



ASSESSING THE IMPACT OF BANKING FINTECH INNOVATION ON BANK SELECTION BEHAVIOUR: EVIDENCE FROM DUAL BANKING MARKETS IN INDONESIA

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Abstract

This study examines the effects of Banking Fintech and Financial Literacy on Banking Consumer Behaviour, with Perceived Bank Risk as an intervening variable within Indonesia's dual banking system. A quantitative cross-sectional survey was conducted involving 500 banking customers, including conventional and Islamic bank users. Data were collected using a structured five-point Likert-scale questionnaire and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4. The analysis included measurement model assessment, structural model evaluation, direct effects, and mediation analysis using 5,000 bootstrap samples. The results show that Banking Fintech significantly affects Perceived Bank Risk ($\beta = 0.178$; $p = 0.021$) and Banking Consumer Behaviour ($\beta = 0.349$; $p < 0.001$). Financial Literacy significantly affects Perceived Bank Risk ($\beta = 0.302$; $p < 0.001$) and has the strongest direct effect on Banking Consumer Behaviour ($\beta = 0.505$; $p < 0.001$). Perceived Bank Risk also significantly affects Banking Consumer Behaviour ($\beta = 0.107$; $p < 0.001$). Furthermore, Perceived Bank Risk significantly mediates the effects of Banking Fintech ($\beta = 0.019$; $p = 0.048$) and Financial Literacy ($\beta = 0.032$; $p = 0.003$) on Banking Consumer Behaviour. The findings highlight the importance of financial capability and digital banking innovation in shaping banking consumer behaviour.

Keywords: Banking Fintech; Financial Literacy; Perceived Bank Risk; Banking Consumer Behaviour; Dual Banking System.

1. INTRODUCTION

The banking industry has undergone substantial transformation as technological innovation has changed the way financial institutions deliver services and interact with customers. Activities that previously required customers to visit bank branches can now be completed through mobile banking applications, internet banking, digital payment systems, QR-based transactions, and other technology-enabled financial services.



These developments have changed not only the delivery of banking services but also the criteria customers use to evaluate financial institutions and make banking decisions. Consequently, digital capability has become an increasingly important element of competition in the banking industry, influencing service accessibility, operational efficiency, customer experience, and institutional competitiveness (Boot et al., 2021; Gomber et al., 2018; I. Lee & Shin, 2018; Thakor, 2020). Beyond customer-facing innovation, digital technology adoption and corporate governance are also relevant to understanding strategic budgeting and organisational competitiveness (Hendratni & Fikri, 2026). The implications of this transformation extend beyond technology adoption because customers must also evaluate the reliability, security, and financial implications of using digital banking services.

Financial technology has encouraged banks to redesign traditional business models, integrate digital channels, and develop services that offer greater convenience and efficiency. These changes have also reduced the extent to which customers rely exclusively on physical interactions when evaluating banking services (Gomber et al., 2018; I. Lee & Shin, 2018; Vives, 2019). The transformation of conventional banking services through financial technology also highlights the changing competitive relationship between established banking institutions and fintech providers (Hendratni & Kristina, 2026). Nevertheless, technological innovation may generate competing perceptions. Digital services can simplify transactions and improve accessibility, but they can also expose customers to concerns regarding fraud, privacy violations, unauthorised transactions, and system failures. More broadly, digitalisation of financial reporting has been examined in relation to organisational transparency and information accuracy, providing a complementary perspective on the role of digital systems in financial management (Hendratni, 2025). Previous research has demonstrated that the interaction between fintech and the banking sector affects institutional performance and competitive dynamics, highlighting the importance of understanding how technological developments influence customer-related outcomes (Phan et al., 2020; Thakor, 2020). Therefore, examining the relationship between banking fintech and consumer behaviour requires attention not only to the benefits of digital services but also to how customers evaluate potential risks.

These issues are particularly relevant in emerging economies, where digital financial services can expand access to banking facilities and provide alternatives to conventional service channels. In Indonesia, the integration of mobile banking, digital payments, and QR-based transactions has increased the relevance of digital capability in customers' banking experiences. Previous studies of Indonesian consumers have identified convenience, security, fintech knowledge, and digital service characteristics as relevant considerations in technology-based financial service usage (Hendi & Keni, 2023; Sebayang et al., 2023). Research on open banking has similarly indicated that consumers' adoption decisions are influenced by their evaluations of



the benefits and characteristics of digital financial services (Chan et al., 2022). Despite these developments, understanding digital banking behaviour remains important because customers' decisions may depend simultaneously on technological attributes, financial knowledge, and perceptions of risk rather than on convenience alone.

Indonesia also provides a relevant setting for examining these relationships because conventional and Islamic banks operate within the same financial system. Customers may evaluate banking alternatives according to service quality, accessibility, product characteristics, financial considerations, institutional preferences, and religious considerations where relevant. Previous research has investigated bank-selection criteria, customer preferences, and the use of Islamic financial services (Rama & Wiranata, 2024; Rusydiana & Hasib, 2019). Recent research has also examined the relationship between fintech and customer preferences in banking service selection, reinforcing the relevance of technological innovation to understanding bank-selection behaviour (Hendratni, Permata, et al., 2026). Other studies have examined individual and institutional factors associated with customers' orientations towards Islamic banking (Nugraha et al., 2022). In addition, customer switching behaviour has become an important consideration in understanding how banking customers reassess their banking relationships (Mochlasin et al., 2023). However, bank selection does not necessarily require customers to maintain an exclusive relationship with either conventional or Islamic banks. Customers may use several banking institutions simultaneously for different financial purposes, making it important to understand both their banking preferences and the factors associated with their selection behaviour.

