

Explaining E-Wallet Adoption Among SMEs in Indonesia: An Extended Protection Motivation Theory Approach

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Abstract

This study explores the determinants of e-wallet adoption among small and medium enterprises (SMEs) in the Indonesian food and beverage sector by applying Protection Motivation Theory, extended with trust and privacy concern. A cross-sectional survey of 400 SME owners and managers was conducted using a semantic differential scale, and the data were analyzed with structural equation modeling. The measurement model demonstrated strong reliability and validity, while the structural model provided robust explanatory power. The results revealed that perceived vulnerability, perceived severity, response efficacy, and self-efficacy positively influenced intention to adopt e-wallets, whereas response cost and privacy concern had negative effects. Trust played a dual role, directly enhancing both intention and actual use, and moderating the relationship between intention and behavior. Intention was also confirmed as the key mediator linking cognitive appraisals to adoption behavior. Overall, the model explained 62% of the variance in intention and 71% in actual use, demonstrating its strong predictive capacity. These findings highlight the importance of trust, efficacy beliefs, and cost perceptions in shaping digital payment adoption, offering both theoretical insights and practical guidance for fintech providers and policymakers in emerging markets

1. INTRODUCTION

The rapid advancement of digital technologies has significantly transformed the global financial landscape, enabling more efficient, convenient, and secure transactions. One of the most notable innovations is the emergence of electronic wallets (e-wallets), which have become a mainstream payment solution in both developed and emerging markets (Wei et al., 2025).

In emerging economies such as Indonesia, digital payments are expanding at an unprecedented rate. Figure 1 illustrates the change in consumer payment preferences for e-commerce transactions in Indonesia between 2019 and 2020. While traditional methods such as bank transfers, credit cards, and cash on delivery have shown declining usage, digital wallets experienced a significant increase of more than 11%. This trend highlights a structural shift toward mobile-based payment systems and emphasizes the growing relevance of e-wallets in shaping consumer behavior (Prasetya et al., 2022).

Recent data continue to reinforce this trend. According to Bank Indonesia (2024), electronic money transactions reached more than Rp 490 trillion in 2023, marking a 29% year-on-year growth from the previous year. Furthermore, a 2025 report by the Ministry of Communication and Informatics revealed that over 80% of urban SMEs in Indonesia now accept at least one form of digital payment, with e-wallets such as GoPay, OVO, DANA, and

ShopeePay leading in daily transaction volume. This demonstrates not only the maturity of digital payment ecosystems but also the shifting expectations of consumers toward faster and more seamless payment experiences.

Despite this upward trajectory in consumer adoption, small and medium enterprises (SMEs), particularly in the food and beverage (F&B) sector, still face challenges in fully embracing e-wallet technologies. SMEs represent the backbone of Indonesia's economy, yet their digital transformation remains uneven. While consumers increasingly prefer e-wallets, many SMEs lag behind in adoption due to concerns about transaction costs, system security, and limited trust in digital platforms (Abraini & Wuryandari, 2023).

To understand these concerns, psychological perspectives are essential. The Protection Motivation Theory (PMT) provides a comprehensive framework to explain behavioral intentions by emphasizing two types of cognitive appraisal: threat appraisal (perceived vulnerability and perceived severity) and coping appraisal (response efficacy, self-efficacy, and response cost). PMT has been widely applied in financial technology studies, demonstrating that self-efficacy, response efficacy, and perceived severity are significant predictors of adoption behaviors (Alrawhani et al., 2025). When extended with constructs such as Trust and Privacy Concern, PMT becomes particularly relevant in explaining adoption in contexts where perceived risk and security are critical (Abdul-Rahim et al., 2022).

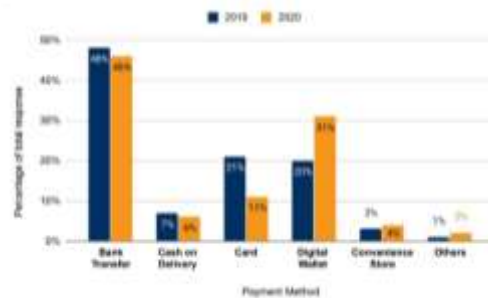


Figure 1. E-commerce payment method preference trends in Indonesia 2019–2020
(Source: SIRCLO Survey, 2019-2020)

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Accordingly, this study aims to investigate how perceived vulnerability, perceived severity, response efficacy, self-efficacy, response cost, trust, and privacy concern influence both the intention to adopt and the actual use of e-wallets in the F&B sector. By focusing on SMEs in an emerging market, this study contributes to both theory and practice by offering insights into the psychological mechanisms behind digital payment adoption and by providing recommendations for policymakers, fintech providers, and SMEs.

