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THE INFLUENCE OF AI PERSONALITY ON TRUST AND LOYALTY IN PAY TECH: THE MODERATING ROLE OF DIGITAL LITERACY

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Abstract. The purpose of this paper is to analyze the effect of digital literacy and AI personality on perceived trust as well as its impact on PayTech application use intention and customer loyalty. This research is conducted in a quantitative approach which data are gathered using on-line questionnaire from the active users of PayTech application and analyzed by applying the Structural Equation Modeling (SEM) with the number of sample size are 225 respondents. The findings indicate that digital literacy and AI's personality both have a significant positive impact on perceived trust. Moreover, perceived trust is positively related to PayTech application usage and customer loyalty. Application usage is directly affected by AI personality, suggesting that human-like AI trait may enhance user engagement. Perceived trust serves as an important mediator between digital literacy and AI personality on one hand, with user behavior (attitudes) on other. The findings provide additional insights into the development of digital trust in AI assisted financial technology and managerial implications as how to enhance PayTech users' experience and loyalty.

Keywords: Digital Literacy, AI personality, Perceived Trust, PayTech App Usage, Customer Loyalty.

1. Introduction

The rapid growth of financial technology (FinTech) has transformed the global payment ecosystem by introducing greater efficiency, faster processes, and more convenient ways to carry out financial transactions. In Indonesia, one of the most transformative innovations within this sector is payment technology (PayTech), which enables users to carry out real-time transactions through mobile applications. According to Bank Indonesia (2024), the total value of electronic money transactions surpassed IDR 500 trillion, reflecting an increase of approximately 25 percent from the previous year. This significant growth is supported by the rise of more than 200 million active digital wallet accounts (OJK, 2024) and an internet penetration rate reaching 79.5 percent of the population (APJII, 2024). These indicators demonstrate that digital financial services have become deeply embedded in the everyday activities of many Indonesians.

Despite this strong upward trend, the PayTech sector still faces challenges related to the development of digital trust. Findings from the Katadata Insight Center (2023) reveal that 40 percent of users remain uncertain about transaction safety, while 30 percent express concerns about personal data protection. Such skepticism weakens loyalty, as users tend to rely on multiple applications and frequently switch between platforms. This pattern reflects the fragile nature of loyalty in digital environments. Trust plays a central role in determining whether users continue engaging with a platform or move to competing services (Kim et al., 2024; Bajwa, 2025). In digital finance, the absence of strong trust becomes a major barrier to cultivating lasting customer relationships.

Perceived trust refers to users' beliefs about the reliability, integrity, and dependability of a digital service, formed through their experiences related to security, privacy, and ease of use (Gefen et al., 2003). A broad range of studies has shown that trust is a major predictor of both usage intention and long-term loyalty (Oliveira et al., 2017; Zhao et al., 2022). When users feel protected and confident in the system, their emotional attachment increases, reinforcing their commitment to continue using the platform (Kaushik & Rahman, 2015). However, customer loyalty in the digital marketplace is inherently unstable, as users can quickly migrate to other applications offering similar features or incentives (Tan et al., 2025; Alrawad et al., 2023). In this situation, building trust becomes essential for companies seeking sustained user retention.

One emerging determinant of trust in digital platforms is AI personality, which refers to the extent to which artificial intelligence systems emulate human-like attributes such as friendliness, empathy, politeness, and natural communication. Prior research suggests that the presence of human-like characteristics in AI can foster emotional bonds, strengthen trust, and improve user engagement (Choi et al., 2023). Similarly, AI with a positive and approachable personality can enhance user experience and encourage continued platform usage (Lee & Kim, 2024). In the context of PayTech, such AI characteristics may serve as an important psychological cue that shapes how users perceive and interact with the technology.

