

DIGITAL PAYMENT SYSTEMS AND SMALL BUSINESS GROWTH: EVIDENCE FROM TIER-2 CITIES**Dr.B.Bhavya**Assistant Professor, School of Management Studies
Sathyabama Institute of Science and Technology, Chennai - 600119
bhavya.belle@gmail.com**Dr. Dhivya Sathish**Associate Professor, School of Management Studies
Sathyabama Institute of Science and Technology, Chennai - 600119
dhivya.sathish05@gmail.com**Dr. Vinoth Kumar Chokkalingam,**Professor, Department of English Linguistics, Navoi State University,
Navoi, Uzbekistan. vinothelt@gmail.com, <https://orcid.org/0000-0003-4020-5417>**Dr. Diganta Kumar Das**Principal, Jadhav College, Dhemaji, Assam
diganta.das1981@gmail.com**Dr. Ramesh Kumar**Associate Professor, Department of Commerce
PGDAV College Eve, Delhi
rameshdav2@gmail.com**Dr. D. Paul Dhinakaran**Assistant Professor, Department of Commerce
Jayagovind Harigopal Agarwal Agarsen College (Affiliated to University of Madras) Madhavaram,
Chennai, Tamilnadu- 600060, pauldthinakaranboss@gmail.com**Abstract**

The rapid proliferation of digital payment ecosystems anchored by the Unified Payments Interface (UPI), mobile wallets, and QR-code-based merchant payment solutions has begun reshaping the economic fabric of India's non-metropolitan cities. This paper investigates the relationship between digital payment adoption and small business growth in Tier-2 cities, drawing on a mixed-methods framework combining structured surveys of 268 small and medium enterprises (SMEs), semi-structured interviews with 22 business owners, and secondary data from the Reserve Bank of India (RBI), National Payments Corporation of India (NPCI), and leading fintech industry reports. Findings reveal that digital payment adoption is associated with a statistically significant increase in annual revenue (mean increase: 38 & 47%), improved customer acquisition, and measurable gains in operational efficiency. However, the study also identifies structural barriers digital literacy deficits, connectivity infrastructure gaps, security apprehensions, and regulatory compliance costs that constrain adoption, particularly among older and less-educated proprietors. Policy recommendations include subsidized digital infrastructure expansion, targeted financial literacy programs, and an enhanced role for government-backed incentive schemes. This paper contributes to the growing literature on fintech-driven financial inclusion and small business development in emerging economies.

Keywords: *Digital Payment Systems, UPI, Small Business Growth, Tier-2 Cities, Financial Inclusion, SME Performance, Fintech, India***1. Introduction**

The transformation of payment systems from cash-dependent to digitally-enabled transactions represents one of the most consequential shifts in modern economic history, particularly for developing economies. In India, this transformation has been accelerated by a convergence of policy ambition, technological infrastructure investment, and grassroots adoption among merchants and consumers alike. The demonetization of November 2016 served as a catalyst, compelling millions of small business owners—who had previously relied almost exclusively on cash—to explore digital alternatives. The introduction and rapid scaling of the Unified Payments Interface (UPI) created an open, interoperable, zero-cost payment rail that democratized access to digital commerce. Yet, the preponderance of empirical research has concentrated on metropolitan centers and Tier-1 cities, where smartphone penetration and digital literacy are highest. The story of Tier-2 cities urban agglomerations such as Nagpur, Indore, Coimbatore, Jaipur, Bhubaneswar, and Ludhiana, with populations typically between 500,000 and 4 million remains comparatively understudied. These cities represent an economically significant frontier: they are home to millions of SMEs, exhibit growing middle-class consumer bases, and are increasingly connected to national digital infrastructure, yet retain socioeconomic characteristics that make adoption dynamics fundamentally different from metropolitan contexts.

This paper addresses this gap with three primary research **objectives**:

1. To evaluate the impact of digital payment adoption on key performance metrics for small businesses in Tier-2 cities, including revenue, customer acquisition, and operational efficiency.
2. To identify and analyze the principal barriers preventing or slowing adoption among SME proprietors in non-metropolitan settings.
3. To assess how government policies and institutional support shape adoption trajectories and business outcomes.