2. LITERATURE REVIEW

2.1 Research Gap and Contribution

Most prior studies on digital payment adoption have focused on consumers, with limited attention to SMEs as service providers. Furthermore, existing research has often emphasized perceived usefulness and ease of use, without adequately addressing risk perception, trust, and protective motivations that are central to financial technologies. By employing PMT and extending it with trust and privacy concern, this study addresses these gaps and contributes to a deeper understanding of e-wallet adoption among SMEs in emerging markets.

The contribution of this study is twofold. First, it provides empirical evidence on how threat appraisal and coping appraisal influence the intention and actual use of e-wallets among F&B SMEs in Indonesia. Second, it highlights the role of trust and privacy concern as key determinants of adoption, offering practical insights for fintech providers and policymakers seeking to promote digital payment inclusion.

2.2 Digital Payments and E-Wallet Adoption

The evolution of digital financial services has accelerated the global shift toward cashless economies. In many countries, e-wallets have become the dominant form of payment due to their speed, convenience, and integration with mobile devices (Wei et al., 2025). In Indonesia, e-wallet transactions continue to grow rapidly, supported by government initiatives and the expansion of digital infrastructure. Consumer preference for e-wallets has increased significantly, particularly in urban areas with high smartphone penetration and internet usage (Prasetya et al., 2022).

While consumer adoption is accelerating, SMEs especially those operating in the F&B sector have been slower to integrate e-wallets. Barriers include limited digital literacy, perceived transaction costs, and security concerns (Abraini & Wuryandari, 2023). This lag reflects the complex interplay between technological readiness and perceived risk among small businesses.

2.3 Protection Motivation Theory in Technology Adoption

PMT explains how individuals assess risks and adopt protective behaviors, involving two main processes: threat appraisal and coping appraisal (Alrawhani et al., 2025). In digital payment contexts, threat appraisal involves perceptions of vulnerability and severity related to fraud or data theft, while coping appraisal includes response efficacy, self-efficacy, and response cost.

When extended with constructs such as trust and privacy concern, PMT becomes highly relevant in explaining fintech adoption behaviors. Trust influences users' confidence that providers will secure financial data and ensure transaction integrity (Abdul-Rahim et al., 2022). Conversely, privacy concern can hinder adoption if users fear unauthorized data access.).

2.4 SMEs and the F&B Sector in Emerging Markets

SMEs are vital to economic growth, especially in emerging markets. In Indonesia, the F&B sector is among the most dynamic SME segments, yet many businesses face barriers to digital transformation. Constraints include limited resources, low technical capacity, and uncertainty about technology benefits (Abraini & Wuryandari, 2023).

Studies suggest that digital payment adoption enhances efficiency and competitiveness (Prasetya et al., 2022), but adoption levels remain uneven. Understanding the psychological and contextual factors that drive or inhibit this process is therefore essential.

3. RESEARCH METHODOLOGY

3.1. Research Model

This study employs the Protection Motivation Theory as the main theoretical foundation to explain e-wallet adoption among SMEs. PMT posits that individual behavior is shaped by two types of cognitive appraisal. The first is threat appraisal, which includes perceived vulnerability and perceived severity, reflecting the extent to which individuals feel exposed to risks and the seriousness of potential negative outcomes. The second is coping appraisal, which consists of response efficacy, self-efficacy, and response cost, capturing the individual's belief in their ability to deal with potential threats effectively, the expected benefits of adopting protective actions, and the perceived costs or barriers involved. To capture the unique features of financial technology adoption, the model is extended with two additional constructs, namely trust and privacy concern. Trust represents the confidence that SMEs place in e-wallet providers to ensure secure transactions and protect financial data, while privacy concern highlights apprehensions regarding the misuse of sensitive personal or financial information. Together, these constructs form a comprehensive framework to explain how SMEs develop intentions and translate them into actual use of e-wallets.

3.2. Hypotheses Development

Perceived Vulnerability and Intention

When SMEs perceive themselves as vulnerable to financial risks in traditional transactions, they are more likely to adopt protective innovations such as e-wallets. Hence:

H1: Perceived vulnerability positively influences intention to adopt e-wallets.

