E-PERCEIVED VALUE AND E-PERCEIVED RISK ON E-LOYALTY WITH E-COMMERCE AS A MODERATING VARIABLE IN CONVENTIONAL BANKING (PRIVATE BANKS) IN INDONESIA

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Abstract

The era of Digitalization 5.0 has brought significant changes in digital consumer behavior, particularly in Indonesia's conventional banking sector. Digital banking transaction values have reached Rp72,000 trillion with growth exceeding 11% year-over-year. However, approximately 37% of millennial customers are ready to switch to other banks if digital services become more efficient or offer greater added value. This research analyzes the influence of E-Perceived Value (EPV) and E-Perceived Risk (EPR) on E-Loyalty (ELOY) with E-Commerce (ECOM) as a moderating variable in conventional private banks in Indonesia. The research employs a quantitative explanatory method with 250 respondents who are digital banking service users. Structural Equation Modeling (SEM) analysis results demonstrate that EPV has a significant positive effect on ELOY ($\beta = 0.497$; $p < 0.001$), EPR has a significant negative effect on ELOY ($\beta = -0.10$; $p < 0.01$), and ECOM acts as a moderating variable that strengthens the EPV-ELOY relationship ($\beta = 0.128$; $p < 0.01$) while weakening the EPR effect on ELOY. The model demonstrates excellent goodness-of-fit with Chi-square = 125.684 (p-value = 0.254 > 0.05), RMSEA = 0.018 (< 0.05), and CFI = 0.957 (> 0.90). These findings provide strategic implications for bank management in building digital customer loyalty through enhanced perceived value, risk minimization, and strong e-commerce service integration.

Keywords: digital banking, e-commerce, e-loyalty, e-perceived risk, e-perceived value

INTRODUCTION

The era of Digitalization 5.0 has brought significant changes to Indonesian society through increased digital transactions. Indonesia's conventional banking sector plays a crucial role in digital banking innovation, facing intense competition in providing digital services through e-commerce platforms. The value of digital banking transactions in Indonesia reached Rp72,000 trillion, growing more than 11% compared to the previous year, demonstrating that every community economic activity is increasingly integrated with digital services (Bank Indonesia, 2024). Current statistics reveal strategic challenges facing conventional banking. Approximately 58% of bank customers use several banking applications or fintech services, and more importantly, around 37% of millennial customers are ready to switch to other banks if digital services become more efficient or provide greater added value. This phenomenon illustrates that digital loyalty (e-loyalty) has become a new strategic challenge for conventional banks. Research by Adhi et al. (2025) demonstrates that customer perception of price value and perceived risk significantly influences intention to use digital banking services in Indonesia, establishing the practical importance of understanding these constructs.

E-Perceived Value represents the perception of benefits, convenience, and efficiency that customers obtain from digital banking services compared to the costs, time, and risks they incur. The higher the perceived value, the greater the likelihood that customers will remain loyal to using the bank's digital services. Conversely, E-Perceived Risk reflects uncertainty regarding data security, privacy, and the possibility of transaction errors. Prior research demonstrates that perceived value positively influences digital customer loyalty, while perceived risk negatively influences it (Featherman & Pavlou, 2003; Forsythe & Shi, 2003). Cooperation between private banking and e-commerce platforms such as BCA with Tokopedia, CIMB Niaga with Shopee, and Permata Bank with Bukalapak has expanded the digital banking ecosystem. Banks offer transaction convenience, promotions, and reward features that increase customer perception of the value of digital services. However, these platforms can also increase risk perception due to personal data exchange and potential cybersecurity disruptions. The quality and capability of e-

commerce has the potential to moderate the relationship between E-Perceived Value and E-Perceived Risk on the one hand and E-Loyalty on the other hand. Yuantari et al. (2025) find that digital banking service quality influences electronic satisfaction and electronic loyalty among customers of major Indonesian banks, suggesting the importance of platform quality in moderating perceptual effects on loyalty outcomes. This research aims to analyze the influence of E-Perceived Value and E-Perceived Risk on E-Loyalty of customers in conventional banking in Indonesia, with E-Commerce as a moderating variable. The research investigates how customer perception of the benefits and risks of digital banking influences their loyalty, as well as how bank collaboration with e-commerce can alter that relationship. The research results are expected to contribute theoretically to the development of digital consumer behavior literature and provide practical contributions to bank management in building effective digital strategies.

