



From Cash to UPI: Examining Changes in Consumer Payment Behaviour in India, 2016–2025

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Abstract

This study examines the changing consumer payment environment in India following the rapid expansion of the Unified Payments Interface (UPI) between 2016 and 2025. Rather than treating the growth of UPI transactions as direct evidence of higher consumption, the study distinguishes payment substitution from changes in spending behaviour. It asks whether the increasing availability of fast, interoperable and low-friction digital payments has altered the frequency, size and everyday character of consumer transactions. The study uses secondary data drawn from the National Payments Corporation of India (NPCI), the Reserve Bank of India (RBI), government publications and relevant academic literature. Particular attention is given to the growth of UPI transaction volume and value, the changing role of person-to-person (P2P) and person-to-merchant (P2M) payments, and the expansion of digital payment infrastructure. The analysis indicates that UPI has substantially changed the payment environment by making digital transactions more accessible and increasingly embedded in routine economic activity. The growth of P2M payments also suggests a wider movement of digital payments into everyday consumption. However, aggregate transaction growth cannot by itself establish that consumers spend more in total, because transaction counts may reflect the replacement of cash or other payment modes and changes in transaction frequency. The study therefore argues that UPI is best understood as an important factor in the reconfiguration of payment practices, while its precise effect on overall consumer expenditure requires further empirical investigation.

Keywords: Unified Payments Interface (UPI); Consumer Spending Behaviour; Digital Payments; Payment Substitution; P2P Payments; P2M Payments; Digital Economy; India

Introduction

India's payment system has undergone a major transformation during the last decade. For a long period, cash remained central to everyday economic activity, particularly for small-value purchases and informal transactions. The expansion of smartphones, internet connectivity, digital banking and payment infrastructure has gradually changed the payment environment. A major turning point came with the introduction of UPI in 2016. Developed by NPCI, UPI enabled interoperable, account-to-account payments through mobile applications and created a common infrastructure for transferring money and making merchant payments. Its subsequent expansion has made digital payment an increasingly routine part of economic activity in India.

The growth of UPI has been particularly significant because it combines speed, interoperability and convenience within a single payment system. Users can initiate payments directly from bank accounts without relying on cash or entering lengthy banking details for every transaction. The increasing availability of QR-based merchant payments has also extended digital transactions beyond formal online commerce into shops, local businesses, transport, food services and other everyday settings. RBI reported that UPI accounted for 79.6% of the volume of retail payments in 2023–24, indicating its central position within India's retail payment



ecosystem. The RBI's Digital Payments Index also increased from a base value of 100 in March 2018 to 465.33 in September 2024, reflecting the broader expansion of digital payment infrastructure and usage.

The expansion of UPI raises an important question about consumer payment behaviour. A change in the method through which a purchase is paid for does not necessarily mean that the amount spent by a consumer has increased. If a person previously paid ₹100 in cash and now pays the same ₹100 through UPI, the payment mode has changed but the expenditure has not. This distinction between payment substitution and behavioural change is important when interpreting the rapid growth of UPI. Aggregate transaction statistics record the number and value of payments, but they do not directly reveal whether consumers are purchasing more goods and services, making smaller purchases more frequently, or simply replacing cash and other payment methods with UPI. Therefore, the present study uses transaction volume, transaction value and average transaction size as observable indicators of changes in the payment environment rather than as direct measures of total consumer expenditure.

At the same time, the characteristics of digital payments may influence the way payments take place. Digital payments reduce the physical and transactional effort associated with making a payment. A consumer can complete a small purchase by scanning a QR code or using a mobile application within seconds. Such convenience may make frequent low-value transactions easier to conduct and may contribute to the normalisation of digital payments in everyday economic activity. However, whether this convenience results in changes in spending behaviour cannot be established from aggregate UPI growth alone. It therefore requires careful examination of transaction patterns alongside existing evidence on consumer behaviour.

The distinction between P2P and P2M transactions is particularly relevant in this context. P2P payments mainly involve transfers between individuals, whereas P2M payments involve payments from individuals to merchants. Therefore, the expansion of P2M transactions can provide a more direct indication of the growing role of UPI in consumer and merchant transactions than overall UPI volume alone. However, P2P and P2M data are not available in a consistent form for the entire study period. For this reason, the study treats P2P and P2M patterns as supplementary evidence rather than as a complete measure of changes in consumer spending.

The period from 2016 to 2025 is also important because UPI developed through several stages. Its early adoption was followed by broader expansion of digital payment infrastructure, increasing smartphone and internet use, and a rapid shift towards contactless transactions during the COVID-19 period. The growth of QR-code acceptance further strengthened the integration of UPI into physical markets. RBI data show that UPI QR codes increased by 35% during 2023–24 to 34.6 crore by March 2024. By June 2024, UPI was processing close to 45 crore transactions per day, while by September 2024 the number of active UPI QR codes had reached approximately 61 crores. These developments indicate that UPI is no longer limited to occasional digital transfers and has become increasingly embedded in routine payment activity across different economic settings.

Existing research on digital payments often examines adoption, convenience, security, financial inclusion and consumer attitudes. A growing body of recent research has also considered whether digital payments influence spending frequency, impulse purchases and expenditure patterns. However, much of this literature relies on primary surveys of particular



groups or locations. Such studies are useful for understanding individual perceptions and self-reported behaviour, but their findings cannot automatically be generalised to the national payment environment. Transaction-level studies provide stronger evidence for examining actual spending responses, while aggregate payment statistics are more useful for identifying broad structural changes in the payment system. A secondary-data approach can therefore contribute by examining long-term changes in transaction volume, transaction value and payment categories while avoiding the assumption that aggregate payment growth is equivalent to increased household consumption.

Against this background, the present study examines changes in consumer payment behaviour in India in the context of UPI expansion from 2016 to 2025. It focuses on three related dimensions: the growth of UPI transactions, the changing composition of P2P and P2M payments where comparable data are available, and the implications of increasing digital payment convenience for everyday payment practices. The study does not claim that UPI independently caused an increase in total consumer expenditure. Instead, it treats UPI as a major component of a wider transformation in the payment environment and examines whether changes in transaction volume, value and average transaction size are consistent with changing patterns of payment activity.