Financial literacy constitutes another important factor in this context. It encompasses the knowledge, skills, attitudes, and behaviours that enable individuals to understand financial information and make informed financial decisions. Individuals with stronger financial capabilities may be better equipped to compare financial products, understand service costs and benefits, and evaluate the potential consequences of financial decisions (Morgan & Trinh, 2019; OECD, 2023). Previous research has associated financial literacy with digital financial behaviour and internet banking behaviour, suggesting that financial capability is relevant to customers' engagement with technology-based financial services (Andreou & Anyfantaki, 2021). Research in Indonesia has also highlighted the importance of financial literacy in financial behaviour and decision-making (Dewi et al., 2020). Within a dual banking environment, financial literacy may help customers evaluate differences between conventional and Islamic banking products, understand transaction mechanisms, and assess the financial implications of the available alternatives (Fahmi et al., 2024; Setiawan, 2023). Accordingly, financial literacy may contribute to banking selection behaviour both directly and through the way customers evaluate banking-related risks.



Perceived bank risk is particularly important because the use of banking services involves customers' financial resources, personal information, and interactions with digital systems. Customers may consider potential financial losses, transaction errors, privacy violations, fraudulent activities, and technological failures when deciding whether to use or maintain a relationship with a particular bank. Perceived risk generally refers to uncertainty about possible negative consequences associated with a decision or transaction (Featherman & Pavlou, 2003). Previous studies have demonstrated that perceived risk can influence consumer attitudes and decisions concerning internet banking and other digital financial services (M.-C. Lee, 2009; Leong et al., 2022). Research on digital banking has also highlighted the relevance of customers' risk perceptions to their intentions to use digital banking services (Hartono et al., 2023; Louis & Kurnia Fajar Afgani, 2024). Moreover, perceived risk has been examined as a mediating mechanism in the relationship between technology-related considerations and digital financial behaviour, including digital wallet usage (Khan & Abideen, 2023). These findings suggest that perceived bank risk may function not only as a direct correlate of banking consumer behaviour but also as an intervening mechanism linking customers' technological evaluations and financial capabilities to their banking decisions.

Although previous studies provide valuable insights into fintech adoption, financial literacy, perceived risk, and bank selection, these research streams have generally examined different components of the decision-making process. Studies of fintech and digital banking have primarily investigated technology adoption, service characteristics, and customers' intentions to use digital financial services (Dianty & Faturohman, 2023; Jain & Raman, 2022; Ryu, 2018). Research on Islamic mobile banking has focused on adoption intentions and the characteristics influencing customers' use of digital banking services (Sudarsono et al., 2022; Suhartanto et al., 2019). Other studies have examined financial literacy and financial behaviour, while research on perceived risk has explored its influence on technology acceptance and its mediating role in digital financial service usage (Andreou & Anyfantaki, 2021; Khan & Abideen, 2023). Research on Islamic banking has also investigated customer preferences, financial literacy, and bank-selection considerations (Fahmi et al., 2024; Rama & Wiranata, 2024; Setiawan, 2023). These studies establish important foundations, but their respective emphases leave room for a more integrated examination of technological, cognitive, and risk-related factors within a single bank-selection framework.

The specific research gap addressed by this study is the limited integration of banking fintech and financial literacy as simultaneous predictors of banking consumer behaviour, with perceived bank risk examined as an intervening variable, particularly among customers operating within Indonesia's dual banking environment. Rather than examining fintech adoption or financial literacy independently, this study incorporates both constructs into an integrated model to assess



their relationships with perceived bank risk and banking consumer behaviour. It further evaluates whether perceived bank risk statistically mediates the relationships between banking fintech and banking consumer behaviour, as well as between financial literacy and banking consumer behaviour. The study also provides descriptive evidence on banking usage patterns among conventional and Islamic bank customers, including the extent to which respondents maintain relationships with multiple banks. The descriptive comparison is intended to contextualise the findings within Indonesia's dual banking environment rather than to establish statistically significant differences between the two groups.

Addressing this research gap is important from both academic and practical perspectives. Academically, integrating banking fintech, financial literacy, and perceived bank risk offers a broader framework for understanding the relationships between technological innovation, financial capability, and banking selection behaviour. Examining the indirect relationships through perceived bank risk also provides insight into a possible mechanism through which technology-related and cognitive factors are associated with consumer decisions. From a practical perspective, the findings may help banks identify the relative importance of digital service characteristics and financial literacy in customer decision-making. Understanding the role of perceived risk may also inform efforts to improve communication about digital security, strengthen customer confidence, and support more informed use of banking services. For financial institutions operating in Indonesia's dual banking system, these insights are relevant to developing customer-oriented digital services while recognising that customers may maintain several banking relationships rather than selecting only one banking institution.

Against this background, this study has three objectives. First, it examines the relationships of banking fintech and financial literacy with perceived bank risk and banking consumer behaviour. Second, it assesses the relationship between perceived bank risk and banking consumer behaviour and evaluates the mediating role of perceived bank risk in the relationships between banking fintech and banking consumer behaviour and between financial literacy and banking consumer behaviour. Third, it describes banking usage patterns among conventional and Islamic bank customers in Indonesia, including the use of multiple banking institutions. By addressing these objectives, the study seeks to contribute an integrated empirical perspective on the relationships between digital banking innovation, financial capability, perceived risk, and banking selection behaviour in an emerging dual banking market.

2. LITERATURE REVIEW

2.1 Banking Fintech and Perceived Bank Risk

Banking fintech represents the integration of financial technology into banking activities to increase service convenience, efficiency, accessibility, security, and reliability. Technological



innovation has become an important source of competition in banking and has changed the ways financial institutions deliver value to customers (Boot et al., 2021; Gomber et al., 2018; Vives, 2019).

The relationship between banking fintech and perceived bank risk is multidimensional. Digital services can improve security through authentication systems, transaction monitoring, and automated controls, but they can also generate new concerns regarding data breaches, fraud, system failure, and privacy. Ryu (2018) demonstrates that perceived risk is an important factor in consumers' willingness or hesitation to use fintech services. Similarly, research on digital financial entrepreneurship and technology-driven financial services highlights the continuing importance of security and consumer trust in digital environments (Leong et al., 2022). In Indonesia, customer responses toward digital banking are also associated with security, convenience, and knowledge of fintech (Hendi & Keni, 2023), while mobile banking selection has been associated with the characteristics of digital services offered by banks (Sebayang et al., 2023).