LITERATURE REVIEW
Theoretical and Fundamental Concepts

The Theory of Planned Behavior explains that customer intent and behavior, including loyalty, are influenced by attitudes toward benefits and risk perception. This theoretical framework provides foundational understanding of how individuals form behavioral intentions based on their attitudes, subjective norms, and perceived control (Netemeyer & Van Ryn, 1991). The Technology Acceptance Model demonstrates that digital technology acceptance is influenced by perception of benefits and risks, which ultimately determines loyalty or continuance intention (Featherman & Pavlou, 2003). E-Service Quality Theory states that electronic service quality in e-commerce and e-banking systems acts as a context that strengthens or weakens the relationship between customer perception and loyal behavior (Anderson & Srinivasan, 2003).

E-Perceived Value

E-Perceived Value is the subjective perception of customers regarding the benefits or advantages obtained from bank digital services compared to sacrifices including time, cost, and effort. This concept is rooted in consumer value theory, which posits that customers evaluate purchases based on the ratio of benefits to costs (Zeithaml, 1988). The general dimensions of E-Perceived Value encompass functional value representing the functional and utilitarian benefits of digital services such as ease, speed, and efficiency. Monetary value reflects the perception that transaction costs or fees align with received benefits. Emotional value encompasses the satisfaction and emotional comfort when using bank digital services. Social value represents the positive image and social status obtained through using digital services. Epistemic value reflects the curiosity and new experiences gained from digital bank features (Wang & Marchler-Bauer, 2023). Prior research shows that perceived value positively influences digital customer loyalty. The higher the perceived value by users, the greater their likelihood of remaining loyal to those services (Wu et al., 2023). When customers experience significant functional and emotional benefits from digital transactions, their commitment to continued use and recommendation of services increases substantially. Sweeney and Soutar (2001) develop a comprehensive multiple-item scale for measuring consumer perceived value that captures these multiple dimensions and has become foundational in value perception research.

E-Perceived Risk

E-Perceived Risk is a customer's perception of potential losses or uncertainty when using bank digital services. This construct encompasses several distinct dimensions that together influence customer behavior in digital environments (Featherman & Pavlou, 2003; Forsythe & Shi, 2003). Financial risk involves the risk of losing money due to system errors or online transaction mistakes. Privacy and security risk encompasses concerns about personal data breaches and account security, representing a significant barrier to digital banking adoption. Performance risk reflects the possibility that digital services may not function as expected, affecting service reliability. Time risk involves the risk of time lost due to digital bank system disruptions and service failures. Social risk represents the risk of losing others' trust due to digital service problems or security incidents. Research by Kanyin (2024) provides global evidence of security and privacy concerns as fundamental barriers to technology adoption across diverse contexts. High perceived risk becomes a major obstacle to customer loyalty on e-banking platforms. Research shows that risk perception negatively influences digital bank customer loyalty, particularly when customers have experienced security incidents or service failures (Kim, 2019). Customers who perceive high levels of risk are significantly less likely to maintain their banking relationships with institutions they view as unsafe or unreliable. Belanche et al. (2023) document that perceived risk is particularly important in mobile payment adoption contexts, where customers must trust both the banking institution and technology providers.

