Financial Inclusion, Digital Payment Growth, and Macroeconomic Dynamics: An Empirical Study of the Indian Economy

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ABSTRACT

This study explores the intertwined dynamics of financial inclusion and digital payment growth in shaping macroeconomic outcomes in India over the past decade. Using multivariate regression analysis on time-series data from 2015–16 to 2024–25, the research investigates the impact of the Digital Payment Index (DPI) and the number of Jan Dhan Yojana (PMJDY) accounts on GDP per capita. Results reveal that financial inclusion, proxied by PMJDY account expansion, significantly contributes to GDP growth, affirming the role of foundational financial access in economic development. In contrast, the DPI—while reflecting exponential digital adoption—did not show a statistically significant short-term impact on GDP, suggesting a delayed or indirect influence of digital payments. The findings are situated within the frameworks of Endogenous Growth Theory, Financial Intermediation Theory, and the Inclusive Growth paradigm, offering critical insights into the policy design of India's financial and digital infrastructure. The study underscores the importance of integrated policy strategies that bridge financial access with meaningful digital usage to realize inclusive, sustainable growth.

Keywords: Financial Inclusion, Digital Payments, PMJDY, Digital Payment Index (DPI), GDP per capita, Economic Growth, UPI, India, Macroeconomic Dynamics, Inclusive Finance

INTRODUCTION

Financial inclusion and digital payments have increasingly come to shape India's economic transformation in the last decade. These two domains—once viewed separately—now operate as core pillars of the country's development agenda, influencing policies on inclusive growth, poverty reduction, and modernization of financial systems. In this context, the Reserve Bank of India (RBI) explains financial inclusion as the effort to provide affordable and transparent access to suitable financial products and services for underserved and low-income groups. Guided by this vision, the Government of India has launched several large-scale initiatives aimed at expanding formal financial access, with the introduction of the Pradhan Mantri Jan Dhan Yojana (PMJDY) in 2014 marking a major milestone.

By March 2024, more than 51 crore Jan Dhan accounts had been opened, together holding deposits of over ₹2.30 lakh crore. This vast outreach has brought millions of previously unbanked individuals—particularly those in remote rural areas and urban margins—into the formal financial system. Beyond basic savings accounts, the PMJDY framework has enabled access to insurance, pension schemes, and credit channels, gradually building a more inclusive and integrated financial environment.

Alongside this progress, India has experienced the rapid expansion of its digital payment ecosystem. The Unified Payments Interface (UPI), developed by the National Payments Corporation of India (NPCI) and launched in 2016, has been central to this shift. In 2023–24 alone, UPI processed more than 14,000 crore transactions valued at nearly ₹200 lakh crore. The adoption of complementary systems—such as BHIM, Aadhaar-enabled payment services (AEPS), and QR-based platforms—has further embedded digital payments into everyday transactions, positioning India as one of the world's most dynamic digital payment markets

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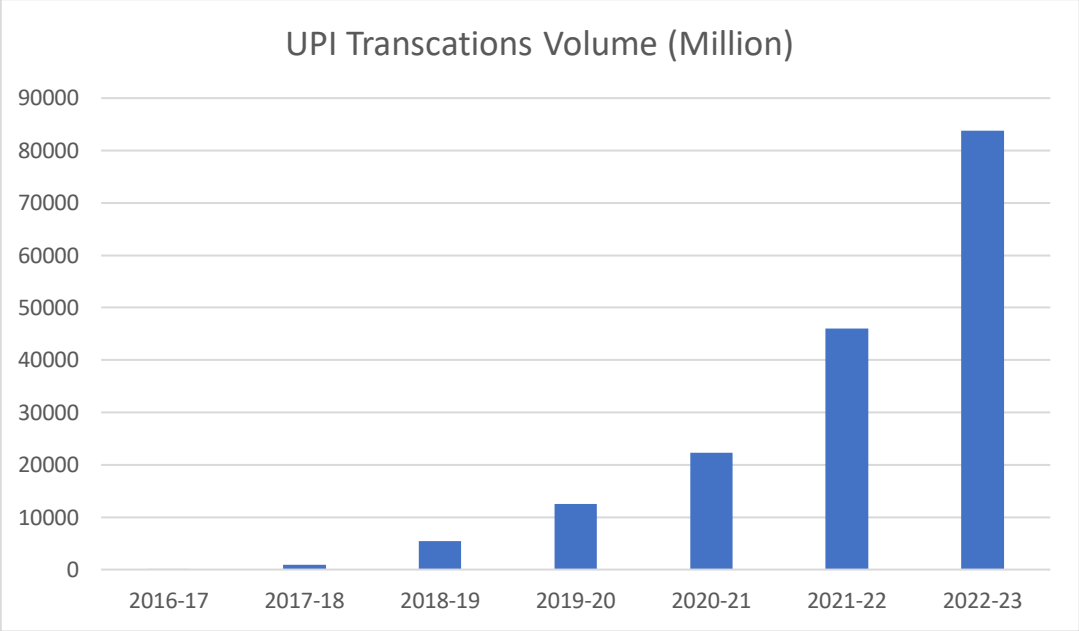
Figure 1: Growth of UPI Transactions in India (2016–2023)



