

Bridging the Last-Mile Digital Payment Gap: Literacy, Connectivity, and MSME Adoption in Rural Leyte, Philippines

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ABSTRACT

Philippine digital payments have expanded rapidly, yet business-made payments remain less digitalized than person- and government-made transactions. This study examined digital payment adoption and its associated factors among 330 micro, small, and medium enterprise (MSME) owners and managers in Hilongos and Bato, Leyte. A quantitative descriptive-correlational design was used. A bilingual, expert-reviewed questionnaire measured financial literacy, digital literacy, perceived security-risk concern, transaction-fee concern, internet connectivity, and adoption. Descriptive statistics, Pearson correlation, and one-way analysis of variance were applied. Digital payment adoption was moderate ($M = 3.246$, $SD = 0.798$). Financial literacy was high ($M = 3.421$, $SD = 0.956$), whereas digital literacy, security-risk concern, fee concern, and internet connectivity were moderate. Adoption was most strongly associated with digital literacy ($r = .677$, $p < .001$) and internet connectivity ($r = .670$, $p < .001$). Financial literacy ($r = .590$), perceived security-risk concern ($r = .604$), and transaction-fee concern ($r = .605$) were also significantly associated with adoption. Mean scores differed significantly across the reported business categories, with personal-service enterprises recording the highest descriptive means. The findings identify a local last-mile gap: foundational financial knowledge and willingness are present, but practical digital capability and dependable connectivity have not yet produced full operational integration. Coordinated merchant training, reliable connectivity, transparent pricing, cybersecurity education, and responsive transaction support are recommended.

Keywords: digital payment adoption; MSMEs; digital literacy; financial literacy; internet connectivity; rural Philippines

INTRODUCTION

Digital payments are increasingly central to financial inclusion, business continuity, and economic modernization. In 2024, digital transactions represented 57.4% of Philippine retail-payment volume and 59.0% of value. The aggregate progress, however, was uneven: business-made payments accounted for only 19.8% of transaction volume and 38.6% of value through digital channels, below person-made and government-made payments (Bangko Sentral ng Pilipinas [BSP], 2025). This difference suggests that national payment growth does not automatically translate into complete merchant-level integration, especially outside major urban centers.

The issue is economically significant because MSMEs comprise 99.63% of registered Philippine establishments (Department of Trade and Industry [DTI], 2025). Digital payments can improve transaction speed, documentation, customer convenience, and access to formal financial services. Yet micro and small firms frequently operate with limited technical support, narrow margins, inconsistent connectivity, and high exposure to failed transfers, scams, and fee sensitivity (Asian Development Bank [ADB], 2023; Diepeveen et al., 2024; OECD, 2025). The urban-rural connectivity divide also remains persistent, limiting the meaningful use of online services even when devices and payment accounts are available (International Telecommunication Union [ITU], 2024).

Digital payment readiness therefore requires more than general financial knowledge. Owners must be able to operate applications, verify transactions, manage account security, recognize fraudulent messages, resolve failed transfers, compare service charges, and maintain reliable internet access. Recent frameworks describe digital financial literacy as a combination of knowledge, skills, behavior, and confidence needed to use digital financial services safely and effectively (OECD, 2025, 2026; Vieira et al., 2024). Philippine studies likewise associate digital-payment use with information-technology capacity, perceived usability, financial knowledge, and facilitating conditions (Acopiado et al., 2022; Pleno, 2024; Sy & Latoja, 2025).

Although recent research has examined digital-payment adoption in Philippine cities and broader national samples, evidence remains limited for municipality-level MSMEs in Eastern Visayas. National data may conceal local combinations of skills, infrastructure, cost, and security perceptions. Hilongos and Bato are therefore useful settings for determining whether MSMEs possess the capabilities and conditions needed to translate payment access into sustained business use. This study addresses that local evidence gap by examining adoption levels, correlates, and business-type differences among registered MSMEs in the two municipalities.