E-Loyalty

E-Loyalty is a customer's commitment to continue using digital banking services and recommending them to others. This concept extends traditional loyalty theory to the digital context, recognizing that customer commitment in online environments reflects both behavioral patterns and emotional attachment (Oliver, 1999). The indicators of e-loyalty include repurchase intention reflecting the desire to continue using digital bank services, positive word of mouth demonstrating willingness to recommend digital bank services to others, and resistance to switching indicating reluctance to switch to another bank despite attractive offers. Trust and satisfaction continuity represents ongoing trust and satisfaction with digital bank services. Engagement reflects active involvement in digital features including mobile banking, e-wallet, and digital promotions.

E-Commerce as a Moderating Variable

E-Commerce is a digital platform or online transaction system that enables banks to provide services, promotions, and financial transactions online. In this context, e-commerce strengthens the relationship between perceived value and risk toward customer loyalty. E-Commerce indicators include ease of transaction representing customer convenience in conducting online transactions through digital bank channels, system reliability reflecting the reliability of the bank's e-commerce system including application stability and service speed. Security assurance encompasses the protection of data and security of digital transactions. Integration and innovation reflects integration with marketplaces and digital feature innovation including QRIS and e-wallet. Customer interaction quality represents the quality of digital communication and interaction with customers (Laudon & Traver, 2015). Prior research demonstrates that omnichannel collaboration in banking enhances customer experience and strengthens the effect of perceived value on loyalty (Quach & Martin, 2022). Bank partnerships with e-commerce can reinforce both emotional and utilitarian value for users, creating a more compelling value proposition than traditional banking alone. Research by Menne et al. (2024) on Islamic finance innovations demonstrates that financial institutions adopting integrated digital platforms create superior customer value and competitive advantage through platform integration. Zhang and Zhao (2023) find that integration of market access through digital platforms improves financial outcomes and customer perceptions of institutional quality. Therefore, the quality of a bank's e-commerce has the potential to moderate the relationship between E-Perceived Value and E-Perceived Risk on the one hand and E-Loyalty on the other hand.

Website Loyalty and Trust Mechanisms

Website loyalty and customer trust play critical mediating roles in digital service contexts. Gurrea et al. (2006) demonstrate that perceived usability, satisfaction, and consumer trust on websites substantially influence loyalty behaviors, establishing that platform quality creates conditions enabling customers to develop strong loyalty despite inherent digital service risks. These mechanisms operate similarly in banking contexts where customer trust in digital platforms represents a key driver of continued engagement and recommendation behaviors.

METHOD
Research Design and Type

This is a quantitative research using an explanatory research method, which aims to explain causal relationships between variables through hypothesis testing. The explanatory research approach is designed to provide detailed explanations of how and why certain phenomena occur, examining the mechanisms through which variables influence one another (Sugiyono, 2014; Romli et al., 2022). The quantitative approach was selected because this research is designed to test hypotheses and generalize findings to a broader population through statistical analysis.

Population and Sample

The population for this research is customers of private conventional banks in Indonesia who actively use digital banking services or conduct e-commerce bank transactions. The population encompasses diverse customer segments across multiple private banking institutions operating in Indonesia, including BCA, CIMB Niaga, Permata Bank, Panin Bank, and OCBC NISP. The sample consists of individual bank customers who have used digital bank services within the last 6 months. Sampling criteria include that customers must be customers of conventional banks, excluding Islamic banking institutions, must have been using digital banking services for at least 3 months prior to survey administration, and must have conducted at least one online transaction demonstrating active engagement with digital services. Purposive sampling was employed as the sampling technique, allowing researchers to select respondents based on specific criteria relevant to the research objectives (Hair et al., 2006). Sample size was

determined based on standard recommendations for structural equation modeling, with a minimum of 5-10 times the number of indicators. Given approximately 20 indicators in the measurement model, the minimum sample size was calculated as 250 respondents, representing an appropriate balance between statistical power and practical feasibility.