Source: NPCI, compiled by the author

Figure 1 reflects this dramatic rise: UPI transactions surged from 17.86 million in 2016–17 to more than 83,751 million in 2022–23. Monthly data for early 2023 show that transactions consistently exceeded 9,000 million, underscoring continuous momentum. Such growth demonstrates not only increased adoption but also growing confidence among users in digital financial mechanisms.

These developments extend beyond technological progress; they signify structural changes with far-reaching economic implications. Greater financial inclusion and expanded digital payment usage can contribute to a more formalized economy, improved financial intermediation, and enhanced transactional transparency. Research suggests that broader access to formal finance supports higher savings, improves credit availability for small and medium enterprises (SMEs), and encourages entrepreneurship—all factors that strengthen aggregate demand and support GDP growth.

Digital transactions can also reduce operational and transactional costs, limit leakages in welfare delivery, and improve tax compliance by reducing overreliance on cash. At the same time, the digital shift raises new concerns related to cybersecurity, uneven internet penetration, and limited digital literacy in rural and semi-urban regions, which can restrict the full benefits of digitalization.

Despite extensive studies on financial inclusion and digital payments individually, limited empirical work examines how these two elements together influence macroeconomic indicators such as GDP growth, inflation, or financial stability. Much of the existing literature focuses either on micro-level impacts—like household welfare and consumption—or on technology adoption patterns, leaving a gap in understanding their combined macroeconomic consequences.

This study aims to address this gap by analysing how financial inclusion and digital payment expansion jointly affect India's major macroeconomic indicators. Using recent time-series data, the research explores the extent to which India's financial and digital reforms are shaping broader economic outcomes. The goal is to offer evidence-based insights for policymakers, financial institutions, and development stakeholders, ultimately contributing to more effective and inclusive financial strategies for a rapidly evolving economy.

LITERATURE REVIEW

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The relationship between financial inclusion, digital transactions, and overall economic development has been widely studied across different regions and time periods. Early work by King and Levine (1993) demonstrated that financial development supports long-term economic growth by enhancing capital formation, improving credit allocation, and fostering productive investment. Later research by Beck et al. (2007) further showed that well-functioning financial systems can reduce income inequality by allowing low-income groups to access affordable financial services.

In the Indian context, Chattopadhyay (2011) highlighted persistent gaps in access to formal finance, particularly in rural and low-income districts. The study emphasized the need for institutional reforms and targeted outreach programs to bridge these disparities. Similarly, Sarma and Pais (2011) introduced composite indicators of financial inclusion and argued that inclusion levels vary significantly across states due to differences in infrastructure, literacy, and institutional strength.

The literature also identifies digital finance as a major catalyst for modernizing financial systems. Gomber et al. (2018) noted that fintech innovations—particularly mobile applications, digital wallets, and automated transaction systems—have redefined the delivery of financial services by offering faster, more efficient, and more accessible options. Ozili (2018) added that digital finance can strengthen financial stability by increasing transparency and broadening the customer base of formal financial institutions.

International evidence shows that digital finance can reinforce financial inclusion patterns. Bongomin et al. (2017), studying sub-Saharan Africa, found that mobile money systems significantly expanded financial access among unbanked populations by overcoming traditional barriers such as distance, cost, and documentation requirements. Zins and Weill (2016) also reported that demographic factors, education levels, and income strongly influence financial inclusion outcomes across African economies.