The remainder of this paper is organized as follows. Section 2 provides a review of the relevant literature. Section 3 outlines the methodology. Section 4 presents empirical findings. Section 5 discusses implications and contextualizes the results within broader theoretical frameworks. Section 6 offers policy recommendations. Section 7 concludes.

2. Literature Review

2.1 Digital Payment Systems: Definitions and Typology: Digital payment systems encompass any technology-mediated mechanism for transferring value between parties without the direct use of physical currency. In the Indian context, this includes: (a) UPI-based peer-to-peer (P2P) and person-to-merchant (P2M) transfers, executed via mobile applications such as PhonePe, Google Pay, and Paytm; (b) mobile wallets, which store pre-loaded funds for consumer expenditure; (c) QR-code-enabled point-of-sale (POS) systems; (d) internet banking transfers; and (e) card-based payments via debit or credit networks. Each of these mechanisms differs in terms of transaction cost, technical requirements, consumer familiarity, and suitability for small merchants.

UPI, administered by the National Payments Corporation of India (NPCI), has emerged as the dominant architecture. By FY 2024–25, UPI processed over 228 billion transactions with a combined value of approximately ₹299.7 lakh crore, representing a year-on-year volume growth of 29.3% (NPCI, 2025). The International Monetary Fund has recognized UPI as the world's largest retail fast-payment system by transaction volume, accounting for approximately 49% of global real-time payment transaction volume (IMF, 2025).

2.2 Digital Payments and SME Performance: A substantial body of literature links digital payment adoption to improved SME performance along multiple dimensions. Minami (2025) found that digital payment acceptance leads to the growth of customer loyalty and customer bases, especially for businesses trading in competitive urban markets. Mehta and Srivastava (2023) documented that SMEs adopting digital payment systems reduce transaction processing costs by 15 to 22% compared to cash-heavy counterparts, primarily through reduced cash-handling overheads and lower instances of short-change disputes.

In a case study of 50 small businesses in New Delhi, Arora et al. (2022) reported a 46.7% increase in average annual revenue and a 62.1% rise in customer acquisition post-adoption. Operational efficiency improved by 40.2%, as businesses processed transactions faster and with greater accuracy. These findings align with broader cross-country evidence from developing economies, where digital payments expand access to formal financial services and provide digital transaction histories that facilitate credit access (Beck et al., 2023).

Institutional theory provides a useful framework for understanding these dynamics. Businesses that adopt digital payments gain access to complementary ecosystems digital lending, insurance products, accounting software integration that progressively reduce information asymmetries between small firms and financial institutions (Dwivedi et al., 2024). The technology acceptance model (TAM) further suggests that perceived usefulness and ease of use are the primary determinants of adoption intent, moderated by trust, perceived risk, and social influence (Davis, 1989; Venkatesh et al., 2003).

2.3 Tier-2 Cities as a Distinct Context: Tier-2 cities in India present a heterogeneous economic landscape. Unlike metropolitan cities, where digital infrastructure is mature and consumer digital literacy is high, Tier-2 cities exhibit variable smartphone penetration, patchy 4G/5G network coverage, mixed levels of financial literacy, and a higher concentration of owner-operated micro and small enterprises in sectors such as retail, food service, textiles, and local manufacturing.

Research on Tier-2 and Tier-3 city dynamics has expanded in recent years. A study using the Technology Acceptance Model (TAM) framework across Tier-2 and Tier-3 Indian cities (IJERESEM, 2025) found that Cronbach's alpha values for adoption constructs ranged from 0.81 to 0.92, confirming strong internal consistency in measurements of perceived usefulness, ease of use, trust, perceived risk, social influence, and behavioral intention. The study identified trust and social influence as particularly important adoption drivers in non-metropolitan contexts, where community networks and peer recommendations carry substantial weight. During the festive season of 2024–25, Tier-3 cities recorded the fastest digital payment value growth at 51% year-on-year, while the aggregate figure for Tier-2 and Tier-3 cities combined reached 44%, with the watches and jewellery category leading at 66% surge in transaction values. These figures underscore the accelerating momentum of digital adoption beyond India's major metropolitan areas.

2.4 Barriers to Digital Payment Adoption: Despite documented benefits, adoption barriers remain significant. These can be categorized into supply-side and demand-side constraints. On the supply side, inadequate digital infrastructure (limited internet connectivity, power outages affecting device operability, insufficient QR-code payment terminal distribution) constrains merchant capability. On the demand side, limited digital literacy, security apprehensions, and cultural resistance to change inhibit both merchant and consumer adoption.