Accordingly, technological characteristics may affect the way customers evaluate the potential risks associated with banking services.

H1: Banking fintech has a significant effect on perceived bank risk.

2.2 Financial Literacy and Perceived Bank Risk

Financial literacy enables consumers to understand financial concepts, evaluate available alternatives, and apply financial information to practical decisions. International evidence indicates that financial literacy is associated with more informed financial behaviour, while evidence from emerging markets demonstrates its relevance to financial decision-making (Morgan & Trinh, 2019; OECD, 2023).

The relationship between financial literacy and risk perception is not necessarily negative. A financially knowledgeable customer may be more capable of identifying the risks associated with financial products and digital transactions. Consequently, greater financial literacy may result in more conscious rather than simply lower risk perceptions. Hermansson & Jonsson (2021) found a relationship between financial literacy and attitudes toward financial risk, supporting the view that financial knowledge influences the way individuals evaluate uncertainty.

Financial literacy is also increasingly relevant in digital financial environments. Research on internet banking behaviour suggests that financial capability may influence how consumers engage with digital banking services (Andreou & Anyfantaki, 2021). Thus, the ability to understand financial and technological information may shape customers' assessment of security, financial, and privacy-related risks.

H2: Financial literacy has a significant effect on perceived bank risk.



2.3 Banking Fintech and Banking Consumer Behaviour

Banking Consumer Behaviour includes customers' evaluation of banking alternatives, preferences, intentions, and selection decisions. As digital banking has become part of everyday financial activity, technological capability can form part of the overall value proposition of a banking institution.

Customers may value banks that provide convenient applications, fast transactions, accessible services, secure systems, and reliable digital infrastructure. Technology-related characteristics can influence customer attitudes and usage intentions (Chan et al., 2022; Ryu, 2018). Evidence from fintech lending in Indonesia similarly suggests that consumer acceptance is shaped by perceptions of technology-based financial services (*Dianty & Faturohman, 2023*). More broadly, PLS-based research on digital finance adoption indicates that technology-related perceptions can help explain consumer adoption decisions (*Jain & Raman, 2022*).

In mobile banking, the relevance of these factors has also been observed among Islamic banking customers. Suhartanto et al. (2019) showed that adoption of mobile banking services within Islamic banking is associated with customer evaluations of digital service characteristics, while Sudarsono et al. (2022) examined mobile banking intentions among Muslim customers of Indonesian Islamic banks. These findings suggest that digital banking capability may influence banking-related behaviour beyond simple technology adoption.

H3: Banking fintech has a significant effect on banking consumer behaviour.

2.4 Financial Literacy and Banking Consumer Behaviour

Bank selection requires customers to process information concerning products, fees, services, accessibility, benefits, and potential risks. Financial literacy provides the knowledge and skills required to perform these comparisons. *Morgan & Trinh (2019)* demonstrate the relevance of financial literacy to financial decision-making, while OECD (2023) identifies financial knowledge and skills as important components of informed financial decision-making.

Financial literacy is also connected with digital financial behaviour. *Andreou & Anyfantaki (2021)* show that financial literacy is associated with internet banking behaviour, indicating that consumers' financial capability can influence their interaction with digital financial services. In Indonesia, evidence on financial literacy similarly suggests that financial knowledge is associated with financial behaviour and decision-making (*Dewi et al., 2020*).

Within Indonesia's dual banking system, financial literacy can help customers understand differences between conventional and Islamic banking products. Research on becoming an Islamic



bank customer identifies Islamic financial literacy as one component of customers' decisions, while studies of Islamic banking perceptions and mobile banking decisions also point to the importance of financial knowledge in customer choice (Fahmi et al., 2024; Kresnowati, 2023; Setiawan, 2023).

H4: Financial literacy has a significant effect on banking consumer behaviour.

2.5 Perceived Bank Risk and Banking Consumer Behaviour

Perceived risk is an established component of consumer decision-making and technology acceptance (Featherman & Pavlou, 2003; M.-C. Lee, 2009). In banking, customers may consider possible financial losses, security problems, data misuse, fraud, and transaction failure when assessing whether a particular service or bank is appropriate. From a stewardship perspective, banking institutions' responsibility for protecting depositor interests and maintaining financial system stability provides a broader institutional context for understanding banking-related risk (Hendratni, 2026).

Research on digital banking has demonstrated the continuing relevance of risk perceptions in customers' intentions to use digital banks (Hartono et al., 2023; Louis & Kurnia Fajar Afgani, 2024). The relationship between risk and behaviour is not limited to banking apps. *Khan & Abideen (2023)* found that perceived risk can function as a mediating factor in digital wallet usage, showing that risk perceptions can be embedded in the broader process through which consumers evaluate digital financial services.

Accordingly, customers' perceptions of bank-related risk are expected to be associated with their banking preferences, intentions, and selection decisions.

H5: Perceived bank risk has a significant effect on banking consumer behaviour.

2.6 Perceived Bank Risk as an Intervening Variable

Perceived Bank Risk is positioned as an intervening construct because both Banking Fintech and Financial Literacy may shape customers' risk evaluations before those evaluations are translated into banking behaviour.

The first mediation path concerns Banking Fintech. Improvements in digital technology can increase convenience and efficiency while simultaneously making customers more aware of security, privacy, and financial-loss concerns. The coexistence of technological benefits and risk perceptions means that the influence of fintech on banking behaviour may partly operate through customers' evaluation of risk.



The second mediation path concerns Financial Literacy. Financially literate customers may have greater ability to recognise and evaluate potential risks associated with financial services. Their resulting risk assessments can then contribute to subsequent banking decisions. This interpretation is consistent with evidence that perceived risk can mediate relationships between consumer characteristics and digital financial behaviour (*Khan & Abideen, 2023*) and that financial literacy and perceived risk can interact in financial-product decision contexts (*Wulan et al., 2024*).

The intervening role of Perceived Bank Risk therefore provides a more complete explanation of how technological and cognitive factors may translate into Banking Consumer Behaviour.

