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Impact Of Digital Payment System on Urban And Rural Areas of Bihar

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Abstract

The rapid expansion of digital payment systems in India has created new avenues for financial inclusion, particularly in states like Bihar where urban–rural disparities remain sharp. This research empirically examines the adoption, usage, and impact of digital payments across urban and rural populations of Bihar using a randomly selected sample of 97 respondents. Data were collected through in-person and online interviews, with special attention to socio-demographic variables, infrastructural access, behavioral usage, and perceived challenges. The findings reveal that 62.9% of respondents have adopted digital payments, with UPI emerging as the most widely used method, especially for small-ticket daily transactions such as groceries, recharges, and utility payments. However, 37.1% of respondents remain cash-dependent, particularly in rural areas where infrastructural barriers such as unreliable networks, poor electricity, and incomplete KYC continue to limit usage. The study further highlights that while digital payments offer convenience, time-saving benefits, and improved record-keeping, issues like failed transactions, delayed refunds, and moderate trust in security reduce satisfaction. Overall, the results suggest that Bihar is undergoing a transitional phase in digital financial adoption, where urban areas are leading the way while rural areas require stronger infrastructural support, awareness, and policy interventions.

Keywords: *Digital Payments; Financial Inclusion; UPI Adoption; Urban–Rural Divide; Bihar Economy*

Introduction

The last decade has witnessed a remarkable transformation in India's financial landscape, marked by the rapid expansion of digital payment systems. Triggered by the government's Digital India initiative, the 2016 demonetisation drive, and the proliferation of low-cost smartphones and internet access, digital finance has moved from being a niche urban phenomenon to a mainstream mode of transaction across the country. Among the various platforms, the Unified Payments Interface (UPI) has played a pivotal role by enabling instant, low-cost, and interoperable payments, thereby reshaping consumer and merchant behavior.

In the context of Bihar, however, this transformation has been uneven. Bihar remains one of India's most socio-economically diverse and infrastructurally challenged states. With nearly 88% of its population residing in rural areas, disparities in education, income, and access to digital infrastructure significantly shape the adoption of new financial technologies. While urban centers like Patna, Muzaffarpur, and Gaya display relatively high penetration of digital wallets and UPI-based platforms, rural districts continue to rely heavily on cash for everyday transactions. These contrasts make Bihar an ideal case to study the opportunities and challenges associated with digital payments.

Digital payment systems hold the potential to enhance financial inclusion by providing safer, quicker, and more transparent modes of transaction. They can save time, reduce the risks of cash handling, and offer better record-keeping for households and businesses. At the same time, infrastructural bottlenecks such as poor network connectivity, frequent electricity shortages, low digital literacy, and fears of cyber fraud limit the confidence of users. The balance between opportunities and constraints is particularly crucial in Bihar, where a large share of the workforce is engaged in agriculture, daily wage labor, and informal trading—sectors traditionally dependent on cash.

Against this backdrop, the present research investigates the *impact of digital payment systems on urban and rural areas of Bihar*. The study adopts an empirical research design based on a random sample of 97 respondents across both contexts. It examines demographic profiles, infrastructural access, patterns of digital usage, perceptions of trust and security, and the challenges faced by users. By comparing urban and rural experiences, the research aims to provide a grounded understanding of how digital payments are reshaping financial practices in Bihar, while also identifying the barriers that must be addressed to achieve inclusive digital transformation.

Methodology

Research Design

The present study, titled *"Impact of Digital Payment System on Urban and Rural Areas of Bihar"*, adopts an empirical research design aimed at generating first-hand evidence regarding how digital payment systems are understood, accessed, and utilized in both urban and rural settings of Bihar. Empirical research was deemed most appropriate for this work because the study is rooted in the collection of primary data through direct interaction with respondents. Since digital payments are a relatively new and evolving phenomenon in India, particularly in states like Bihar where socio-economic diversity between urban and rural regions is significant, reliance on empirical data ensures authenticity, relevance, and practical insights. The research follows a cross-sectional design, wherein data were collected during a specific time frame rather than over an extended period, to capture the current scenario of digital payment usage and its impacts. This design is especially suitable because it allows comparison between urban and rural populations under the same temporal conditions, thereby eliminating time-related biases in interpretation.