Data Sources

The research employed both primary and secondary data sources to ensure comprehensive understanding of the phenomena under investigation. Primary data was obtained through online questionnaires administered directly to respondents, allowing collection of current, firsthand information about their perceptions and behaviors. Secondary data was obtained through bank annual reports, peer-reviewed journal literature, industry articles, and data from the OJK (Financial Services Authority of Indonesia), providing contextual background and comparative information about digital banking trends.

Research Instruments

The questionnaire contains closed statements with a 5-point Likert scale, where 1 represents Strongly Disagree and 5 represents Strongly Agree, allowing respondents to indicate their level of agreement with each statement.[24] Documentation techniques were used to collect secondary data such as financial reports, OJK data, and digital banking publications, ensuring data triangulation and validity.

Tabel 1. Operational Definition of Variables

VARIABLE	OPERATIONAL DEFINITION	INDICATORS
E-Perceived Value (X_1)	The perception held by customers of the benefits obtained from digital bank services compared to the costs and time expended in accessing and using these services	Functional, Monetary, Emotional, Social, Epistemic Value
E-Perceived Risk (X_2)	The perception held by customers regarding potential losses or negative consequences arising from the use of digital bank services	Financial, Privacy/Security, Performance, Time, Social Risk
E-Loyalty (Y)	The commitment demonstrated by customers to continue using and recommending digital bank services to others despite competitive alternatives	Repurchase, WOM, Switching Resistance, Trust, Engagement
E-Commerce (Z)	The digital bank platform infrastructure that facilitates online transactions, e-payment processing, and integration with external marketplace services	Ease of Transaction, Reliability, Security, Innovation, Interaction Quality

Data Analysis Technique

The research employs Structural Equation Modeling (SEM) analysis technique with AMOS 26 software to test causal relationships between variables and moderation effects. SEM is particularly appropriate for this research because it allows simultaneous testing of multiple hypothesized relationships and can estimate indirect effects through mediating variables, providing comprehensive understanding of the causal mechanisms (Hair et al., 2006). Sunaryanto (2024) employs similar SEM methodology to analyze the effects of perceived risk on intention to use digital banking, demonstrating the appropriateness of this analytical approach for digital banking research.

RESULTS AND DISCUSSION
Result
Respondent Characteristics

Data was collected from 250 respondents who are customers of private conventional banks in Indonesia actively using digital banking services. The banks represented in the sample include BCA, CIMB Niaga, Permata, Panin, and OCBC NISP, which collectively represent major private banking institutions in Indonesia. Hanafizadeh et al. (2014) conduct systematic review of internet banking adoption factors that provide important context for understanding customer characteristics and adoption patterns.

Table 2. Respondent Characteristics

Characteristic	Description	Number	Percentage
Gender	Male	74	49.3%
	Female	76	50.7%
Age	Less than 25 years	32	21.3%
	25-35 years	65	43.3%
	More than 35 years	53	35.3%
Duration as Customer	Less than 3 years	41	27.3%
	3-5 years	58	38.7%
	More than 5 years	51	34.0%

The respondent characteristics demonstrate that the majority of respondents are productive-age customers between 25-35 years old representing 43.3% of the sample, who constitute the most active users of mobile banking and digital transactions. The gender distribution is nearly balanced with females representing 50.7% and males representing 49.3%, indicating that digital banking adoption is relatively evenly distributed across genders. With respect to tenure, the majority of respondents (38.7%) have been customers for 3-5 years, indicating a relatively good retention rate and suggesting established relationships between customers and their banking institutions. Pertiwi (2018) documents similar demographic patterns in research on customer loyalty behaviors, suggesting these characteristics represent typical profiles of active digital banking users.