This approach also allows the study to examine the distinction between payment substitution and possible behavioural reconfiguration using observable aggregate indicators. A substantial increase in transaction volume may result from greater use of UPI for existing purchases, an increase in transaction frequency, changes in transaction size, or a combination of these factors. Similarly, changes in average transaction size may reflect the increasing use of UPI for smaller routine payments, but may also result from changes in transaction composition or the splitting of transactions. These possibilities are therefore considered when interpreting the quantitative evidence rather than treating any single indicator as direct proof of increased consumption.

The study therefore seeks to provide a balanced assessment of the movement from cash-oriented payments towards a digitally mediated payment environment in India. By combining long-term aggregate transaction data with evidence from relevant academic and institutional sources, it examines the extent to which UPI has transformed payment practices while maintaining a clear distinction between changes in the mode of payment and changes in total consumer expenditure. The central argument is that UPI provides strong evidence of a transformation in India's payment environment, while its precise effect on overall consumer spending requires more disaggregated evidence than aggregate UPI statistics alone can provide.

Review of Literature

The rapid expansion of digital payments in India has generated increasing academic interest in the relationship between payment technology and consumer behaviour. Existing studies have examined UPI adoption, consumer psychology, spending patterns, demographic differences and the changing payment ecosystem. For the present study, the literature is organised into five themes: technology adoption and acceptance; psychological mechanisms underlying digital payments; changes in consumer spending; demographic differences, impulse buying and financial discipline; and merchant digitisation and the payment ecosystem. These themes are arranged to trace the relationship between digital payment use and consumer spending behaviour. The first theme explains why consumers adopt digital payments, the second examines the psychological experience of digital spending, the third considers evidence of



actual changes in expenditure, the fourth examines differences across consumer groups, and the fifth places consumer behaviour within the wider merchant and payment environment.

Theme 1: Technology Adoption and Acceptance

Research on digital payment adoption primarily focuses on convenience, perceived usefulness, trust, social influence and perceived risk. Razi-ur-Rahim et al. (2024) examined UPI adoption using an extended Meta UTAUT model among 894 urban UPI users. The study found that performance expectancy significantly influenced use behaviour, while attitude affected behavioural intention and trust influenced attitude. However, the sample was restricted to urban users and therefore does not represent rural consumers. The study is consequently useful for explaining why users adopt UPI but provides limited evidence about whether adoption changes the amount or frequency of actual expenditure. Padma Kiran and Vedala Naga Sailaja (2025) similarly found that performance expectancy, effort expectancy and social influence positively influence behavioural intention towards UPI, while perceived risks moderate several adoption factors. Although the use of PLS-SEM and multi-group analysis provides detailed evidence on adoption intentions, the study does not directly measure verified changes in consumer spending. Shree et al. (2021) also show that perceptions, trust, demographic characteristics and experiences of fraud influence digital payment behaviour. Collectively, these studies explain the determinants of digital payment adoption, but adoption, intention and use behaviour should not be treated as direct evidence of increased expenditure. This distinction creates a need for research that moves beyond adoption measures and examines actual spending behaviour.

Theme 2: Psychological Mechanisms Underlying Digital Payments

The literature increasingly suggests that the form of payment can influence the psychological experience of spending. Ma et al. (2024) investigated mobile payments and purchase behaviour through two experimental studies, including an eye-tracking experiment. Their findings indicate that the “pain of paying” varies according to the price level of a purchase, with reduced pain particularly evident in high-price conditions. For lower-priced purchases, the study identified an alternative mechanism referred to as the “pleasure of payment.” These findings suggest that digital payments may influence purchasing through psychological mechanisms rather than convenience alone. However, the evidence is largely experimental and was generated outside the Indian UPI context. Its direct applicability to Indian UPI users is therefore limited because payment practices, consumer environments and UPI-specific features may differ across countries. Moreover, experimental evidence can demonstrate short-term psychological responses but cannot by itself establish whether such responses produce sustained increases in actual expenditure. The psychological literature therefore provides an important theoretical explanation, but there remains a need to test these mechanisms using India-specific and transaction-related evidence.

Theme 3: Changes in Consumer Spending

Agarwal et al. (2024) provide stronger evidence linking digital payment use with actual consumption. Using the 2016 demonetisation episode as a natural experiment, the study employed extensive transaction-level data from a large Indian supermarket chain. It found that greater exposure to the shift from cash towards digital payments resulted in higher monthly spending, with the increase continuing after cash availability recovered. The authors also provide evidence that the effect was not explained by income shocks, price changes or purchase



substitution. This study is particularly important because it uses observed transaction data rather than relying only on consumer perceptions. Dev, Gupta and Kumar (2024), in contrast, examined UPI and individual spending behaviour using 235 valid survey responses and 20 interviews. Around three-fourths of respondents reported increased spending after adopting UPI, with many associating this increase with the intangible nature of digital payments and reduced feelings of guilt. However, these figures are self-reported and are not verified through transaction or bank-account records. Thus, the study measures perceived changes in expenditure rather than actual expenditure. The contrast between transaction-level and survey-based evidence demonstrates the need to combine behavioural perceptions with objective spending measures when examining whether UPI contributes to increased consumption.

Theme 4: Demographic Differences, Impulse Buying and Financial Discipline

Existing research also indicates that the relationship between digital payments and spending may differ across demographic groups. Maladkar and Shyam (2025), based on 500 urban and semi-urban respondents, find that digital payment convenience is associated with more frequent unplanned and impulsive purchases. Kanwal and Singh (2025), using 840 urban and semi-urban respondents, similarly report increased spending frequency and higher average monthly discretionary expenditure among digital payment users. Their findings indicate that convenience and rewards influence spending behaviour, while financial literacy moderates these effects. Devmurari (2025), using secondary evidence, focuses on Indian youth aged 15–25 and identifies associations between digital payment use, impulsive purchases, micro-transactions and reduced psychological restraint. These studies provide useful evidence of demographic and behavioural differences, but their samples are concentrated mainly among urban, semi-urban and younger consumers. The absence or limited representation of rural populations, older consumers and other socio-economic groups restricts national generalisation. Therefore, the existing evidence cannot be assumed to represent the behaviour of all Indian consumers. These studies also largely identify associations rather than establishing a direct causal relationship between UPI use and increased spending across different demographic groups.