The research also incorporates both descriptive and analytical elements. It is descriptive because it aims to portray the existing status of digital payment adoption and its perceived impact on everyday economic and social activities in Bihar. At the same time, it is analytical as it seeks to examine patterns of differences between urban and rural respondents, thereby identifying factors that influence the varying impacts of digital payment systems across geographical and socio-economic divides. By combining these approaches, the study ensures that its methodological foundation is both comprehensive and robust.

Sampling and Sample Size

Given the focus of the study on both urban and rural areas of Bihar, a random sampling technique was used to ensure that the selection of respondents reflected the population diversity without bias. Random sampling was preferred because it increases the representativeness of the sample and reduces the risk of researcher-driven selection influencing the data. Since Bihar comprises multiple districts with distinct socio-economic conditions, both urban centers such as Patna, Gaya, and Muzaffarpur, and rural areas spread across districts like Nalanda, Bhojpur, and Sitamarhi were included in the sampling frame. The selection of respondents within these areas was random, ensuring that individuals had equal chances of participation regardless of their economic class, gender, or occupation.

The final sample size for the study was 97 respondents, which was determined based on feasibility, available resources, and the need to maintain statistical reliability while conducting in-depth empirical research. The sample was split across urban and rural areas, with a proportionate allocation that reflected demographic realities of Bihar, leaning slightly toward rural respondents since the majority of Bihar's population still resides in villages. This sample size is adequate for an exploratory empirical study of this nature because it is large enough to provide meaningful patterns and comparisons, while also being manageable for conducting detailed in-person and online interviews.

Within the sample, care was taken to include respondents across age groups, occupations, and education levels, as these factors play an important role in influencing digital payment usage and perception. For example, younger respondents in urban areas are more likely to use mobile wallets and UPI-based platforms, whereas older individuals in rural settings may have limited exposure to digital financial tools. Thus, randomness in selection was balanced with a conscious effort to ensure diversity within the sample.

Data Collection Methods

The primary data for the research were collected through a combination of in-person and online interviews. This mixed approach to data collection was necessary to address the challenges of accessibility in Bihar, where internet penetration is uneven, and personal availability of respondents varies between urban and rural areas.

In-person interviews were conducted particularly in rural regions where digital access and online communication may not be as widespread. The researcher physically visited selected villages, interacted with households, and carried out structured interviews based on a pre-designed questionnaire. In-person interactions were crucial not only for ensuring participation from digitally excluded populations but also for observing the socio-cultural environment in which digital payment systems operate. Respondents often provided richer and more nuanced answers during face-to-face discussions, and the researcher could clarify ambiguities immediately.

On the other hand, online interviews were utilized primarily for urban respondents, many of whom are digitally literate and comfortable with online communication platforms such as Google Forms, WhatsApp video calls, or email-based surveys. Online interviews were particularly useful during instances where scheduling in-person meetings was logistically difficult. They also allowed urban respondents to answer questions at their convenience, thereby improving response quality and accuracy.

Both modes of data collection followed the same structured interview schedule to maintain consistency across respondents. Questions covered themes such as frequency of digital payment use, reasons for adoption, challenges faced, perceived benefits, and the overall impact on economic and social life. Open-ended questions were also included to capture respondents' personal narratives, which are vital for understanding the human dimension of digital payment adoption.

The mixed-methods approach ensured that the dataset was both comprehensive and inclusive, reflecting the realities of Bihar's diverse population. Importantly, the choice of in-person and online interviews aligns with the study's aim of generating authentic empirical evidence rather than relying on secondary or generalized sources.

Tools and Techniques

The primary tool for data collection was a structured interview schedule designed in alignment with the research objectives. The interview schedule contained both closed-ended and open-ended questions. Closed-ended questions allowed quantifiable data collection that can be analyzed statistically, while open-ended questions encouraged respondents to share detailed experiences and perceptions. The combination of both types of questions provided the research with both breadth and depth.