Within India, digital payments have drawn increasing scholarly attention. Ghosh (2016) observed that mobile technology adoption has contributed not only to improved communication networks but also to higher productivity and regional economic growth. Arora and Rathore (2021) studied the impact of digital payments on monetary transmission and found that digital channels improve the speed and reach of policy measures by reducing frictions in payment processes.

Recent studies emphasize the role of UPI in transforming India's payment landscape. Raghavan (2018) described UPI as a foundational innovation that integrates banks, apps, and merchants into a unified real-time payment system. Mohan (2023) further analyzed UPI's growth trajectory and concluded that its success stems from low transaction costs, interoperability, and strong institutional support from NPCI and the RBI.

Research on financial literacy and behavioural dimensions has also gained importance. Kumar and Prakash (2021) argued that financial literacy plays a crucial role in enabling individuals to confidently use digital banking services, which in turn expands overall financial inclusion. OECD (2020) similarly stressed that digital preparedness and skills are essential to narrowing access inequalities in fast-digitizing economies.

Empirical evidence also links digital payments with macroeconomic outcomes. Studies like Park and Mercado (2018) and Allen et al. (2016) found that broader access to financial services can enhance economic activity, increase savings and credit circulation, and support investment capacities. IMF (2021) highlighted that digital financial services help governments deliver welfare transfers more efficiently, reducing leakages and administrative costs.

Indian government initiatives such as PMJDY, coupled with rapid digitalization, are seen as complementary forces. NABARD (2023) reported that formal bank outreach—combined with Aadhaar-enabled services—has improved credit penetration in rural districts. Meanwhile, the rise of QR-based transactions, AEPS, and app-based platforms has propelled India to one of the world's fastest-growing digital payment markets (NPCI, 2024).

Despite extensive scholarship, the combined macroeconomic effect of financial inclusion and digital payments remains underexplored. Many studies examine these themes separately—focusing either on banking access, mobile adoption, or fintech growth—but few assess how they jointly influence GDP, inflation, or financial sector

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performance in India. This gap creates space for fresh empirical inquiry into the interconnected pathways through which financial inclusion and digital payment expansion contribute to economic development.

METHODOLOGY

This study examines how digital financial inclusion contributes to India's economic growth by applying a multivariate regression approach. The analysis uses annual data covering ten financial years from 2015–16 to 2024–25. Economic growth is represented by the natural logarithm of GDP per capita (GDPc), which serves as the dependent variable. Two indicators act as the primary explanatory variables, both transformed into logarithmic form: the Digital Payment Index (DPI), reflecting the scale and intensity of digital transactions in the economy, and the count of Pradhan Mantri Jan Dhan Yojana (PMJDY) accounts, which indicates access to basic banking facilities.

The dataset was compiled from authoritative and publicly accessible sources. DPI data were sourced from the Reserve Bank of India (RBI), while PMJDY figures were obtained from the official government dashboard. All variables were log-transformed to stabilise variance, smooth exponential trends, and allow the estimated coefficients to be interpreted as elasticities. The purpose of this model is to evaluate the extent to which growth in digital payments and expansion of financial inclusion contribute to changes in GDP per capita.

Ordinary Least Squares (OLS) regression was used as the primary estimation technique. Because the study is based on a relatively small sample size of ten observations, careful model selection was essential to avoid overfitting. An initial specification included inflation (measured through the Consumer Price Index), but CPI was removed during refinement. Empirical checks showed that CPI did not significantly improve model performance and introduced potential multicollinearity concerns. Excluding it resulted in a clearer, more stable model.

The final regression equation is as follows:

$$\ln(\text{GDPc}) = \beta_0 + \beta_1 \ln(\text{DPI}) + \beta_2 \ln(\text{PMJDY}) + \varepsilon$$

Here, $\beta_0$denotes the intercept, while $\beta_1$and $\beta_2$represent the estimated elasticities of DPI and PMJDY, respectively. The term εcaptures the random error not explained by the model. All statistical outputs, including coefficient estimates, significance values, and goodness-of-fit indicators, were derived using Excel's built-in regression tools.