THEORETICAL AND CONCEPTUAL FRAMEWORK

The study integrates the Technology Acceptance Model and the Theory of Planned Behavior as applied in contemporary digital-payment research. The acceptance perspective explains that users are more likely to adopt a system when they can operate it confidently and recognize its practical value. The behavioral perspective adds that adoption depends on attitudes, perceived control, costs, risk perceptions, and facilitating conditions. Within this integrated view, financial literacy supports informed decisions; digital literacy strengthens ease of use and self-efficacy; reliable connectivity enables transactions; and security-risk and fee concerns may discourage use when they reduce trust or perceived affordability (Acopiado et al., 2022; OECD, 2025, 2026; Sy & Latoja, 2025).

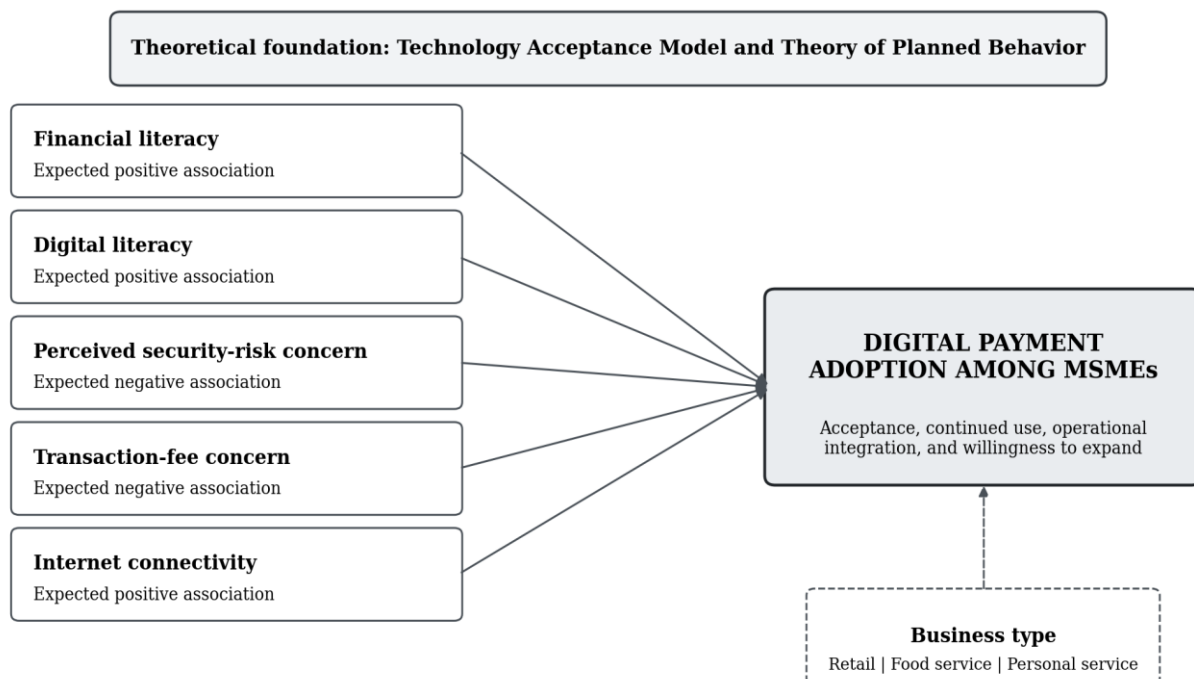


Figure 1. Conceptual framework of digital payment adoption among MSMEs

The framework guided six expectations: financial literacy, digital literacy, and internet connectivity would be positively associated with adoption; perceived security-risk concern and transaction-fee concern would be negatively associated with adoption; and mean scores would differ by business type. The empirical analysis tested observed relationships and group differences. Because the design was correlational, the results are interpreted as associations rather than causal effects.

METHODS

Research Design and Setting

A quantitative descriptive-correlational design was used to describe the study variables and determine their relationships. The study was conducted in Hilongos and Bato, Leyte, municipalities in Eastern Visayas with retail, food-service, personal-service, and other small enterprises. Business Permits and Licensing Office records dated March 9, 2026 identified 1,068 registered businesses in Hilongos and 770 in Bato, yielding a study population of 1,838.

Respondents and Sampling

Eligible respondents were active MSME owners or managers who were at least 18 years old and directly involved in financial management and payment decisions. Inactive or temporarily closed businesses and employees without payment-related decision authority were excluded. The source manuscript calculated a minimum sample of approximately 329 using a 5% margin of error and obtained 330 respondents: 191 from Hilongos and 139 from Bato. Respondents meeting the inclusion criteria were recruited purposively.

