

FROM CASH TO CLICKS - THE INDIAN MACROECONOMICS TRANSFORMED BY DIGITAL ECONOMY TOOL UPI, ACCELERATE THE VELOCITY OF MONEY

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1. Introduction

India is passing through a remarkable phase of economic transformation in which conventional macroeconomic forces are increasingly interacting with digital technologies, data-driven financial systems and real-time payment infrastructure. The Indian economy has moved beyond the traditional framework in which cash, bank branches and physical financial intermediaries dominated everyday economic transactions. The emergence of Digital Public Infrastructure (DPI), smartphones, affordable internet connectivity, Aadhaar-enabled services, Jan Dhan accounts and the Unified Payments Interface (UPI) has created a new architecture for the movement of money. UPI, launched in 2016, has transformed the way households, businesses, farmers, professionals and small merchants transfer and receive money. By September 2025, UPI was processing more than 650 million transactions a day, according to an IMF assessment.

This transformation has an important macroeconomic dimension. In conventional monetary economics, the **velocity of money** represents the frequency with which a unit of money is used for transactions during a given period. The classical identity, $MV = PY$, connects money supply (M), velocity (V), the price level (P) and real output (Y). Digital payments do not automatically imply a higher measured monetary velocity; nevertheless, they can reduce transaction frictions, shorten settlement time and make balances more readily usable. Therefore, India's digital-payment revolution raises an important exploratory question: **Can a faster, more efficient and increasingly inclusive payment ecosystem improve the effective circulation of money and thereby contribute to productivity, consumption, investment and economic growth?**

India's digital transformation is particularly significant because it is not confined to metropolitan centres. QR-code payments, mobile banking, interoperable payment systems and digital financial services are progressively reaching small towns, villages, agricultural markets, micro-enterprises and informal-sector workers. The World Bank's Global Findex data show that financial account ownership in India reached 89.2% of adults in 2024, compared with much lower levels a decade earlier.

The significance of this transformation becomes even greater when viewed against India's long-term development ambition. A \$10 trillion economy requires not merely a larger money supply but higher productivity, efficient capital allocation, stronger formalisation, wider financial inclusion, deeper digital infrastructure and faster circulation of economic resources. This paper therefore explores the relationship between India's evolving macroeconomy, the digital economy, UPI and the changing economic environment surrounding the velocity of money. It argues that UPI should not be viewed merely as a payment mechanism; rather, it is becoming an important component of India's broader economic infrastructure.

2. From Traditional Macroeconomics to Digital Macroeconomics

2.1 The Foundations of Indian Macroeconomics

Macroeconomics traditionally examines the economy at the aggregate level through variables such as **GDP, inflation, employment, consumption, investment, government expenditure, exports, imports, money supply, interest rates and exchange rates**.

For decades, India's macroeconomic performance was primarily understood through the interaction of these conventional variables. Economic growth depended on the expansion of productive capacity, capital formation, labour productivity, infrastructure, savings and investment. Monetary policy operated through interest rates, liquidity conditions and credit channels, while fiscal policy influenced aggregate demand through government expenditure and taxation.

Money played a central role in this framework. Households received income, firms generated revenue, banks mobilised deposits and credit, and economic agents used currency and bank deposits for transactions. The banking system was therefore a major transmission mechanism connecting monetary policy with economic activity.

However, the emergence of digital payments has changed the **speed, accessibility and architecture** of monetary transactions. The transformation is not necessarily a replacement of conventional macroeconomics. Rather, it represents an additional layer:

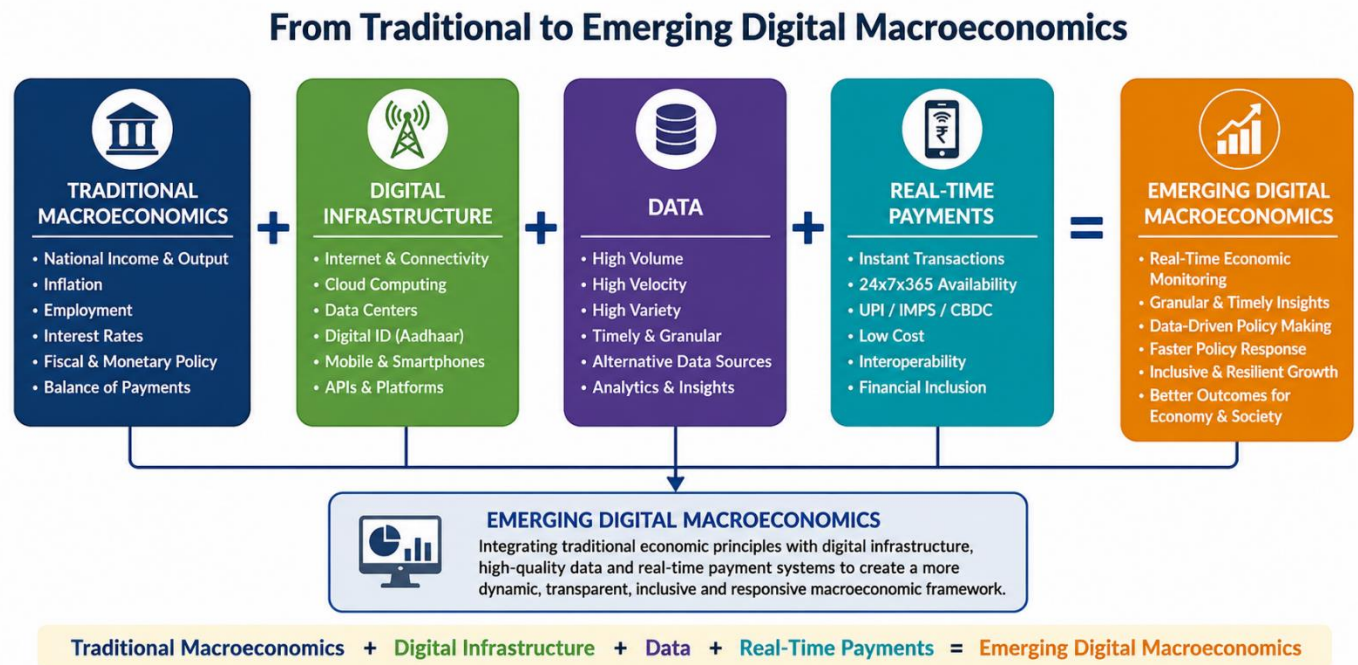
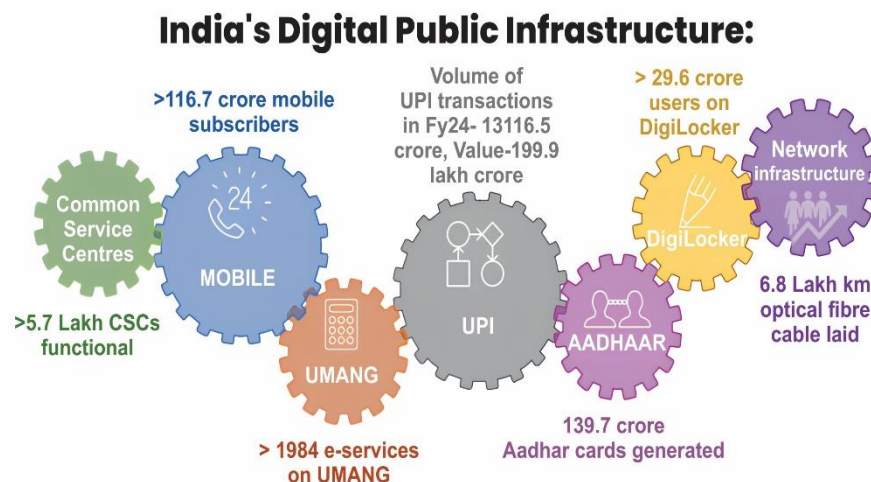


Fig 1

The digital economy increasingly affects consumption decisions, business models, financial intermediation, taxation, credit assessment and the transmission of monetary policy.

2.2 India's Digital Economic Transformation



Note : Figures as of July 2024 (Economic Survey 2023-24)

The Indian digital economy has developed through several mutually reinforcing layers. UPI has emerged as the most visible component of this transformation. According to NPCI statistics, UPI transaction volume increased from just **18 million transactions in 2016–17 to 185,866 million transactions in 2024–25**, while transaction value increased from ₹70 billion to approximately **₹260.57 trillion** over the same period.

Table 1: Growth of UPI Transactions in India

Financial Year	UPI Volume (million)	UPI Value (₹ billion)
2016–17	18	70
2017–18	915	1,098
2018–19	5,392	8,770
2019–20	12,519	21,317
2020–21	22,331	41,037
2021–22	45,968	84,176
2022–23	83,714	139,149
2023–24	131,129	199,951
2024–25	185,866	260,570

Source: Economic Survey 2025–26 Statistical Appendix, based on NPCI data.

Table 2: Indicative Volume Trend

2016-17	18 million
2017-18	915 million
2018-19	5.4 billion
2019-20	12.5 billion
2020-21	22.3 billion
2021-22	46.0 billion
2022-23	83.7 billion
2023-24	131.1 billion
2024-25	185.9 billion

The trajectory is extraordinary. It demonstrates how technological platforms can create network effects: as more banks, merchants and consumers join the ecosystem, the usefulness of the payment network increases for every participant.

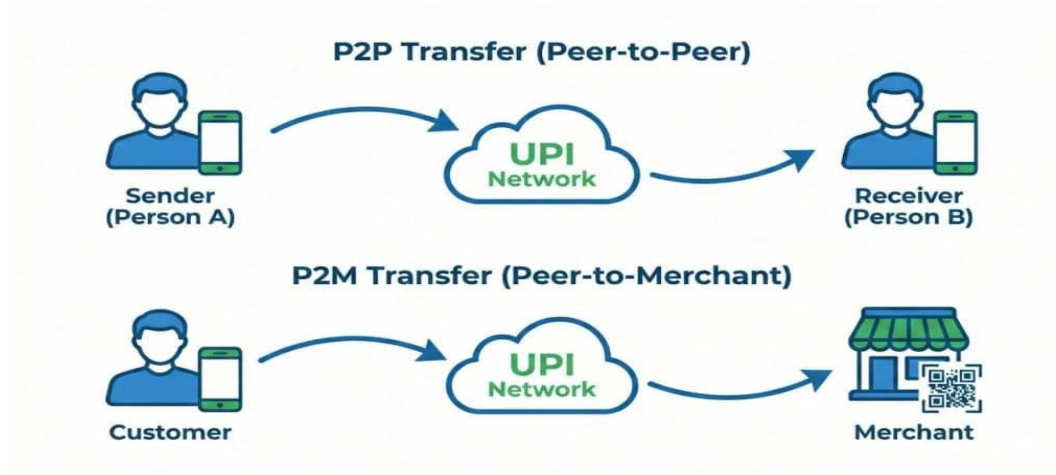
3. UPI: From Payment Instrument to Economic Infrastructure