H6: Perceived bank risk mediates the relationship between banking fintech and banking consumer behaviour.

H7: Perceived bank risk mediates the relationship between financial literacy and banking consumer behaviour.

2.7 Research Hypotheses and Conceptual Framework

The proposed research model positions Banking Fintech (X1) and Financial Literacy (X2) as exogenous constructs, Perceived Bank Risk (Y1) as the intervening construct, and Banking Consumer Behaviour (Y2) as the endogenous outcome.

The model contains five direct relationships represented by H1–H5 and two indirect relationships represented by H6–H7.

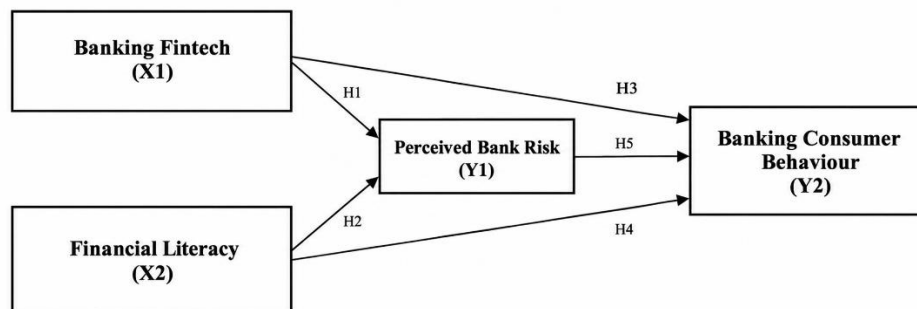


Figure 1. Conceptual Framework of the Study

The framework integrates technological, financial, and risk-related dimensions to explain Banking Consumer Behaviour within Indonesia's dual banking environment.



3. METHODOLOGY

3.1 Research Design and Participants

This study used a quantitative research approach with a cross-sectional survey design. The research design was selected because the study aimed to examine relationships among measurable constructs using structured questionnaire data (Creswell & Creswell, 2023).

A total of 500 respondents participated in the study. Respondents were individuals residing in Indonesia who actively used banking services. A non-probability sampling approach was employed based on predetermined respondent criteria. The questionnaire was distributed once, and respondents were asked to provide information regarding their banking usage and perceptions of the research constructs.

Respondents included users of conventional and Islamic banks. They were asked to identify their primary bank type, allowing the study to provide a descriptive comparison of the two groups. This comparison was not treated as a formal multi-group statistical test.

3.2 Measurement of Variables

Four main constructs were included in the research model.

Banking Fintech (X1) was measured using five dimensions: convenience, efficiency, accessibility, security, and reliability. These dimensions capture the technological characteristics of banking services that are relevant to customer evaluation (Hendi & Keni, 2023; Sebayang et al., 2023).

Financial Literacy (X2) was measured through financial knowledge, financial skills, and financial behaviour. The conceptualisation follows the broader OECD/INFE understanding of financial literacy and prior research concerning financial literacy and financial behaviour (Andreou & Anyfantaki, 2021; Dewi et al., 2020; OECD, 2023).

Perceived Bank Risk (Y1) was measured through security risk, financial risk, and privacy risk. These dimensions reflect customer concerns regarding possible negative consequences of banking and digital financial transactions (Featherman & Pavlou, 2003; M.-C. Lee, 2009).

Banking Consumer Behaviour (Y2) was measured through bank preference, selection intention, and selection decision. The construct reflects the behavioural process through which customers evaluate and select financial institutions, including considerations relevant to Islamic and conventional bank choice (Rama & Wiranata, 2024; Rusydiana & Hasib, 2019).



3.3 Research Instrument

All measurement items were assessed using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

The questionnaire also collected respondent characteristics, including gender, age, education, occupation, income, duration of bank usage, frequency of banking usage, most frequently used service, number of banks used, and primary bank type.

3.4 Data Collection Procedure

The questionnaire was distributed to active banking users in Indonesia. Data collection was conducted as a one-time survey. Respondents from both conventional and Islamic banking contexts were included so that the study could describe banking usage patterns within the country's dual banking environment.

The descriptive component of the study was designed to identify observable patterns in customer characteristics and banking usage. In particular, the study examined the extent of multi-banking behaviour and differences in the most frequently used digital banking services.

3.5 Data Analysis

The data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4. PLS-SEM was selected because the study focuses on latent constructs and the estimation of multiple relationships within an integrated structural model (Hair et al., 2022).

The analysis consisted of measurement-model assessment, structural-model assessment, and hypothesis testing. The measurement model was evaluated using outer loadings, Cronbach's alpha, ρ_A , composite reliability, Average Variance Extracted (AVE), and discriminant validity using HTMT. Collinearity was assessed using VIF.

The structural model was evaluated using R^2 , adjusted R^2 , f^2 effect sizes, path coefficients, and relevant model-fit information. Hypotheses were tested using a bootstrapping procedure with 5,000 bootstrap samples and a two-tailed significance level of 0.05.

Direct effects were assessed using path coefficients, t-statistics, and p-values. Mediation effects were assessed using specific indirect effects and bootstrap confidence intervals. The indirect effects were considered statistically meaningful when the confidence interval did not include zero.

Descriptive comparisons between conventional and Islamic bank users were presented using percentages only. No PLS-MGA, permutation test, or other inferential group-comparison procedure was conducted. Therefore, the observed differences between the two groups are interpreted descriptively.



4. RESULTS

4.1 Respondent Characteristics

The study involved 500 banking customers in Indonesia. The characteristics of the respondents are presented in Table 1.

Table 1. Main Characteristics of Respondents

Characteristics	Dominant Category	n	%
Gender	Female	294	58.8
Age	25–34 years	229	45.8
Education	Bachelor's Degree	206	41.2
Occupation	Entrepreneur	171	34.2
Monthly Income	IDR 5,000,001–8,000,000	182	36.4
Length of Bank Usage	4–5 years	223	44.6
Frequency of Bank Usage	Frequently	285	57.0
Most Frequently Used Service	QR Payment	109	21.8
Number of Banks Used	2 Banks	225	45.0
Primary Bank Type	Islamic Bank	269	53.8

Source: Primary Data, Processed by Researchers, 2026.