The interview schedule was initially prepared in English and then translated into Hindi, as Hindi is the dominant language in Bihar and facilitated better comprehension among rural respondents. In some cases, local dialects such as Bhojpuri and Maithili were also used by the researcher to ensure clarity, particularly for older rural respondents. This linguistic adaptation was critical in building trust and ensuring that responses accurately reflected participants' experiences rather than being influenced by language barriers.

Data collection was also aided by note-taking and, where permitted by the respondents, audio recordings. These tools helped the researcher capture responses in detail and reduced the possibility of data loss due to recall error. In rural contexts, where literacy levels are relatively low, the interviewer carefully read out the questions and noted down answers to ensure that respondents' voices were captured authentically. In urban contexts, digital submission forms were sometimes used, and data were exported directly into spreadsheets for analysis.

For data analysis, both descriptive statistics and comparative techniques were employed. Frequency distributions, percentage analysis, and cross-tabulations were used to highlight general patterns of digital payment usage. Comparative analysis between urban and rural responses was conducted to determine significant differences in adoption, challenges, and perceived impacts. This dual-layer analysis enabled the research to provide both an overall picture and specific insights into regional contrasts.

Ethical Considerations

The study maintained high ethical standards throughout its methodological process. Participation was voluntary, and respondents were clearly informed about the purpose of the research. Consent was obtained before beginning each interview, whether in-person or online. Respondents were assured that their responses would remain confidential and would be used solely for academic purposes. No personal identifying information such as bank account details, phone numbers, or exact addresses was collected, ensuring the privacy and safety of participants.

Special care was taken while interviewing rural respondents to explain the intent of the study in simple and accessible terms, as many were initially hesitant to discuss matters related to financial practices. Trust-building was facilitated by explaining that the research was independent and not connected to any government or private financial institution.

Additionally, respondents were allowed to skip questions they felt uncomfortable answering. The research also ensured that no respondent was coerced into participating and that interviews did not excessively intrude into their daily routines. These ethical safeguards ensured that the empirical data collected were both credible and respectful of participants' dignity.

Limitations of Methodology

While the methodological framework was carefully designed, certain limitations are acknowledged. The sample size of 97, though adequate for an exploratory study, may not fully capture the diversity of Bihar's vast population. Additionally, while random sampling was applied, practical challenges sometimes necessitated purposive adjustments, particularly in rural areas where respondent availability was limited. Internet-based data collection also had limitations, as online interviews may exclude individuals who are not digitally literate even in urban areas.

Nevertheless, these limitations do not undermine the validity of the findings but rather highlight the contextual challenges of conducting empirical research in Bihar. The chosen methodological approach represents a balanced compromise between feasibility, inclusiveness, and academic rigor.

Results and Discussion

The present section analyses the empirical findings obtained from the survey of 97 respondents across both urban and rural regions of Bihar. The results are presented in tabular form for clarity, and each table is followed by a detailed discussion that interprets the data in light of the study's objectives. This structure ensures that the nuances of each dataset are fully explored, while simultaneously linking them to the broader theme of understanding the impact of digital payment systems in Bihar.

Table A – Demographic Profile (n = 97)

Variable	Categories	Frequency	Percentage (%)
Location	Urban	39	40.2
	Rural	58	59.8
Gender	Male	55	56.7
	Female	41	42.3
	Other	1	1.0
Age (Years)	18–25	26	26.8
	26–35	31	32.0
	36–45	21	21.6
	46–55	12	12.4
	56+	7	7.2
Education	No formal	4	4.1
	Primary	9	9.3
	Middle	13	13.4
	Secondary	24	24.7
	Higher Secondary	20	20.6
	Graduate	21	21.6
	Postgraduate	6	6.2
Occupation	Student	23	23.7
	Salaried	17	17.5
	Self-employed	15	15.5
	Farmer	18	18.6
	Homemaker	8	8.2
	Daily-wage	9	9.3
	Small Trader	5	5.2
	Retired	2	2.0
Monthly Income	< ₹10,000	25	25.8
	₹10–20,000	29	29.9

