



The Effect of Digital Payment on MSME Performance: Mediating Role of Transaction Velocity and Security

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ABSTRACT: Within an Accounting Information System (AIS) framework, digital payments function as automated data-capture tools integrated into the revenue cycle. By using digital payments or payment gateways, organizations can record transactions accurately and in real time, thereby eliminating manual processes that are susceptible to human error. A robust AIS ensures that all cash inflows are authorized and recorded, which supports reliable financial reporting and objective measurement of micro, small, and medium enterprise (MSME) performance. Digital payments further enhance financial and operational outcomes for MSMEs by increasing transaction velocity and security. The present study investigates and empirically validates (a) the causal relationships among digital payment, transaction velocity, transaction security, and MSME performance, and (b) the mediating roles of transaction velocity and security in the relationship between digital payment and MSME performance. Data were collected through a survey using questionnaires distributed to respondents selected via purposive sampling. The study uses primary data and focuses on four constructs: digital payment, transaction velocity, transaction security, and MSME performance, each measured by 21 reflective indicators. Respondents included MSME entrepreneurs at the managerial level (owners or managers) operating in the wholesale and retail, culinary, fashion, agribusiness, and service sectors. The survey targeted MSMEs on the islands of Java, Bali, and Sumatra, yielding 145 valid data points. Structural equation modeling with partial least squares was employed for data analysis, using SmartPLS version 3.29 for data processing and hypothesis testing. All hypotheses concerning the direct effects of exogenous constructs on endogenous constructs were significantly supported. Furthermore, empirical findings indicate that transaction velocity and security mediate the causal relationship between digital payment and MSME performance.

KEYWORDS: Digital Payment, Transaction Velocity, Transaction Security, MSME performance, Partial Least Squares

INTRODUCTION

Digital transformation in the financial ecosystem has fundamentally changed the operational landscape of Micro, Small, and Medium Enterprises (MSMEs). Digital payments, including the Quick Response Code Indonesian Standard (QRIS), e-wallets, and payment gateways, have become critical infrastructure in supporting transaction efficiency, market expansion, and increasing MSME competitiveness in the digital economy era (Saragih et al., 2025; Sukhadeve, 2026). In Indonesia, digital payment adoption accelerated significantly following the COVID-19 pandemic, with digital payment transaction value increasing from IDR 145.2 trillion in 2018 to IDR 305.4 trillion in 2022, reflecting an average annual growth of 20.4% (Rahma et al., 2023). MSMEs, which contribute 61.07% to Indonesia's Gross Domestic Product (GDP) and employ 97% of the national workforce, face structural challenges in accessing formal financial services, managing cash flow, and increasing productivity (Ardianto, 2025). Digital payments offer potential solutions by reducing transaction costs, accelerating settlements, increasing financial transparency, and facilitating access to formal financing through verified digital footprints (Arkeman & Ermawati, 2023).

In an AIS framework, digital payments serve as automated data-capture tools integrated with the revenue cycle. Using digital payments or payment gateways, businesses can record transactions accurately and in real time, eliminating manual processes that are prone to human error. A robust AIS ensures that all cash inflows are authorized and recorded, supporting reliable financial reporting and objective measurement of MSME performance (Rivanda et al., 2025). Digital payments also improve financial and operational performance for MSMEs by enhancing transaction velocity and security. Transaction velocity improves information efficiency and relevance, while transaction security ensures reliability and internal control. Research indicates that transaction velocity mediates the relationship between technology adoption and operational performance. It reduces information lag, meets the timeliness requirement in accounting information, and enables MSME owners to make faster decisions, optimize inventory turnover,

and respond to market changes, thereby enhancing profitability. Transaction velocity also directly affects the efficiency of the cash conversion cycle. In an AIS, payment gateways accelerate the transfer of payment data from the point of sale to the general ledger (Ananda et al., 2025). Transaction security mitigates operational risks, protects digital cash assets, and ensures the integrity of MSME financial data. As a mediating factor, it reduces financial anomalies and unexpected losses. Without adequate security controls, increased transaction volumes can expose MSMEs to losses that may significantly harm their financial performance (Nugroho et al., 2024). Since digital payments involve cybersecurity risks such as fraud, data interception, and system failures, a strong security architecture is essential to encourage continued use (Nugraha & Mahadianto, 2026).

Recent studies on MSME digitalization are still largely dominated by basic financial inclusion approaches or by evaluations of technology adoption. The effectiveness of digital payment adoption in MSMEs is generally assessed solely by the extent to which financial literacy or technology increases aggregate market share (Jeandry et al., 2024). Furthermore, the concept of transaction security is often separated from the realm of economic value creation and is primarily studied as a legal compliance issue or simply as a parameter of user trust (Alamsyah et al., 2024; Michael et al., 2024). More specifically, literature examining speed and security simultaneously generally positions both elements as determinants of customer satisfaction in MSMEs, rather than as variables that drive the resilience or managerial performance of the business entity itself (Alfiya & Susanto, 2026). Although there are studies linking the standardization of digital payment instruments to increased cash turnover in MSMEs, these studies still tend to view the relationship between variables as linear and fail to examine the underlying operational transmission mechanisms (Ayuningtyas et al., 2024). This creates at least two gaps: (a) There is a naive assumption in many recent studies that speed and security will always move in the same direction in improving MSME business performance without any frictional obstacles (Alfiya & Susanto, 2026); (b) Much of the literature stops at "why MSMEs want to use digital payments," but fails to dissect the operational black box after the payment instrument is used (Jeandry et al., 2024; Michael et al., 2024).

Based on research gaps identified above, this study offers substantive and measurable novelty relative to previous work. First, in the practice of information systems architecture, there is a real trade-off: layered security procedures often delay operational acceleration (velocity). The parallel mediation model challenges the mainstream literature by examining which is more dominant in converting MSME technology into performance margins—high-speed cash-flow turnover or the level of reliability and reconciliation accuracy provided by digital security features. Second, the exogenous digital payment variable captures technology investment, while the mediating variable assesses the quality of the system architecture. This research precisely answers that the adopted infrastructure will translate into financial performance only if it successfully reduces the duration of cash conversion (velocity) while simultaneously ensuring the integrity of its assets (security).