Digital literacy is another factor that contributes to trust formation. Individuals with higher levels of digital literacy are generally able to navigate digital systems more effectively and understand the risks and security mechanisms embedded within them, leading to higher trust evaluations (Ng, 2012; Chawla & Joshi, 2019; Tesfaye & Zelalem, 2025). Although studies have shown that personality traits influence user interactions with AI technologies (Amichai-Hamburger et al., 2025), limited attention has been given to how digital literacy interacts with AI personality in shaping trust, particularly in the PayTech environment. The role of digital literacy as a moderating variable has not been extensively examined, leaving a clear gap in the literature.

Addressing this gap, the present study proposes a conceptual model integrating AI personality and digital literacy to investigate their combined effects on perceived trust, PayTech application usage, and customer loyalty. This study contributes to the theoretical development of digital trust in financial technology by providing a more nuanced understanding of psychological and technological factors that influence user behavior. In practical terms, the findings are expected to guide PayTech providers and regulators in formulating strategies to enhance user trust, encourage sustained usage, and strengthen loyalty within the increasingly competitive digital financial ecosystem. Based on the proposed framework, the following hypotheses are developed:

H1. AI Personality has a significant effect on PayTech App Usage

H2. AI Personality has a significant effect on Perceived Trust

H3. Perceived Trust has a significant effect on Paytech App Usage

H4. Perceived Trust has an effect on Customer Loyalty

H5. Paytech App Usage has a significant effect on Customer Loyalty

H6. Perceived Trust mediates the relationship between AI Personality and Paytech Usage

H7. Perceived Trust mediates the relationship between AI Personality and Customer Loyalty.

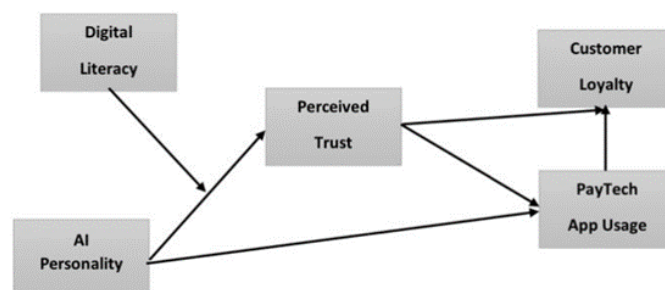
H8. Digital literacy moderates the relationship between AI Personality and Perceived Trust

2. Research Methods

This study adopts a quantitative survey approach to examine the relationships among AI personality, perceived trust, PayTech application usage, and customer loyalty. The analysis was conducted using Covariance-Based Structural Equation Modeling (CB-SEM) with AMOS, which is appropriate for theory testing and confirmation. CB-SEM was selected because it allows researchers to evaluate the goodness of fit between a theoretically grounded model and the empirical covariance matrix, making it suitable for studies that draw upon established theoretical frameworks (Hair et al., 2013).

The target population consists of individuals who actively use digital payment applications in Indonesia, such as DANA, OVO, GoPay, and ShopeePay. A purposive sampling technique was applied to ensure that the respondents met specific criteria relevant to the research aims. The inclusion criteria required participants to be at least 18 years of age, to have used a PayTech application within the past three months, and to have completed at least one transaction during that period. Following the recommendation of Hair et al. (2019), a minimum of five respondents per estimated parameter was applied; with 45 parameters, the required minimum sample size was 225 respondents.

Data were collected online through Google Forms and distributed via social media platforms and PayTech user communities. The questionnaire consisted of demographic items and research constructs measured using a semantic differential scale ranging from 1 to 10. This scale presents bipolar adjective pairs along a continuum, allowing assessment of both the intensity and direction of respondents' perceptions (Osgood et al., 1957). The study employed a cross-sectional design, capturing data at a single point in time to examine the structural relationships among variables without influencing or manipulating them (Creswell, 2014). The collected data were processed using IBM SPSS 22.0 for preliminary analyses and AMOS 24 for model estimation and hypothesis testing. CB-SEM was used to evaluate the structural model and to test the direct, indirect, and moderating effects proposed in the conceptual framework. The conceptual model used to illustrate the research framework is presented below.