UPI's importance lies not simply in transaction volume but in its **interoperability, immediacy and low-friction architecture**. Users can transfer funds between participating bank accounts without needing the sender and recipient to use the same bank.

The system has therefore reduced several conventional transaction costs:

- Time required to transfer funds
- Dependence on physical banking infrastructure
- Cost of small-value transactions
- Geographic limitations
- Need for cash handling
- Settlement delays
- Information asymmetry between buyers and sellers

The IMF describes UPI as the world's largest real-time payment system by volume and highlights interoperability as a central reason for its rapid adoption. NPCI data provide further evidence of the scale. In August 2025, UPI recorded more than **20 billion transactions**, with transaction value exceeding **₹24.85 trillion**. Person-to-merchant transactions alone accounted for more than 12.7 billion transactions.



This distinction is important.

UPI is no longer restricted to person-to-person transfers. The result is a transition from **digital payment as a facility** to **digital payment as an economic infrastructure layer**.

4. Understanding the Changing Velocity of Money

The concept of velocity of money originates from the relationship:

$$MV = PY$$

Where:

- **M** = Money supply
- **V** = Velocity of money
- **P** = Price level
- **Y** = Real output

Therefore:

$$V = PY / M$$

Velocity indicates how frequently a unit of money is associated with transactions supporting nominal economic activity during a given period.

However, a major conceptual distinction is necessary in the digital economy.

UPI transaction volume $\neq$ Macroeconomic Velocity of Money.

A single rupee may move through several accounts and generate multiple digital transactions, but payment-system turnover cannot simply be substituted for the velocity calculated from nominal GDP and a monetary aggregate such as M1 or M3.

Consequently, this paper uses the phrase “**changing velocity of money**” in a broader exploratory sense to examine how digital payments may alter the *effective circulation, accessibility and transactional efficiency* of money.

Traditional Cash-Based Economy

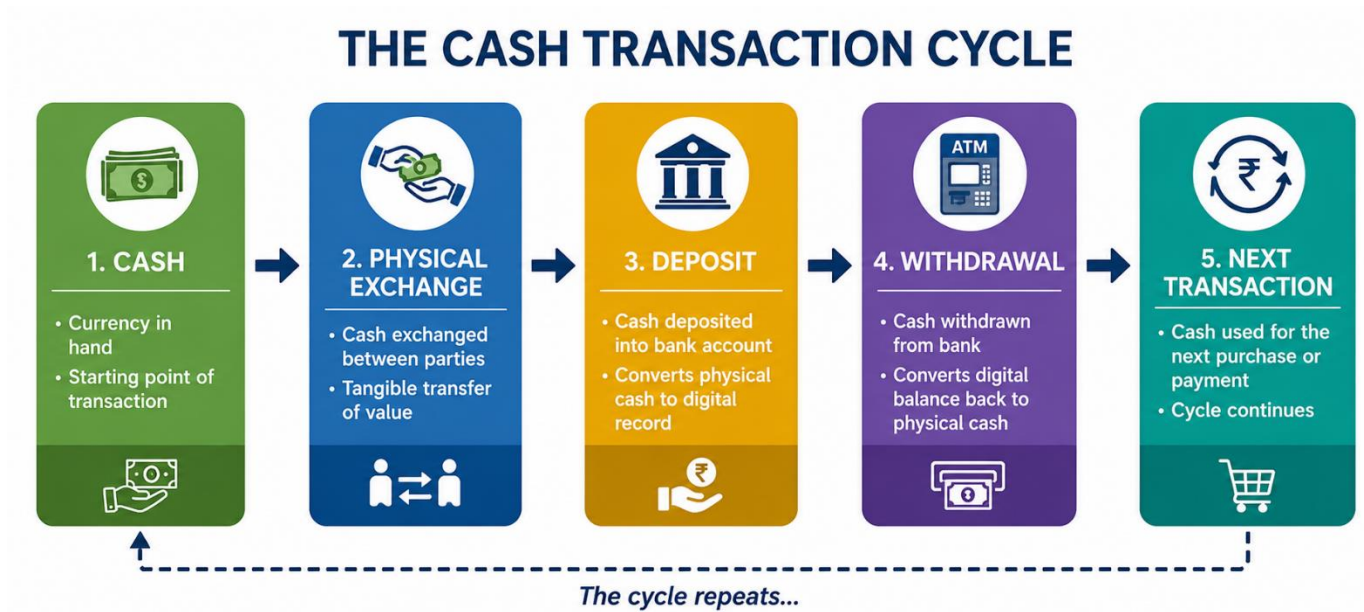


Fig 3

This process may involve considerable time and friction.