This research thus seeks to answer the following question: (a) How do digital payment, transaction velocity, and transaction security collectively influence the MSME performance? (b) How do digital payment influence MSME performance when mediated by transaction velocity and security? This research aims to investigate and empirically validate: (a) the causal relationship between digital payment, transaction velocity, transaction security, and MSME performance; (b) the role of transaction velocity and security in mediating the causal relationship between digital payment and MSME performance.

THEORETICAL FRAMEWORK & HYPOTHESIS DEVELOPMENT

Technology Acceptance Model (TAM). First introduced by Fred Davis in 1989 (Davis, 1989), this theory adapts the Theory of Reasoned Action (TRA) proposed by Fishbein and Ajzen, specifically to model user acceptance of new information systems or technologies (Davis et al., 1989). The main objective of TAM is to explain the determinants of technology acceptance across various technologies and user populations. TAM argues that a person's behavioral intention to use a technology is determined by two main beliefs: (a) Perceived Usefulness: defined as the extent to which a person believes that using a particular system will improve their job performance. If users find the technology useful and helpful, they will be more likely to use it (Davis, 1989); (b) Perceived Ease of Use: defined as the extent to which a person believes that using a system will be free from effort or difficulty. The easier a technology is to learn and operate, the more likely it is to be accepted (Davis, 1989).

Unified Theory of Acceptance and Use of Technology (UTAUT). This theory was developed by Viswanath Venkatesh and his colleagues in 2003 (Venkatesh et al., 2003). It arose from the realization that there were too many overlapping models of technology acceptance. Therefore, Venkatesh synthesized eight previously existing theories/models of technology acceptance (including TRA, TAM, Motivational Model, Theory of Planned Behavior, etc.) to create a more comprehensive and integrated



model. UTAUT identifies four key constructs that act as direct determinants of behavioral intentions and technology use behavior: (a) Performance Expectancy: the degree to which an individual believes that using a system will help them achieve benefits in their job performance (Venkatesh et al., 2003); (b) Effort Expectancy: the degree of ease associated with using the system (Venkatesh et al., 2003); (c) Social Influence: the extent to which an individual considers it important that others (who are considered important to him) believe he should use the new system (Venkatesh et al., 2003); (d) Facilitating Conditions: the extent to which an individual believes that the organizational and technical infrastructure is available to support the use of the system (Venkatesh et al., 2003).

Resource-Based View (RBV) theory. This concept was first proposed by Birger Wernerfelt (1984) and was later popularized and structured into a robust framework by Jay Barney (1991). According to the RBV, a company is viewed as a collection of resources and capabilities. To provide a sustained competitive advantage, these resources must meet the VRIN or VRIO criteria (Barney, 1991; Barney, 1995): (a) Valuable: resources must enable the company to implement strategies that increase its efficiency and effectiveness; (b) Rare: the resource must not be widely owned by current or potential competitors; (c) Inimitable: the resource must be difficult or very expensive for other companies to imitate or develop on their own; (d) Organized: the company must have the right organizational structure, processes, and culture to capture and exploit the value of the resource (Barney, 1995). In the initial model (VRIN), the letter N refers to Non-substitutable (cannot be replaced by other resources).

Digital payments are financial transactions, or the transfer of monetary value, executed entirely through electronic infrastructure and telecommunications networks, without the involvement of physical cash. As the transformation from conventional to digital systems, such as e-wallets, continues, it has become a fundamental driver of technology adoption to improve the efficiency of business entities, particularly smaller businesses in the regions. This system is not simply an alternative payment method, but rather an integrated platform that facilitates automatic, transparent, and reconcilable recording of daily cash flows with a higher degree of accuracy (Raya et al., 2026). Transaction velocity is defined as the ratio of the speed of financial instrument movement or cash turnover within an economic ecosystem over a specific observation period. The adoption of financial technology-based payment methods has sharply accelerated the velocity of money circulation in the community and business world by eliminating spatial and temporal barriers previously encountered in conventional bank clearing processes. As a result, this high velocity creates essential capital flexibility, enabling entities to minimize idle cash and encourage business expansion, thereby contributing to regional and national macroeconomics (Mukhyi, 2024).

Transaction security is defined as a systematic configuration of layers of protection, an encryption architecture, and authentication protocols for information systems, specifically designed to ensure confidentiality and data integrity while protecting entities from the risk of cyber manipulation. In the context of using digital financial services, such as e-wallets, in small- to medium-sized businesses, cybersecurity plays both technical and psychological roles and directly mediates the formation of customer satisfaction and loyalty, leading to continued transactions (Alfiya & Susanto, 2026). MSME performance is a multidimensional measure of a small entity's overall capability to manage its resources to achieve operational efficiency, market resilience, and long-term financial excellence. In the contemporary economic era, performance evaluation is no longer viewed solely in terms of short-term profit ratios but rather is evaluated holistically, integrating the business's agility in implementing financial technology to support financial inclusion and managerial digital literacy (Jeandry et al., 2024).

Research findings from Hamidah et al. (2022); Annisa et al. (2024); Wasiah & Sartika (2025); Yap & Fabroa (2025); Zakariya & Arifin (2025) show that transaction velocity has a positive effect on MSME performance. Research results from Nurchayati et al. (2024); Bachtiar et al. (2025); Marcellawati & Kurniawanto (2025); Sari & Sari (2025); Hartatik et al. (2025) show that digital payment has a positive effect on MSME performance. Findings from Buluati et al. (2023); Citraninggrat & Hidayati (2024); Djunaid et al. (2025); Husriadi et al. (2025); Rizka & Sendjaja (2025); Serang et al. (2025) show that transaction security has a positive effect on MSME performance. Research findings of Brown et al. (2024); Hedge & Jena (2024); Kahveci & Gurgur (2025); Nurhudaini & Nurindah (2025); Pambudi & Mubin (2025) show that digital payment has a positive effect on transaction velocity. Meanwhile, research results from Rabbani et al. (2023); Sunderajulu (2024); Prastiwi et al. (2025); Sethupathy (2025); Situmorang (2025); Patil (2025) show that digital payment has a positive effect on transaction security. Thus, the proposed hypotheses are as follows:

- H1. Transaction Velocity has a positive effect on MSME Performance.
- H2. Digital Payment has a positive effect on MSME Performance.
- H3. Transaction Security has a positive effect on MSME Performance.