Theme 5: Merchant Digitisation and the Payment Ecosystem

The expansion of UPI also depends on the growing acceptance of digital payments among merchants. Evidence from merchant studies indicates that convenience, transaction efficiency, customer demand and the wider digital ecosystem influence merchant adoption. However, merchant-level research is often based on specific cities, regions or selected categories of retailers, meaning that its findings cannot automatically represent all Indian merchants. National-level evidence from the RBI indicates substantial differences in digital payment adoption across merchant groups and locations, with adoption being particularly high in metropolitan areas (RBI, 2024). Similarly, NPCI data show the growing importance of P2M payments P2P transactions. P2M transaction volume surpassed P2P volume in FY 2022–23, indicating the increasing role of UPI in everyday consumption (NPCI, 2023). However, aggregate P2P and P2M statistics describe the scale of transactions rather than the behaviour of individual consumers or merchants. They therefore need to be interpreted alongside consumer-level evidence. Merchant digitisation is consequently important for understanding the availability and normalisation of UPI payments, but existing localised merchant studies cannot provide a complete picture of the Indian merchant ecosystem.



Research Gap

The reviewed literature establishes that UPI adoption is influenced by convenience, usefulness, trust, social influence and perceived risk, while psychological studies suggest that digital payments may reduce the salience or “pain” associated with spending. However, important gaps remain. First, a substantial part of the adoption literature examines behavioural intention, adoption or use rather than verified changes in actual expenditure. Second, psychological evidence is largely experimental and non-India-specific, limiting its direct application to Indian UPI users. Third, demographic studies rely heavily on urban, semi-urban or youth samples, restricting national generalisation. Fourth, merchant evidence is often geographically localised and cannot represent the diversity of Indian merchants. Finally, the P2P/P2M distinction is valuable for separating personal transfers from merchant spending, but consistently comparable P2P/P2M data that can be directly aligned with consumer spending behaviour are available for only a limited part of the study period. Therefore, there is a need for an India-specific study that connects UPI usage with actual consumer spending, distinguishes P2P from P2M transactions where data permit, and considers demographic and merchant-context differences. The present study addresses this gap by examining whether the expansion and increasing use of UPI are associated with changes in consumer spending behaviour rather than treating adoption alone as evidence of behavioural change.

Research Methodology

Research Design

The present study adopts a secondary research design to examine the transformation of consumer spending behaviour in India in the context of the rapid expansion of digital payments, particularly UPI, during the period 2016–2025. The study is based entirely on secondary data and does not involve primary surveys, interviews, or fieldwork. It seeks to examine whether the growth of UPI represents only a shift from cash and other payment methods towards digital modes of payment or whether it is also associated with changes in the frequency, value, size, and nature of consumer spending.

The study uses both quantitative and qualitative approaches to analyse secondary information. Quantitative data are used to examine trends in UPI transaction volume, transaction value, average transaction size, and the composition of transactions. Qualitative analysis is used to interpret the policy, technological, economic, and behavioural factors associated with the expansion of digital payments.

A central analytical distinction of the study is between payment substitution and behavioural reconfiguration. Payment substitution refers to the replacement of cash or another payment method with UPI without necessarily changing the underlying level of consumption. Behavioural reconfiguration refers to possible changes in spending practices associated with greater convenience, reduced transaction friction, wider merchant acceptance, and the increasing availability of digital payment facilities.

The study does not treat an increase in UPI transactions as automatic evidence of increased consumer expenditure. The distinction between substitution and behavioural reconfiguration is assessed through four main indicators: transaction volume, transaction value, average transaction size, and the composition of transactions between P2P and P2M payments. A rise in transaction volume alone is interpreted primarily as evidence of increased use of digital



payments. Stronger evidence of possible behavioural change is considered when an increase in transaction frequency occurs together with changes in average transaction size, P2M activity, and the growth of small-value merchant transactions.

However, the use of aggregate secondary data places an important boundary on the research design. Aggregate UPI statistics measure patterns of payment activity at the system level and cannot directly identify individual consumers' spending decisions, motives, preferences, or psychological responses. Therefore, the study does not claim to measure individual consumer behaviour directly. Instead, it uses aggregate payment indicators as proxies for broader behavioural patterns and examines whether these patterns are consistent with changes in consumer spending. Individual-level behavioural claims are made only where supported by existing empirical studies based on transaction-level or survey evidence. Thus, the present research provides an aggregate-level assessment of possible changes in spending behaviour rather than a direct measurement of individual consumer behaviour.

This approach is supported by existing empirical research showing that changes in digital payment use can be associated with changes in consumer spending. For example, Agarwal et al. (2024), using transaction-level data in the context of the 2016 demonetisation, found evidence of an increase in consumer spending following a forced shift towards digital payments. However, their study uses individual-level transaction data and a specific empirical identification strategy, whereas the present study relies mainly on aggregate secondary data. Therefore, the findings of the present study are not interpreted as establishing a direct causal relationship between UPI adoption and consumer spending.

Sources and Selection of Secondary Data

The study primarily relies on authoritative institutional sources, particularly RBI and NPCI. RBI publications, including Annual Reports, payment-system publications, reports on digital payments, and related statistical material, are used to understand the broader development of India's payment ecosystem. NPCI's official UPI statistics are used for UPI-specific information relating to transaction volume, transaction value, monthly and yearly trends, and the composition of transactions. NPCI provides official UPI product statistics as well as separate ecosystem statistics covering P2P and P2M transactions.

Relevant government reports, policy documents, regulatory publications, and financial inclusion documents are also examined where they contribute directly to understanding the development of digital payments in India. In addition, peer-reviewed journal articles and credible academic and institutional studies are used to examine consumer behaviour, digital payment adoption, payment psychology, spending behaviour, merchant acceptance, and related issues.