Digital Payment Economy

Bank Account → UPI → Merchant Account → Immediate Reuse → Further Transaction

DIGITAL PAYMENT & TRANSACTION FLOW

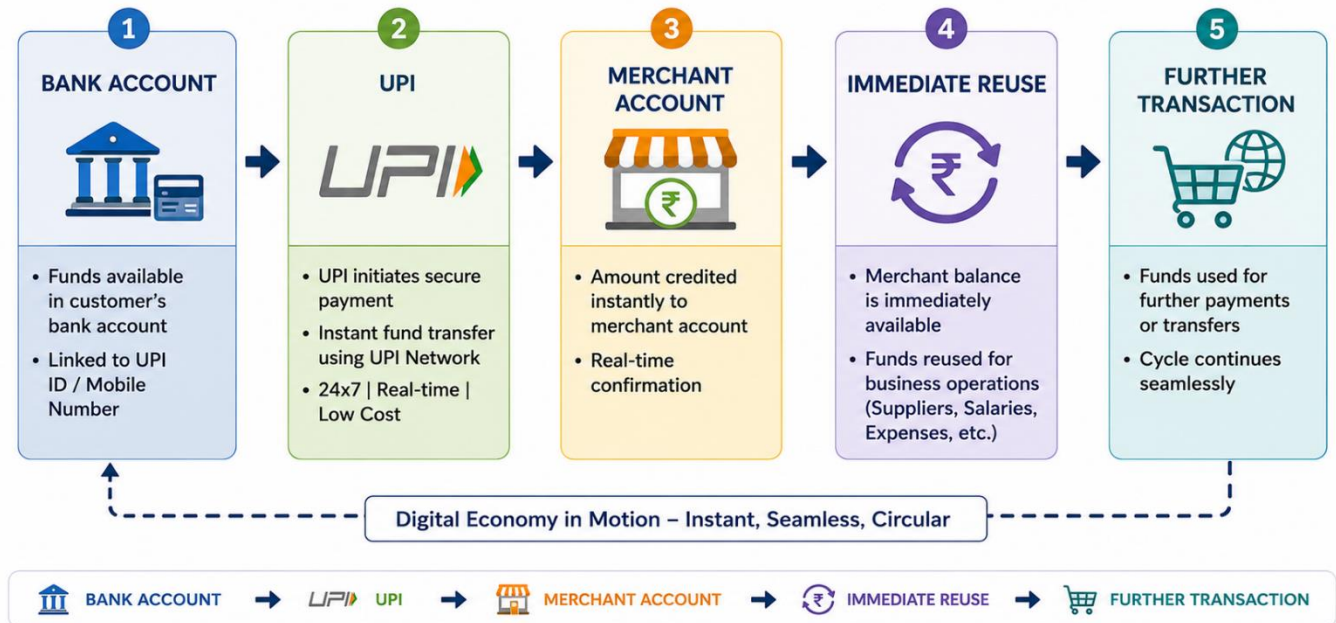


Fig 4

The second system allows financial balances to become transactionally usable almost instantaneously.

This does not automatically mean that India's official macroeconomic velocity has increased by the same magnitude as UPI transaction volume. Instead, it suggests that **transactional friction has fallen dramatically**.

5. How Digitalisation Can Influence Effective Monetary Circulation

Several channels may connect digital payments with the effective circulation of money.

5.1 Reduction in Transaction Time

A cash transaction can require physical handling, counting, transport and deposit. Digital payments can complete the transfer almost instantaneously. When transaction time falls, the opportunity cost of holding transaction balances may also change.

5.2 Reduction in Transaction Costs

Digital payments can reduce the direct and indirect cost associated with small-value transactions. This is particularly important for micro-merchants and consumers because a lower transaction cost can make economically viable transactions possible at smaller values.

5.3 Greater Liquidity Accessibility

Money deposited in a bank account can traditionally be less convenient for small daily purchases than cash. UPI changes this relationship by allowing bank balances to be used directly at millions of payment points.

Thus, **bank deposits become more transactionally liquid**.

5.4 Faster Business Cash Flows

A small business receiving digital payments can potentially use those funds immediately to:

- Purchase inventory
- Pay suppliers
- Pay workers
- Meet utility expenses
- Repay obligations
- Reinvest in business expansion

This may shorten the business cash-conversion cycle.

5.5 Better Financial Records

Digital transactions create verifiable financial histories. The Economic Survey 2025–26 highlights evidence that digital payment infrastructure can bridge the gap between account ownership and formal credit by generating transaction histories and reducing transaction costs. This is particularly significant for small enterprises that traditionally lack formal collateral or detailed accounting records.