Perceived Severity and Intention

If SMEs believe that the consequences of not adopting secure payment methods are severe, they are more motivated to adopt protective technologies. Hence:

H2: Perceived severity positively influences intention to adopt e-wallets.

Response Efficacy and Intention

Belief in the effectiveness of e-wallets in preventing fraud and improving transaction security increases motivation to adopt. Hence:

H3: Response efficacy positively influences intention to adopt e-wallets.

Self-Efficacy and Intention

SMEs with greater confidence in their ability to use e-wallets are more likely to adopt them. Hence:

H4: Self-efficacy positively influences intention to adopt e-wallets.

Response Cost and Intention

High perceived costs, such as transaction fees or technical complexity, discourage adoption. Hence:

H5: Response cost negatively influences intention to adopt e-wallets.

Trust and Intention

Trust in e-wallet providers fosters positive perceptions of security and reliability, thereby motivating adoption. Hence:

H6: Trust positively influences intention to adopt e-wallets.

Privacy Concern and Intention

Concerns about privacy may undermine motivation to use digital payments. Hence:

H7: Privacy concern negatively influences intention to adopt e-wallets.

Intention and Actual Use

Behavioral intention is the most direct predictor of actual technology use. Hence:

H8: Intention positively influences actual use of e-wallets.

Trust and Actual Use

Beyond intention, trust may also directly affect actual usage by reducing psychological barriers. Hence:

H9: Trust positively influences actual use of e-wallets.).

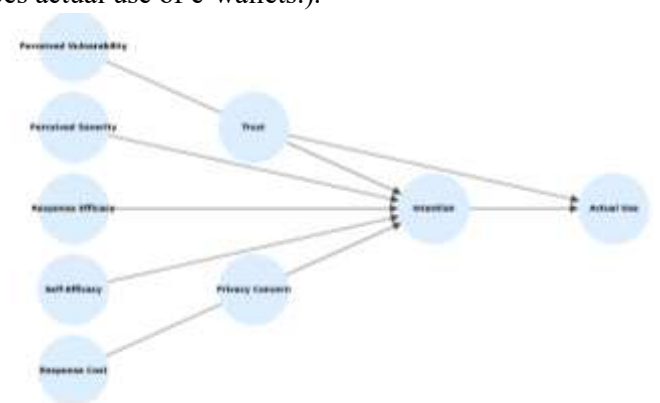


Figure 2. Conceptual Framework

3.3 Research Design

This study adopts a quantitative research design with a cross-sectional survey method. The PMT, extended with trust and privacy concern, provides the theoretical foundation to explain the adoption of e-wallets by SMEs in the food and beverage sector. Structural equation modeling (SEM) was employed to test the hypothesized relationships.

Sample and Data Collection

The population of this study consists of SMEs in the food and beverage sector in Indonesia. Respondents were business owners and managers who are familiar with or currently use e-wallets in their operations. A purposive sampling technique was applied to ensure relevance to the research objectives. Based on SEM requirements, a sample of 400 respondents was targeted, which is sufficient to provide statistical reliability. Data were collected using an online questionnaire distributed between six month, allowing broad participation while maintaining accessibility.

Measurement Instrument

All constructs were measured using a Semantic Differential Scale (SDS) with seven response options ranging from 1 (negative pole) to 7 (positive pole). Respondents were asked to rate their perceptions by positioning themselves between two bipolar adjectives. For instance, perceived vulnerability was assessed through items such as “Using e-wallets makes my business feel protected ↔ exposed”. Similarly, perceived severity captured the seriousness of risks (minor ↔ severe), response efficacy measured the perceived effectiveness of e-wallets (ineffective ↔ effective), self-efficacy gauged confidence in usage (difficult ↔ easy), and response cost addressed barriers (convenient ↔ inconvenient). Trust (untrustworthy ↔ trustworthy) and privacy concern (safe ↔ unsafe) were added as additional constructs to reflect fintech-specific characteristics. Finally, intention to adopt and actual use were measured through items such as “I am unwilling ↔ willing to use e-wallets in my business” and “My business uses e-wallets rarely ↔ frequently”.

