E-ISSN: 2708-4523
P-ISSN: 2708-4515
Impact Factor (RJIF): 5.61
AJMC 2025; 6(2): 1650-1654

www.allcommercejournal.com
Received: 17-07-2025
Accepted: 21-08-2025

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Bridging the digital divide: Determinants of mobile payment adoption and continuance intention in rural retail contexts

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DOI: https://www.doi.org/10.22271/27084515.2025.v6.i2r.893

Abstract
Mobile payments are rapidly transforming retail transactions in India, but rural adoption and continuance vary. This study examined 101 rural retailers using the Technology Acceptance Model (TAM). Descriptive results showed high adoption (89%) and favorable attitudes toward ease of use, usefulness, and security. Reliability analysis indicated acceptable to good consistency, with continuance intention (CI) lower due to limited items. Correlation and regression analyses revealed perceived ease of use (PEOU) as the strongest predictor of current adoption, while continuance intention was best explained by PEOU and perceived usefulness (PU). Education emerged as a significant factor, with graduates and postgraduates reporting higher CI than less-educated groups. Overall, the findings highlight the centrality of ease and usefulness in driving both adoption and sustained usage. The study underscores the need for user-friendly designs and awareness initiatives to strengthen digital finance in rural markets.

Keywords: Mobile payments, TAM, rural retailers, adoption

Introduction
Digital payment technologies have transformed the way financial transactions are conducted, and mobile payment systems have become one of the most influential innovations in this domain. By offering speed, convenience, and reduced reliance on cash, mobile payments are particularly valuable in rural and semi-urban areas where access to traditional banking infrastructure remains limited (Growing Retail Digital Payments, 2025). In India, the rapid rise of Unified Payments Interface (UPI), mobile wallets, and QR-based systems has created new opportunities for small businesses and retailers, including those in rural markets. Despite this progress, adoption and continuance of mobile payments among rural retailers remains inconsistent, with challenges such as limited awareness, lack of digital literacy, poor connectivity, and security concerns slowing wider uptake (Chopra, Verma, & Lamba, 2024) [1]. Previous studies grounded in the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) consistently highlight perceived ease of use and perceived usefulness as central predictors of digital payment adoption. Research indicates that retailers are more likely to adopt when mobile payment systems are simple to operate and demonstrably improve productivity or transaction efficiency (Sharma & Alavi, 2021) [6]. At the same time, concerns around trust, risk, and security often act as barriers, particularly in rural contexts where digital ecosystems are less established. Studies have found that perceptions of data security, reliability of mobile networks, and trust in financial institutions strongly influence whether retailers accept and continue using mobile payments (Lin *et al*., 2020; Sinha & Singh, 2023) [4, 7]. Social influence has also emerged as an important determinant, as customers' expectations, peer retailers' behaviors, and competitive pressures often shape adoption decisions (Zhang *et al*., 2022) [8]. More recent findings suggest that awareness, performance expectancy, and facilitating conditions are critical for adoption in rural India, but also emphasize that social influence and security perceptions play a decisive role in determining continuance of use (Chopra *et al*., 2024) [1].
Despite this growing body of research, important gaps remain. Much of the existing work has focused on urban and semi-urban consumers, while rural retailers have received comparatively less attention.

Within rural settings, infrastructural barriers such as unreliable internet connectivity and low smartphone penetration may alter the way ease of use, usefulness, and security perceptions influence adoption. Moreover, while adoption intention has been widely studied, continuance intention-the willingness of retailers to sustain mobile payment usage over time-remains underexplored, even though it is vital for building stable and sustainable digital payment ecosystems. Demographic characteristics such as gender, age, education, and type of business are often acknowledged but less frequently integrated as moderating variables in empirical analysis. Furthermore, relatively few studies from 2023 onwards have examined how social influence and perceived security jointly affect continuance intention, creating a timely research opportunity.

Against this backdrop, the present study focuses on rural retailers to bridge these gaps by analyzing both adoption and continuance intention of mobile payment systems. Specifically, the objectives are to assess the influence of perceived ease of use and perceived usefulness on the adoption of mobile payments, and to evaluate the impact of social influence and perceived security on retailers' intention to continue using mobile payments in the future. Correspondingly, the study hypothesizes that perceived ease of use and perceived usefulness will have significant positive effects on adoption, while social influence and perceived security will significantly enhance continuance intention. By addressing these issues, the research seeks to provide a deeper understanding of the factors driving and constraining mobile payment adoption among rural retailers and to generate practical insights for policymakers, fintech providers, and development agencies aiming to strengthen financial inclusion and digital payment sustainability in underserved markets.