Source: Research Findings, 2025

Fig 1. Research Framework

Table 1. Source of Variables Indicators

Variable	Indicators	Source
AI Personality	System empathy. System competence. Response consistency. Human-likeness.	Akhtar et al. (2025), Han et al. (2024)
Perceived Trust	Integrity. Competence. Benevolence. Reliability.	Kim & Kim (2023), Luo et al. (2024)
PayTech App Usage	Frequency of use. Variation of use. Continuation intention.	Zhang et al. (2024), Li & Wang (2024)
Customer Loyalty	Behavioral loyalty. Attitudinal loyalty. Resilience to turnover. Advocacy.	Xu et al. (2024), Tian (2024)
Digital Literacy	Technical skills. Data security awareness.	Hassan et al. (2024); Rahman et al. (2024)

3. Result and Discussion

Based on the characteristics of the respondents, this study involved 225 participants with a balanced gender proportion, namely 51.6% male and 48.4% female. The majority of respondents came from the productive age group, namely 18–24 years (40%) and 25–34 years (30.7%), indicating that the main users of digital payment applications (PayTech) are dominated by the younger generation who are adaptive to technology. From the type of application used, DANA is the most popular platform (40.9%), followed by ShopeePay (25.8%), GoPay (19.1%), and OVO (14.2%). Meanwhile, the frequency of use shows high intensity, with 43.6% of respondents using PayTech 3–4 times per week and 21.8% more than 5 times. These findings indicate that respondents are active users, so the data obtained is relevant to analyze the relationship between trust, usage, and loyalty to PayTech services. A summary of the characteristics of the respondents can be seen in the table below:

Table 2. Respondent Characteristics

Characteristics	Attribute	Total	%
Gender	Male	116	51,6
	Female	109	48,4
Age	<18 Years Old	37	16,4
	18-24 Years Old	90	40
	25-34 Years Old	69	30,7
	35-44 Years Old	27	12
	≥45 Years Old	2	0,9
Applications PayTech Used	Dana	92	40,9
	Ovo	32	14,2
	Gopay	43	19,1
	ShopeePay	58	25,8

<i>Characteristics</i>	<i>Attribute</i>	<i>Total</i>	<i>%</i>
<i>Frequency of use of the PayTech application every week</i>	1-2	78	34,6
	3-4	98	43,6
	≥ 5	49	21,8

Source: Research Findings, 2025

To ensure data validity, the basic assumptions of SEM were tested before testing the structural model (Hair et al., 2013). The test results showed that the critical ratio values for skewness and kurtosis were within the range of ± 2.58 , indicating that the data were relatively normally distributed. This indicates that the distribution of the research data met the standards of normality and allowed for additional model testing. Outlier tests were also conducted at the univariate and multivariate levels. The minimum and maximum Z-score values for each indicator were within the range of ± 3 at the univariate level, indicating that there were no significant outlier observations. Meanwhile, at the multivariate level, the highest Mahalanobis distance value was compared with the chi-square value of the table. The analysis results showed that there were no observations with Mahalanobis values above the critical chi-square value, so the results of the assumption test indicate that the research data met the criteria for normality and did not contain outliers. In addition, the highest Mahalanobis distance value was compared with the chi-square value of the table at the multivariate level.