6. Digital Payments and Financial Inclusion: From Urban India to Rural India

The most transformative dimension of India's digital economy is its potential to move beyond metropolitan India. The first phase of financial inclusion concentrated on **opening bank accounts**. The next phase is about **making those accounts economically active**. The World Bank's Global Findex 2021 found that 78% of Indian adults had an account, while 35% used accounts for digital payments. It also identified a rural-urban gap: around 40% of urban adults used accounts for digital payments compared with 30% of rural adults. The subsequent expansion of smartphones, internet access and UPI has significantly altered this landscape.

The rural digital economy now includes:

Farmer → Mandi → Buyer → Bank Account → UPI → Digital Receipt

and

Rural Consumer → Local Merchant → QR Code → Bank Account

The significance is larger than convenience.

DIGITAL TRANSACTION SYSTEM BLOCK DIAGRAMS

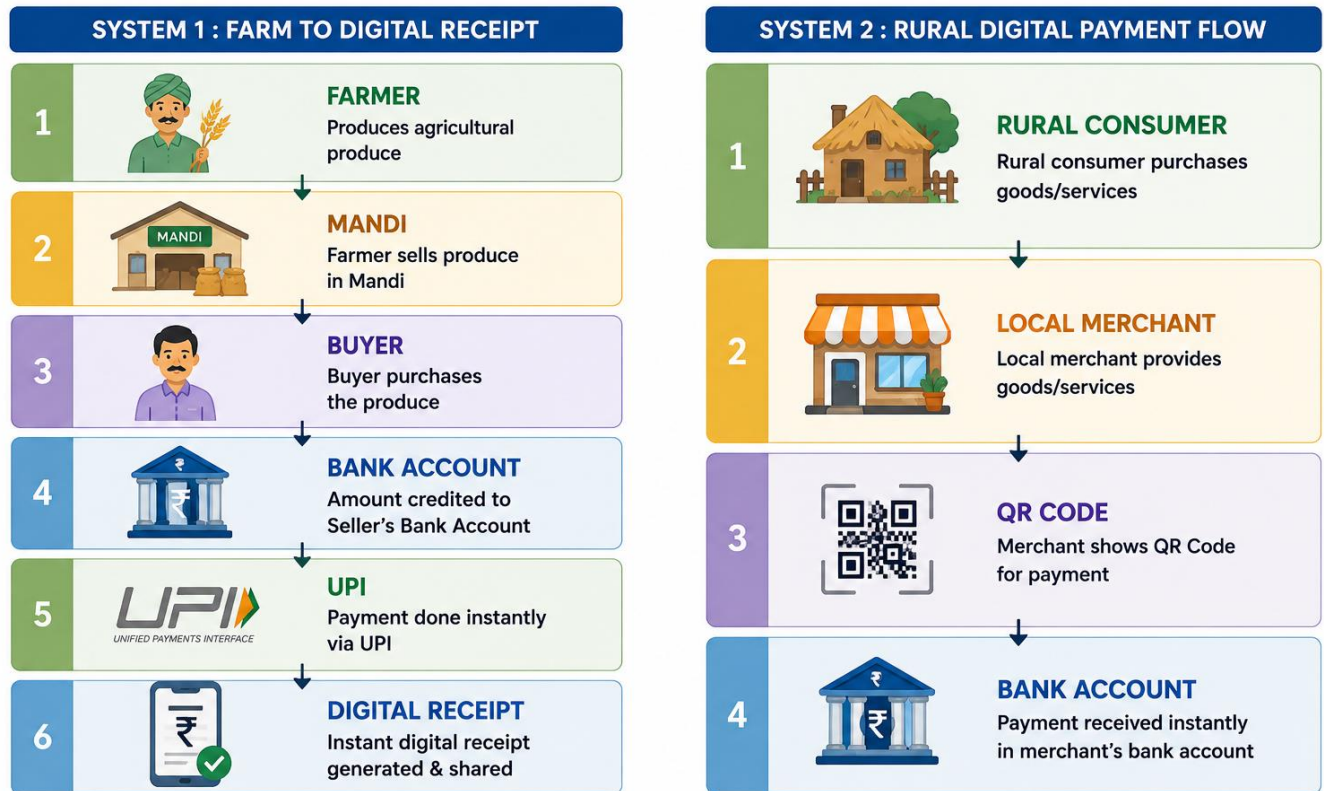


Fig 5

Digital payments can help integrate rural economic activity into the formal financial system. A small retailer who previously operated almost entirely through cash may gradually develop a transaction record. That record can become useful for financial management, taxation, credit assessment and business planning.

The Economic Survey 2025–26 notes that UPI has become a general-purpose payment instrument across multiple transaction categories and that survey evidence shows broad use across rural and urban locations. At the same time, it cautions that digital payments continue to complement rather than completely replace cash.

This is an important finding - India is not necessarily moving directly from a **cash economy to a cashless economy**. It is moving towards a **hybrid digital economy in which cash and digital money coexist, while digital transactions increasingly dominate the high-frequency payment layer**.

7. Technology as the Accelerator of India's Digital Macroeconomy

The transformation of India's payment ecosystem has been enabled by a combination of technologies:

Mobile Internet

Affordable smartphones and expanding mobile connectivity have made digital transactions accessible beyond traditional banking centres.