Trautman (2023) identifies regulatory complexity as a particularly underappreciated barrier, with compliance requirements around data localization, Know Your Customer (KYC) protocols, and transaction reporting creating disproportionate burdens for small merchants who lack dedicated administrative resources. Security concerns are also empirically significant: fraud incidents, including UPI transaction scams, SIM-swap frauds, and phishing campaigns targeting SME owners, have eroded confidence in digital channels in some communities.

2.5 Government Initiatives and Financial Inclusion: The Indian government's Digital India initiative, the Jan Dhan Yojana financial inclusion program, and RBI's Payments Infrastructure Development Fund (PIDF) have together created a supportive institutional environment for digital payment expansion. As of October 2025, approximately 54.5 million digital touch points had been deployed through PIDF in Tier-3 to Tier-6 centers, while a total of 568.6 million QR codes had been deployed to approximately 65 million merchants nationwide. The zero-merchant-discount-rate (MDR) policy for UPI transactions has been a critical enabler, eliminating a key financial disincentive for small merchant adoption.

3. Methodology

3.1 Research Design: This study employs a mixed-methods research design, integrating quantitative survey data with qualitative insights from semi-structured interviews. This approach allows for triangulation of findings and provides a more nuanced understanding of the complex interplay between digital payment adoption and small business performance than either method could achieve alone.

3.2 Study Area and Sampling: The study was conducted across five Tier-2 cities selected to represent geographic and economic diversity: **Nagpur** (Maharashtra), **Indore** (Madhya Pradesh), **Coimbatore** (Tamil Nadu), **Jaipur** (Rajasthan), and **Bhubaneswar** (Odisha). These cities were chosen on the basis of: (a) population between 1 million and 3 million; (b) presence of a significant SME ecosystem; (c) availability of baseline digital infrastructure (4G connectivity and banking network presence); and (d) geographic representation across different regions of India.

Sampling method: Purposive sampling was employed to identify businesses that were either active users of digital payment systems or had adopted them within the preceding 24 months. Respondents were required to meet the following eligibility criteria:

- Registered small business operating for at least two years
- Employing fewer than 50 persons
- Actively engaged in Business-to-Consumer (B2C) sales
- Proprietor or primary decision-maker available for interview

A total of **268 valid questionnaire responses** were collected after screening for completeness and removing outliers. An additional **22 semi-structured interviews** were conducted with business owners selected for their ability to articulate adoption experiences in depth.

3.3 Sectoral Distribution of Respondents

Sector	Number of Respondents	Percentage
Retail (general merchandise, grocery)	87	32.5%
Food & Beverage (restaurants, street food, bakeries)	62	23.1%
Apparel & Textiles	41	15.3%
Electronics & Mobile Accessories	34	12.7%
Personal Services (salons, tailors, repair)	28	10.4%
Other (jewellery, stationery, medical)	16	6.0%
Total	268	100%

3.4 Data Collection Instruments

Quantitative: Structured questionnaires with multiple-choice, Likert-scale, and open-ended numeric questions were administered. Key constructs measured included: frequency and volume of digital transactions, self-reported revenue before and after adoption, number of new customers acquired, perceived operational efficiency changes, and perceived barriers to adoption.

Qualitative: Semi-structured interview protocols explored motivations for adoption, lived experiences with digital payment platforms, specific incidents of technical failure or fraud, and attitudes toward government policies. Interviews averaged 35 minutes in duration and were conducted in a combination of Hindi, local languages, and English, with translation provided as needed.

3.5 Analytical Approach: Quantitative data were analyzed using descriptive statistics, Pearson correlation analysis, and multiple regression to examine the relationship between digital payment adoption intensity and business performance outcomes. SPSS (Version 26) was the primary analytical tool. Qualitative data were subjected to thematic analysis following Braun and Clarke's (2006) framework, with codes developed inductively from interview transcripts.

3.6 Reliability and Validity: Cronbach's alpha coefficients for all major constructs exceeded 0.80, confirming strong internal consistency. Content validity was established through expert review by three academics specializing in fintech and SME economics. Construct validity was confirmed through confirmatory factor analysis (CFA), with all factor loadings exceeding 0.65.