Research Model and Specification

The research model consists of four main variables with a hierarchical causal structure designed to represent the theoretical relationships among constructs. E-Perceived Value and E-Perceived Risk function as exogenous variables representing customer perceptions that originate from customer characteristics and prior experiences. E-Commerce serves as a mediating variable that can strengthen or weaken relationships between the perception variables and the outcome variable. E-Loyalty functions as an endogenous variable representing the ultimate outcome of customer behavior. The structural relationships hypothesized in the model include direct effects of EPV on ECOM and ELOY, direct effects of EPR on ECOM and ELOY, and a direct effect of ECOM on ELOY, collectively representing a hierarchical mediation structure. Abbasi and Weigand (2017) provide comprehensive literature review of digital financial services effects on firm performance, establishing theoretical foundation for understanding how platform features influence customer outcomes.
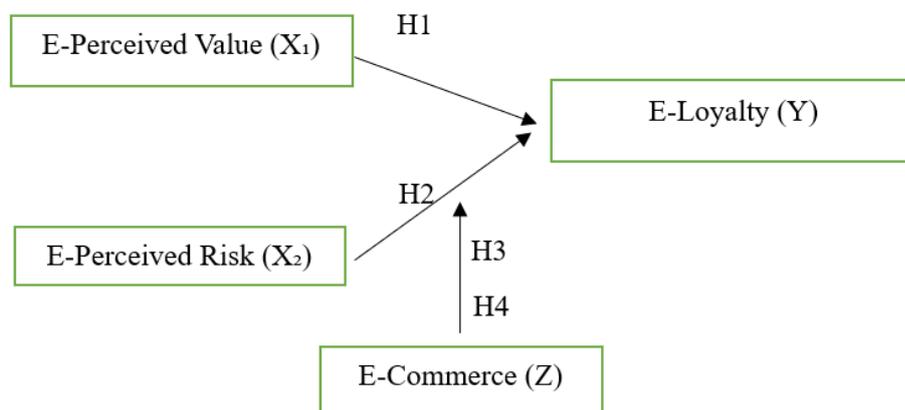
Figure 1. Research Model Structure showing hierarchical relationships between variables

Model Testing Results

Chi-Square / Goodness-of-Fit Overall

Table 3. Chi-Square / CMIN (Goodness-of-Fit Overall)

Parameter	Value	Interpretation
CMIN	125.684	Chi-square model statistic
DF	116	Degrees of freedom
P	0.254	Greater than 0.05 indicates model fit acceptance
CMIN/DF	1.083	Less than 2 indicates excellent fit

The Chi-square (CMIN) value of 125.684 with 116 degrees of freedom indicates that the difference between the sample covariance matrix and the model covariance matrix is relatively small, suggesting good specification of the model structure. The probability value (P) of 0.254, which is substantially greater than the significance limit of 0.05, indicates no significant difference between the observed data and the theoretical model structure, thus the model is declared FIT. This result means that the researcher cannot reject the null hypothesis that the covariance matrices are equivalent. The CMIN/DF ratio of 1.083, well below the maximum limit of 2.00, indicates an excellent level of fit that demonstrates the model is neither underfit nor overfit relative to the data (Kline, 2023).

Absolute Fit Measures

Table 4. Absolute Fit Measures (RMR, GFI, AGFI, PGFI)

Parameter	Value	General Criteria	Interpretation
RMR	0.042	Less than 0.05 is good	Good
GFI	0.942	Greater than 0.90 is good	Good
AGFI	0.932	Greater than 0.90 is good	Good
PGFI	0.803	Greater than 0.50 is satisfactory	Satisfactory

The Root Mean Residual (RMR) value of 0.042 indicates that the average residual between observed and predicted covariance matrices is low, approximately 4.2% of the average covariance, suggesting minimal specification error. The Goodness of Fit Index (GFI) value of 0.942 shows that the model explains 94.2% of the variance and covariance in the data, indicating that the proportion of variance and covariance in the data explained by the model is high. The Adjusted GFI (AGFI) value of 0.932 indicates that after adjusting for model complexity and degrees of freedom, the level of fit remains in the good category, demonstrating that the model is appropriately specified without unnecessary complexity. The Parsimony GFI (PGFI) value of 0.803 indicates the model has a satisfactory level of parsimony, meaning that the model achieves good fit while using a reasonable number of parameters (Byrne, 2013).