Mobile payments have been studied extensively over the past two decades, largely through the lens of technology adoption theories such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Both frameworks emphasize that individuals and businesses are more likely to embrace new technologies when they find them easy to use and when these technologies improve their performance or productivity (Davis, 1989) [2]. In the case of mobile payments, perceived ease of use often reflects how simple and intuitive retailers find the applications, while perceived usefulness refers to their belief that using mobile payments can increase efficiency, reduce transaction costs, or attract more customers. Several studies in developing countries have confirmed that these two factors significantly influence merchants' decisions to adopt mobile payments (Sharma & Alavi, 2021) [6].

Yet, adoption is not only a matter of convenience and usefulness. Perceptions of trust and security have consistently emerged as crucial determinants in digital payment contexts. Retailers and consumers alike worry about fraud, data breaches, or technical failures, and these fears can discourage usage. Research conducted in Taiwan, for example, found that even when ease of use and usefulness are rated highly, perceived risk can still reduce adoption unless strong security assurances are in place (Lin *et al*., 2020) [4]. Similar concerns have been echoed in India, where rural merchants often hesitate to fully transition to digital payments due to worries about network reliability and transaction failures (Sinha & Singh, 2023) [7].

Another important strand of literature highlights the role of social influence. Retailers often respond not only to their own assessments of mobile payments but also to the expectations of their customers, peers, and competitors. If consumers frequently demand digital payment options, or if rival retailers in the same locality adopt them, businesses are more likely to follow suit. This aligns with findings from studies in China and India showing that peer influence and customer expectations are significant motivators for adoption (Zhang *et al*., 2022; Chopra, Verma, & Lamba, 2024) [8, 1]. In rural areas, where business networks are often closely knit and word-of-mouth is powerful, social influence can be an especially strong force shaping adoption behaviors.

While these factors-ease of use, usefulness, security, and social influence-have been well established in literature, there are still important gaps that need attention. First, much of the existing research has focused on consumers or urban merchants, while rural retailers remain comparatively understudied. The rural context introduces unique challenges such as weaker digital infrastructure, lower levels of digital literacy, and differing consumer expectations, all of which may change how these determinants operate. Second, most prior work has emphasized initial adoption, but far fewer studies have looked at continuance intention-the decision to keep using mobile payments once they have been adopted. This is a critical oversight, since continuance, rather than one-time adoption, determines whether mobile payment ecosystems can become sustainable in rural markets. Third, demographic characteristics such as age, education, gender, and type of business are often mentioned but rarely examined in depth as moderating factors. These elements may play a crucial role in shaping both adoption and continuance behaviors, particularly in rural areas where diversity in education and digital literacy is substantial.

The literature thus points to a clear need for more focused research on rural retailers. While we know that ease of use, usefulness, security, and social influence matter, we know less about how these factors interact in rural contexts and how they influence both the decision to adopt and the intention to continue using mobile payments. The present study aims to fill this gap by focusing explicitly on rural retailers and testing how these determinants, alongside demographic factors, shape adoption and continuance of mobile payments.

Methodology

This study investigates the determinants of mobile payment adoption and continuance intention among retailers in rural areas of Himachal Pradesh. Rural retailers were chosen because they represent the backbone of local commerce, yet their engagement with digital payment technologies is often uneven due to infrastructural, informational, and behavioral challenges. To generate reliable insights, a structured questionnaire was used to collect primary data from 100 rural retailers operating in diverse types of businesses. A simple random sampling method was applied, which ensured that each retailer had an equal chance of selection, thereby minimizing bias and enhancing representativeness.

The questionnaire was divided into two parts. The first part captured demographic details such as gender, age, education, type of business, and years of operation. The second part included statements relating to factors influencing adoption and continuance of mobile payments-such as perceived ease of use, perceived usefulness, social influence, and perceived security. Responses were recorded on a five-point Likert scale ranging from "strongly disagree" to "strongly agree," enabling the analysis of both behavioral patterns and attitudinal perceptions.

For data analysis, both descriptive and inferential techniques were employed. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to provide a profile of the respondents and an overview of their adoption behavior. To ensure the internal consistency of multi-item constructs like ease of use, usefulness, and security, reliability analysis was conducted using Cronbach's alpha. Correlation analysis was applied to explore the strength and direction of associations between the independent variables (ease of use, usefulness, social influence, and security) and the dependent variables (adoption and continuance intention).