Variable	Categories	Frequency	Percentage (%)
	₹20–30,000	21	21.6
	₹30–50,000	15	15.5
	₹50,000+	7	7.2
Smartphone Access	Yes	78	80.4
	No	19	19.6
Internet Access	Yes	74	76.3
	No	23	23.7
Bank Account	Yes	86	88.7
	No	11	11.3

Discussion on Demographics

The demographic distribution offers an insightful foundation for interpreting the subsequent findings. Rural respondents (59.8%) marginally outnumber urban respondents (40.2%), thereby reflecting the demographic reality of Bihar where the majority resides in villages. This distribution is crucial, as it ensures the study does not disproportionately emphasize the relatively more digitally literate urban population.

Gender distribution is moderately balanced, with 56.7% male and 42.3% female respondents. Interestingly, even though Bihar historically records lower female participation in financial decision-making, the inclusion of 42.3% female respondents signals a shift in women's engagement with digital financial systems. The inclusion of one respondent identifying as "Other" highlights inclusivity, although the representation remains too small to draw generalized insights.

Age distribution shows a dominance of younger respondents: nearly 59% fall in the 18–35 range. This is highly significant because youth are generally early adopters of technology, and their perceptions likely influence community adoption rates. The relatively small percentage of respondents above 55 years (7.2%) indicates generational hesitation or barriers in adopting digital payment systems, consistent with national trends.

Educational backgrounds reveal a wide range: while 4.1% reported no formal education, 21.6% held graduate degrees and 6.2% were postgraduates. This spectrum demonstrates the digital payment system's reach beyond formally educated populations, though higher education correlates with increased digital payment adoption, as will be seen later.

Occupational diversity further strengthens representativeness. Farmers (18.6%) and daily-wage earners (9.3%) constitute more than a quarter of the sample, underscoring the study's ability to capture rural economic realities. Meanwhile, students (23.7%) and salaried employees (17.5%) exemplify the urban and semi-urban segments most likely to embrace digital payments.

The income profile shows clustering around lower-middle brackets: 55.7% of respondents earn between ₹10,000 and ₹30,000. This suggests affordability and trust in digital payments must be evaluated against modest financial capacities.

Crucially, smartphone access (80.4%) and internet penetration (76.3%) are high, which signifies that the infrastructural foundation for digital payments exists. However, nearly one in five respondents still lack smartphones, and one in four lack internet connectivity—structural gaps that could impede uniform adoption.

Finally, 88.7% of respondents maintain bank accounts, aligning with India's national financial inclusion drives under Jan Dhan Yojana. Nevertheless, 11.3% remain unbanked, highlighting residual exclusion even in the era of digital finance.

Table B – Access & Infrastructure

Variable	Categories	Frequency	Percentage (%)
Network Reliability	High (4–5)	41	42.3
	Medium (3)	33	34.0
	Low (1–2)	23	23.7
Electricity Reliability	High (4–5)	56	57.7
	Medium (3)	28	28.9
	Low (1–2)	13	13.4
KYC Completed	Yes	72	74.2
	No	25	25.8
Preferred App	PhonePe	31	32.0
	Paytm	19	19.6
	Google Pay	15	15.5
	Bank App	6	6.2
	None	26	26.8

Discussion on Access & Infrastructure

Infrastructure represents the bedrock upon which digital payment systems function. Network reliability is uneven, with 42.3% reporting high reliability but 23.7% facing poor connectivity. This is particularly relevant in rural Bihar, where patchy mobile networks significantly constrain the feasibility of UPI-based transactions.

Electricity reliability tells a similar story: although 57.7% experience stable supply, a non-trivial 13.4% report poor electricity access. Frequent outages can prevent timely mobile charging and internet use, thus directly affecting transaction feasibility.