Table 3. Measurement, Loadings, CR and VE

<i>No</i>	<i>Questionnaire Statements</i>	<i>Construct</i>	<i>Indicator</i>	<i>Loading</i>	<i>CR</i>	<i>VE</i>
1	The AI feature in the PayTech app feels like it understands my needs.	AI Personality	AIP1	0,795	0,87	0,62
2	I often use the PayTech application for various transactions.		AIP2	0,794		
3	AI features provide consistent responses.		AIP3	0,771		
4	The AI features feel like a human-like digital assistant.		AIP4	0,795		
5	I believe the PayTech application can be trusted in managing transactions.	Perceived Trust	PT1	0,744	0,78	0,46
6	I am sure that the PayTech application has reliable system capabilities.		PT2	0,661		
7	I feel that the PayTech application cares about the interests of its users.		PT3	0,624		

The Influence of AI Personality on Trust and Loyalty in Pay Tech: The Moderating Role of Digital Literacy

<i>No</i>	<i>Questionnaire Statements</i>	<i>Construct</i>	<i>Indicator</i>	<i>Loading</i>	<i>CR</i>	<i>VE</i>
8	I believe the PayTech app works well every time I use it.	PayTech App Usage	PT4	0,691	0,73	0,47
9	I often use the PayTech application for various transactions.		PTAU1	0,729		
10	I use the PayTech app for various purposes, such as payments.		PTAU2	0,612		
11	I plan to continue using the PayTech app in the future.		PTAU3	0,712		
12	I still use the PayTech app even though there are other similar apps.	Customer Loyalty	CL1	0,669	0,80	0,50
13	I would recommend the PayTech app to others.		CL2	0,681		
14	I am not interested in switching to another digital payment app.		CL3	0,784		
15	I often encourage others to use the PayTech apps that I use.		CL4	0,695		
16	I have a good understanding of how to use the digital features in the PayTech application.	Digital Literacy	DL1	0,792	0,78	0,64
17	I know how to keep my personal data safe when using the PayTech app.		DL2	0,82		

Source: Research Findings, 2025

The Influence of AI Personality on Trust and Loyalty in Pay Tech: The Moderating Role of Digital Literacy

Construct validity and reliability tests were conducted after the assumption testing stage in the SEM analysis. Reliability reflects the level of consistency of measurement results, while validity indicates the extent to which indicators are able to accurately represent the construct being measured (Hair et al., 2013). The test results showed that all indicators had factor loading values of more than 0.40, indicating that convergent validity criteria were met. In addition, each construct showed a Construct Reliability (CR) value above 0.70 and a Variance Extracted (VE) value of more than 0.50, which means all constructs met reliability standards. Based on these results, the research instrument was declared feasible, valid, and reliable for use in structural model analysis.

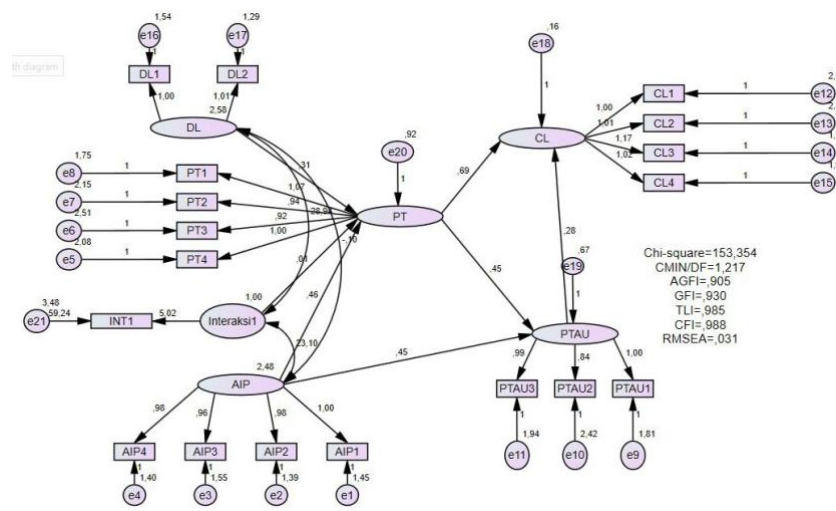


Fig 2. Research Model AMOS Result

Table 4. Goodness of Fit (Gof) SEM-AMOS Model

<i>Goodness of Fit</i>	<i>Analysis Result</i>	<i>Cut of Value</i>	<i>Model Evaluation</i>
<i>Chi-Square</i>	153,354	Expected small	Marginal Fit
<i>CMIN/DF</i>	1,217	< 2.000	Good Fit
<i>AGFI</i>	0,905	> 0.90	Fit
<i>GFI</i>	0,930	> 0.90	Fit
<i>TLI</i>	0,985	> 0.95	Good Fit
<i>CFI</i>	0,988	> 0.95	Good Fit
<i>RMSEA</i>	0,031	< 0.80	Fit