H4. Digital Payment has a positive effect on Transaction Velocity.

H5. Digital Payment has a positive effect on Transaction Security.

The findings of Mutiso et al. (2021); Anggarini (2022); Kilay et al. (2022); Rahma et al. (2023); Santos-Jaen et al. (2023); Candra et al. (2024); Mulyani et al. (2024); Nan et al. (2024); Prayoga et al. (2025); Saragih et al. (2025); Zakariya & Arifin (2025) provide statistical evidence that transaction velocity mediates a causal relationship between digital payment and MSME performance. The results of Affandi et al. (2024); Fitriyah et al. (2024); Riana et al. (2024); Rinaldi et al. (2024); Santoso et al. (2025); Serang et al. (2025); Situmorang et al. (2025); Suseno (2025); Zayyani et al. (2025) show that transaction security mediates a causal relationship between digital payment and MSME performance. Thus, the proposed hypotheses are as follows:

H6. Transaction Velocity mediates the causal relationship between Digital Payment and MSME Performance.

H7. Transaction Security mediates the causal relationship between Digital Payment and MSME Performance.

METHODOLOGY

Operational Constructs

The objects of this research are four latent variables (Digital Payment; Transaction Velocity; Transaction Security; MSMEs Performance) and 21 reflective indicators that will represent latent variables. Indicators are measured using a Likert scale instrument with a score range of one to five. A score of one represents the perception of Strongly Disagree; a score of two represents the perception of Disagree; a score of three represents the perception of Neutral; a score of four represents the perception of Agree; and a score of five represents the perception of Strongly Agree. With reference to Hair, et al. (2017) and McBride (2010), this study assumes the measurement of the Likert scale instrument is included in the interval scale category.

The following is an operational description for each of these types of variable:

- 1) Digital Payment (DIGIPAY) refers to a payment method that eliminates physical cash or checks and facilitates transactions among individuals, businesses, and government entities through online platforms and mobile devices, including e-wallets (GoPay, OVO, DANA, ShopeePay, LinkAja), QRIS, Mobile Banking, and PayLater. This variable is an exogenous construct which is represented by five manifest variables/reflective indicators coded DIGP-1, DIGP-2, DIGP-3, DIGP-4, DIGP-5. The reflective indicators used in this study refer to Kilay et al. (2022); Abdulai et al. (2024).
- 2) Transaction Velocity (TRAVELO) refers to the speed and frequency with which users or accounts make transactions over a given period and is a major concern in digital payments. This variable is an exogenous construct represented by five manifest variables/reflective indicators coded VELO-1, VELO-2, VELO-3, VELO-4, VELO-5. The reflective indicators used in this study refer to Kilay et al. (2022); Abdulai et al. (2024).
- 3) Transaction Security (TRASECU) refers to the security of digital payment transactions encompasses technical security features, users' perceived security, and actual security outcomes. This variable is an endogenous construct represented by five manifest variables/reflective indicators coded SECU-1, SECU-2, SECU-3, SECU-4, SECU-5. The reflective indicators used in this study refer to Kilay et al. (2022); Almaiah et al. (2023); Ananda & Mardiana (2025).
- 4) MSMEs performance (PERFSME) in this study refers to the extent to which micro, small, and medium enterprises (MSMEs) achieve their business goals over a specific period, particularly after adopting digital payments that offer faster transaction speeds and greater security, reflects their performance. This performance is influenced by internal and external factors that interact to determine MSMEs' overall effectiveness and efficiency. This variable is an endogenous construct represented by five manifest variables/reflective indicators coded PERF-1, PERF-2, PERF-3, PERF-4, PERF-5. The reflective indicators used in this study refer to Kilay et al. (2022); Cuevas-Vargas et al. (2023).

Population and Sample

The population of this study comprises MSMEs located on the islands of Java, Bali, and Sumatra. The sample was selected using purposive sampling among MSME entrepreneurs, with the following criterion: respondents are owners or managers of micro, small, and medium enterprises (MSMEs). These MSMEs operate in the wholesale & retail, culinary, fashion, agribusiness, and service sectors. MSMEs included in the study are not credit unions or foundations and may operate both offline and online. Eligible MSMEs have adopted digital payment in daily transactions.

Data Collection Methods

This study seeks to obtain primary data through surveys by distributing questionnaires to eligible sample respondents. This research questionnaire consists of two main parts. The first part concerns the respondents' demographics and the characteristics of the companies where they work. The second part concerns respondents' perceptions of several statements representing operational variables in this study. The number of samples required in this study depends on the data analysis technique, which will use latent path modeling. Because this study will use structural equation modeling, following Hair et al. (2010), the minimum sample size to be obtained is 5 to 10 times the total number of indicators reflecting the research construct. The reflective indicators in this study totaled 21 units. Thus, with a limit of 10, the minimum number of samples to be obtained is 210 units. The questionnaire will be sent to the sample respondents via a Google Form at the following link: <https://forms.gle/FykXUBNuvcpRUVT19>. The online questionnaire was sent to respondents via email. The email data were obtained from the dataumkm.com and smesco.go.id websites. Dataumkm.com is a relatively comprehensive online service platform for data collection, mapping, classification, and validation of MSME profiles in Indonesia. Meanwhile, Smesco.go.id is the website of the Cooperative and MSME Marketing Service Agency under the Ministry of Cooperatives and MSMEs of the Republic of Indonesia. Questionnaires designed in Google Forms were sent to 210 respondents' email addresses. The email addresses were obtained from MSME profiles publicly listed on the dataumkm.com page and also on the smesco.go.id page. There were 65 non-returned questionnaires. There were 145 respondents who filled out the questionnaire and resubmitted it, and it was processed. Thus, the usable response rate in this study is 69,05%.