RESULTS AND INTERPRETATION

Table-1 Results of Multivariate Regression analysis

Dependent variable	Independent Variable	Coefficient (Intercept)	Coefficient (X1)	Coefficient (X2)	R Square	Adjusted R Square
Log (GDP)	Log (DPI)+Log (PMJDY)	6.4633	-0.0110	0.5081***	0.8980	0.8688

Source- Author's own calculation

Fig-2 Regression Coefficient plot

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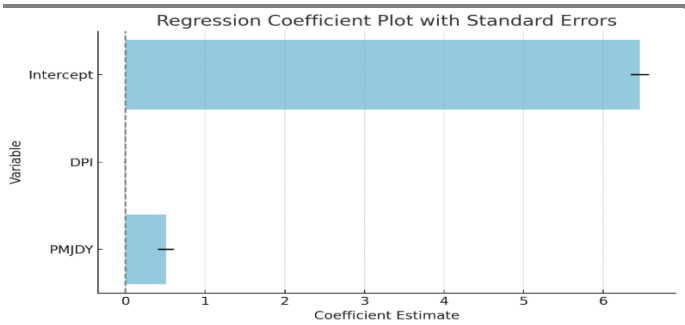

Source- Author's own calculation

To examine how financial inclusion and digitalization relate to India's economic performance, GDP per capita was regressed on two key indicators: the Digital Payment Index (DPI) and the number of PMJDY accounts. The regression output reveals a strong model fit, with the independent variables jointly explaining a substantial proportion of the variations in GDP per capita. The significance of the overall model, as suggested by the F-statistic, indicates that the observed relationships are statistically robust and not the result of random variation.

The high R-squared value (0.8980) shows that changes in DPI and PMJDY together account for nearly 90 percent of the fluctuations in GDP per capita during the study period. This highlights the increasing relevance of financial inclusion initiatives and digital financial systems in India's growth trajectory over the last decade.

A closer look at the coefficients shows that the PMJDY variable plays a significant role in influencing GDP per capita. This suggests that expanding access to basic banking facilities—particularly for groups traditionally excluded from formal finance—has supported broader economic participation. The widening reach of PMJDY has helped channel savings, improved the efficiency of direct benefit transfers, lowered leakages, and allowed more individuals to engage with formal credit and welfare programs. These mechanisms collectively translate into more inclusive and sustained economic activity.

In contrast, the coefficient on the DPI variable is not statistically significant in the short run. This does not undermine the role of digital payments; instead, it suggests that their contribution to economic growth may emerge more gradually. Digital payment adoption often involves behavioural and infrastructural transitions—movement from cash to electronic transactions, learning costs, platform readiness, and trust in digital systems. Much of the increased DPI usage during the period may reflect a shift in payment modes rather than new economic activity.

Another plausible explanation for the insignificance of DPI is the overlap between digitalisation efforts and PMJDY. Through the JAM trinity (Jan Dhan–Aadhaar–Mobile), many digital services rely on the same foundation that PMJDY strengthens. As a result, part of the digital impact may already be captured by the PMJDY variable, reducing the independent explanatory power of the DPI variable in a small-sample multivariate model.

Theoretical justification

The empirical relationships observed in the analysis align with several economic theories. Endogenous Growth Theory highlights the importance of institutional strength, technological advancement, and human capital—factors influenced by financial deepening and digital infrastructure—in sustaining long-term growth. By improving access to banking services, financial inclusion contributes to higher savings, smoother investment flows, and more opportunities for entrepreneurship.

Financial Intermediation Theory further explains how well-developed financial networks lower transaction costs, make credit allocation more efficient, and spread risk across participants, all of which support productive economic outcomes. PMJDY's expansion of formal banking access aligns well with these theoretical mechanisms.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue XI November 2025

The Inclusive Growth Framework emphasises that equitable access to financial tools enables wider participation in economic activities and reduces structural inequalities. PMJDY's reach among previously excluded households exemplifies this principle by enabling them to save, transact, and access welfare with greater reliability.

On the digital side, the Technology Adoption Curve suggests that innovations such as digital payments generate major economic effects only after reaching a certain threshold of usage. This framework helps explain why DPI may not yet show strong short-term macroeconomic influence: the system appears to be progressing through early-to-mid adoption phases, where benefits accrue slowly and become more visible as adoption becomes widespread.

Together, these theoretical perspectives support the study's findings: financial access through PMJDY has an immediate and observable impact on economic growth, while the broader economic dividends of digital payments may require more time and ecosystem development to fully materialise.