Source: Research Findings, 2025

The results of the Goodness of Fit test indicate that the research model is in the feasible category. The Chi-Square value of 153.354 indicates a marginal fit, while the CMIN/DF (1.217), AGFI (0.905), and GFI (0.930) meet the good fit criteria. The TLI (0.985) and CFI (0.988) indices also indicate a good fit, while the RMSEA (0.031) indicates a low level of approximation error. Thus, this model is considered appropriate and suitable for use in further structural analysis (Hair et al., 2019; Ferdinand, 2016).

Hypothesis testing in this study aims to identify and analyze causal relationships between latent variables estimated in the structural model. (Hair et al., 2013). The testing procedure was carried out using the Structural Equation Modeling (SEM) approach through path analysis using AMOS software version 24. Evaluation of the results of hypothesis testing is based on the critical ratio (CR) or t-value and probability value (p-

value). The hypothesis is declared significant and accepted if the p-value is <0.05 , while the direction of influence between variables is determined based on the positive or negative sign of the t-value obtained. (Hair et al., 2013).

Table 5. Hypothesis Testing Result

Influence Relationship			Estimate	S.E.	C.R.	P	Decision
PT	<---	AIP	0,457	0,066	6,923	0,000	<i>Supported</i>
PTAU	<---	AIP	0,451	0,078	5,749	0,000	<i>Supported</i>
PTAU	<---	PT	0,447	0,095	4,686	0,000	<i>Supported</i>
CL	<---	PT	0,689	0,116	5,955	0,000	<i>Supported</i>
CL	<---	PTAU	0,28	0,091	3,092	0,002	<i>Supported</i>
PT	<---	DL	0,311	0,058	5,394	0,000	<i>Supported</i>
PT	<---	Interaksi1	0,006	0,001	4,501	0,000	<i>Supported</i>

Source: Research Findings, 2025

The structural model results show that all hypothesized relationships are statistically significant. AI Personality positively influences Perceived Trust ($\beta = 0.457$, $p < 0.05$) and PayTech App Usage ($\beta = 0.451$, $p < 0.05$), indicating that users tend to trust and use the application more when the AI displays favorable personality traits. Perceived Trust also has a strong positive effect on PayTech App Usage ($\beta = 0.447$, $p < 0.05$) and Customer Loyalty ($\beta = 0.689$, $p < 0.05$), emphasizing trust as a key driver of both user engagement and long-term loyalty. Similarly, PayTech App Usage contributes significantly to Customer Loyalty ($\beta = 0.280$, $p = 0.002$). Digital Literacy shows a positive impact on Perceived Trust ($\beta = 0.311$, $p < 0.05$), suggesting that users with higher digital skills are more likely to trust PayTech systems. The significant interaction effect ($\beta = 0.006$, $p < 0.05$) confirms that Digital Literacy strengthens the influence of AI Personality on Perceived Trust.