Sources are selected according to four criteria: credibility, relevance, temporal coverage, and methodological usefulness. Official institutional data are prioritised for numerical payment statistics, while peer-reviewed academic literature is prioritised for theoretical explanations and empirical evidence concerning consumer behaviour.

Sources are included when they satisfy at least one of the following conditions: they provide official paymentsystem statistics; directly address the development or use of UPI and digital payments in India; examine consumer spending or payment behaviour; or provide a relevant theoretical or empirical explanation of digital payment use. Sources are excluded when they



lack identifiable authorship or institutional responsibility, do not provide sufficient methodological information for academic use, fall outside the research questions, or make unsupported claims that cannot be independently verified.

Particular attention is given to differences between RBI and NPCI statistics. Where figures from the two institutions appear to differ, the study first examines the reporting period, unit of measurement, transaction classification, coverage, and any methodological or definitional differences. Figures that are not directly comparable are not combined or averaged. For UPI-specific transaction statistics, NPCI data are treated as the primary source, while RBI data are used primarily for broader payment-system context and cross-validation. Where a discrepancy remains after checking definitions and reporting periods, both figures may be retained with an explanation of the difference rather than selecting one figure without justification.

Period of the Study and Analytical Framework

The study covers the period 2016–2025. The year 2016 is selected because it marks the introduction of UPI and also witnessed the major disruption to cash-based transactions caused by demonetisation. RBI identifies UPI as having been introduced in 2016 and notes the significant expansion of digital payments following this period. The year 2025 is selected as the end point because it provides a decade-long period for examining the development and mainstreaming of UPI after its introduction.

For analytical purposes, the period is divided into four broad phases.

Phase I: 2016. This phase focuses on the introduction of UPI and the disruption of the existing cash-based payment environment following demonetisation.

Phase II: 2017–2019. This phase examines the early expansion of UPI, increasing smartphone use, the spread of QR-based payments, and the growing acceptance of digital payments by merchants.

Phase III: 2020–2021. This phase considers the acceleration of digital payment adoption during the COVID-19 pandemic, when contactless payment practices became increasingly important.

Phase IV: 2022–2025. This phase examines the mainstreaming of UPI, increasing merchant acceptance, expansion of digital payment infrastructure, and the growing use of UPI for small-value transactions. RBI data show the continued expansion of UPI during this broader period, including substantial increases in both transaction volume and value.

This periodisation is analytical rather than absolute. It does not suggest that changes occurred suddenly at the beginning or end of each phase. Instead, the phases provide a framework for examining the major stages in the development and adoption of digital payments.

The analytical framework combines quantitative trend analysis with structured qualitative interpretation. Quantitative indicators are first examined to identify changes in payment activity. These findings are then interpreted through relevant institutional reports, policy documents, and academic literature. The qualitative interpretation focuses on four recurring dimensions: policy and regulatory change, technological and infrastructural development, economic and market conditions, and consumer or merchant behavioural factors. Documents are reviewed for evidence relating to these dimensions, and recurring explanations or patterns are compared across sources. The purpose of this qualitative analysis is not to generate primary



themes from interviews but to contextualise and explain patterns identified in the secondary quantitative data.

Data Analysis and Interpretation

The quantitative analysis is based primarily on UPI transaction data obtained from NPCI and relevant payments system data published by RBI. The data are organised according to the research period and analysed using comparable measures across the selected years.

The principal variables examined are:

- 1. Transaction volume**, which indicates the number of UPI transactions conducted during a specified period.
- 2. Transaction value**, which indicates the total monetary value of UPI transactions.
- 3. Average transaction size**, calculated as total transaction value divided by total transaction volume where the units and reporting periods are comparable. This indicator helps assess whether the expansion of UPI is accompanied by changes in the average monetary size of transactions.
- 4. P2P and P2M composition**, where data are available and sufficiently comparable. P2P transactions represent transfers between individuals, while P2M transactions are more directly associated with payments to merchants for goods and services. Therefore, P2M activity receives particular attention when examining possible changes in consumer spending behaviour.
- 5. Small-value transactions**, where reliable category-level data are available. Their growth is examined as a possible indicator of the increasing use of digital payments for routine and everyday purchases.

Annual and monthly data are compiled according to their availability and comparability. Where monthly data are used to construct annual measures, the aggregation method is kept consistent across the relevant years. Year-on-year growth rates and percentage changes are calculated to identify major trends in UPI usage.

The analysis of P2P and P2M transactions is subject to data availability. In the early years of UPI, particularly 2016–2018, comparable P2P/P2M breakdowns may not be available in the same form as later years. In such cases, the study does not estimate or reconstruct missing figures. Instead, total UPI transaction volume and value are used, while the absence or limited availability of P2P/P2M data is explicitly acknowledged. P2P/P2M comparisons are made only for periods in which the definitions, units, and reporting categories are sufficiently comparable.

The qualitative analysis follows a structured interpretive procedure. First, relevant institutional reports, policy documents, regulatory publications, and academic studies are identified according to their relevance to the research questions. Second, the selected sources are reviewed for evidence concerning policy changes, technological development, merchant acceptance, payment convenience, transaction costs, consumer practices, and other factors that may help explain changes in payment behaviour. Third, recurring explanations and contrasting findings are grouped under the analytical dimensions identified above. Fourth, these qualitative findings are compared with the quantitative trends to determine whether the explanations provided in the literature are consistent with the observed changes in UPI transaction patterns.



Finally, interpretations are cross-checked across different sources to avoid relying on a single institutional or academic explanation.

The quantitative findings are therefore not interpreted independently. They are examined alongside qualitative evidence from RBI, NPCI, government publications, and academic studies. For example, an increase in P2M transactions may be considered alongside evidence regarding merchant acceptance, QR infrastructure, digital payment policies, and studies of consumer payment practices. This procedure helps distinguish a statistical trend from a possible explanation for that trend.