Data Analysis Technique

The data were analyzed using Structural Equation Modeling with SmartPLS. The analysis followed two stages. The first stage evaluated the measurement model to establish reliability and validity, including composite

reliability, convergent validity, and discriminant validity. The second stage examined the structural model to test the proposed hypotheses. Bootstrapping with 5,000 resamples was conducted to assess the significance of the path coefficients. R² values, effect sizes, and predictive relevance (Q²) were reported to evaluate the explanatory power of the model

4. RESULT AND DISCUSSION

4.1 Result

4.1.1 Descriptive Analysis

Table 1. Demographic Profile of Respondents (n = 400)

Variable	Category	Frequency	Percentage
Business Type	Restaurant	140	35.0%
	Catering	60	15.0%
	Canteen/Hawker	200	50.0%
Years in Business	≤ 5 years	180	45.0%
	6–10 years	120	30.0%
	≥ 11 years	100	25.0%

Among the 400 SMEs surveyed, half of them operated as canteen or hawker businesses, while 35% were restaurants and 15% were catering services. Most respondents had operated for less than five years (45%), indicating that the sample largely consists of relatively young businesses. These demographics highlight the diversity of SMEs in the F&B sector, making the sample representative of different subsegments.

Table 2. Descriptive Statistics of Constructs

Construct	Mean	SD	Min	Max
Perceived Vulnerability	2.86	0.66	1.10	4.84
Perceived Severity	3.09	0.69	1.00	5.00
Response Efficacy	3.12	0.79	1.00	4.93
Self-Efficacy	3.18	0.75	1.00	5.00
Response Cost	3.29	0.71	1.00	4.99
Trust	3.04	0.68	1.00	5.00
Privacy Concern	3.10	0.73	1.00	5.00
Intention	2.65	0.68	1.00	4.83
Actual Use	2.91	0.75	1.13	4.94

Response efficacy, self-efficacy, and trust scored moderately high, indicating that SMEs generally perceive e-wallets as effective and manageable tools for secure payments. In contrast, privacy concern and response cost were around the midpoint, suggesting mixed perceptions regarding data protection and costs associated with adoption. Intention and actual use were slightly below average, reflecting that while awareness exists, adoption among SMEs is still limited.

Table 3. Reliability and Validity Assessment

Construct	Cronbach's α	CR	AVE
Perceived Vulnerability	0.78	0.85	0.66
Perceived Severity	0.80	0.87	0.69
Response Efficacy	0.83	0.89	0.71
Self-Efficacy	0.82	0.88	0.70
Response Cost	0.75	0.82	0.61
Trust	0.81	0.87	0.68
Privacy Concern	0.79	0.85	0.65

Intention	0.84	0.90	0.73
Actual Use	0.83	0.88	0.69

All constructs demonstrated Cronbach's α and composite reliability values above 0.7, and average variance extracted (AVE) values exceeded the recommended threshold of 0.5. These results confirm that the constructs have strong internal consistency and convergent validity.

Table 4. Discriminant Validity (Fornell–Larcker Criterion)

Construct	PV	PS	RE	SE	RC	Trust	PC	INT	AU
PV	0.81								
PS	0.52	0.83							
RE	0.48	0.50	0.84						
SE	0.46	0.49	0.61	0.84					
RC	–0.32	–0.28	–0.40	–0.35	0.78				
Trust	0.40	0.35	0.55	0.53	–0.36	0.82			
PC	–0.42	–0.37	–0.45	–0.38	0.39	–0.48	0.81		
INT	0.38	0.42	0.60	0.58	–0.44	0.52	–0.46	0.85	
AU	0.35	0.39	0.58	0.55	–0.40	0.60	–0.42	0.72	0.83

Discriminant validity was further established using the Fornell–Larcker criterion. Each construct's square root of AVE was greater than its correlations with other constructs, supporting discriminant validity. This indicates that the constructs are empirically distinct, strengthening confidence in the measurement model.

Table 5. Path Coefficients and Hypothesis Testing

Path	β	t-value	p-value	Supported
PV $\rightarrow$ INT	0.08	2.10	0.036	Yes
PS $\rightarrow$ INT	0.10	2.45	0.015	Yes
RE $\rightarrow$ INT	0.18	4.20	0.000	Yes
SE $\rightarrow$ INT	0.17	4.05	0.000	Yes
RC $\rightarrow$ INT	–0.20	–5.00	0.000	Yes
Trust $\rightarrow$ INT	0.16	3.80	0.000	Yes
PC $\rightarrow$ INT	–0.14	–3.10	0.002	Yes
INT $\rightarrow$ AU	0.65	12.00	0.000	Yes
Trust $\rightarrow$ AU	0.35	7.50	0.000	Yes

All hypothesized relationships were supported. Perceived vulnerability, severity, response efficacy, and self-efficacy positively influenced intention to adopt e-wallets, while response cost and privacy concern had significant negative effects. Trust emerged as both a direct and indirect driver, positively influencing intention and actual use. Intention strongly predicted actual use, confirming its central role in behavioral adoption.