Testing of Measurement Model (Outer Model Test)

The outer model test is performed using the PLS Algorithm menu and assesses data quality through validity and reliability tests. Discriminant validity, namely cross-loadings, is obtained by comparing the loading of the intended construct with the loading of other constructs. The targeted indicators and constructs are considered good if their correlation is higher than that of the other indicators and constructs. In addition, convergent validity assesses whether a reflective indicator is valid for explaining a construct if it has an outer loading greater than 0,7 (Ghozali & Latan, 2015). The outer loading has the same magnitude as the cross-loading value. In addition, the Average Variance Extracted criterion has a threshold greater than 0,50 (Hair et al., 2017). The reliability test uses Composite Reliability, where a construct is considered reliable if Composite Reliability is greater than or equal to 0,70 (Hair et al., 2017). In addition to composite reliability, reliability is assessed using Cronbach's alpha, with a construct considered reliable if the alpha value is greater than or equal to 0,70 (Hair et al., 2017).

Testing of Structural Model (Inner Model Test)

In the structural model test (inner model test), according to Hair et al. (2017), it is evaluated by observing the coefficient of determination (R-sqr) threshold values, such as 0,75; 0,50; and 0,25, each of which indicates that the proportion of endogenous construct variance explained by exogenous constructs is substantial, moderate, or weak. The R-squared value is displayed in the PLS Algorithm menu in SmartPLS. The inner model test also assesses the F-sqr effect size, with threshold values of 0,35, 0,15, and 0,02, each indicating that the exogenous construct has a large, medium, or small effect on the endogenous construct. The F-square effect size is a measure used to assess the relative impact of exogenous constructs on endogenous constructs (Hair et al., 2017). The F-square effect size is displayed in the blindfolding menu of SmartPLS. The inner model test will also measure Stone-Geisser's Q-sqr value, used to assess the predictive relevance of exogenous constructs to an endogenous construct. Stone-Geisser's Q-sqr value in the inner model test is obtained through the Blindfolding menu in SmartPLS, as indicated by the estimated Construct Crossvalidated Redundancy. The threshold value for Q-sqr is greater than zero, indicating that exogenous constructs have predictive relevance for endogenous constructs (Hair et al., 2017).

Method of Mediating Role Testing

Hair et al. (2017) applied a special procedure to examine the effect of mediation in causal relationships in PLS-PM. The method was adopted from Zhao, Lynch, & Chen (2010). Based on the method, it might be clear that if the indirect effect is significant and the direct effect is also significant, then the type of mediation effect is partial mediation. Partial mediation with a positive sign is classified as complementary mediation. Meanwhile, if the sign is negative, it will be included in competitive mediation. However, if the indirect effect is significant but the direct effect is not significant, then the type of mediation becomes full mediation. Measurement of the significance of direct and total effects on PLS-PM using bootstrapping.

RESULTS

Descriptive Statistics of Respondents Demographics

Exhibit 1 presents descriptive statistics on respondents’ demographics, including MSME region, estimated annual sales turnover, line of business, number of employees, form of business entity, gender, highest level of education, position, age, work tenure, time of digital payment adoption, and daily digital payment use. With 145 respondents, the survey found that most respondents were female (57%), aged 31–40 years (47%), and located on the island of Java (54%). Most respondents had an undergraduate degree (34%). The majority were MSME owners (71%), with a work tenure of five years (54%). Referring to Government Regulation No. 7 of 2021, most respondents run micro-scale businesses with estimated annual sales turnover of less than or equal to Rp. 2 billion (54%). Most respondents run a culinary business (28%). Respondents who returned the questionnaire were mostly individual businesses (81%). Because most respondents reported a workforce of fewer than five people (46%), this indicates a micro-scale classification by the Indonesian Central Bureau of Statistics. Meanwhile, most respondents adopted digital payments within six months to less than a year (32%) and use them 20-30 times daily (34%).

Exhibit 1. Demographic Characteristics of Respondents

Characteristics of Respondents		Freq	%
MSME Region	Bali island	30	0,21
	Java island	78	0,54
	Sumatera island	37	0,25
	Total	145	100,00
Estimated annual sales turnover	Less or equal to Rp. 2 billion	78	0,54
	Over Rp. 2 billion to Rp. 15 billion	56	0,39
	Over Rp. 15 billion	11	0,07
	Total	145	100,00
Sector	Wholesale & Retail	38	0,26
	Culinary	41	0,28
	Fashion business	29	0,20
	Agribusiness	14	0,10
	Service	23	0,16
	Total	145	100,00
Number of employees	Less than 5	67	0,46
	5 to 19	58	0,40
	20 to 99	20	0,14
	Over 100	0	0,00
	Total	145	100,00
Form of business entity	Individual	118	0,81
	Firm	17	0,12
	Partnership	10	0,07
	Total	145	100,00
Gender	Male	62	0,43
	Female	83	0,57
	Total	145	100,00
Education	High school & equivalent	36	0,25
	Diploma	42	0,29
	Undergraduate	49	0,34
	Postgraduate	18	0,12
	Total	145	100,00
Position	Owner	103	0,71



Characteristics of Respondents		Freq	%
	Manager	42	0,29
	Total	145	100,00
Age	20 years	10	0,07
	21 to 30	40	0,28
	31 to 40	69	0,47
	Over 40	26	0,18
	Total	145	100,00
Work tenure	5 years	78	0,54
	6 to 10 years	58	0,40
	Over 10 years	9	0,06
	Total	145	100,00
When to adopt digital payment	Less than 6 months	20	0,14
	6 months to less than 1 year	46	0,32
	1 year to less than 3 years	39	0,27
	3 to less than 5 years	24	0,16
	Over 5 years	16	0,11
	Total	145	100,00
Usage of digital payment daily	Less than 10 times	19	0,13
	10 to 20 times	41	0,28
	Over 20 to 30 times	49	0,34
	Over 30 to 50 times	27	0,19
	Over 50 times	9	0,06
	Total	145	100,00

Result Testing of the Measurement Model (Outer Model Test).