The study also employs triangulation to strengthen interpretation. Triangulation involves comparing evidence from different types of sources addressing the same issue. For example, changes in P2M transactions reported by NPCI can be examined alongside RBI evidence concerning payment infrastructure and merchant acceptance and academic research concerning consumer payment behaviour. When different sources point towards similar developments, this strengthens the interpretation. Where sources differ, the discrepancy is examined in terms of differences in definitions, periods, coverage, or methodology rather than being ignored.

The analysis does not assume that an increase in UPI transaction volume represents an equivalent increase in consumption. UPI transactions may include P2P transfers, business-related payments, bill payments, transfers between accounts, and other transactions that are not necessarily related to household consumption. Consequently, transaction growth is treated as evidence of increasing digital payment activity, while changes in P2M activity, average transaction size, transaction frequency, and small-value payments are considered together when assessing possible changes in consumer spending behaviour.

The study therefore does not attempt to establish a direct causal relationship between UPI adoption and increased consumer spending. Instead, it identifies major trends and examines the possible mechanisms through which the expansion of digital payment infrastructure may be associated with changes in consumer spending behaviour. The findings are consequently presented as a secondary-data-based analytical assessment of the changing relationship between payment practices and consumer behaviour in India during 2016–2025.

Methodological Limitations

The study has several methodological limitations. First, it relies primarily on aggregate secondary data and therefore cannot directly observe individual consumers' motives, preferences, psychological responses, or individual spending decisions. The aggregate indicators used in the study should consequently be understood as proxies for broader payment and spending patterns rather than direct measures of individual consumer behaviour.

Second, an increase in UPI transaction volume cannot by itself establish an increase in consumption because UPI transactions include activities that may not represent consumer purchases. The study therefore avoids equating digital payment growth with consumption growth and relies particularly on P2M activity, average transaction size, small-value payments, and supporting qualitative evidence when assessing possible behavioural change.

Third, P2P and P2M data are not available in a uniform and directly comparable form for every year of the study period. The analysis therefore does not reconstruct missing early-year data



and restricts P2P/P2M comparisons to periods for which sufficiently comparable information is available.

Fourth, differences in reporting conventions, classifications, coverage, and revisions between institutional sources may create apparent discrepancies in the data. These differences are addressed by checking the reporting period, definitions, units, and source methodology before figures are compared.

Finally, the study does not employ individual-level experimental or survey data and therefore does not claim to establish causality between UPI adoption and changes in spending behaviour. Its purpose is to identify and interpret trends in payment activity and examine whether these trends, when considered alongside qualitative evidence, are consistent with a broader reconfiguration of consumer spending behaviour.

Data Analysis

Growth of UPI Transactions in India, 2016–17 to 2024–25

The growth of the Unified Payments Interface (UPI) can be examined through changes in the volume and value of transactions recorded during each financial year. The available data show a continuous and substantial expansion of UPI between 2016–17 and 2024–25. The analysis uses financial-year data throughout in order to maintain consistency across the different indicators. NPCI provides yearly UPI statistics covering financial years from 2016–17 onwards, while its retail payment statistics also report annual and quarterly UPI figures.

Table 1. Growth of UPI Transactions in India, 2016–17 to 2024–25

Financial Year	UPI Transaction Volume (billion transactions)	UPI Transaction Value (₹ trillion)
2016–17	0.02	0.07
2017-18	0.92	1.10
2018-19	5.39	8.77
2019-20	12.52	21.32
2020-21	22.33	41.04
2021-22	45.96	84.16
2022-23	83.75	139.21
2023-24	131.13	199.95
2024-25	185.87	260.57



Note: Figures are based on NPCI data. Minor differences in calculated figures may occur because the underlying NPCI figures are rounded.

Source: Compiled from NPCI UPI Product Statistics and NPCI Retail Payments Statistics.

Table 1 shows the substantial expansion of UPI during the period under study. Transaction volume increased from approximately 0.02 billion transactions in 2016–17 to 185.87 billion transactions in 2024–25. Over the same period, the total value of transactions increased from approximately ₹0.07 trillion to ₹260.57 trillion. Thus, UPI experienced strong growth both in the number of transactions processed and in the monetary value transferred through the platform.

The initial years were characterised by particularly rapid growth from a very small base. Transaction volume increased from 0.02 billion in 2016–17 to 0.92 billion in 2017–18 and then to 5.39 billion in 2018–19. It increased further to 12.52 billion in 2019–20 and 22.33 billion in 2020–21. By 2021–22, annual UPI transaction volume had reached approximately 45.96 billion.

The expansion continued during the later period. Transaction volume increased from 45.96 billion in 2021–22 to 83.75 billion in 2022–23, 131.13 billion in 2023–24 and 185.87 billion in 2024–25. Transaction value also increased from approximately ₹84.16 trillion in 2021–22 to ₹139.21 trillion in 2022–23, ₹199.95 trillion in 2023–24 and ₹260.57 trillion in 2024–25.

These figures demonstrate the growth of the UPI payment channel, rather than growth in total consumer expenditure. UPI transaction value represents the monetary value processed through UPI and should not be treated as equivalent to household consumption expenditure. A transaction previously made through cash, debit card, credit card or another payment instrument may simply have shifted to UPI without changing the amount consumed. In addition, UPI includes P2P transfers and other transactions that may not represent consumer purchases. Therefore, the evidence in Table 1 is strongest for the expansion and increasing importance of digital payments in India, while its implications for total consumer expenditure remain indirect.

Average UPI Transaction Size

The relationship between transaction volume and transaction value provides another way to examine changes in UPI usage. Average transaction size is calculated by dividing total transaction value by total transaction volume.