Know-Your-Customer (KYC) completion at 74.2% reflects both regulatory penetration and the success of Aadhaar-enabled verification. Yet, 25.8% of respondents remain outside the KYC net, restricting them from seamless use of wallets and certain UPI services.

Preferences among applications reveal a competitive landscape. PhonePe leads (32%), followed by Paytm (19.6%) and Google Pay (15.5%). Interestingly, 26.8% of respondents reported using none of these platforms, signaling that a significant proportion either remains cash-reliant or uses indirect methods such as assisted digital services. The dominance of PhonePe suggests regional brand trust and its active rural penetration strategies.

Table C – Usage & Behaviour

Variable	Categories	Frequency	Percentage (%)
Adopted Digital Payments	Yes	61	62.9
	No	36	37.1
Primary Method	UPI	45	46.4
	Wallet	10	10.3
	Card	5	5.2
	USSD	1	1.0
	Cash-only	36	37.1
Frequency of Use	Daily	21	21.6
	Several/week	17	17.5
	Weekly	13	13.4
	Monthly	7	7.2
	Rarely	3	3.1
	Never	36	37.1
Monthly Transactions	Mean = 17 (adopters)	Range: 1–60	–
Average Value (₹)	Mean ≈ 225	Range: 30–1,200	–
Common Merchants	Grocery/Kirana	52	53.6
	Mobile Recharge	44	45.4
	Utility Bills	38	39.2
	Transport/Auto	28	28.9
	Medicines	21	21.6
	School Fees	14	14.4
	Online Shopping	32	33.0

Discussion on Usage & Behaviour

Adoption rates show 62.9% respondents using digital payments, while 37.1% remain cash-only. This reveals progress but also demonstrates that cash continues to dominate. Rural hesitancy and infrastructural barriers likely explain this persistence.

UPI stands out as the primary method for 46.4% respondents, dwarfing wallets (10.3%) and cards (5.2%). This aligns with national UPI trends, which emphasize instant, bank-to-bank transactions. The negligible use of USSD (1.0%) highlights the failure of feature-phone-based solutions, despite their policy promotion.

Frequency data further illustrates behavioural divides: while 21.6% use digital payments daily and another 17.5% several times a week, a sizable 37.1% never use them. Thus, there exists a dichotomy between digital enthusiasts and complete non-users.

Transaction volume averages 17 per month among adopters, with mean values around ₹225. These figures indicate that digital transactions in Bihar are largely small-ticket, daily-need purchases rather than high-value transfers. Supporting this, groceries (53.6%), mobile recharges (45.4%), and utility bills (39.2%) are the most common categories, followed by online shopping (33%). This pattern underscores that digital payments are gradually embedding into daily routines but remain concentrated in essential consumption rather than aspirational or luxury spending.

Table D – Perceptions & Impact

Variable	Mean Score (1–5)	Key Observations
Convenience	3.8	Higher in urban (4.1) vs rural (3.6)
Trust	3.5	Moderate trust, rural slightly lower
Security	3.3	Concerns remain, esp. rural (3.0)
Cost Transparency	3.6	Costs are clear, rural confusion persists
Satisfaction	3.7	Some dissatisfaction due to failed txns
Time Saved per week (mins)	48 (adopters)	vs only 12 mins non-users
Record-keeping help	Yes: 64%	Many use transaction history for budgeting

Discussion on Perceptions & Impact

Convenience scores (3.8 overall) highlight user appreciation, particularly in urban areas (4.1). For rural respondents (3.6), infrastructural inconsistencies reduce perceived convenience.

Trust (3.5) and security (3.3) remain moderate, reflecting persistent anxieties around fraud and technical glitches. Rural respondents rate security lower (3.0), suggesting heightened sensitivity to risks where digital literacy is limited.

Cost transparency (3.6) demonstrates that users broadly understand transaction charges, but rural confusion persists due to lack of formal financial training.

Time savings are a tangible impact: adopters save on average 48 minutes weekly compared to 12 minutes among non-users. This is significant in contexts where time equates to daily labour hours. Moreover, 64% respondents acknowledged better record-keeping through digital histories, indicating rising financial literacy and budgeting habits.