Policy Implications

The findings carry significant policy implications for India's financial and digital inclusion agenda. First, the strong association between PMJDY account penetration and GDP growth highlights the critical importance of sustaining and expanding basic financial services, especially in underserved rural and semi-urban regions. Policymakers should focus on ensuring account activity (rather than mere account creation), improving access to microcredit, insurance, and pension schemes through these accounts, and reducing dormancy rates.

Second, while digital payments infrastructure is progressing, its lack of significant short-term impact in this model suggests a need for complementary strategies. This includes enhancing digital literacy, especially among first-generation users, investing in cybersecurity and grievance redressal mechanisms, and promoting the use of digital transactions in productive sectors like agriculture, small enterprises, and informal trade. Financial incentives, behavioural nudges, and interoperability improvements (e.g., UPI linkages with PMJDY accounts) can further strengthen the ecosystem.

Third, there is a need for integrated financial-digital inclusion policies, recognizing the synergies between access to accounts and their usage through digital means. A combined push on account access, credit enablement, and transaction facilitation could deliver stronger growth dividends. Monitoring and evaluating such schemes through data-driven feedback loops will also help policymakers course-correct and maximize development outcomes.

Ultimately, a dual focus on access and usage—bridging the gap between inclusion and empowerment—will be key to ensuring that the gains from financial reforms translate into sustained, inclusive economic growth.

CONCLUSION

This study set out to understand how financial inclusion and digitalization have shaped India's economic performance by analysing the influence of the Digital Payment Index (DPI) and the Pradhan Mantri Jan Dhan Yojana (PMJDY) on GDP per capita from 2015–16 to 2024–25. Based on a multivariate regression framework, the results show that the expansion of PMJDY accounts has a clear and positive association with economic growth. This highlights the importance of widening access to basic banking services, which continues to play a foundational role in improving household financial behaviour, increasing participation in the formal economy, and supporting overall economic activity.

The analysis also reveals that digital payments, although rapidly growing, do not exhibit a statistically significant impact on GDP over the short study period. This finding points to the possibility that digitalization's contribution to macroeconomic outcomes may manifest gradually. The full economic gains from digital payments typically depend on broader ecosystem readiness—such as digital skills, network reliability, trust in digital systems, and

integration into business processes—which may take more time to develop. Thus, while digital transactions are rising quickly, their measurable macro-level effects may follow with a lag.

Taken together, the results indicate that strengthening basic financial access continues to deliver immediate developmental benefits, whereas digital payment systems may serve as longer-term enablers of efficiency, transparency, and financial deepening. Policy efforts should therefore aim to sustain the momentum of PMJDY, encourage meaningful account usage, and build complementary digital infrastructure that allows digital payments to evolve from convenience tools into engines of economic value creation.

Future studies could broaden the scope by examining longer datasets, comparing state-level differences, or exploring how the interaction between financial inclusion and digitalization jointly shapes growth outcomes. As India's financial landscape continues to transform, a coordinated and inclusive policy approach remains vital for ensuring that both financial access and digital technology translate into sustained, equitable economic progress.