QR-Code Technology

QR codes have dramatically reduced the technological entry barrier for small merchants. A roadside vendor, shopkeeper or service provider can accept payments without sophisticated point-of-sale equipment.

Cloud Computing

Large-scale digital payment infrastructure requires high availability, scalability and real-time processing.

Artificial Intelligence and Machine Learning

AI can strengthen fraud detection, transaction monitoring, risk assessment and customer support.

Big Data Analytics

Digital transaction histories can potentially improve credit assessment and economic forecasting.

Cybersecurity

As dependence on digital infrastructure grows, cyber resilience becomes a macroeconomic necessity rather than merely an IT concern.

Digital Public Infrastructure

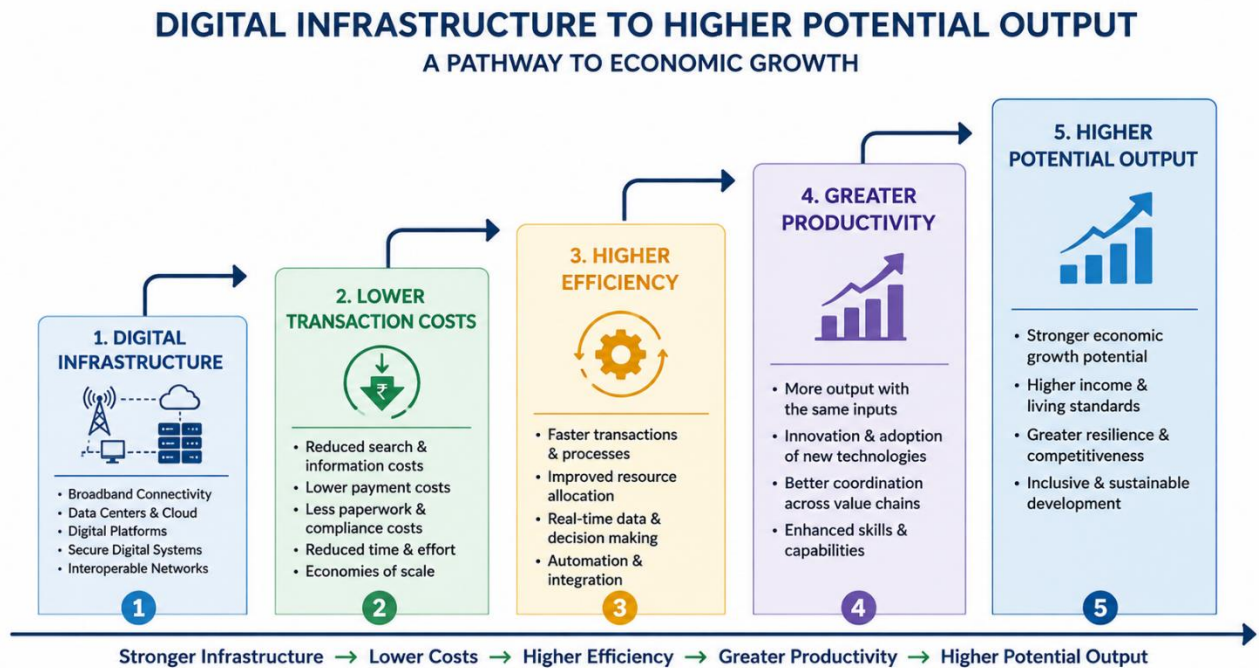
India's DPI approach combines interoperable digital systems with public infrastructure and private innovation. The broader implication is that **technology is becoming a factor of production**.

In the traditional production function:

$$Y = f(K, L, A)$$

where capital, labour and technology/productivity determine output.

In the emerging digital economy, data, connectivity, algorithms and digital infrastructure increasingly influence the productivity of capital and labour.



8. UPI, Consumption, Investment and Formalisation

The macroeconomic significance of UPI can be analysed through aggregate demand.

$$GDP = C + I + G + (X - M)$$

where:

- C = Consumption
- I = Investment
- G = Government expenditure
- X = Exports
- M = Imports

Digital payments can influence several components indirectly.

Consumption

Frictionless payments can make transactions easier and expand access to markets. Consumers can make small payments without carrying cash.

Investment

Formal transaction histories can improve access to finance for businesses. Better access to working capital can support investment.

Government Expenditure

Digital transfers can improve the speed and traceability of welfare payments.

Exports

India's digital-payment capabilities are increasingly becoming part of its broader digital-services and technology ecosystem, with potential international applications.

Formalisation

Digital transaction records can improve visibility of economic activity. Formalisation can broaden the tax base, improve credit access and strengthen productivity. The result can be a reinforcing cycle:



Digital Payments → Formalisation → Better Records → Better Credit Access → Investment → Productivity → Income → Consumption → Growth

This cycle is potentially important for India's \$10 trillion ambition.

9. The Macroeconomic Significance of a Changing Velocity of Money

The most important question is whether faster digital circulation can contribute to economic growth.