The results of the validity test with discriminant validity are reflected in the value of the cross loadings as shown in **Exhibit 2** and also **Exhibit 3**. All reflective indicators have good validity with values above 0,7 and significant at p less than 0,01 after going through the bootstrap. It appears that the entire cross-loading each indicator can explain each construct (DIGIPAY, TRAVELO, TRASECU, and PERFSME) significantly, as shown in **Exhibit 2** and also **Exhibit 4**. Value of cross-loadings indicate that the correlation between each indicator and its construct has a greater value than the correlation with other constructs. Test of convergent validity indicated by the Average Variance Extracted (AVE) value for each construct with a value above 0,5, which indicates that each construct (DIGIPAY, TRAVELO, TRASECU, and PERFSME) can be explained validly by their respective reflective indicators. **Exhibit 2** also shows that the results of the composite reliability on all constructs in this study have high reliability with a value of more than 0,70. Likewise, the value of internal consistency represented by Cronbach's Alpha of each construct also shows high reliability for each construct.

Exhibit 2. Summary of Data Measurements

Constructs	Indicators	Cross Loadings	t-stat ***	Cronbach's Alpha	AVE	Composite Reliability	R-sqr	Q-sqr
TRAVELO	VELO-1	0,893	47,957	0,922	0,763	0,942	0,444	0,334
	VELO-2	0,874	37,406					
	VELO-3	0,855	35,247					
	VELO-4	0,872	37,006					
	VELO-5	0,873	36,350					



Constructs	Indicators	Cross Loadings	t-stat ***	Cronbach's Alpha	AVE	Composite Reliability	R-sqr	Q-sqr
PERFSME	PERF-1	0,911	67,450	0,934	0,754	0,948	0,760	0,564
	PERF-2	0,907	63,333					
	PERF-3	0,877	48,269					
	PERF-4	0,852	28,132					
	PERF-5	0,810	29,902					
	PERF-6	0,848	27,038					
TRASECU	SECU-1	0,893	51,390	0,885	0,686	0,916	0,483	0,319
	SECU-2	0,887	47,190					
	SECU-3	0,713	11,653					
	SECU-4	0,823	28,693					
	SECU-5	0,813	31,593					
DIGIPAY	DIGP-1	0,865	32,107	0,916	0,750	0,937	—	—
	DIGP-2	0,903	47,955					
	DIGP-3	0,876	43,228					
	DIGP-4	0,879	43,131					
	DIGP-5	0,805	21,793					