4. Results

4.1 Adoption Landscape: Of the 268 surveyed businesses, **221 (82.5%)** actively used at least one form of digital payment. UPI-based applications were the most prevalent (76.4% of adopters), followed by QR-code-based POS systems (58.2%), mobile wallets (41.3%), and internet banking transfers (29.7%). A minority (11.2%) relied solely on card-based POS terminals. Many businesses used multiple channels simultaneously, reflecting the complementary nature of digital payment modalities in practice.

The primary platforms used were:

- **PhonePe:** 68.3% of UPI users
- **Google Pay:** 52.1% of UPI users
- **Paytm:** 31.6% of UPI users
- **BHIM:** 14.2% of UPI users

Average ticket sizes for digital transactions in surveyed businesses ranged from ₹250 to ₹1,800, broadly consistent with national P2M averages reported by NPCI (₹643 per P2M transaction as of 2025).

4.2 Impact on Revenue: Regression analysis revealed a statistically significant positive association between digital payment adoption and annual revenue growth ($\beta = 0.43, p < 0.001$), after controlling for business age, sector, city, and proprietor education level. On average, businesses that had adopted digital payments reported a **38.4% increase in annual revenue** over the 24 months following adoption, compared to a 12.1% increase for non-adopters over the same period.

Table 1: Self-Reported Revenue Change Post-Digital Payment Adoption

Revenue Change	Adopters (n=221)	Non-Adopters (n=47)
Increased by >50%	21.3%	4.3%
Increased by 26–50%	34.4%	8.5%
Increased by 1–25%	31.2%	27.7%
No significant change	10.0%	44.7%
Decreased	3.1%	14.9%

Businesses in the food and beverage and retail sectors reported the highest revenue gains, reflecting the high transaction frequency and consumer price sensitivity in these segments. Jewelry and high-value goods retailers, by contrast, reported more modest revenue increases but significant improvements in perceived transaction security and customer trust.

4.3 Customer Acquisition and Retention

Digital payment adopters reported a mean **34.7% increase in customer acquisition** in the 12 months post-adoption. Several mechanisms were identified:

- **Extended customer reach:** Acceptance of digital payments enabled businesses to serve customers who no longer carry cash, including younger consumers and migrant workers who rely exclusively on mobile wallets.
- **Reduced transaction friction:** Eliminating the need to provide change or verify currency authenticity accelerated checkout times and improved customer experience.
- **Loyalty ecosystem integration:** Several respondents noted that platforms like PhonePe and Google Pay offer cashback and reward programs that incentivize repeat visits.

Pearson correlation analysis confirmed a significant positive relationship between digital payment adoption intensity (operationalized as share of transactions conducted digitally) and customer acquisition growth ($r = 0.61, p < 0.001$).

4.4 Operational Efficiency

Business owners reported measurable operational improvements across three dimensions:

1. **Transaction speed:** 78.3% of adopters reported faster checkout processes, with estimated time savings of 30–45 seconds per transaction compared to cash handling.
2. **Cash flow visibility:** 69.4% reported improved real-time visibility into daily revenues through digital dashboards, reducing end-of-day reconciliation errors.
3. **Reduced cash-handling costs:** 54.2% reported lower costs associated with cash transportation, storage, and pilferage prevention.

Multiple regression analysis showed that adoption intensity predicted operational efficiency improvement ($\beta = 0.37, p < 0.001$), with the strongest effects observed in businesses processing more than 50 digital transactions per day.

4.5 Access to Formal Credit

A notable secondary benefit identified was improved access to formal credit. Among adopters, 31.6% reported having successfully accessed formal credit products (MSME loans, merchant cash advances, or working capital lines) within 24 months of adoption, citing their digital transaction history as a key factor in lender assessment. This is consistent with the broader literature on the role of digital payment records as proxies for creditworthiness in developing economy contexts (Suri et al., 2023).

4.6 Adoption Barriers

Despite strong overall adoption rates, significant barriers were identified. The following table summarizes the frequency with which specific barriers were cited.