A simplified conceptual relationship is:

Higher Transaction Efficiency → Greater Economic Activity per Unit of Transaction Balance

If the same stock of transaction money can support economic activity more efficiently, the economy may require less idle liquidity for a given level of transactions. However, the relationship must not be interpreted mechanically. A rise in velocity can coexist with

inflationary pressure if aggregate demand grows faster than productive capacity. Conversely, an increase in digital transactions can occur without a corresponding rise in real output if transactions merely replace cash-based payments. Therefore, the desirable outcome is not simply:

“Higher Velocity = Higher Growth.”

The stronger proposition is:

Efficient Monetary Circulation + Productive Investment + Stable Prices + Rising Productivity = Sustainable Growth

This distinction is crucial for monetary policy.

Digitalisation may make payment flows faster, but the Reserve Bank of India must continue to balance:

- Inflation
- Liquidity
- Credit growth
- Financial stability
- Monetary transmission
- Currency demand
- Digital-payment resilience

The RBI's Annual Report continues to treat money supply, credit, payment systems and monetary policy as interconnected components of the financial system.

10. From Digital Payments to the \$10 Trillion Economy

The \$10 trillion objective should be understood as a **long-term development aspiration rather than the result of any single technology**. India will require sustained real growth, productivity enhancement, investment, human-capital development, infrastructure expansion, export competitiveness and macroeconomic stability. Nevertheless, digital infrastructure can act as an important **economic multiplier**.



The pathway can be represented as:

India's bank-account ownership had reached approximately 89.2% in 2024, according to World Bank data, while the IMF reported more than 650 million UPI transactions per day in September 2025. These developments demonstrate the extraordinary scale of India's digital financial transformation. The opportunity now is to convert **transactional scale into productive economic scale**.

11. Positive Economic Impact of an Efficiently Circulating Digital Rupee

The changing environment of monetary circulation can contribute positively to India's development through several channels.

11.1 Higher Transactional Efficiency

Digital payments reduce time and friction, allowing households and businesses to complete transactions rapidly.

11.2 Improved Business Productivity

Small businesses can receive payments immediately and potentially reduce the time between sales and reinvestment.

11.3 Financial Inclusion

Digital payments can make formal financial services more accessible to populations previously dependent on cash.

11.4 Formalisation

Digital records can increase transparency and facilitate the transition of informal economic activity into the formal financial ecosystem.

11.5 Improved Credit Access

Transaction histories can provide lenders with additional information for assessing borrowers, especially small businesses and new-to-credit customers. The Economic Survey 2025–26 highlights this channel explicitly.

11.6 Reduction in Cash-Handling Costs

The economy can potentially reduce costs associated with printing, transporting, storing and managing physical currency.

11.7 Stronger Monetary Transmission

A more digitally connected financial system can potentially allow monetary-policy changes to move more efficiently through financial markets and banking channels.

11.8 Greater Transparency

Digital records can strengthen accountability and improve the visibility of transactions.

11.9 Expansion of Rural Markets

Digital payments can connect rural producers and consumers with wider markets.

11.10 Innovation and Entrepreneurship

Low-friction payments provide a foundation upon which new fintech, e-commerce and digital-service businesses can develop.

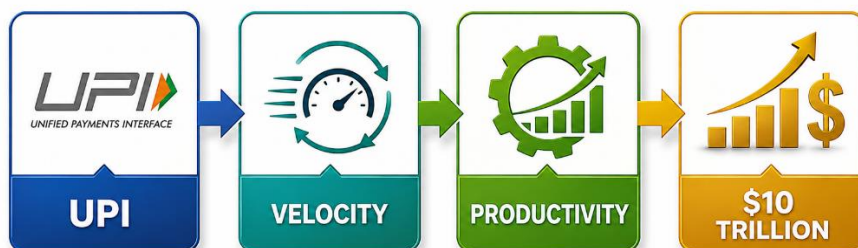
12. Challenges and the Need for Balanced Digital Macroeconomics

The digital transformation also creates challenges.

- First, **cybersecurity** becomes a systemic economic issue. A major disruption in digital payment infrastructure could affect millions of economic agents.
- Second, **digital literacy** must expand alongside digital access.
- Third, rural connectivity and device affordability remain important.
- Fourth, financial inclusion must mean **meaningful usage**, not merely account ownership.
- Fifth, consumer protection must remain strong against fraud and unauthorised transactions.
- Sixth, excessive transaction concentration among a small number of platforms could create systemic or competitive concerns. Current debates around UPI ecosystem concentration demonstrate why interoperability and healthy competition matter.
- Seventh, digital-payment data raise important questions concerning privacy, consent and responsible data governance.
- Finally, policymakers should avoid interpreting every increase in digital transaction volume as an equivalent increase in macroeconomic velocity.

The objective should be **productive velocity**, not merely transactional velocity.

13. The Positive Growth Cycle:



The central exploratory proposition of this paper can therefore be expressed as follows:

UPI does not create economic growth by itself.

Rather, it can create an enabling environment in which money, information and economic transactions move more efficiently.

The process can be conceptualised through five stages:

Stage I – Digitisation

Cash and paper-based transactions increasingly acquire digital alternatives.

Stage II – Acceleration

Transactions become faster and more frequent.

Stage III – Formalisation

Transactions generate records and become increasingly visible to formal financial institutions.