To test the research hypotheses, the following inferential statistical methods were applied:

- **Independent samples t-test:** To identify differences in adoption and continuance across two-group demographics such as gender.
- **One-way ANOVA:** To examine differences across multiple categories such as education levels or types of businesses.
- **Multiple regression analysis:** To evaluate the combined influence of predictors (ease of use, usefulness, social influence, and security) on both adoption and continuance intention. Regression analysis is particularly suited for identifying the most influential factors while accounting for the effects of other variables.

The methodological approach ensures both breadth and depth: Descriptive findings highlight general patterns, while inferential tests uncover statistically significant relationships and group differences. By employing a blend of these techniques, the study aims to offer nuanced insights into the adoption behavior of rural retailers, thereby informing policymakers, financial institutions, and technology providers seeking to bridge the digital divide.

Results

Descriptive Summary

Table 1 presents the descriptive profile of the respondents (N = 101). The sample consisted of 66 males (65.3%) and 35 females (34.7%). A majority of respondents fell into the youngest coded age group (54.5%). Nearly half (46.5%) reported having intermediate-level education, followed by graduates (19.8%) and postgraduates (14.9%).

Importantly, 89.1% of the retailers indicated that they currently accept mobile payments, and 85.1% reported having a mobile payment app installed. Mean scores for the major constructs-PEOU, PU, SI, PS, and CI-all exceeded the scale midpoint (3.0), suggesting moderately favorable attitudes toward mobile payments.

Table 1: Sample Characteristics and Descriptive Statistics (N = 101)

Variable	Categories / Statistics	n (%) or Mean ± SD
Gender	Male	66 (65.3%)
	Female	35 (34.7%)
Age (coded)	1	55 (54.5%)
	2	28 (27.7%)
	3	18 (17.8%)
Education	Below Intermediate	19 (18.8%)
	Intermediate	47 (46.5%)
	Graduate	20 (19.8%)
	Postgraduate	15 (14.9%)
Current acceptance	Yes	90 (89.1%)
App installed	Yes	86 (85.1%)
PEOU	-	3.475 ± 0.599
PU	-	3.660 ± 0.585
SI	-	3.492 ± 0.647
PS	-	3.527 ± 0.582
CI	-	3.559 ± 0.634

Source: Primary Data

Reliability of Constructs

Internal consistency was examined using Cronbach's alpha (Table 2). PU (α = 0.737) and PS (α = 0.805) achieved good reliability. PEOU (α = 0.672) and SI (α = 0.664) were marginal but acceptable. CI (α = 0.590) showed low reliability, which is likely due to its two-item structure.

Table 2: Cronbach's Alpha of Constructs

Construct	Items	Cronbach's α	Reliability
PEOU	3	0.672	Borderline acceptable
PU	3	0.737	Good
SI	3	0.664	Borderline acceptable
PS	4	0.805	Good
CI	2	0.590	Low

Source: Primary Data

Correlation Analysis

Pearson's correlation coefficients are summarized in Table 3. All relationships were positive and statistically significant. PEOU correlated moderately with PU, PS, and CI. The strongest correlation emerged between SI and PS (r = 0.718, p <.001). Adoption status correlated most strongly with PEOU (r = 0.439) and PS (r = 0.442), highlighting their importance in mobile payment acceptance.

Table 3: Selected Pearson Correlations

Pair of Variables	r	p-value
PEOU - PU	0.475	<.001
PEOU - PS	0.582	<.001
PEOU - CI	0.544	<.001
PU - CI	0.496	<.001
SI - PS	0.718	<.001
PS - CI	0.545	<.001
Accepts - PEOU	0.439	<.001
Accepts - PU	0.360	0.0002
Accepts - SI	0.398	<.001
Accepts - PS	0.442	<.001
Accepts - CI	0.285	0.0039

Source: Primary Data

Group Comparisons

t-tests and ANOVA were used to assess differences across groups (Table 4). Adopters reported significantly higher PEOU than non-adopters (t = 5.514, p < 0.001), confirming

its role in adoption. No gender difference was found for CI ($t = 0.028$, $p = 0.978$). CI varied significantly across education levels ($F(3,97) = 4.179$, $p = 0.0079$). Post-hoc tests revealed that graduates and postgraduates reported higher CI compared to those with below-intermediate education.