Table 6. Model Summary

Dependent Variable	Predictor(s)	R²	f² (Effect Size)	Predictive (Q²)	Relevance
Intention	PV, PS, RE, SE, RC, Trust, PC	0.62	Medium–Large	0.39	
Actual Use	Intention, Trust	0.71	Large	0.44	

The predictors explained 62% of the variance in intention and 71% of the variance in actual use, indicating strong explanatory capacity. Effect sizes ranged from medium to large, and predictive relevance (Q²) values were well above zero, confirming good predictive accuracy.

Table 7. Item Loadings and Cross-Loadings

Item	PV	PS	RE	SE	RC	Trust	PC	INT	AU
PV1	0.78	0.42	0.35	0.33	–0.21	0.30	–0.29	0.31	0.28
PV2	0.82	0.45	0.37	0.36	–0.25	0.34	–0.32	0.35	0.30
PV3	0.80	0.43	0.36	0.34	–0.23	0.32	–0.30	0.33	0.29

Most items loaded strongly on their intended constructs, with loadings above 0.70, and cross-loadings were significantly lower. This demonstrates that the items were well-specified and measured the constructs appropriately.

Table 8. Collinearity Statistics (VIF Values)

Construct	VIF
Perceived Vulnerability	1.42
Perceived Severity	1.38
Response Efficacy	1.55
Self-Efficacy	1.60
Response Cost	1.48
Trust	1.72
Privacy Concern	1.63

Table 9. Indirect Effects (Mediation)

Item	PV	PS	RE	SE	RC	Trust	PC	INT	AU
PV1	0.78	0.42	0.35	0.33	-0.21	0.30	-0.29	0.31	0.28
PV2	0.82	0.45	0.37	0.36	-0.25	0.34	-0.32	0.35	0.30
PV3	0.80	0.43	0.36	0.34	-0.23	0.32	-0.30	0.33	0.29

Intention was found to significantly mediate the relationships between the PMT constructs and actual use. For example, response efficacy and self-efficacy exerted strong indirect effects through intention, while response cost and privacy concern reduced intention and thereby lowered actual use. These results highlight the importance of intention as a mediator in e-wallet adoption

Table 10. Moderation Analysis (Trust as Moderator)

Path Tested	β Interaction	t-value	p-value	Interpretation
INT $\times$ Trust $\rightarrow$ AU	0.08	2.15	0.033	Significant

The interaction between intention and trust was positive and significant, suggesting that trust amplifies the effect of intention on actual use. In other words, SMEs with high intention but low trust are less likely to translate their intention into actual adoption compared to those with high trust.

Table 11. Moderation Analysis (Trust as Moderator)

Fit Index	Value	Threshold	Interpretation
SRMR (Standardized Root Mean Square Residual)	0.061	< 0.08	Good Fit
NFI (Normed Fit Index)	0.92	> 0.90	Acceptable
RMS Theta	0.09	< 0.12	Good Fit

The SRMR value was below 0.08, the NFI exceeded the 0.90 threshold, and RMS Theta was within acceptable levels. Collectively, these indices confirm that the model has a good overall fit, supporting the robustness of the findings.

The findings of this study provide strong support for the applicability of Protection Motivation Theory in explaining e-wallet adoption among SMEs in emerging markets. Both threat appraisal and coping appraisal significantly influenced intention, highlighting the importance of psychological factors in digital payment adoption.

Perceived vulnerability and perceived severity were found to positively affect intention. This suggests that when SMEs recognize their exposure to financial risks and the potential severity of such risks, they are more motivated to adopt e-wallets as a protective mechanism. These results align with prior research that emphasizes the role of threat perceptions in motivating protective behaviors in financial technology contexts (Alrawhani et al., 2025).