Table 2. Average UPI Transaction Size, 2016–17 to 2024–25

Financial Year	Average UPI Transaction Size (₹ per transaction)
2016–17	3,855
2017-18	1,200
2018-19	1,627



2019-20	1,703
2020-21	1,838
2021-22	1,831
2022-23	1,662
2023-24	1,525
2024-25	1,402

Source: Author's calculation based on UPI transaction volume and value reported by NPCI

The average transaction size was relatively high in the initial year because UPI was operating on a very small transaction base. It was approximately ₹3,855 per transaction in 2016–17 and declined sharply to about ₹1,200 in 2017–18. The average then increased to approximately ₹1,627 in 2018–19, ₹1,703 in 2019–20 and ₹1,838 in 2020–21. After 2020–21, average transaction size declined from approximately ₹1,838 to ₹1,831 in 2021–22, ₹1,662 in 2022–23, ₹1,525 in 2023–24 and ₹1,402 in 2024–25.

The decline after 2020–21 occurred alongside a rapid increase in transaction volume. This pattern is consistent with a growing role for smaller-value transactions, but it should not be interpreted as conclusive evidence that consumers were making smaller purchases. Average transaction size is affected by the composition of transactions within the UPI system. For example, changes in the relative share of P2P and P2M payments, changes in bill payments, account transfers, merchant payments, and other transaction categories can alter the average without necessarily changing individual consumption behaviour.

Therefore, the decline in average transaction size is best interpreted as evidence of a change in the composition and structure of UPI transactions. It may be consistent with more frequent use of UPI for routine and smaller payments, but aggregate data cannot determine whether individual consumers actually reduced their average spending per purchase or changed their total expenditure.

Year-on-Year Growth in UPI Transactions

The year-on-year growth rates indicate how rapidly UPI transaction volume and value changed across financial years. Examining these rates helps identify periods of rapid expansion and the gradual moderation of growth as UPI became more established within India's digital payment system.



Table 3. Year-on-Year Growth in UPI Transactions

Financial Year	Volume Growth (%)	Value Growth (%)
2016–17	Base year	Base year
2017–18	5,012.8	1,491.8
2018-19	489.1	698.5
2019-20	132.2	143.1
2020-21	78.4	92.5
2021-22	105.8	105.1
2022-23	82.2	65.4
2023-24	56.6	43.6
2024-25	41.7	30.3

Source: Author's calculation based on UPI transaction volume and value reported by NPCI.

The growth rates show that UPI expanded particularly rapidly during its early adoption period. The very high growth rates recorded in 2017–18 and 2018–19 were strongly influenced by the small initial base. Transaction volume increased by approximately 5,012.8% in 2017–18, while transaction value increased by approximately 1,491.8%.

As UPI became more established, annual growth generally moderated. The later years nevertheless continued to record substantial expansion. In 2024–25, transaction volume increased by approximately 41.7%, while transaction value increased by approximately 30.3%. The fact that volume grew faster than value is consistent with the decline in average transaction size observed in Table 2.

This pattern indicates that the continued expansion of UPI increasingly involved a larger number of transactions rather than simply larger monetary transfers. However, it should be interpreted as a change in digital payment activity, not as direct evidence of an equivalent increase in consumer expenditure.

P2P and P2M Transactions

The composition of UPI transactions provides an additional perspective on the relationship between digital payments and consumer spending. UPI transactions can broadly be classified into person-to-person (P2P) and person-to-merchant (P2M) payments. P2P transactions involve transfers between individuals, while P2M transactions involve payments made by individuals to merchants.



NPCI's ecosystem statistics provide separate P2P and P2M data. However, directly comparable financial-year data are available only for 2021–22 and 2022–23 in the source used for this analysis. Consequently, P2P/P2M data cannot be used as a continuous longitudinal indicator for the entire 2016–17 to 2024–25 period. N/A is therefore reported for years where comparable annual observations could not be established.

Table 4. P2P and P2M Shares in UPI Transactions

Financial Year	P2P Volume Share (%)	P2M Volume Share (%)	P2P Value Share (%)	P2M Value Share (%)
2016–17	N/A	N/A	N/A	N/A
2017-18	N/A	N/A	N/A	N/A
2018-19	N/A	N/A	N/A	N/A
2019-20	N/A	N/A	N/A	N/A
2020-21	N/A	N/A	N/A	N/A
2021-22	58	42	81	19
2022-23	49	51	78	22
2023-24	N/A	N/A	N/A	N/A
2024-25	N/A	N/A	N/A	N/A

Source: Source: NPCI and TransUnion CIBIL, The Rise and Evolution of India's Digital Finance. N/A indicates that a directly comparable financial-year figure was not available in the source used for this analysis.

The available comparable data show a change in transaction composition between 2021–22 and 2022–23. P2P transactions accounted for 58% of transaction volume in 2021–22, while P2M transactions accounted for 42%. In 2022–23, the P2P share declined to 49%, while the P2M share increased to 51%. Thus, P2M transactions represented a larger share of transaction volume than P2P transactions in 2022–23.

The distribution by transaction value remained different. In 2021–22, P2P transactions accounted for 81% of UPI transaction value, while P2M transactions accounted for 19%. In 2022–23, the P2P share declined to 78% and the P2M share increased to 22%.

The increase in the P2M share is relevant because merchant payments are more directly associated with purchases of goods and services. It therefore provides supporting evidence of the increasing role of UPI in commercial transactions. However, because comparable P2P/P2M data are available for only two financial years, this evidence cannot support a strong long-term claim about the transformation of transaction composition from 2016–17 to 2024–25.



Moreover, an increase in P2M transactions does not necessarily mean an increase in total consumer expenditure. A purchase previously made using cash or a card may simply have shifted to UPI. P2M data therefore strengthen the evidence for changing payment composition, but they do not independently establish consumption growth.

Transaction Frequency and Changing Payment Behaviour

The growth in transaction volume and the decline in average transaction size after 2020–21 provide evidence of changes in the frequency and structure of digital payments. Between 2020–21 and 2024–25, annual UPI transaction volume increased from approximately 22.33 billion to 185.87 billion. During the same period, average transaction size declined from approximately ₹1,838 to ₹1,402.

This combination is consistent with greater use of UPI for smaller and potentially more frequent payments. The available P2M data also show an increasing role for merchant payments between 2021–22 and 2022–23. However, these indicators must not be equated directly with increased consumption.