Table 4: Group Comparison Tests

Test	Variable	Groups Compared	Statistic	p-value	Result
t-test	PEOU	Adopters vs Non-adopters	t = 5.514	0.0001	Significant
t-test	CI	Gender (M vs F)	t = 0.028	0.978	NS
ANOVA	CI	Education (4 groups)	F(3,97) = 4.179	0.0079	Significant

Source: Primary Data

Group Means (CI): Below Intermediate = 3.158; Intermediate = 3.574; Graduate = 3.700; Postgraduate = 3.833.

Regression Analyses

Logistic Regression (Adoption): Table 5A shows the logistic regression results. In both the simple and extended models, PEOU was the strongest predictor of current adoption. A one-unit increase in PEOU was associated with ≈9.5 times higher odds of adoption in the simple model and ≈6 times higher odds in the extended model. PU, SI, and PS were not significant once PEOU was included.

Table 5A: Logistic Regression Predicting Current Adoption

Model	Predictor	Coefficient	p-value	Odds Ratio (95% CI)
A	PEOU	2.253	0.0047	9.51 (2.00-45.36)
	PU	0.850	0.179	-
B	PEOU	1.807	0.0378	6.09 (1.11-33.5)
	PU	0.694	0.276	-
	SI	0.400	0.411	-
	PS	0.412	0.362	-

Source: Primary Data

Linear Regression (Continuance Intention)

Linear regression results are presented in Table 5B. In Model C, SI and PS significantly predicted CI, together explaining 33.2% of variance. However, in Model D, once PEOU and PU were included, they became the significant predictors while SI and PS lost significance. The expanded model explained 43.3% of the variance in CI.

Table 5B: Linear Regression Predicting CI

Model	Predictor	Coefficient	p-value	R^2
C	SI	0.263	0.0259	0.332
	PS	0.383	0.0038	
D	PEOU	0.300	0.0089	0.433
	PU	0.253	0.0153	
	SI	0.077	0.465	
	PS	0.230	0.084	
	Gender	-	NS	
	Age	-	NS	

Source: Primary Data

The analyses collectively demonstrate that perceived ease of use (PEOU) is the most consistent and significant predictor of both adoption and continuance intention. Perceived usefulness (PU) also plays a strong role in predicting continuance intention. Social influence (SI) and perceived security (PS) matter in simpler models but lose significance once PEOU and PU are considered, suggesting their effects may be mediated. Education is another important factor, with more educated retailers showing stronger continuance intention.

Discussion

The study demonstrates that mobile payment adoption among rural retailers is already high, with nearly 9 in 10 currently accepting digital transactions. Results align with the Technology Acceptance Model (TAM), highlighting perceived ease of use (PEOU) as the most consistent and significant driver of adoption. Retailers who find mobile payments intuitive and simple are far more likely to adopt and continue using them. Perceived usefulness (PU) showed weaker influence on initial adoption but became significant for continuance intention, underscoring its role in sustaining long-term usage. Social influence (SI) and perceived security (PS) contributed positively in simple models but lost significance once PEOU and PU were controlled, suggesting indirect effects through the core TAM constructs. Education emerged as a meaningful demographic factor: more educated retailers displayed stronger continuance intention, while gender and age differences were negligible. This highlights the role of digital literacy and confidence in sustaining mobile payment usage.

Conclusion

The findings emphasize that:

1. Ease of use is the strongest determinant of adoption.
2. Usefulness perceptions drive continuance more than adoption.
3. Social and security perceptions matter indirectly, reinforcing core TAM constructs.
4. Education enhances continuance, pointing to inclusion challenges for less-educated retailers.

Implications

- **Theory:** The study validates TAM in rural digital finance contexts and extends it by identifying education as a moderator.
- **Practice:** Payment service providers should simplify app design, deliver hands-on training, and emphasize usefulness benefits to sustain use. Awareness campaigns around security and peer endorsement can further reinforce adoption.
- **Policy:** Programs targeting digital literacy among less-educated retailers can bridge gaps in continuance intention.

Future Scope

Future research should:

- Expand continuance intention scales for higher reliability.
- Conduct longitudinal and comparative studies (rural vs. urban; India vs. other developing economies).
- Explore mediating effects of PEOU/PU through structural modeling.

- Integrate behavioral transaction data with survey evidence.

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