The results show that the respondents were predominantly female (58.8%), while the largest age group was 25–34 years (45.8%). In terms of educational background, respondents with a bachelor's degree represented the largest group (41.2%). Entrepreneurs constituted the largest occupational group (34.2%), while the most common monthly income category was IDR 5,000,001–8,000,000 (36.4%). Regarding banking experience, 44.6% of respondents had used banking services for four to five years.

The respondents also demonstrated relatively intensive engagement with banking services. A total of 57.0% reported using banking services frequently, while 20.2% reported very frequent usage. QR payment was the most frequently used banking service (21.8%). Furthermore, 45.0% of respondents used two banks, while 21.4% used three or more banks. Overall, 66.4% of respondents used more than one bank. In terms of primary bank type, 53.8% identified an Islamic bank as their primary bank, while 46.2% identified a conventional bank.

4.2 Measurement Model Assessment

The measurement model was assessed using outer loadings, Average Variance Extracted (AVE), Cronbach's alpha, composite reliability, and discriminant validity. The results are presented in Table 2.



Table 2. Results of Outer Model Assessment

Construct	Outer Loading	AVE	Cronbach's Alpha	Composite Reliability	Conclusion
Banking Fintech (X1)	0.704–0.738	0.520	0.898	0.915	Valid and reliable
Financial Literacy (X2)	0.700–0.765	0.522	0.886	0.908	Valid and reliable
Perceived Bank Risk (Y1)	0.737–0.792	0.581	0.912	0.926	Valid and reliable
Banking Consumer Behaviour (Y2)	0.707–0.749	0.530	0.902	0.919	Valid and reliable

Source: SmartPLS 4 Output, Processed by Researchers, 2026.

All indicators achieved outer loading values above 0.70, ranging from 0.700 to 0.792. The AVE values ranged from 0.520 to 0.581, exceeding the recommended threshold of 0.50. Cronbach's alpha values ranged from 0.886 to 0.912, while composite reliability values ranged from 0.908 to 0.926. These results indicate that all constructs demonstrated adequate convergent validity and internal consistency.

Discriminant validity was further assessed using cross-loading and the Heterotrait–Monotrait ratio (HTMT). The cross-loading results indicated that each indicator had a higher loading on its respective construct than on the other constructs.

Table 3. Heterotrait–Monotrait Ratio (HTMT)

Construct	Banking Fintech	Financial Literacy	Perceived Bank Risk	Banking Consumer Behaviour
Banking Fintech	—	0.883	0.454	0.879
Financial Literacy	0.883	—	0.487	0.925
Perceived Bank Risk	0.454	0.487	—	0.520
Banking Consumer Behaviour	0.879	0.925	0.520	—

The HTMT values ranged from 0.454 to 0.925. The highest value was observed between Financial Literacy and Banking Consumer Behaviour (0.925). All HTMT values remained below 0.95, indicating acceptable discriminant validity. Overall, the measurement model demonstrated satisfactory convergent validity, discriminant validity, and construct reliability.



4.3 Collinearity Assessment

Collinearity was assessed using the Variance Inflation Factor (VIF). The results are presented in Table 4.

Table 4. Inner VIF Results

Structural Relationship	VIF
Banking Fintech → Perceived Bank Risk	2.639
Financial Literacy → Perceived Bank Risk	2.639
Banking Fintech → Banking Consumer Behaviour	2.679
Financial Literacy → Banking Consumer Behaviour	2.754
Perceived Bank Risk → Banking Consumer Behaviour	1.262

The VIF values ranged from 1.262 to 2.754. These values indicate that the structural model did not exhibit problematic multicollinearity among the predictor constructs.

4.4 Structural Model Assessment

The structural model was evaluated using the coefficient of determination (R^2), adjusted R^2 , and effect size (f^2). The results are presented in Table 5.

Table 5. Coefficient of Determination and Effect Size

Endogenous Construct	R^2	Adjusted R^2	Predictor Relationship	f^2	Effect Size
Perceived Bank Risk (Y1)	0.207	0.204	Banking Fintech → Perceived Bank Risk	0.015	Small
			Financial Literacy → Perceived Bank Risk	0.043	Small
Banking Consumer Behaviour (Y2)	0.745	0.743	Banking Fintech → Banking Consumer Behaviour	0.178	Medium
			Financial Literacy → Banking Consumer Behaviour	0.362	Large
			Perceived Bank Risk → Banking Consumer Behaviour	0.035	Small

Source: SmartPLS 4 Output, Processed by Researchers, 2026.

The R^2 value for Perceived Bank Risk was 0.207, with an adjusted R^2 of 0.204. This indicates that Banking Fintech and Financial Literacy jointly explained 20.4% of the variance in Perceived Bank Risk. Meanwhile, the R^2 value for Banking Consumer Behaviour was 0.745, with an adjusted R^2 of 0.743, indicating that Banking Fintech, Financial Literacy, and Perceived Bank Risk jointly explained 74.3% of the variance in Banking Consumer Behaviour.



The effect-size results show that Banking Fintech had a small effect on Perceived Bank Risk ($f^2 = 0.015$), while Financial Literacy also had a small effect ($f^2 = 0.043$). For Banking Consumer Behaviour, Banking Fintech had a medium effect ($f^2 = 0.178$), Financial Literacy had a relatively large effect ($f^2 = 0.362$), and Perceived Bank Risk had a small effect ($f^2 = 0.035$).

Figure 1 presents the estimated structural model obtained from the SmartPLS analysis, including the measurement loadings, path coefficients, and R^2 values for the endogenous constructs.