More transactions can arise through several mechanisms. First, consumers may make more purchases because digital payments are convenient. Second, an existing payment may be divided into several smaller transactions. Third, cash or card payments may simply be substituted by UPI. Fourth, some transactions may represent transfers that are not related to household consumption.

Therefore, transaction frequency is treated as an indicator of changing payment behaviour rather than a direct measure of consumption frequency. The aggregate evidence supports the conclusion that UPI became more deeply integrated into everyday payment activity, but it does not establish that consumers necessarily spent more in total.

Payment Substitution and Consumer Spending

A central issue in examining the relationship between UPI and consumer behaviour is the distinction between payment substitution and actual changes in consumption. Payment substitution occurs when an existing purchase is made using a different payment method. Consumption transformation, by contrast, refers to changes in the amount, frequency or composition of goods and services purchased.

For example, if a consumer previously paid ₹500 in cash and subsequently pays the same ₹500 through UPI, the payment method has changed but expenditure remains ₹500. Similarly, an increase in the number of UPI transactions may occur because consumers make smaller payments more frequently, even when their total expenditure remains unchanged.

The aggregate UPI statistics cannot distinguish reliably between these situations. They record payment activity through the UPI system rather than the complete expenditure pattern of individual consumers. Consequently, UPI transaction growth cannot be treated as direct evidence of an equivalent increase in household consumption.

The analysis therefore treats payment substitution as an alternative explanation that must be considered alongside possible behavioural change. Where transaction volume rises, the study examines transaction value, average transaction size, P2M evidence and relevant qualitative



research rather than assuming that increased transaction frequency represents increased consumption.

Evidence of Smaller and More Frequent Payments

The decline in average transaction size after 2020–21 is relevant to the changing structure of UPI use. Average transaction size decreased from approximately ₹1,838 in 2020–21 to ₹1,402 in 2024–25, while transaction volume increased substantially.

This combination is consistent with a broader use of UPI for smaller and more frequent transactions. However, the evidence should be interpreted cautiously because average transaction size is affected by the composition of the UPI transaction pool, not solely by consumer purchasing behaviour.

The available P2M evidence adds some support to this interpretation. P2M transactions accounted for 42% of UPI transaction volume in 2021–22 and 51% in 2022–23. However, because these figures cover only two comparable financial years, they cannot be used to demonstrate a continuous long-term increase in merchant-payment activity across the entire study period.

Thus, the data suggest that UPI became increasingly embedded in routine and relatively smaller digital payments, but they do not establish that consumers independently changed their total spending or purchasing preferences.

Phases of UPI Expansion

The overall data can be understood through four broad phases.

The first phase, from 2016–17 to 2018–19, represents the initial adoption period. Transaction volume increased from approximately 0.02 billion to 5.39 billion, while transaction value increased from ₹0.07 trillion to ₹8.77 trillion. The very high growth rates during this period were partly associated with the small initial base.

The second phase, covering 2019–20 and 2020–21, represents a period of rapid expansion. Transaction volume increased from 12.52 billion to 22.33 billion, while transaction value increased from ₹21.32 trillion to ₹41.04 trillion.

The third phase, from 2021–22 to 2022–23, was characterised by continued expansion in both transaction frequency and value. Transaction volume increased from approximately 45.96 billion to 83.75 billion. The limited comparable P2P/P2M data during this phase also show an increase in the P2M share of transaction volume from 42% to 51%.

The fourth phase, covering 2023–24 and 2024–25, reflects the consolidation of UPI as a high-volume retail payment system. Transaction volume increased from 131.13 billion to 185.87 billion, while average transaction size declined from approximately ₹1,525 to ₹1,402. The combination indicates continued growth in the number of digital transactions alongside a lower average value per transaction.

These phases describe the development of the UPI payment system. They should not be interpreted as four stages of growth in household consumption because the available data do not measure total consumer expenditure.



Payment Transformation and Consumption Transformation

The findings indicate an important distinction between payment transformation and consumption transformation. Payment transformation refers to changes in the methods, frequency and structure through which payments are made. Consumption transformation refers to changes in the amount, frequency or composition of goods and services purchased.

The available data provide considerably stronger evidence for payment transformation. UPI transaction volume increased substantially over the period, transaction value expanded considerably, average transaction size declined after 2020–21, and the available P2P/P2M data show an increased P2M share between 2021–22 and 2022–23.

These developments indicate that UPI became increasingly integrated into everyday digital and merchant payment activity. The growth in transaction frequency and lower average transaction size are consistent with a greater role for UPI in routine payments.

However, these indicators do not establish that UPI independently increased total consumption. Payment transformation can occur without consumption transformation. A consumer can change from cash to UPI while maintaining the same expenditure, or can divide an existing payment into several smaller transactions.

Therefore, the evidence of this study is stronger for payment transformation than for consumption transformation. Establishing a direct relationship between UPI adoption and total consumer expenditure would require individual-level expenditure data, household surveys or transaction-level datasets capable of distinguishing new consumption from payment substitution.

Data Quality and Comparability

The analysis uses official statistics published by NPCI. NPCI's UPI Product Statistics provide monthly and yearly transaction data, including financial-year selections from 2016–17 onwards. The use of financial-year data ensures that the main indicators are measured over comparable twelve-month periods.

The overall UPI volume and value series are sufficiently available for analysing long-term growth. However, the P2P/P2M series has substantially weaker comparability across years. Although NPCI provides ecosystem-level P2P and P2M statistics, directly comparable annual financial-year observations could not be established for every year of the study.

For this reason, N/A is used rather than estimating missing values. This is methodologically preferable to constructing figures from incomplete or differently defined observations because estimated values could create a misleading impression of long-term changes in transaction composition.

Consequently, P2P/P2M evidence is treated as supplementary evidence. The main longitudinal analysis relies on the more consistently available UPI transaction volume, transaction value and average transaction size, while P2P/P2M data are used only where direct comparison is possible.

This distinction is important for interpreting the findings. The long-term data demonstrate the expansion of UPI, while the P2P/P2M data provide only a limited indication of changing



transaction composition. Therefore, claims about the increasing role of merchant payments are restricted to the years for which comparable evidence is available.