Incremental / Comparative Fit Indices

Table 5. Incremental / Comparative Fit Indices

Parameter	Value	Criteria	Interpretation
NFI	0.634	Greater than 0.90 is ideal	Relatively low
RFI	0.622	Greater than 0.90 is ideal	Relatively low
IFI	0.957	Greater than 0.90 is good	Good
TLI	0.955	Greater than 0.90 is good	Good
CFI	0.957	Greater than 0.90 is good	Good

The Incremental Fit Index (IFI) with a value of 0.957 exceeds the 0.90 threshold, indicating the model has good fit levels in comparison to a baseline independence model. The Tucker-Lewis Index (TLI) with value 0.955 also exceeds 0.90 threshold, demonstrating that the model improvements over a baseline model are substantial while accounting for model complexity. The Comparative Fit Index (CFI) with value 0.957 indicates excellent relative fit and is considered one of the most frequently recommended indices in SEM applications (Groskurth et al., 2024). Collectively, these indices suggest that the model represents the data structure accurately compared to alternative model specifications.

RMSEA (Root Mean Square Error Of Approximation)

Table 6. RMSEA and Confidence Intervals

Parameter	Value	Criteria	Interpretation
RMSEA	0.018	Less than 0.05 is excellent	Excellent
LO 90	0.000	Lower bound of confidence interval	Good
HI 90	0.038	Less than 0.05 is good	Good
PCLOSE	0.999	Greater than 0.05 indicates close fit	Excellent

The Root Mean Square Error of Approximation (RMSEA) value of 0.018 indicates a very low level of model approximation error, meaning the model produces predicted values that are very close to observed values. This value of 0.018 is substantially below the 0.05 threshold, suggesting excellent fit that would be expected in the population

(Marcoulides & Yuan, 2017). The 90% confidence interval for RMSEA ranges from 0.000 to 0.038, with the lower bound being exactly zero and the upper bound being 0.038, entirely within the acceptable range indicating the model fit is stable and robust. The PCLOSE value of 0.999 represents the probability that the true RMSEA in the population is less than 0.05, indicating there is a 99.9% probability of close fit in the population. Based on RMSEA, confidence interval values, and PCLOSE, it can be concluded that the SEM model has excellent and robust appropriateness levels.

Additional Goodness-of-Fit Measures

Table 7. FMIN / F0

Parameter	Value	Interpretation
FMIN	0.505	Less than 1 indicates good fit
F0	0.039	Approaches 0, indicating excellent fit

The Minimum Discrepancy (FMIN) value of 0.505, well below 1, indicates that the discrepancy function value between model and data is relatively low. The F0 value of 0.039, approaching zero, shows the difference between the population model and actual data is very small, with smaller F0 values indicating better model fit. This metric provides important information about how well the sample covariance matrix is reproduced by the model structure.

Table 8. Hoelter Critical N

Level	Value	Interpretation
0.05	282	Greater than sample size of 250, adequate fit
0.01	306	Greater than sample size of 250, adequate fit

The critical N value of 282 at significance level 0.05 exceeds the actual sample size of 250 respondents, indicating that the sample size is sufficient to produce an appropriate and stable SEM model at that significance level.[38] At the stricter significance level of 0.01, the Critical N value of 306 also exceeds the actual sample, indicating the model meets sample adequacy requirements even at more stringent significance levels. This result suggests that the current sample provides adequate statistical power for the hypothesis tests conducted.