Overall satisfaction (3.7) is encouraging but qualified by the frustrations of failed transactions, underlining the need for reliability improvements.

Table E – Challenges & Incidents

Variable	Categories	Frequency	Percentage (%)
Failed Transactions	Yes	27	27.8
	No	70	72.2
Refund Delay (days)	Mean ≈ 4.5	Range 0–21	–
Fraud Experience	Yes	6	6.2
	No	91	93.8
Merchant Surcharge	Yes	21	21.6
	No	76	78.4
Cashback Received	Yes	32	33.0
	No	65	67.0
Grievance Redressal Used	Bank Branch	14	14.4
	App Support	13	13.4
	Call Centre	9	9.3
	UPI Helpline	5	5.2
	None	56	57.7
Cash Payment Share (%)	Median = 47%	Range 0–100	–

Discussion on Challenges & Incidents

The challenges reported highlight the fragility of digital ecosystems in Bihar. Nearly 28% have faced failed transactions, with refunds averaging 4.5 days—a delay long enough to deter trust. Even if fraud incidence is low (6.2%), the psychological impact is disproportionately high, amplifying rural anxieties about digital payments.

Merchant surcharges (21.6%) further erode confidence, particularly in rural markets where informal levies are common. Conversely, cashback schemes (33%) prove effective in incentivizing use, especially among youth.

Grievance redressal is underutilized: 57.7% never sought help despite facing issues. Among those who did, preference for traditional bank branches (14.4%) suggests lack of trust in digital helplines and app-based support.

Finally, even adopters retain a median of 47% of transactions in cash, indicating hybrid payment behaviour. This shows that while digital payments are expanding, cash remains integral to Bihar's economic culture, especially in rural commerce.

Overall Discussion

Taken together, the results portray digital payments in Bihar as a system at a critical juncture: infrastructurally enabled but behaviourally uneven. Adoption is significant (62.9%), but cash dominance remains resilient. Youth, students, and salaried workers are driving adoption, while rural populations, older individuals, and those in informal occupations remain cautious.

Convenience, time savings, and record-keeping benefits are major positive impacts. However, infrastructural limitations (network and electricity), transaction failures, refund delays, and security fears persist as barriers. Trust-building remains the biggest challenge for rural inclusion.

Policy implications include strengthening digital infrastructure in rural areas, improving grievance redressal mechanisms, and designing targeted awareness campaigns that address security fears. Private players can expand cashback schemes, but government interventions must focus on systemic reliability and transparency to ensure long-term sustainability.

In conclusion, digital payment systems are steadily transforming economic life in Bihar, but the transformation is partial and layered. The state's socio-economic and infrastructural divides remain deeply influential, and bridging these divides will be key to achieving comprehensive digital financial inclusion.

Conclusion

The study on the *Impact of Digital Payment Systems on Urban and Rural Areas of Bihar* demonstrates that while digital finance has made significant inroads across the state, adoption patterns remain uneven. The research reveals that younger, urban, and better-educated respondents are the most enthusiastic users, whereas rural populations, older age groups, and those engaged in informal occupations continue to rely heavily on cash. UPI has clearly emerged as the dominant mode of transaction, reflecting the success of low-cost, real-time platforms in India.

At the same time, infrastructural limitations such as unreliable networks, irregular electricity, incomplete KYC, and delayed refunds constrain trust in the system. Perceptions of security and transparency remain moderate, and a considerable portion of transactions still occur in cash, indicating that Bihar is in a transitional phase of financial digitization.

Overall, digital payments have improved convenience, saved time, and enhanced record-keeping for a large share of users, but policy attention is required to bridge rural–urban divides. Strengthening infrastructure, ensuring quicker grievance redressal, and expanding awareness campaigns will be crucial for sustaining momentum. Thus, while digital payments are shaping Bihar's financial landscape, their full potential will only be realized when inclusivity, trust, and reliability are strengthened.

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