Table 1. Respondent and Enterprise Profile (N = 330)

Respondent profile	Category	n (%)	Enterprise profile	Category	n (%)
Age	18-25	90 (27.3)	Business type	Retail	114 (34.5)
Age	26-35	89 (27.0)	Business type	Food service	137 (41.5)
Age	36-45	79 (23.9)	Business type	Personal service	77 (23.3)
Age	46-55	54 (16.4)	Business type	Other	2 (0.6)
Age	56 and above	18 (5.5)	Years operating	Less than 1 year	103 (31.2)
Gender	Female	188 (57.0)	Years operating	1-5 years	146 (44.2)
Gender	Male	139 (42.1)	Years operating	6-10 years	63 (19.1)
Gender	Prefer not to say	3 (0.9)	Years operating	More than 10 years	18 (5.5)
Location	Hilongos	191 (57.9)	Location	Bato	139 (42.1)

Instrument and Data Collection

Data were collected using a bilingual English-Cebuano questionnaire with a five-point response scale. Financial literacy, digital literacy, perceived security-risk concern, transaction-fee concern, and internet connectivity were measured using five items each; digital payment adoption was measured using ten items. The instrument drew on financial-literacy and digital-financial-knowledge frameworks and was reviewed by three academic experts in research, financial management, and statistics. Revisions were incorporated to improve clarity, relevance, and language appropriateness.

Permission was obtained from the relevant local offices. Questionnaires were administered personally, with assistance when necessary. Respondents were informed of the study purpose, voluntary participation, confidentiality, and their right to withdraw. Completed questionnaires were checked, encoded, and analyzed in Microsoft Excel.

Data Analysis

Frequencies and percentages summarized the profile data. Means and standard deviations described the constructs using the source interpretation bands: 1.00-1.79, very low; 1.80-2.59, low; 2.60-3.39, moderate; 3.40-4.19, high; and 4.20-5.00, very high. Pearson correlation tested bivariate associations with digital payment adoption. One-way analysis of variance tested differences across the reported business categories. Statistical significance was set at $\alpha = .05$.

RESULTS

Descriptive Levels

Table 2. Descriptive Levels of Digital Payment Adoption and Related Factors

Construct	N	Mean	SD	Interpretation
Financial literacy	330	3.421	0.956	High
Digital literacy	330	3.206	0.896	Moderate
Perceived security-risk concern	330	3.301	0.825	Moderate
Transaction-fee concern	330	3.329	0.788	Moderate
Internet connectivity	330	3.313	0.844	Moderate
Digital payment adoption	330	3.246	0.798	Moderate

Financial literacy received the highest overall mean and was the only construct interpreted as high. However, knowledge of how digital payment systems work ($M = 3.38$) and confidence in managing financial transactions through digital tools ($M = 3.36$) remained moderate. This pattern shows that foundational financial understanding was stronger than applied digital-finance capability. Adoption was also moderate: respondents were open to adopting and expanding digital payments, but acceptance, customer encouragement, reduction in cash use, transaction speed, accounting support, and customer-satisfaction benefits were not yet fully established.

Business-Type Differences

Table 3. Construct Means and One-Way ANOVA by Business Type

Construct	Retail	Food service	Personal service	F(2, 327)	p
Financial literacy	3.321	3.349	3.689	4.188	.016
Digital literacy	3.049	3.124	3.572	9.364	<.001
Perceived security-risk concern	3.205	3.220	3.580	6.107	.002
Transaction-fee concern	3.175	3.282	3.633	8.676	<.001
Internet connectivity	3.146	3.296	3.582	6.499	.002
Digital payment adoption	3.170	3.155	3.514	6.048	.003

Note. Personal-service enterprises had the highest descriptive mean for every construct. The ANOVA values are reproduced for the three analytic categories reported in the source manuscript.

All omnibus ANOVA results were significant. Digital literacy produced the largest F statistic, followed by transaction-fee concern. Personal-service enterprises recorded the highest adoption mean ($M = 3.514$), while food-service enterprises recorded the lowest ($M = 3.155$). These results indicate that support strategies should recognize sector-specific operating conditions rather than treating MSMEs as a uniform group.