REFERENCES

1. Agyapong, D. (2015). Financial development and economic growth: A literature review. International Journal of Business and Social Science, 6(8), 112–120. http://ijbssnet.com/journals/Vol_6_No_8_August_2015/11.pdf
2. Allen, F., Demirgüç-Kunt, A., Klapper, L., & Peria, M. S. M. (2016). Understanding financial inclusion: Ownership and use of formal accounts. Journal of Financial Intermediation, 27, 1–30. https://doi.org/10.1016/j.jfi.2015.12.003
3. Arora, R., & Rathore, S. (2021). Digital payments and their impact on monetary transmission in India. Indian Journal of Economics and Development, 17(2), 112–120.
4. Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. Journal of Economic Growth, 12(1), 27–49. https://doi.org/10.1007/s10887-007-9010-6
5. Bongomin, G. O. C., Ntayi, J. M., Munene, J. C., & Akol, C. M. (2017). Mobile money and financial inclusion in sub-Saharan Africa. Journal of African Business, 18(4), 361–384. https://doi.org/10.1080/15228916.2017.1396792
6. Chakravorti, B. (2021). The digital transformation of India's financial system. Harvard Business Review. https://hbr.org
7. Chattopadhyay, S. K. (2011). Financial inclusion in India: A case study of West Bengal (RBI Working Paper No. 8/2011). Reserve Bank of India.
8. Demirgüç-Kunt, A., & Klapper, L. (2013). Measuring financial inclusion. Brookings Papers on Economic Activity, 2013(1), 279–340. https://doi.org/10.2139/ssrn.2183431
9. Ghosh, S. (2016). Does mobile telephony spur growth? Evidence from Indian states. Telecommunications Policy, 40(10–11), 1020–1031. https://doi.org/10.1016/j.telpol.2016.05.004
10. Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution. Journal of Management Information Systems, 35(1), 220–265. https://doi.org/10.1080/07421222.2018.1440766
11. IMF. (2021). Digitalization and development: The role of digital financial services. https://www.imf.org/en/Publications/WP
12. Kaur, M., & Singh, B. (2022). Digital payments in India. Journal of Financial Innovation, 8(4), 43–59.
13. King, R. G., & Levine, R. (1993). Finance and growth. Quarterly Journal of Economics, 108(3), 717–737. https://doi.org/10.2307/2118406
14. Khan, A. (2022). Financial inclusion and rural development: A study of selected states in India (Doctoral dissertation). Shodhganga. https://shodhganga.inflibnet.ac.in/bitstream/10603/584190/12/12_chapter%208.pdf
15. Kumar, N., & Prakash, A. (2021). Financial literacy, digital banking, and inclusion. International Journal of Bank Marketing, 39(7), 1065–1086. https://doi.org/10.1108/IJBM-12-2020-0652
16. Ministry of Finance. (2024). Economic Survey of India 2023–24. Government of India. https://images.assettype.com/bloombergquint/2024-07/dcc7fc3c-d8c6-4de4-98d5-519b26c204cf/Economic_Survey.pdf
17. Mishra, R. (2021). Macroeconomic determinants of digital payments in India (Doctoral dissertation). Shodhganga. https://shodhganga.inflibnet.ac.in/bitstream/10603/637674/9/09_chapter%205.pdf

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue XI November 2025

18. Mohan, S. (2023). India's UPI market: Growth trajectory and policy implications. Observer Research Foundation. https://www.orfonline.org/research/indias-upi-market/
19. NABARD. (2023). Annual report 2022–23. https://www.nabard.org
20. Narula, S. A., & Pant, B. (2017). Digital India and its economic impact. IOSR Journal of Business and Management, 19(10), 92–95. https://doi.org/10.9790/487X-1910079295
21. National Payments Corporation of India. (2024). UPI statistics dashboard. https://www.npci.org.in
22. OECD. (2020). Financial literacy and the future of work. https://www.oecd.org
23. Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. Borsa Istanbul Review, 18(4), 329–340. https://doi.org/10.1016/j.bir.2017.12.003
24. Park, C. Y., & Mercado, R. V. (2018). Financial inclusion: New measurement and cross-country impact. ADB Working Paper Series, 539. https://doi.org/10.2139/ssrn.3208695
25. Punch, S. O. (2023). Digital financial inclusion and economic development: Evidence from developing economies. Jurnal Ekonomi & Manajemen (JEM), 19(3), 112–124. https://ejurnal.undana.ac.id/index.php/JEM/article/view/11943
26. Raghavan, R. S. (2018). UPI and digital payments in India. Economic & Political Weekly, 53(42), 12–14.
27. Reserve Bank of India. (2021). Digital Payment Index (DPI) reports. https://www.rbi.org.in
28. Reserve Bank of India. (2024). PMJDY dashboard. https://pmjdy.gov.in
29. Roy, P. (2019). Digital finance and financial inclusion in India (Doctoral dissertation). Shodhganga. https://shodhganga.inflibnet.ac.in/bitstream/10603/294308/8/7_chapter%204.pdf
30. Sahu, G. B., & Das, S. (2020). Financial inclusion and economic growth. South Asian Journal of Macroeconomics and Public Finance, 9(1), 76–95. https://doi.org/10.1177/2277978719863060
31. Sarma, M., & Pais, J. (2011). Financial inclusion and development. Journal of International Development, 23(5), 613–628. https://doi.org/10.1002/jid.1698
32. Zins, A., & Weill, L. (2016). The determinants of financial inclusion in Africa. Review of Development Finance, 6(1), 46–57. https://doi.org/10.1016/j.rdf.2016.05.001