Note: *** t-stat > 2.58, sig. at p < 0.01

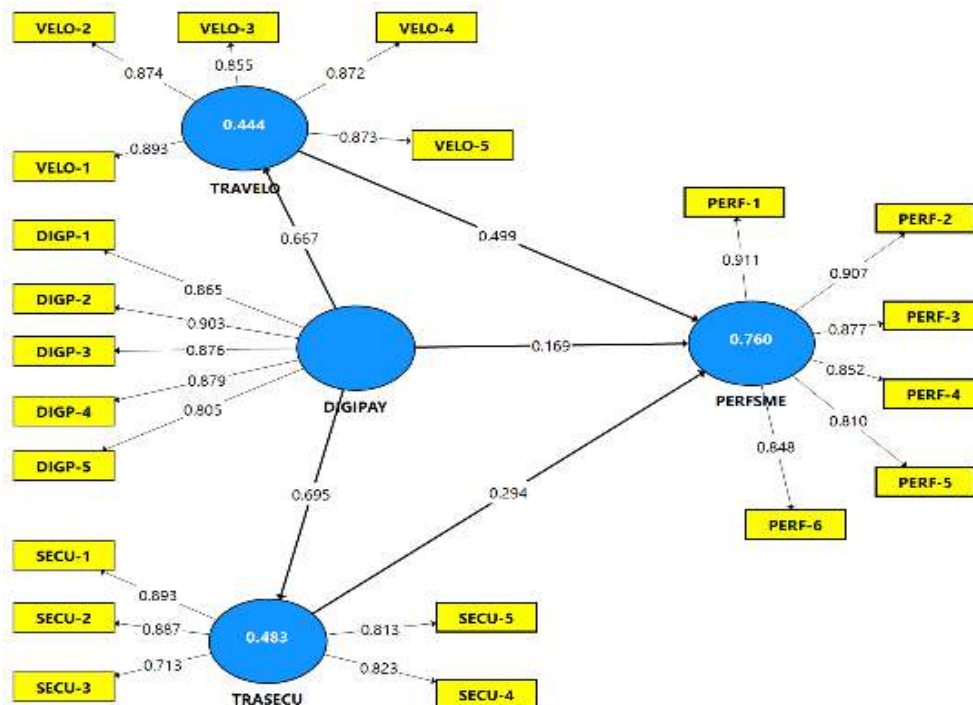


Exhibit 3. Visual Chart of PLS Algorithm Measurement Results of SmartPLS-v.3.29

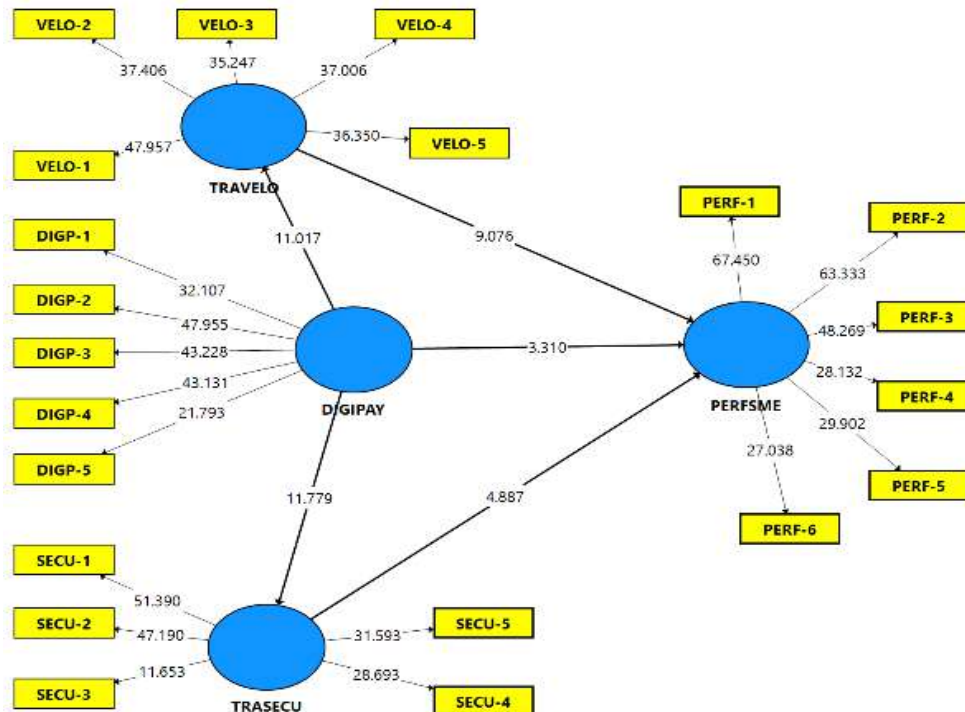


Exhibit 4. Visual Chart of Bootstrapping Measurement Results of SmartPLS-v.3.29

Result Testing of Structural Model (Inner Model Test).

Data processing using the PLS Algorithm menu shows the determination coefficients for the TRAVELO construct of 0,444, the TRASECU construct of 0,483, and the PERFSME construct of 0,760, as presented in Exhibit 2. It can be interpreted that: a) the constructs of DIGIPAY moderately explain the variability of the endogenous TRAVELO construct and also moderately explain the variability of the TRASECU construct; b) the constructs of DIGIPAY, TRAVELO, and TRASECU substantially explain the variability of the endogenous construct of PERFSME. Exhibit 2 also presents the calculation results for Stone-Geisser's Q-sqr with blindfolding, which show predictive relevance between the exogenous construct DIGIPAY and each of the endogenous constructs TRAVELO (Q-sqr = 0,334) and TRASECU (Q-sqr = 0,319). Another predictive relevance exists among the constructs DIGIPAY, TRAVELO, and TRASECU and the endogenous construct PERFSME (Q-sqr = 0,564). The test results assessing the strength of the causal relationship between exogenous and endogenous constructs are evaluated using the effect size (F-sqr). The F-square value from the exogenous construct DIGIPAY to the endogenous construct TRAVELO indicates a medium effect size, which tends to be large (F-square = 0,800). The exogenous DIGIPAY construct also has a medium effect size, which tends to be large (F-sqr = 0,934) on the TRASECU endogenous construct. The F-sqr value from the endogenous construct of TRAVELO to the endogenous construct of PERFSME is large (F-sqr = 0,441); the endogenous construct TRASECU has a medium effect size (F-sqr = 0,143) on the endogenous construct of PERFSME. The F-sqr of the DIGIPAY endogenous construct to the PERFSME endogenous construct has a small effect size, tending to medium (F-sqr = 0,055).

The final part of testing the structural model is testing the research hypothesis. The summary of all hypothesis-testing results in this study is shown in Exhibit 5. The results of testing the seven research hypotheses are as follows:

- 1) **Hypothesis One.** The path coefficient of 0,499 indicates a positive association between constructs. The t-statistic value of 9,076 was significant at $p < 0,01$. Statistically, this study rejected H_0 . With the support of H_1 , this study significantly predicted that TRAVELO has a positive effect on PERFSME.
- 2) **Hypothesis Two.** The path coefficient of 0,169 indicates positive predictive causality between constructs. The t-statistic value of 3,310 was significant at $p < 0,01$. Statistically, there is sufficient evidence to reject H_0 . With the support of H_2 , this study can statistically predict that DIGIPAY has a positive effect on PERFSME.



- 3) **Hypothesis Three.** The path coefficient of 0,294 indicates positive predictive causality between constructs. The t-statistic value of 4,887 was significant at $p < 0,01$. Statistically, this study rejected H0. With the support of H3, this study significantly predicted that TRASECU has a positive effect on PERFSME.
- 4) **Hypothesis Four.** The path coefficient of 0,667 indicates positive predictive causality between constructs. The t-statistic value of 11,017 was significant at $p < 0,01$. Statistically, there is sufficient evidence to reject H0. With the support of H4, this study is able to predict significantly that DIGIPAY has a positive effect on TRAVELO.
- 5) **Hypothesis Five.** The path coefficient of 0,695 indicates positive predictive causality between constructs. The t-statistic value of 11,779 was significant at $p < 0,01$. Statistically, there is sufficient evidence to reject H0. With the support of H5, this study can statistically predict that DIGIPAY has a positive effect on TRASECU.
- 6) **Hypothesis Six.** The path coefficient of 0,333 indicates that the mediating variable has a positive and significant indirect effect on the predictive causal relationship between constructs. The t-statistic value of 8,420 was significant at $p < 0,01$. Statistically, there is sufficient evidence to reject H0. With the support of H6, this study confidently predicts that TRAVELO mediates the causal relationship between DIGIPAY and PERFSME. The role of TRAVELO as a mediating construct has been statistically shown to be complementary, that means both the direct path (DIGIPAY to PERFSME) and the indirect path (DIGIPAY toward TRAVELO toward PERFSME) are significant and work together in the same positive direction.
- 7) **Hypothesis Seven.** The path coefficient of 0,205 indicates that the mediating variable has a positive indirect effect on the predictive causal relationship between constructs. The t-statistic value of 4,255 is significant at $p < 0,01$. Statistically, there is sufficient evidence to reject H0. With the support of H7, this study confidently predicts that TRASECU mediates the causal relationship between DIGIPAY and PERFSME. The role of TRASECU as a mediating construct has been statistically shown to be complementary, that means both the direct path (DIGIPAY to PERFSME) and the indirect path (DIGIPAY toward TRASECU toward PERFSME) are significant and work together in the same positive direction.