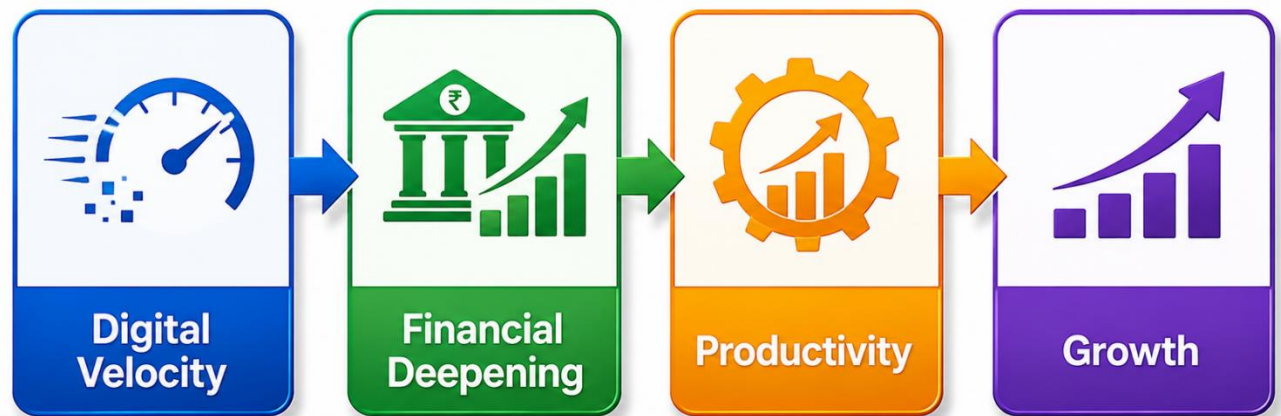
Stage IV – Financial Deepening

Better information can support credit, savings, investment and entrepreneurship.

Stage V – Productivity-led Growth

Capital and labour can be allocated more efficiently, increasing potential output.

Therefore:



This is the mechanism through which India's digital economy can support the long-term \$10 trillion ambition.

14. Conclusion

India's macroeconomic journey is entering a new phase in which digital infrastructure is becoming an integral component of economic infrastructure. The transformation from cash to clicks represents much more than a technological change in payment methods. It represents a structural change in the way economic agents interact with money. UPI has transformed the economics of small-value, high-frequency transactions. It has made instant payments possible across individuals, merchants and institutions. The scale of UPI growth demonstrates the extraordinary network effects generated by interoperable digital infrastructure. However, UPI transaction volume should not be treated as a direct statistical measure of macroeconomic velocity. The formal velocity of money remains a macroeconomic concept derived from nominal output and an appropriate monetary aggregate. The importance of UPI lies instead in its potential to reduce transaction frictions and increase the effective usability of financial balances. Digital payments can make money more mobile, accessible and immediately deployable. This may shorten transaction cycles for households and businesses. For small enterprises, faster payment settlement can improve working-capital management. For consumers, digital payments can reduce transaction barriers. For rural communities, digital financial

infrastructure can connect local economic activity with formal banking systems. For lenders, transaction histories can potentially improve credit assessment. For governments, digital payment systems can strengthen transparency and efficiency. For the broader economy, formalisation can improve the quality of economic information. These developments can collectively support financial deepening and productivity growth. The most important transition is therefore from **financial access to financial participation**.

Opening a bank account is only the first stage of inclusion. Making that account useful for payments, savings, credit and investment represents the deeper stage. India's digital economy has the potential to convert millions of previously fragmented transactions into a more integrated economic ecosystem.

The next challenge is to ensure that digital transformation reaches every village, small enterprise, farmer, worker and household. Digital infrastructure must therefore be accompanied by digital literacy, cybersecurity, consumer protection and reliable connectivity.

The policy objective should not be simply a cashless India, but a **more efficient, inclusive and productive India**. Similarly, the objective should not be merely higher transaction velocity. It should be **productive economic velocity** that supports real output rather than merely financial turnover.

The \$10 trillion ambition will ultimately depend on productivity, investment, human capital, infrastructure, innovation and macroeconomic stability. UPI cannot independently deliver that objective. It can, however, become one of the important enabling infrastructures supporting the journey. A faster circulation of economic resources can reduce friction between earning, spending, saving, borrowing and investing. A more transparent digital economy can strengthen formalisation. A more inclusive financial system can expand opportunities for entrepreneurship and investment. A stronger digital infrastructure can increase the productivity of both capital and labour. The cumulative effect may create a powerful growth ecosystem.

India's transformation from cash to clicks is therefore not simply a story about payment technology. It is increasingly a story about the **changing architecture of Indian macroeconomics**. The emerging digital economy is redefining how money moves, how markets connect and how economic opportunities are created. If supported by sound monetary policy, fiscal discipline, technological innovation and inclusive development, India's digital transformation can become an important accelerator of sustainable economic growth.

The journey towards a \$10 trillion economy will require many engines of growth. Digital payments and an increasingly efficient monetary circulation system can be one of those engines. The ultimate objective is to transform **speed into productivity, transactions into economic value, and digital connectivity into inclusive prosperity**. That is the deeper economic significance of India's journey **from cash to clicks**.

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