Limitations of the Data

The analysis has several limitations. First, the study is based entirely on secondary data. The available payment statistics record transactions and their monetary value but do not directly measure the complete consumption expenditure of individual households.

Second, growth in UPI transactions cannot be treated as equivalent to growth in consumer expenditure. An increase in UPI transactions may partly represent substitution away from cash, cards or other payment instruments.

Third, the decline in average transaction size provides information about the structure of UPI transactions but cannot independently establish changes in consumer preferences, purchasing behaviour or household expenditure. Changes in the composition of P2P, P2M and other transaction categories may also influence the average.

Fourth, the P2P/P2M series is not available in a directly comparable annual format for every financial year examined in this study. Comparable data are available only for 2021–22 and 2022–23 in the source used for the present comparison. This limits the extent to which changes in transaction composition can be examined longitudinally.

Finally, the data do not establish a direct causal relationship between UPI adoption and consumer spending. Other factors, including smartphone access, internet connectivity, merchant digitisation, financial inclusion, e-commerce growth, income changes and broader economic conditions, may also have influenced the expansion of digital payments.

Overall Findings from the Data

The data demonstrate a major expansion of UPI between 2016–17 and 2024–25. Transaction volume increased from approximately 0.02 billion to 185.87 billion, while transaction value increased from approximately ₹0.07 trillion to ₹260.57 trillion. Average transaction size also changed considerably, declining from approximately ₹1,838 in 2020–21 to ₹1,402 in 2024–25.

The available P2P/P2M evidence provides an additional but limited dimension to this change. P2M transactions increased their share of UPI transaction volume from 42% in 2021–22 to 51% in 2022–23, while their share of transaction value increased from 19% to 22%. However, because comparable P2P/P2M data are not available for the full study period, these figures cannot be used as evidence of a continuous longitudinal transformation.

Taken together, the indicators show that UPI became increasingly important within India's payment system and increasingly integrated into routine digital and merchant payments. The growth in transaction volume and the decline in average transaction size is consistent with a greater role for smaller and potentially more frequent digital payments.

At the same time, the evidence does not establish that UPI caused an increase in total consumer expenditure. The available aggregate data measure payment-system activity rather than complete individual consumption behaviour. The findings therefore support a stronger conclusion about payment transformation than about consumption transformation. The extent to which UPI has altered overall consumer spending remains an open empirical question requiring individual-level expenditure, household survey or transaction-level evidence.



Conclusion

The expansion of UPI has significantly altered the payment environment in India during the period 2016–2025. The evidence examined in this study shows a substantial increase in both the volume and value of UPI transactions. Annual transaction volume increased from 0.02 billion in 2016–17 to 185.87 billion in 2024–25, while transaction value increased from ₹0.07 trillion to ₹260.57 trillion over the same period. This expansion indicates the rapid integration of digital payments into everyday economic activity. However, the growth of transaction volumes and values should not be interpreted automatically as evidence of a corresponding increase in consumer expenditure. The central purpose of this study was therefore to distinguish changes in payment practices from changes in spending behaviour.

The analysis provides stronger evidence of a transformation in the way payments are made than of a direct transformation in the overall level of consumption. The decline in average UPI transaction size after 2020–21 is particularly relevant. The average transaction size fell from approximately ₹1,838 in 2020–21 to ₹1,402 in 2024–25, even as transaction volume continued to increase. This pattern indicates a change in the composition or scale of UPI transactions, but the aggregate data do not establish why the average size declined. It may be associated with greater use of UPI for lower-value transactions, changes in transaction composition, transaction splitting, or other factors. Therefore, the decline should not be treated as direct evidence of smaller or more frequent consumer purchases. What can be established more clearly is that UPI became increasingly embedded in routine payment activity.

The available P2P and P2M evidence provides further insight into the changing composition of UPI transactions. In the comparable data examined in this study, the P2M share of transaction volume increased from 42 percent in 2021–22 to 51 percent in 2022–23. This shift is relevant because merchant payments are more directly connected with purchases of goods and services than person-to-person transfers. However, comparable P2P and P2M data are available only for a limited part of the study period. Consequently, this evidence cannot be used to establish a continuous decade-long shift from P2P towards P2M payments. It is therefore treated as supplementary evidence of changing payment composition rather than as a comprehensive measure of changes in consumer spending.

The findings reinforce the importance of distinguishing payment substitution from behavioural reconfiguration. Payment substitution occurs when an existing purchase is made through UPI instead of cash, card, or another payment instrument. Behavioural reconfiguration, in contrast, would involve changes in the frequency, size, timing, composition, or nature of expenditure. The aggregate evidence in this study clearly demonstrates the expansion and increasing use of digital payment channels, but it does not provide sufficient evidence to conclude that UPI alone has caused a sustained increase in total consumer expenditure.

This interpretation is consistent with the broader empirical literature while also highlighting the importance of research design. Agarwal et al. (2024), using individual-level transaction data and a difference-in-differences approach, found evidence of changes in spending following demonetisation and increased digital payment use. Such transaction-level evidence can capture behavioural responses that cannot be identified from national aggregate payment statistics alone. The present study therefore treats UPI as an important component of a broader transformation in India's payment ecosystem rather than as an independent causal explanation for changes in consumption.



Overall, the evidence supports the conclusion that UPI has substantially reconfigured India's payment landscape by increasing the reach, accessibility and use of digital transactions. The continued rise in transaction volume and value, together with changes in average transaction size and the available P2P/P2M evidence, demonstrates a significant transformation in payment practices. However, these indicators should not be interpreted as direct measures of changes in total consumer expenditure. The evidence is therefore stronger for payment transformation than for consumption transformation.

Future research can address this limitation by combining UPI transaction data with household expenditure surveys, consumer-level transaction records, merchant-level information and demographic characteristics. Such evidence could provide a clearer understanding of whether digital payment convenience changes the frequency, value and composition of individual consumption. Until such evidence is available, UPI's most clearly established contribution is the transformation of India's payment practices, while its precise effect on consumer spending behaviour remains an empirical question requiring further investigation.

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