Exhibit 5. Hypotheses Testing Results

Hypothesis	Relationship	Direct Effect	t-Statistic	Indirect Effect	t-Statistic	Decision
H1	TRAVELO → PERFSME (+)	0,499	9,076 ***	—	—	supported
H2 ^a	DIGIPAY → PERFSME (+)	0,169	3,310 ***	—	—	supported
H3	TRASECU → PERFSME (+)	0,294	4,887 ***	—	—	supported
H4	DIGIPAY → TRAVELO (+)	0,667	11,017 ***	—	—	supported
H5	DIGIPAY → TRASECU (+)	0,695	11,779 ***	—	—	supported
H6	DIGIPAY → TRAVELO → PERFSME (+)	—	—	0,333	8,420 ***	supported
H7	DIGIPAY → TRASECU → PERFSME (+)	—	—	0,205	4,255 ***	supported

Note:

*** t-stat > 2,58, sig. at $p < 0,01$

a. Total effect = 0,707; t-statistic= 14,066 (t-stat > 2.58) sig, at $p < 0.01$

DISCUSSION

- (a) The results of the H1 test are in line with the results of Hamidah et al. (2022); Annisa et al. (2024); Wasiah & Sartika (2025); Yap & Fabroa (2025); Zakariya & Arifin (2025). The results indicate that MSME entrepreneurs perceive digital payments as providing adequate TRAVELO to support PERFSME. This finding indicates that MSME entrepreneurs can serve customers



more quickly through DIGIPAY by eliminating cash handling, reducing long queues, and providing immediate transaction notifications, thereby increasing operational efficiency. This is in line with the UTAUT (Unified Theory of Acceptance and Use of Technology), which states that increased performance and expectations for operational efficiency are influenced by the transaction velocity enabled by DIGIPAY.

- (b) The results of the H2 test are consistent with the results of the research by Nurchayati et al. (2024); Bachtiar et al. (2025); Marcellawati & Kurniawanto (2025); Sari & Sari (2025); Hartatik et al. (2025). The results indicate that the adoption of DIGIPAY effectively and efficiently develops PERFSME. DIGIPAY reduce operational costs because there is no need for recurring bookkeeping or for transporting cash to the bank for periodic deposits. MSME entrepreneurs also do not need to manually recapitulate transactions, thereby saving time, avoiding inconvenience to customers, and optimizing customer service. Therefore, it also creates a good image for the business, potentially widening its market reach to young people who prefer DIGIPAY. These results are also in line with the TAM theory, which posits that perceptions of DIGIPAY as providing benefits and user convenience will influence MSMEs to adopt digital technology, with the hope that it will improve business performance later. These results are also relevant to the Unified Theory of Acceptance and Use of Technology (UTAUT), in which the implementation of DIGIPAY technology can impact business operations.
- (c) The results of the H3 test are consistent with the results of the research by Buluati et al. (2023); Citraningrat & Hidayati (2024); Djunaid et al. (2025); Husriadi et al. (2025); Rizka & Sendjaja (2025); Serang et al. (2025). The results of this study indicates that adopting DIGIPAY is expected to provide adequate TRASECU to support PERFSME. Improving TRASECU through DIGIPAY can reduce financial risks, such as illegal transactions using counterfeit money or loss of funds due to direct theft. This has the potential to reduce the additional workload required to maintain security manually, thereby supporting improved MSME operational performance. The results of this study also align with the UTAUT (Unified Theory of Acceptance and Use of Technology), which defines performance expectancy as the belief that improved performance and expectations regarding operational efficiency are influenced by the guaranteed TRASECU provided by DIGIPAY.
- (d) The results of the H4 test are in line with the results of Brown et al. (2024); Hedge & Jena (2024); Kahveci & Gurgur (2025); Nurhudaini & Nurindah (2025); Pambudi & Mubin (2025). The research result shows that the TRAVELO makes MSMEs interested in using DIGIPAY methods. TRAVELO focuses on MSMEs' perceptions of DIGIPAY, such as fast transactions, short access times, and rare operational delays except for network problems. This will certainly be very helpful for MSMEs seeking financial technology that aligns with their operational resource needs. In line with the Technology Acceptance Model (TAM), perceived ease of use can explain why MSMEs adopt DIGIPAY technology, as it is simple to use and offers TRAVELO that align with MSME entrepreneurs' perceptions.
- (e) The results of the H5 test are consistent with the results of the research conducted by Rabbani et al. (2023); Sunderajulu (2024); Prastiwi et al. (2025); Sethupathy (2025); Situmorang (2025); Patil (2025). This finding shows that TRASECU focuses on MSMEs' perceptions that DIGIPAY enable the confidentiality of business data, which must be secure and trusted. In this context, digital payments offer MSMEs protection against potential data manipulation. This will be very helpful for MSMEs seeking financial technology that matches their operational resource needs. In line with the Technology Acceptance Model (TAM), MSMEs' perceptions of data security are based on a single measurement variable: perceived ease of use. Perceived ease of use influences user perceptions of TRASECU. With an easy-to-use system, MSMEs can focus on key elements such as security notifications, authentication processes, and signs that transactions are protected (such as a padlock icon or an encryption message), helping users more clearly understand that their data is secure during transactions.
- (f) H6 test results are in line with the research results of Mutiso et al. (2021); Anggarini (2022); Kilay et al. (2022); Rahma et al. (2023); Santos-Jaen et al. (2023); Candra et al. (2024); Mulyani et al. (2024); Nan et al. (2024); Prayoga et al. (2025); Saragih et al. (2025); Zakariya & Arifin (2025). The finding indicates that MSME entrepreneurs perceive DIGIPAY as speeding up transactions and supporting business operations, with the hope of improving operational performance. Because this is complementary mediation, the total impact of DIGIPAY splits into two positive paths. First, the indirect effect of DIGIPAY increases TRAVELO, which then increases PERFSME. This means part of the reason DIGIPAY work is that they accelerate cash flow cycles, reduce checkout times, and speed up settlement. This operational speed directly translates into higher performance (e.g., higher sales volume, quicker inventory turnover). Second, DIGIPAY also increase PERFSME directly. Even if the velocity factor is excluded, DIGIPAY still boost performance through other mechanisms. These include lower cash-

handling risks, access to broader customer bases, digital record-keeping, or increased financial inclusion (eligibility for bank loans). TRAVELO, as a mediator, can be explained by TAM and UTAUT, which link behavioral intention to actual system use and use behavior. In this context, TRAVELO, perceived usefulness, perceived ease of use, and performance expectancy regarding DIGIPAY are key factors shaping users' behavioral intentions. These behavioral intentions encourage users to use technology effectively in their daily lives, ultimately improving operational performance and providing overall benefits. From an Resource-Based View, DIGIPAY can actively build an organizational capability, namely TRAVELO. This ability to move capital more quickly may secure a competitive valuable and boost MSME performance.