Associations with Digital Payment Adoption

Table 4. Pearson Correlations with Digital Payment Adoption

Correlate	r	p	Interpretation
Years of business operation	.150	.006	Very weak
Financial literacy	.590	<.001	Moderate
Digital literacy	.677	<.001	Strong

Correlate	r	p	Interpretation
Perceived security-risk concern	.604	<.001	Moderate-to-strong
Transaction-fee concern	.605	<.001	Moderate-to-strong
Internet connectivity	.670	<.001	Strong

Note. Two-tailed tests. Positive coefficients for risk and fee concern should be interpreted in relation to the negatively framed items and respondents' exposure to digital-payment use.

Digital literacy had the strongest association with adoption ($r = .677$), closely followed by internet connectivity ($r = .670$). Financial literacy was moderately associated with adoption ($r = .590$). Years of operation showed only a very weak positive relationship ($r = .150$), suggesting that business longevity alone was not a major indicator of digital-payment use.

Perceived security-risk concern and transaction-fee concern were also positively associated with adoption. Because these scales measured concern rather than security or affordability, the coefficients do not mean that risk and cost promote adoption. More active users may become more aware of fraud, account safety, transfer failures, or charges because of greater exposure. The result emphasizes the need for secure use, transparent pricing, and effective support alongside wider adoption.

DISCUSSION

The findings document a local last-mile digital-payment gap. MSMEs in Hilongos and Bato showed moderate adoption despite substantial national digital-payment growth. This result is consistent with the BSP report showing that business-made payments remain less digitalized than person- and government-made payments (BSP, 2025). National infrastructure and platform availability are therefore necessary but not sufficient; merchant adoption depends on the capability to use systems reliably in daily operations.

The gap between high financial literacy and moderate digital literacy is especially important. Owners generally understood financial concepts and monitored transactions, but their knowledge and confidence weakened when activities moved to applications and online platforms. This supports the distinction between conventional financial knowledge and digital financial literacy, which includes operating skills, security awareness, problem resolution, and informed comparison of digital products (OECD, 2025, 2026; Vieira et al., 2024).

Digital literacy and connectivity were the strongest correlates of adoption, reinforcing evidence that payment transition depends on both human capability and usable infrastructure (Acopiado et al., 2022; ITU, 2024; Pleno, 2024; Sy & Latoja, 2025). An owner may be willing to accept QR or e-wallet payments but still avoid routine use when signals are unstable, confirmations are delayed, or transaction errors are difficult to resolve. In municipalities where connectivity quality varies, adoption programs should combine technical training with dependable access and responsive support.

The findings on security and fees also clarify that adoption quality matters. Users who transact more often may recognize more risks and costs, while those concerns can still reduce trust and continued use when providers do not offer clear safeguards, pricing, and redress. OECD guidance emphasizes scam awareness, account protection, secure behavior, and accessible reporting channels as core digital-financial competencies (OECD, 2025, 2026). The BSP likewise identifies reasonable fees, merchant protection, and timely consumer redress as priorities for payment-system development (BSP, 2025).

Finally, the significant business-type differences show that MSMEs are heterogeneous. Personal-service firms recorded the highest descriptive means, possibly because appointment-based, direct-to-customer, or mobile transactions create stronger incentives for electronic payment. Retail and food-service businesses may face different customer preferences, transaction sizes, operating routines, and cost pressures. Sector-sensitive interventions are therefore more appropriate than a single generalized training program (ADB, 2023; Diepeveen et al., 2024).

CONCLUSIONS AND PRACTICAL IMPLICATIONS

Digital payment adoption among MSMEs in Hilongos and Bato was present but not fully embedded in routine business operations. Respondents demonstrated comparatively strong foundational financial knowledge, while digital literacy, connectivity, security-risk concern, transaction-fee concern, and adoption remained moderate. Digital literacy and internet connectivity were the strongest correlates of adoption, and personal-service enterprises recorded the highest descriptive means across the study constructs.

Local governments, DTI field offices, financial institutions, internet providers, and payment-service providers should jointly deliver practical merchant support. Priority activities include QR and e-wallet setup, transaction verification, digital bookkeeping, scam detection, account recovery, failed-transfer reconciliation, customer dispute filing, and fee comparison. Programs should use demonstrations and supervised practice, provide Cebuano-language materials, establish accessible support channels, and target sector-specific needs. Improving connectivity in commercial areas and promoting transparent merchant pricing can help convert willingness into sustained and secure digital-payment use.