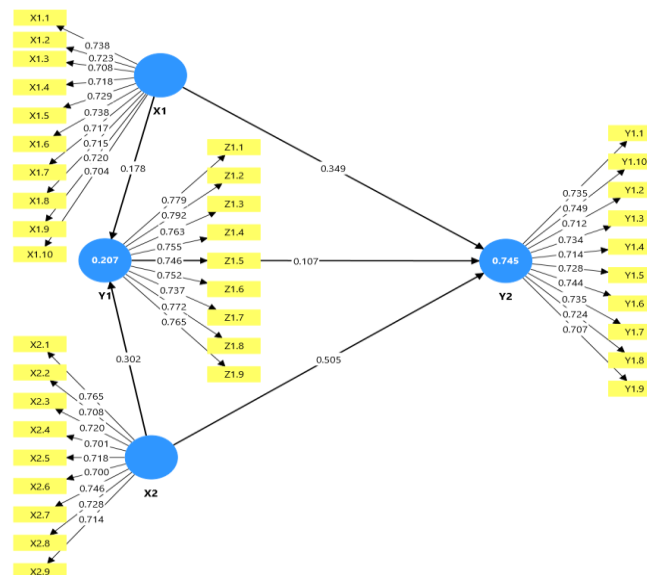


Figure 1. Structural Model Results

Source: SmartPLS 4 Output, Processed by Researchers, 2026.

Figure 1 shows that the path coefficients from Banking Fintech and Financial Literacy to Perceived Bank Risk are 0.178 and 0.302, respectively. The path coefficients from Banking Fintech, Financial Literacy, and Perceived Bank Risk to Banking Consumer Behaviour are 0.349, 0.505, and 0.107, respectively. The model also shows R^2 values of 0.207 for Perceived Bank Risk and 0.745 for Banking Consumer Behaviour.

4.5 Model Fit Assessment

The model fit results are presented in Table 6.

Table 6. Model Fit Results

Fit Index	Value
<i>SRMR</i>	0.0446
<i>NFI</i>	0.879
<i>d_ULS</i>	1.476
<i>d_G</i>	0.463
<i>Chi – square</i>	1255.483



The SRMR value was 0.0446, indicating a relatively low discrepancy between the observed and model-implied correlations. The NFI value was 0.879. The d_ULS and d_G values were 1.476 and 0.463, respectively, while the model chi-square value was 1255.483. These indices provide an assessment of the overall correspondence between the proposed structural model and the observed data.

4.6 Direct Effects and Hypothesis Testing

The hypotheses were tested using the bootstrapping procedure with 5,000 bootstrap samples and a two-tailed significance level of 5%. The results are presented in Table 7.

Table 7. Direct Effects and Hypothesis Testing

Hypothesis	Relationship	β	t-statistic	p-value	Decision
H1	Banking Fintech $\rightarrow$ Perceived Bank Risk	0.178	2.302	0.021	Supported
H2	Financial Literacy $\rightarrow$ Perceived Bank Risk	0.302	3.715	<0.001	Supported
H3	Banking Fintech $\rightarrow$ Banking Consumer Behaviour	0.349	3.774	<0.001	Supported
H4	Financial Literacy $\rightarrow$ Banking Consumer Behaviour	0.505	5.702	<0.001	Supported
H5	Perceived Bank Risk $\rightarrow$ Banking Consumer Behaviour	0.107	4.218	<0.001	Supported

The results indicate that all five direct hypotheses were statistically supported. Banking Fintech had a positive and significant relationship with Perceived Bank Risk ($\beta = 0.178$, $t = 2.302$, $p = 0.021$), supporting H1. Financial Literacy also had a positive and significant relationship with Perceived Bank Risk ($\beta = 0.302$, $t = 3.715$, $p < 0.001$), supporting H2.

Banking Fintech had a positive and significant relationship with Banking Consumer Behaviour ($\beta = 0.349$, $t = 3.774$, $p < 0.001$), supporting H3. Financial Literacy demonstrated the strongest direct relationship with Banking Consumer Behaviour ($\beta = 0.505$, $t = 5.702$, $p < 0.001$), supporting H4. Finally, Perceived Bank Risk had a positive and significant relationship with Banking Consumer Behaviour ($\beta = 0.107$, $t = 4.218$, $p < 0.001$), supporting H5.

4.7 Mediation Analysis

The mediating role of Perceived Bank Risk was examined using the indirect effects obtained from the bootstrapping procedure. The results are presented in Table 8.



Table 8. Indirect Effects and Mediation Testing

Hypothesis	Indirect Relationship	Indirect Effect	STDEV	t-statistic	p-value	Decision
H6	Banking Fintech → Perceived Bank Risk → Banking Consumer Behaviour	0.0190	0.0096	1.978	0.048	Supported
H7	Financial Literacy → Perceived Bank Risk → Banking Consumer Behaviour	0.0322	0.0109	2.961	0.003	Supported

The indirect effect of Banking Fintech on Banking Consumer Behaviour through Perceived Bank Risk was 0.0190 and statistically significant ($t = 1.978$, $p = 0.048$). The indirect effect of Financial Literacy on Banking Consumer Behaviour through Perceived Bank Risk was 0.0322 and also statistically significant ($t = 2.961$, $p = 0.003$). Therefore, both H6 and H7 were supported.

Table 9. Confidence Intervals of Indirect Effects

Indirect Relationship	Percentile 5%	Percentile 95%	Bias-Corrected 5%	Bias-Corrected 95%
Banking Fintech → Perceived Bank Risk → Banking Consumer Behaviour	0.00270	0.03944	0.00423	0.04363
Financial Literacy → Perceived Bank Risk → Banking Consumer Behaviour	0.01183	0.05427	0.01468	0.05913

The confidence intervals for both indirect effects do not include zero, providing additional evidence of statistically significant mediation. Because the corresponding direct effects remained significant, Perceived Bank Risk functions as a partial intervening mechanism in both relationships.

4.8 Total Effects

The total effects of Banking Fintech and Financial Literacy on Banking Consumer Behaviour are presented in Table 10.