Table 6. Indirect Effect

Indirect Effect	Estimate	Lower	Upper	P	Decision
AIP→PT→CL	0,315	0,199	0,46	0,003	<i>Supported</i>
AIP→PTAU→CL	0,057	0,024	0,123	0,01	<i>Supported</i>
AIP→PT→PTAU→CL	0,126	0,042	0,23	0,015	<i>Supported</i>

Source: Research Findings, 2025

The analysis of indirect effects indicates that all mediation pathways are statistically significant. First, AI Personality indirectly influences Customer Loyalty through Perceived Trust ($\beta = 0.315$, $p = 0.003$), showing that higher AI Personality enhances loyalty when trust is strengthened. AI Personality also exhibits a significant indirect effect on Customer Loyalty through PayTech App Usage ($\beta = 0.057$, $p = 0.010$), suggesting that users engage more with the application when the AI displays positive personality traits, which subsequently increases loyalty. Moreover, the sequential mediation pathway between AI Personality, Perceived Trust, PayTech App Usage, Customer Loyalty is also significant ($\beta = 0.126$, $p = 0.015$), indicating that AI Personality enhances trust, which then promotes app usage and ultimately strengthens customer loyalty. All confidence

intervals fall within the positive range, confirming the robustness of these mediation effects.

This study shows that artificial intelligence (AI) personality plays a crucial role in building user trust in digital payment (PayTech) services. When AI is perceived as friendly, empathetic, and communicative, users feel more secure and trust the system. This aligns with the findings of Schrank (2025) and Gonçalves et al. (2022), who found that human-like perceptions of AI increase perceived trust and strengthen user engagement. AI personality has also been shown to drive increased usage of PayTech applications. AI designed with an empathetic approach creates a more personalized and enjoyable experience (Lee & Kim, 2024). User trust is a key factor in building loyalty, as a sense of security in the system encourages users to stay and recommend the service to others (Oliveira et al., 2017; Zhao et al., 2022). Loyalty here is based not only on functional satisfaction but also on emotional beliefs that arise from repeated positive experiences (Oliver, 1999). Furthermore, digital literacy has been shown to strengthen the relationship between AI personality and trust. Users with high digital literacy are better able to understand system security and interact effectively with technology (Pudin et al., 2024). These results are consistent with Tesfaye and Zelalem (2025), who asserted that digital literacy plays a reinforcing role in building trust and adopting financial technology. Overall, this study confirms that perceived trust and application usage act as a bridge between AI personality and customer loyalty. A positive AI personality fosters trust and user engagement, ultimately strengthening long-term loyalty (Budiyanto et al., 2025).

The findings of this study provide several important insights for PayTech service providers and AI developers. Companies need to enhance the personality of their AI features by designing systems that communicate in a warm, empathetic, and consistent manner, as these characteristics have been shown to increase user trust and encourage greater application usage. Strengthening trust-building elements such as transparent security notifications, clear explanations of data protection, and timely fraud alerts will further reinforce users' confidence in the platform. In addition, the study shows that digital literacy plays a crucial moderating role, which means PayTech providers should invest in educational initiatives that help users better understand the technology they use. This can be supported through intuitive in-app tutorials, simple guidance, or awareness programs aimed at improving technological proficiency. By combining well-developed AI personality features, strong trust mechanisms, and digital literacy support, providers can improve user engagement, strengthen customer loyalty, and build a more sustainable and competitive PayTech ecosystem.

4. Conclusion and Recommendations

This study shows that AI personality significantly enhances perceived trust, PayTech app usage, and customer loyalty. AI that communicates in a friendly and empathetic manner increases user confidence, and this trust subsequently drives greater engagement and long-term loyalty. Perceived trust and usage act as important mediators, demonstrating that loyalty is shaped not only by functional performance but also by users' comfort in interacting with AI. Digital literacy is also found to strengthen the effect of AI personality on trust, indicating that users who better understand digital systems are more likely to interpret AI behaviour positively. These findings suggest that PayTech providers should design AI with human-like and user-friendly characteristics, improve trust communication, and support digital literacy initiatives to strengthen user engagement and retention. This study has several limitations. The cross-sectional design limits causal

conclusions, purposive sampling may reduce generalizability, and the focus on a single PayTech platform does not capture variations across different services. Future studies should use longitudinal methods, involve more diverse samples, and examine additional mediators or moderators such as cultural factors, privacy concerns, or AI transparency to deepen understanding of user AI relationships in digital finance.

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