Ethical Statement

Participation was voluntary and based on informed consent. Respondents were informed of their right to decline or withdraw. No personally or commercially identifying information was disclosed, and the collected data were used for academic purposes and stored securely.

Declaration on the Use of Artificial Intelligence

Generative artificial intelligence was used to support language editing, organization, and formatting. The authors remain responsible for verifying the citations, statistical values, interpretations, and final manuscript content.

REFERENCES

1. Acopiado, I. M. A., Sarmiento, J. M. P., Romo, G. D. A., Acuña, T. R., Traje, A. M., & Wahing, G. D. (2022). Digital payment adoption during the COVID-19 pandemic in the Philippines. *Philippine Journal of Science*, 151(3), 1185-1196. <https://doi.org/10.56899/151.03.31>
2. Aguilar, A., Frost, J., Guerra, R., Kamin, S., & Tombini, A. (2024). Digital payments, informality and economic growth (BIS Working Papers No. 1196). Bank for International Settlements. <https://www.bis.org/publ/work1196.htm>
3. Asian Development Bank. (2023). Measuring progress on women's financial inclusion and entrepreneurship in the Philippines: Results from a micro, small, and medium-sized enterprise survey. <https://doi.org/10.22617/TCS230388-2>
4. Bangko Sentral ng Pilipinas. (2025). From surge to stability: Digital payments driving a steady transition - 2024 status of digital payments in the Philippines. https://www.bsp.gov.ph/PaymentAndSettlement/2024_Report_on_E-payments_Measurement.pdf
5. Debuque-Gonzales, M., & Corpus, J. P. P. (2024). Understanding financial inclusion in the Philippines. *Philippine Journal of Development*, 48(1a). <https://doi.org/10.62986/pjd2024.48.1a>
6. Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19. World Bank. <https://doi.org/10.1596/978-1-4648-1897-4>
7. Department of Trade and Industry. (2025). 2024 Philippine MSME statistics. <https://www.dti.gov.ph/dti-knowledge-hub/dti-statistics/>
8. Diepeveen, S., Long, C., Deshmukh, S., Lowe, C., Lacroix, A., & Morgan, R. (2024). Digital payments and the economic empowerment and inclusion of micro and small enterprises. ODI Global Advisory. <https://odi.org/en/publications/digital-payments-and-the-economic-empowerment-and-inclusion-of-micro-and-small-enterprises/>
9. International Telecommunication Union. (2024). Measuring digital development: Facts and Figures 2024. <https://www.itu.int/itu-d/reports/statistics/facts-figures-2024/>

10. OECD. (2025). Supporting informed and safe use of digital payments through digital financial literacy. OECD Publishing. <https://doi.org/10.1787/21de47d1-en>
11. OECD. (2026). Digital financial literacy core competency framework for adults in ASEAN. OECD Publishing. <https://doi.org/10.1787/be938ace-en>
12. Pesa, N. C., Agner, M. G. R., & Lacaza, R. M. (2026). Digital financial platform engagement and financial inclusion in the Philippines: Insights on AI deployment and policy implications (Discussion Paper No. 2026-03). Philippine Institute for Development Studies. <https://doi.org/10.62986/dp2026.03>
13. Pleno, A. B. (2024). E-payment system readiness of micro business owners. *Journal of Social Entrepreneurship Theory and Practice*, 3(2), 59-73. <https://doi.org/10.31098/jsetp.v3i2.2800>
14. Sy, C. M. G., & Latoja, M. A. D. (2025). Readiness of MSEs for mobile cashless payment: An emerging market city in the Philippines. *DMMMSU Research and Extension Journal*, 9(1), 44-62. <https://doi.org/10.62960/dmmmsu.v9i1.63>
15. Vieira, K. M., Matheis, T. K., Lehnhart, E. R., & Tavares, F. O. (2024). Digital Financial Knowledge Scale (DFKS): Insights from a developing economy. *International Journal of Financial Studies*, 12(4), 120. <https://doi.org/10.3390/ijfs12040120>