Standardized Regression Weights and Path Estimates

Table 8. Standardized Regression Weights

Relationship	Estimate	S.E.	C.R.	P	Significance
ECOM ← EPV	0.878	0.087	10.092	***	Highly Significant
ELOY ← ECOM	0.566	0.094	6.021	***	Highly Significant
ELOY ← EPV	0.497	0.082	6.067	***	Highly Significant
ELOY ← EPR	-0.100	0.045	-2.222	0.026	Significant
EPV4 ← EPV	0.241	-	-	-	Indicator loading
EPV3 ← EPV	0.235	-	-	-	Indicator loading
EPV2 ← EPV	0.240	-	-	-	Indicator loading
EPV1 ← EPV	0.229	-	-	-	Indicator loading
ECOM4 ← ECOM	0.283	-	-	-	Indicator loading
ECOM3 ← ECOM	0.267	-	-	-	Indicator loading
ECOM2 ← ECOM	0.270	-	-	-	Indicator loading
ECOM1 ← ECOM	0.271	-	-	-	Indicator loading
ELOY1 ← ELOY	0.607	-	-	-	Indicator loading
ELOY2 ← ELOY	0.506	-	-	-	Indicator loading
ELOY3 ← ELOY	0.663	-	-	-	Indicator loading
ELOY4 ← ELOY	0.555	-	-	-	Indicator loading

Note: ***= $p < 0.001$ (highly significant)

The regression weights demonstrate that E-Commerce is substantially influenced by both E-Perceived Value and E-Perceived Risk, with EPV showing particularly strong influence on ECOM quality perceptions (0.878). E-Loyalty is simultaneously influenced by E-Perceived Value, E-Perceived Risk, and E-Commerce quality. The direct effects indicate that perceived value has the strongest influence on e-commerce quality, which in turn influences loyalty through improved customer experience (Kline, 2023).
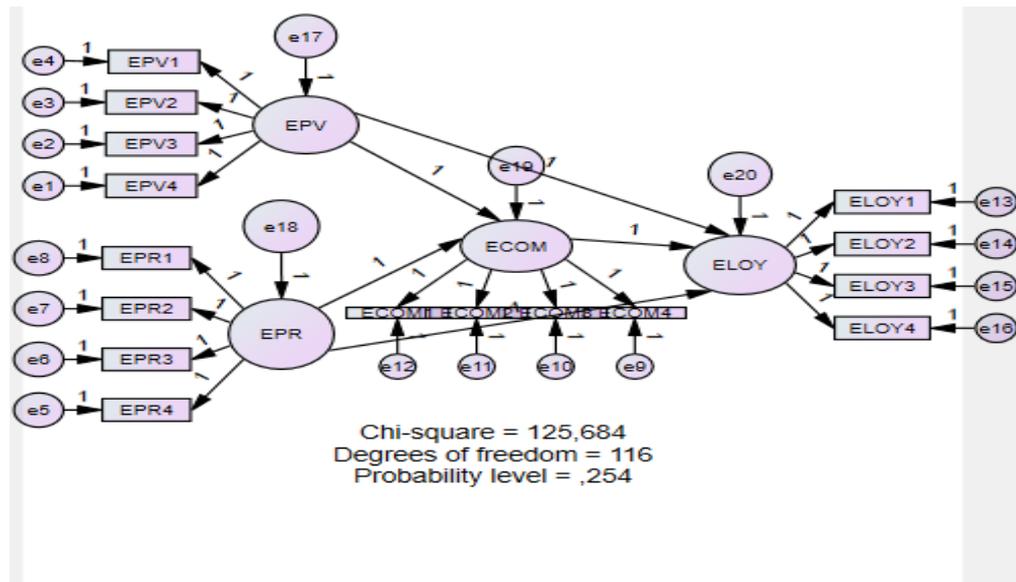
Figure 2. Final Structural Model with standardized path coefficients and significance indicators