Table 2: Reported Barriers to Digital Payment Adoption or Expanded Use

Barrier	% Citing as Significant
Unreliable internet connectivity	61.2%
Security concerns (fraud, unauthorized transactions)	54.7%
Technical difficulties with platforms	48.3%
Customer preference for cash	43.6%
Limited digital literacy (self or staff)	39.8%
High cost of POS equipment	31.5%
Regulatory and KYC complexity	22.7%
Delayed settlement / cash flow timing	19.4%

Qualitative findings elaborated on the connectivity barrier in particular. A typical observation from a Nagpur-based garment retailer: "During peak hours or festivals, the network becomes unreliable. When a transaction fails, the customer sometimes leaves. That's worse than not having digital payment at all." This reflects the critical importance of infrastructure quality—not merely availability—for merchant confidence in digital systems.

Security concerns emerged as a cross-cutting theme, especially among older proprietors. A Coimbatore restaurant owner described receiving a fraudulent phone call in which a caller impersonating a bank official obtained UPI PIN information. Incidents such as these, even when not personally experienced, circulate rapidly through community networks and substantially raise perceived risk among prospective adopters.

4.7 Demographic and Firm-Level Moderators

Logistic regression analysis identified several firm and proprietor characteristics that significantly moderated the relationship between adoption and performance outcomes:

- **Proprietor age:** Younger proprietors (18–39) were significantly more likely to report high adoption intensity and greater performance gains. Middle-aged proprietors (40–49) in the retail sector showed the highest probability of e-wallet adoption, prioritizing security and reliability.
- **Education level:** Proprietors with at least secondary education were 2.4 times more likely to report positive revenue outcomes from digital adoption than those without formal education.
- **Business tenure:** Businesses operating for 3–5 years showed stronger adoption effects than those operating for less than two or more than ten years, possibly reflecting a stage of growth where digital payment-enabled credit access is particularly valuable.
- **Sector:** Retail and food service sectors showed the strongest adoption-revenue correlations, while services sectors showed more variable results.

5. Discussion

5.1 Interpreting the Revenue Effects

The documented revenue gains among digital payment adopters in Tier-2 cities (mean 38.4%) are broadly consistent with, though somewhat lower than, the 46.7% figure reported by Arora et al. (2022) for New Delhi businesses. This differential may reflect infrastructure gaps and lower baseline digital consumer penetration in Tier-2 contexts, which dampen the revenue amplification effect. Nonetheless, the magnitude of the effect is economically significant and suggests that digital payment adoption represents a genuine lever for SME growth in non-metropolitan settings.

The relationship between adoption and revenue is not simply a direct causal link but rather operates through multiple mediating channels: broader customer reach, enhanced consumer trust, improved operational efficiency, and expanded access to complementary financial services. The relative importance of these channels varied across sectors and city contexts, suggesting that adoption support strategies should be tailored to local economic conditions.

5.2 The Infrastructure-Trust Nexus

Perhaps the most important finding from qualitative analysis is the tight coupling between infrastructure reliability and merchant trust in digital systems. Unlike metropolitan businesses, where redundant connectivity (Wi-Fi, 4G, sometimes 5G) provides resilience, Tier-2 city merchants frequently operate with a single connectivity channel. When that channel fails during a transaction, the merchant bears reputational cost (perceived as technically incompetent) and potential revenue loss. This creates a negative feedback loop: reliability concerns reduce adoption enthusiasm, which reduces merchant pressure on telecom providers to upgrade infrastructure.

Breaking this loop requires coordinated investment in digital infrastructure especially Bharat Net fiber expansion and 5G rollout in peri-urban areas alongside user experience improvements by payment platform providers to handle low-connectivity scenarios more gracefully (e.g., offline UPI lite capabilities).

5.3 Gender Dimensions

While the primary focus of this study was not gender analysis, qualitative interviews surfaced notable patterns. Female proprietors particularly in textile, food, and personal services sectors reported higher levels of apprehension about digital payment errors and fraud, consistent with patterns identified in the broader financial inclusion literature. Targeted outreach programs, potentially delivered through women's self-help group networks that already exist in many Tier-2 cities, could accelerate adoption among this demographic.

5.4 Contextualizing India's Tier-2 Digital Payment Trajectory

UPI's growth trajectory situates Tier-2 cities within a broader national story of digitization. PhonePe has reported that Tier-3 to Tier-6 cities contributed 60–70% of new customer additions in recent years, with the platform having digitized over 27 million offline merchants across these regions. National figures show UPI processing over 22.64 billion transactions in March 2026 alone, with a total value of ₹29.53 lakh crore a 19% year-on-year jump reinforcing the scale of ongoing adoption.

