater than the 0.05 significance level. Therefore, the relationship is not statistically significant.

Significance of Digital Payment Growth:-

A one-sample t-test was applied to determine whether the average annual growth in digital payment volume was significantly different from zero.

Table 6. One-Sample t-test for Annual Growth in Digital Payment Volume

Particular	Value
Number of Observations	14
Mean Annual Growth (%)	47.84
Standard Deviation	13.82
Test Value	0
t-value	12.951

Degrees of Freedom	13
p-value	< 0.001
Significance Level	0.05
Decision	Reject H_{02}

The calculated t-value of 12.951 with a p-value of less than 0.001 indicates that the average annual growth in digital payment volume is statistically significant.

Testing of Hypotheses:-

The hypotheses formulated for the study were tested using appropriate statistical techniques. **Pearson's Correlation** was employed to examine the relationship between digital payment volume and economic growth, while a **One-Sample t-test** was used to determine whether the average annual growth in digital payment volume was statistically significant. The level of significance was fixed at **5% ($\alpha = 0.05$)**.

Hypothesis 1

H_{01} : There is no significant relationship between digital payment volume and economic growth in India.

Table 7. Pearson Correlation between Digital Payment Volume and Economic Growth

Variables	N	Pearson Correlation (r)	t-value	df	p-value	Decision
Digital Payment Volume & Real GDP Growth	15	0.142	0.515	13	0.615	Not Significant

The Pearson correlation coefficient of 0.142 indicates a very weak positive relationship between digital payment volume and economic growth. However, the p-value of 0.615 is greater than the 0.05 significance level. Hence, the relationship is not statistically significant.

Decision: Fail to Reject H_{01} .

Conclusion: There is no statistically significant relationship between digital payment volume and economic growth in India.

Hypothesis 2

H_{02} : The average annual growth in digital payment volume is not significantly different from zero in India.

Table 8. One-Sample t-test for Annual Growth in Digital Payment Volume

Particular	Value
Number of Observations (N)	14
Mean Annual Growth (%)	47.84
Standard Deviation	13.82
Test Value	0
t-value	12.951
Degrees of Freedom	13
p-value	< 0.001
Significance Level	0.05

The average annual growth in digital payment volume was 47.84%. The calculated t-value of 12.951 and the p-value of less than 0.001 indicate that the average annual growth is statistically significant. Therefore, the null hypothesis is rejected.

Decision: Reject H_{02} .

Conclusion: The average annual growth in digital payment volume in India is statistically significant.

Table 9. Summary of Hypothesis Testing

Hypothesis	Statistical Test	Test Statistic	p-value	Decision	Result
H_{01} : No significant relationship between digital payment volume and economic growth	Pearson Correlation	$r = 0.142$	0.615	Fail to Reject H_{01}	Not Significant

H ₀₂ : Average annual growth in digital payment volume is not significantly different from zero	One-Sample t-test	t = 12.951	< 0.001	Reject H ₀₂	Significant
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The hypothesis testing indicates that digital payment volume has increased significantly in India. The one-sample t-test confirms that the average annual growth in digital payment volume is statistically significant. However, the Pearson correlation analysis indicates that the relationship between digital payment volume and real GDP growth is weak and statistically insignificant ($r = 0.142$, $p = 0.615$). Thus, while digital payments have expanded substantially, the available secondary data do not establish a statistically significant association between digital payment volume and GDP growth.

Findings of the Study:-

1. The study found that digital payment volume in India has increased substantially from 2011–12 to 2025–26, indicating a strong expansion in the use of digital payment systems.
2. The average annual growth rate of digital payment volume was 47.84%, showing a significant upward growth trend in digital payments.
3. The One-Sample t-test confirmed that the growth in digital payment volume was statistically significant ($t = 12.951$, $p < 0.001$).
4. The Pearson correlation analysis showed a very weak positive relationship between digital payment volume and real GDP growth ($r = 0.142$).
5. The relationship between digital payment volume and economic growth was not statistically significant ($p = 0.615$). Hence, the study does not establish a significant relationship between the two variables.
6. The findings indicate that although digital payments have expanded significantly, this expansion alone does not show a statistically significant association with India's real GDP growth.
7. Overall, the study highlights the rapid development of India's digital payment ecosystem, while the observed relationship between digital payment volume and economic growth remains statistically insignificant.

Suggestions:-

1. The government and financial institutions should continue to promote digital payment adoption through awareness and digital literacy programmes.
2. Greater attention should be given to digital payment security, including fraud prevention, cybersecurity, and safe transaction practices.
3. Banks and payment service providers should improve digital payment infrastructure and reliability, particularly in rural and semi-urban areas.
4. Affordable and reliable internet connectivity should be strengthened to support wider adoption of digital payments.
5. Digital payment services should be made more user-friendly and accessible for people with limited digital knowledge.
6. Financial institutions should encourage small businesses and merchants to adopt digital payment facilities.
7. Since the study does not find a statistically significant relationship between digital payment volume and GDP growth, policymakers should consider other economic factors along with digitalisation while framing policies for economic growth.
8. Further studies may include additional variables such as financial inclusion, employment, consumption, investment, internet penetration, and business activity to obtain a broader understanding of the economic impact of digital payments.

Conclusion:-

The study concludes that digital payments have witnessed substantial growth in India during the period from 2011–12 to 2025–26. The average annual growth in digital payment volume was 47.84%, and the One-Sample t-test confirmed that this growth was statistically significant. However, the Pearson correlation analysis revealed only a very weak positive relationship between digital payment volume and real GDP growth ($r = 0.142$), and the relationship was not statistically significant ($p = 0.615$). Thus, the study concludes that although digital payments have expanded rapidly, the available data do not establish a significant relationship between digital payment volume and economic growth in India. Overall, the findings highlight the growing importance of digital payments in India's

financial system while suggesting that economic growth is influenced by several factors beyond the expansion of digital payment systems.

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