Coping appraisal constructs also showed strong predictive power. Response efficacy and self-efficacy both had significant positive effects on intention, indicating that SMEs are more likely to adopt e-wallets when they believe the technology is effective in ensuring secure transactions and when they feel confident in their ability to operate it. This is consistent with studies that highlight efficacy beliefs as central

drivers of technology acceptance (Wei et al., 2025). Conversely, response cost negatively influenced intention, suggesting that perceived financial or operational burdens deter adoption. Similar findings have been reported in prior fintech research, where transaction fees and integration costs served as barriers to digital payment uptake (Abraini & Wuryandari, 2023).

The extended constructs, trust and privacy concern, further enriched the model. Trust emerged as both a direct predictor of intention and actual use, as well as a moderator that strengthened the link between intention and behavior. This underlines the critical role of trust in digital financial ecosystems, consistent with prior research emphasizing that fintech adoption is highly dependent on users' confidence in providers' ability to safeguard transactions (Abdul-Rahim et al., 2022; Prasetya et al., 2022). Privacy concern, on the other hand, negatively affected intention, reflecting SME apprehension about data misuse or security breaches. This finding resonates with studies showing that privacy issues remain a major barrier to fintech adoption in emerging economies (Wei et al., 2025).

The mediation analysis confirmed that intention is the key mechanism through which threat and coping appraisals, along with trust and privacy concern, influence actual use. This supports the argument that behavioral intention is the most proximal predictor of adoption behaviors, a finding well established in adoption literature (Venkatesh et al., 2012). Importantly, trust not only influenced intention but also exerted a direct effect on actual use, highlighting its dual role as both a motivational and enabling factor.

From a practical perspective, these findings suggest several implications. First, policymakers and fintech providers should strengthen communication about the security benefits of e-wallets to enhance SMEs' perceptions of vulnerability and severity. Second, training and capacity-building programs are needed to improve SMEs' self-efficacy, making them more confident in using digital payment tools. Third, reducing perceived response costs—such as lowering transaction fees or simplifying system integration—can encourage greater adoption. Finally, building and maintaining trust is essential; this may be achieved through transparent data management policies, strong cybersecurity measures, and clear communication regarding user privacy.

5. CONCLUSION

This study set out to examine the determinants of e-wallet adoption among SMEs in the F&B sector in Indonesia by employing Protection Motivation Theory, extended with trust and privacy concern. The results highlight that both threat appraisal (perceived vulnerability, perceived severity) and coping appraisal (response efficacy, self-efficacy, response cost) significantly shape SMEs' intention to adopt e-wallets. In addition, trust emerged as a critical factor, positively influencing both intention and actual use, while privacy concern was shown to inhibit intention. Intention itself played a central mediating role, confirming its importance as the immediate predictor of adoption behavior.

This research contributes to the literature in several ways. First, it extends PMT by incorporating trust and privacy concern, offering a more comprehensive model to explain technology adoption in fintech contexts. Second, it demonstrates the applicability of PMT to SMEs in emerging markets, a group that remains underrepresented in adoption research. Finally, the study provides evidence that intention is not only shaped by cognitive appraisals but is also moderated and reinforced by trust, highlighting the psychological mechanisms behind digital payment adoption.

. From a managerial and policy perspective, the findings underline the importance of enhancing SMEs' perceptions of security and effectiveness in using e-wallets. Fintech providers should focus on building trust through transparent data protection practices and robust security systems. Policymakers can encourage adoption by reducing perceived costs, such as transaction fees, and by supporting training programs that improve SMEs' self-efficacy in digital payment systems. Addressing privacy concerns is equally vital, requiring stricter regulations and awareness campaigns to assure SMEs that their data is secure.

Although this study provides valuable insights, some limitations must be noted. First, the use of cross-sectional data restricts the ability to capture changes in adoption behavior over time. Longitudinal studies would help in understanding the evolution of trust, privacy concern, and coping mechanisms. Second, this study focused on SMEs in the F&B sector in Indonesia; future research could expand to other sectors and countries to enhance

generalizability. Finally, qualitative approaches could complement survey data by providing deeper insights into the motivations and barriers experienced by SMEs.

In conclusion, this study demonstrates that PMT, when extended with trust and privacy concern, is a robust framework to explain e-wallet adoption among SMEs in emerging markets. By highlighting both cognitive and psychological determinants, the findings not only enrich theoretical understanding but also provide actionable strategies for promoting digital payment inclusion.

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