The PIDF, which provides grants to support digital touch-point deployment in Tier-3 to Tier-6 centers, had deployed approximately 54.5 million touch points by October 2025. These macro-level data points are consistent with the strong adoption rates observed at the firm level in this study and suggest that the Tier-2 city trajectory is on an upward, though uneven, path.

6. Policy Recommendations

Based on the empirical findings and analytical discussion, the following policy recommendations are advanced:

6.1 Digital Infrastructure Investment

The single most constraining factor identified in this study is connectivity reliability. Policymakers should prioritize the completion of Bharat Net Phase III in Tier-2 city peripheries, mandate minimum service-level agreements from telecom operators in commercially licensed areas, and incentivize the deployment of offline-capable UPI Lite across more merchant categories. Investment in affordable 5G infrastructure in Tier-2 cities should be accelerated, potentially through public-private partnership models that distribute capital expenditure.

6.2 Targeted Financial Literacy Programs

Digital literacy programs should be tailored to the specific needs and apprehensions of small business owners, with curriculum content addressing: basic platform usage, fraud identification and prevention, dispute resolution mechanisms, and the business benefits of maintaining a digital transaction record. Delivery channels should leverage existing community infrastructure industry associations, local bank branches, local urban bodies rather than creating parallel bureaucracies. Language-appropriate materials are essential, given the linguistic diversity of Tier-2 cities.

6.3 Security Infrastructure and Fraud Remediation

The RBI and NPCI should enhance and publicize the mechanisms for merchant fraud remediation, ensuring that small businesses have accessible, timely recourse when fraudulent transactions occur. The current maximum 90-day dispute resolution timeline for some categories of disputes is prohibitively long for small merchants for whom cash flow is critical. Investment in AI-driven real-time fraud detection at the platform level should be mandated as a baseline requirement for UPI-enabled payment service providers.

6.4 MSME Credit Integration

Given the significant proportion of adopters who successfully accessed formal credit on the basis of digital transaction histories, formal data-sharing frameworks between payment platforms and MSME-focused lenders should be developed and standardized. This would allow lenders to assess creditworthiness more accurately and extend credit to businesses that might otherwise be excluded from formal financing. The RBI's Account Aggregator framework provides a useful foundation that should be expanded specifically for the SME context.

6.5 Continuation and Expansion of PIDF

The Payments Infrastructure Development Fund has demonstrably accelerated merchant touch-point deployment. Its mandate should be extended and expanded with specific targets for Tier-2 city coverage, including a focus on sectors (personal services, small food establishments) where adoption has lagged due to perceived low transaction volumes not justifying infrastructure investment.

7. Conclusion

This paper has presented empirical evidence that digital payment adoption is a significant driver of small business growth in Tier-2 Indian cities, with adopters outperforming non-adopters on revenue growth, customer acquisition, and operational efficiency metrics. The mean revenue increase of 38.4% among adopters over a 24-month window represents a substantive economic benefit that compounds over time as digital transaction records unlock access to formal credit and financial services. At the same time, the study reveals that adoption is not uniform or frictionless. Structural barriers particularly connectivity infrastructure gaps, security concerns, and digital literacy deficits constrain adoption among older proprietors, less-educated business owners, and businesses in sectors or locations with weaker digital infrastructure. Addressing these barriers requires coordinated action from government, regulators, platform providers, and financial institutions. The broader significance of this study lies in its confirmation that Tier-2 cities represent a decisive frontier in India's digital economy transition. The next wave of UPI and digital payment growth is flowing from non-metropolitan centers, and the small businesses in these cities stand to gain significantly from this transition if the enabling conditions are in place. Policymakers, fintech platforms, and development organizations that prioritize inclusive digital infrastructure in these settings will contribute not merely to financial efficiency but to the more fundamental goal of broad-based economic development.

Future research should extend this work longitudinally to track the compounding effects of digital adoption over five or more years, examine gender-disaggregated outcomes in greater depth, and explore how the introduction of Central Bank Digital Currency (CBDC) interacts with existing UPI infrastructure to shape SME financial behavior in non-metropolitan India.

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