- (g) The results of the H7 test are consistent with the results of Affandi et al. (2024); Fitriyah et al. (2024); Riana et al. (2024); Rinaldi et al. (2024); Santoso et al. (2025); Serang et al. (2025); Situmorang et al. (2025); Suseno (2025); Zayyani et al. (2025). The finding shows that MSME entrepreneurs perceive that implementing DIGIPAY can provide TRASECU for business information stored in the DIGIPAY system, and certainly impacts PERFSME. Because this is complementary mediation, the total impact of DIGIPAY splits into two positive paths. First, the indirect effect of DIGIPAY increases TRASECU, which then increases PERFSME. This means a major reason DIGIPAY improve performance is because they make transactions safer. High security reduces cash theft, eliminates counterfeit money, prevents payment fraud, and protects customer data. This safety builds deep customer trust and protects business margins, which directly increases customer retention and financial performance. Second, DIGIPAY directly increase PERFSME. Even outside of security, DIGIPAY still drive success through other features, such as transaction speed, convenience, automatic record-keeping, and the ability to serve remote or online customers. TRASECU, as a mediator, can be explained by the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). In TAM, TRASECU, which provides a sense of comfort and convenience (perceived ease of use), will influence users' behavioral intentions towards technology use. This intention, in turn, encourages users to use the technology in their daily operational activities (actual system use). Meanwhile, in UTAUT, TRASECU is considered part of performance expectancy, where the perceived security of DIGIPAY influences users' intentions to use the technology (use behavior). This is expected to support the development of more efficient PERFSME, especially in their business operations. Under the Resource-Based View, TRASECU acts as a protective capability. DIGIPAY provide the technology as a resource, and the resulting high security shields the firm from financial leaks, vulnerabilities, and reputational damage. This risk-mitigation capability helps sustain the MSME's competitive valuable and drive performance.

CONCLUSION

The coefficient of determination obtained in this study indicates that the DIGIPAY construct moderately explains the variability in the endogenous constructs TRAVELO and TRASECU. Meanwhile, the endogenous PERFSME construct is substantially explained by DIGIPAY, TRAVELO, and TRASECU. The F-sqr calculation clarifies the strength of the relationship between exogenous and endogenous constructs. Specifically, DIGIPAY has a large effect size on TRAVELO and TRASECU, and a small effect size on PERFSME. TRAVELO and TRASECU both have a medium effect size on PERFSME. The Q-sqr value reflects the predictive power of these relationships, and its value above zero indicates that the constructs studied are statistically predictive of one another. These research findings provide sufficient evidence to support all seven hypotheses in this study. The findings demonstrate that DIGIPAY, TRAVELO, and TRASECU each are positively associated with PERFSME, and that DIGIPAY is positively associated with both TRAVELO and TRASECU. The results further indicate that both TRAVELO and TRASECU significantly mediate the relationship between DIGIPAY and PERFSME. Collectively, these findings also align with the problem statements and research objectives. This research has some limitations in indicating the study findings. This research was conducted only on MSMEs in Java, Bali and Sumatera. Future research could examine MSMEs across Indonesia. This research tested only four constructs: DIGIPAY, TRAVELO, TRASECU, and PERFSME. Future research could integrate or develop additional variables related to DIGIPAY, such as Technology Readiness to assess readiness to use digital payments, Innovation Resistance Theory to identify resistance factors among users and non-users, and Expectation Confirmation Theory (ECT) to determine user satisfaction with DIGIPAY.

These research findings contribute to the AIS study in both theoretical and practical ways. Contribution related to theoretical elements includes: (1) These findings show expansion of the real-time transaction processing systems paradigm that processing, verifying, and settling digital payment transactions can drive value creation; (2). This research contributes by



demonstrating and redefining the role of system security in internal control that transaction security measures, such as encryption and multi-factor authentication, within digital payment infrastructure can support trust and business continuity for MSMEs; (3). This research contributes to AIS theory through AIS design based on information asymmetry risk mitigation by showing that transaction security, as a mediator, can reduce agency costs and the risk of microfraud, while transaction speed can accelerate cash reconciliation. These findings expand the literature on how the cash and bank modules in MSME accounting systems should be designed to mitigate risks while optimizing working capital turnover. Contribution related to practical elements includes: (1) These research findings contribute to the development of metrics for Performance Measurement Systems in the MSME sector. AIS designers can use transaction speed metrics, such as average settlement time, and security metrics, such as zero-fraud incident rate, as non-traditional financial Key Performance Indicators (KPIs); (2) This research contributes to the effort to bridging the gap between information technology infrastructure and MSME governance that address the black box of the Productivity Paradox in digital payments. It shows accounting system developers that digital payment technology alone is not enough. Added value for business performance is created only if the AIS architecture in MSMEs includes governance that ensures fast, secure data interoperability. Meanwhile, these research findings also contribute to the government agencies in the following ways: a) Optimizing national payment system regulations by the government agencies regarding payment service providers and avoiding trade-offs, where the government agencies might otherwise tolerate less secure systems to accelerate digital payment penetration in remote areas. Because speed and security are complementary in boosting MSME performance, the government should tighten Service Level Agreements (SLAs) regarding settlement times to MSME accounts to ensure more real-time (velocity), while also requiring higher cyber risk mitigation standards for payment service providers, such as anti-fraud protection and data encryption (security); b) Redesigning digital empowerment and literacy programs through a more comprehensive digital literacy policy direction, so that Indonesia state budget for MSME training can have a tangible impact on improving MSME performance.

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