Table 10. Total Effects on Banking Consumer Behaviour

Relationship	Direct Effect	Indirect Effect	Total Effect
Banking Fintech → Banking Consumer Behaviour	0.349	0.019	0.368
Financial Literacy → Banking Consumer Behaviour	0.505	0.032	0.537

The total effect of Banking Fintech on Banking Consumer Behaviour was approximately 0.368, consisting of a direct effect of 0.349 and an indirect effect of approximately 0.019 through Perceived Bank Risk. Meanwhile, the total effect of Financial Literacy on Banking Consumer Behaviour was approximately 0.537, consisting of a direct effect of 0.505 and an indirect effect of approximately 0.032 through Perceived Bank Risk.

4.9 Comparative Descriptive Analysis of Conventional and Islamic Bank Users

A descriptive comparison was conducted to provide additional context regarding banking behaviour within Indonesia's dual banking environment. The comparison focused on age, frequency of bank usage, number of banks used, and the most frequently used banking services.

Table 11. Descriptive Comparison of Banking Usage Patterns between Conventional and Islamic Bank Users

Characteristics	Category	Conventional Bank (%)	Islamic Bank (%)
Age	18–24 years	25.5	19.0
	25–34 years	45.5	46.1
	35–44 years	27.3	26.4
	45–54 years	1.7	7.8
	≥55 years	0.0	0.7
Frequency of Bank Usage	Very rarely/Rarely	2.6	6.7
	Occasionally	15.6	20.1
	Frequently	62.8	52.0
	Very frequently	19.0	21.2
Number of Banks Used	1 bank	32.9	31.6
	2 banks	48.1	42.4
	≥3 banks	19.0	26.0
Most Frequently Used Banking Service	Mobile banking	28.6	14.9
	QR payment	25.1	19.0
	Digital payment/E-wallet	15.2	23.8



	Digital transfer	15.2	17.8
	Internet banking	10.8	13.0
	Bill payment	5.2	11.2
	Others	0.0	0.4

Source: Processed by Researchers, 2026.

The descriptive comparison shows that both conventional and Islamic bank users were predominantly represented by the 25–34 age group. Frequent banking usage was also common in both groups. Regarding the number of banks used, two-bank usage was the most common pattern for both groups, while the proportion of respondents using three or more banks was 19.0% among conventional bank users and 26.0% among Islamic bank users.

Differences were also observed in the most frequently used banking services. Mobile banking represented the largest category among conventional bank users at 28.6%, compared with 14.9% among Islamic bank users. Islamic bank users showed higher proportions for digital payment/e-wallet services (23.8%), digital transfer (17.8%), internet banking (13.0%), and bill payment (11.2%).

These comparisons are descriptive and are not intended to indicate statistically significant differences between conventional and Islamic bank users. No multi-group statistical test was conducted in this study. The descriptive findings instead provide contextual information regarding the patterns of banking usage within Indonesia's dual banking environment.

5. Discussion

5.1 Banking Fintech, Financial Literacy, and Perceived Bank Risk

The findings show that banking fintech has a positive and significant relationship with perceived bank risk ($\beta = 0.178$; $t = 2.302$; $p = 0.021$), supporting H1. This result indicates that the increasing use of technology-based banking services is accompanied by customers' awareness of potential risks related to security, privacy, transaction reliability, and possible financial losses. The finding does not imply that fintech itself objectively increases banking risk; rather, it indicates that technological interaction is associated with how customers perceive and evaluate potential risks. Previous studies have emphasized that fintech development changes the way consumers interact with financial services while simultaneously introducing concerns related to security, privacy, and uncertainty (Gomber et al., 2018; Leong et al., 2022; Ryu, 2018). The relatively small effect size ($f^2 = 0.015$) further suggests that banking fintech is only one of several factors contributing to perceived bank risk.

Financial literacy also has a positive and significant relationship with perceived bank risk ($\beta = 0.302$; $t = 3.715$; $p < 0.001$), supporting H2. This finding suggests that financially literate customers do not necessarily perceive lower risk; instead, they may be better able to recognize and evaluate potential risks associated with financial products and digital transactions.



Financial literacy encompasses the knowledge and skills required to understand financial information and make informed decisions (Morgan & Trinh, 2019; OECD, 2023). Therefore, higher financial literacy may increase customers' awareness of security, financial, and privacy risks rather than simply eliminating risk perceptions. This interpretation is also consistent with Hermansson & Jonsson (2021), who found that financial literacy is related to how individuals evaluate financial risk. The small effect size ($f^2 = 0.043$) indicates that financial literacy contributes to perceived bank risk, although other factors may also play an important role.

5.2 Banking Fintech, Financial Literacy, and Banking Consumer Behaviour

Banking fintech has a positive and significant relationship with banking consumer behaviour ($\beta = 0.349$; $t = 3.774$; $p < 0.001$), supporting H3. The medium effect size ($f^2 = 0.178$) indicates that digital banking capability is an important factor in customers' decisions regarding banking services. Convenience, accessibility, efficiency, transaction speed, and system reliability may increase the functional value offered by banks and influence how customers evaluate alternative institutions. The development of fintech has transformed traditional financial services by making digital technologies an increasingly important component of banking competition (Gomber et al., 2018; I. Lee & Shin, 2018). Previous research also indicates that technology-related characteristics can shape consumer responses to digital financial services (Hendi & Keni, 2023). The present finding therefore supports the view that banking fintech has become an important component of customers' banking decision-making.

Financial literacy shows an even stronger relationship with banking consumer behaviour ($\beta = 0.505$; $t = 5.702$; $p < 0.001$), supporting H4. Its effect size is large ($f^2 = 0.362$), making financial literacy the strongest direct predictor in the model. This finding suggests that customers' ability to understand financial information and evaluate available alternatives plays a substantial role in banking-related decisions. Financially literate customers may be better positioned to compare product characteristics, costs, benefits, accessibility, and risks before selecting banking services. This finding is consistent with the broader literature showing that financial literacy is associated with financial decision-making and financial behaviour (Morgan & Trinh, 2019; OECD, 2023). It is also relevant to the Indonesian banking context, where customers may compare different institutions and products according to their financial needs. Studies of banking selection have demonstrated that customers consider multiple attributes when choosing between banking alternatives, including convenience, service characteristics, and, in the case of Islamic banking, Sharia-related considerations (Rama & Wiranata, 2024; Rusydiana & Hasib, 2019).

5.3 Perceived Bank Risk and the Mediating Role of Risk Perception

Perceived bank risk has a positive and significant relationship with banking consumer behaviour ($\beta = 0.107$; $t = 4.218$; $p < 0.001$), supporting H5, although the effect size is small ($f^2 = 0.035$). The positive coefficient should not be interpreted as indicating that customers prefer banks



with greater risk. Rather, the result suggests that risk perception is involved in the process through which customers evaluate banking alternatives. Customers may consider security, privacy, reliability, and possible financial consequences when assessing whether a banking service is appropriate for their needs. Perceived risk has long been recognized as an important component of consumer decision-making, particularly in technology-based financial services (Featherman & Pavlou, 2003; M.-C. Lee, 2009; Ryu, 2018).

The mediation results provide further evidence that perceived bank risk functions as an intervening mechanism in the relationship between the two main predictors and banking consumer behaviour. The indirect effect of banking fintech on banking consumer behaviour through perceived bank risk is significant ($\beta = 0.019$; $p = 0.048$), supporting H6. The indirect effect of financial literacy through perceived bank risk is also significant ($\beta = 0.032$; $p = 0.003$), supporting H7. Because the direct effects of banking fintech and financial literacy on banking consumer behaviour remain significant, the mediation is partial rather than full. These findings indicate that technology and financial literacy influence consumer behaviour both directly and through customers' evaluation of banking-related risks. The larger indirect effect of financial literacy also reinforces the importance of customers' ability to understand and evaluate financial risks as part of the banking decision-making process.

5.4 Overall Interpretation and Implications for the Dual Banking Environment

The total effects further demonstrate the relative contribution of the predictors to banking consumer behaviour. Banking fintech produces a total effect of approximately 0.368, consisting of a direct effect of 0.349 and an indirect effect of 0.019. Financial literacy produces a larger total effect of approximately 0.537, consisting of a direct effect of 0.505 and an indirect effect of 0.032. These findings indicate that technological capability and financial capability both matter in banking decisions, but financial literacy has a stronger overall relationship with consumer behaviour in this sample. This suggests that digital transformation may be most effective when customers possess sufficient knowledge and skills to evaluate the value, costs, and risks of financial services.

The descriptive comparison between conventional and Islamic bank users provides additional contextual evidence for this interpretation. The sample consisted of 46.2% conventional and 53.8% Islamic primary-bank users, while a substantial proportion of respondents used more than one bank. The patterns of service usage also differed descriptively between the two groups, particularly in the use of mobile banking, QR payment, and digital payment or e-wallet services. Previous studies have shown that bank selection may be influenced by different combinations of service, accessibility, product, and institutional considerations, particularly in Islamic banking (Rama & Wiranata, 2024; Rusydiana & Hasib, 2019). At a broader organisational level, environmental cost disclosure has also been examined in relation to financial performance and



corporate sustainability, although its direct implications for bank-selection behaviour remain outside the scope of the present study (Hendratni, Saranga, et al., 2026). However, the present study does not provide a statistical multi-group test; therefore, these differences should be interpreted as descriptive patterns rather than evidence of statistically significant differences between conventional and Islamic bank customers.

Overall, the results indicate that banking consumer behaviour in Indonesia is shaped by the interaction of technological, financial, and risk-related considerations. Banking fintech contributes to customer behaviour by enhancing the value and accessibility of digital banking services, while financial literacy provides customers with the capability to evaluate those services more effectively. Perceived bank risk plays a smaller but significant intervening role by connecting customers' evaluations of technology and financial knowledge with their banking-related behaviour. These findings extend previous research on fintech, financial literacy, perceived risk, and bank selection by examining the three dimensions simultaneously within Indonesia's dual banking environment (Gomber et al., 2018; Leong et al., 2022; Morgan & Trinh, 2019; Rama & Wiranata, 2024).

CONCLUSION

This study examined the relationships among banking fintech, financial literacy, perceived bank risk, and banking consumer behaviour among 500 banking customers in Indonesia. The findings show that banking fintech has a positive and significant relationship with perceived bank risk ($\beta = 0.178$; $p = 0.021$) and banking consumer behaviour ($\beta = 0.349$; $p < 0.001$). Financial literacy also has a positive and significant relationship with perceived bank risk ($\beta = 0.302$; $p < 0.001$) and banking consumer behaviour ($\beta = 0.505$; $p < 0.001$). Among the predictors, financial literacy demonstrates the strongest direct relationship with banking consumer behaviour, indicating the importance of customers' knowledge and ability to evaluate financial products, services, benefits, and risks when making banking-related decisions.

Perceived bank risk is also significantly related to banking consumer behaviour ($\beta = 0.107$; $p < 0.001$) and functions as an intervening variable. The indirect effect of banking fintech on banking consumer behaviour through perceived bank risk is significant ($\beta = 0.019$; $p = 0.048$), as is the indirect effect of financial literacy through perceived bank risk ($\beta = 0.032$; $p = 0.003$). Since the direct effects remain significant, the mediation is partial. The total effects are approximately 0.368 for banking fintech and 0.537 for financial literacy, indicating that both technological capability and financial capability contribute to banking consumer behaviour, with financial literacy showing the larger overall effect.

These findings indicate that banking consumer behaviour in Indonesia cannot be understood solely from technological availability. Customers also require sufficient financial



knowledge and skills to evaluate banking alternatives and assess potential risks. Therefore, banking institutions may need to combine digital service innovation with reliable security, transparent information, and financial literacy support. The descriptive comparison between conventional and Islamic bank users provides additional contextual information regarding banking usage patterns, but these differences were not examined using a statistical multi-group analysis. The study is limited by its cross-sectional design and non-probability sampling, while future research may employ broader sampling and formal multi-group analysis to further examine differences between conventional and Islamic banking customers and incorporate additional determinants of banking consumer behaviour.

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