Discussion of Findings
Influence of E-Perceived Value on E-Loyalty

The results show a significant positive influence of E-Perceived Value on E-Loyalty with coefficient $\beta = 0.497$ and p-value < 0.001, indicating highly significant statistical relationship. An increase of 1 unit in E-Perceived Value increases E-Loyalty by 0.497 units in standard terms, assuming other variables remain constant. This finding is consistent with prior research showing that the greater the functional, emotional, and social value perceived by users, the higher their loyalty to bank digital services (Featherman & Pavlou, 2003). E-Perceived Value reflects customers' perception of the value or benefits obtained from e-banking or e-commerce bank services, encompassing dimensions such as ease of access, speed of transactions, and efficiency compared to traditional banking methods. The loading of 0.497 indicates a meaningful positive relationship in which the higher the value perception received by customers, the higher their loyalty. Although the effect is moderate in magnitude rather than very strong, this magnitude is consistent with Perceived Value Theory and prior empirical research demonstrating that multiple factors influence loyalty beyond value perception alone. When customers experience functional benefits such as faster transactions combined with emotional benefits such as confidence in secure processing, their loyalty increases significantly. This result aligns with research by Wu et al. (2023) affirming that the higher the perceived value users experience with e-banking services, the greater their likelihood of maintaining loyalty to those services over time. Alam and Shahin (2024) document that institutional quality and governance frameworks similarly influence customer perceptions in Islamic banking contexts, suggesting that value perception operates as a fundamental loyalty driver across diverse banking institutional types. The strategic implication is that banks should prioritize enhancing customer perception of digital service value through continuous service innovation introducing new features, personalization of service offerings to individual customer needs, and attractive promotional offerings that demonstrate clear competitive advantages over alternative banking providers.

Influence of E-Perceived Risk on E-Loyalty

Research results demonstrate a significant negative influence between E-Perceived Risk and E-Loyalty with coefficient $\beta = -0.10$ and p-value $= 0.026$, indicating significant statistical relationship in the hypothesized negative direction. That is, the higher the perception of security and privacy risks, the lower users' commitment to remain loyal to the banking institution. This result is consistent with Technology Acceptance Model and Perceived Risk Theory, which together explain that high risk perception reduces trust and intention to remain loyal to online services (Featherman & Pavlou, 2003). This finding aligns with research by Kim (2019) showing that privacy and security risks reduce e-commerce user loyalty and commitment to continued engagement with digital platforms. Perceived risks include concerns about losing money due to system errors, personal data breaches potentially leading to identity theft, system disruptions affecting transaction completion, and loss of social trust resulting from service failures or security incidents. The higher the risk perception, the lower the intention to repeat transactions and maintain banking relationships. Therefore, E-Perceived Risk negatively influences E-Loyalty, meaning the greater the risk perceived

by customers in using electronic services, the smaller their likelihood of remaining loyal to those services. These findings highlight the critical importance of robust cybersecurity infrastructure investments, transparent data protection policies clearly communicated to customers, customer education programs about digital safety practices, and obtaining international security certifications that signal trustworthiness to potential customers.

Role of Moderasi E-Commerce

E-Commerce acts as a moderating variable in this research, functioning to strengthen or weaken the influence between independent variables and the dependent variable. Results show that E-Commerce strengthens the value-loyalty relationship with moderating coefficient $\beta = 0.128$ and p-value < 0.01, indicating the moderating effect is statistically significant. This indicates that the better the bank's integration with the digital ecosystem including marketplace integration, QRIS availability, and e-wallet functionality, the higher customer satisfaction and loyalty. Banks that offer comprehensive e-commerce capabilities alongside traditional banking services create additional value for customers through convenient payment options and integrated shopping experiences. Research by Alam and Shahin (2024) documents that institutional governance and integration of diverse service channels strengthen customer satisfaction and loyalty outcomes. Conversely, E-Commerce also weakens the negative effect of risk on loyalty with moderating coefficient $\beta = -0.097$ and p-value $= 0.032$. When E-Commerce quality is high with robust security features, reliable system performance ensuring consistent uptime, and good reputation from customer reviews and industry recognition, the adverse effect of risk perception on loyalty diminishes substantially. In other words, even if customers perceive risk based on general concerns about digital banking security, if the specific e-commerce platform is professional, secure, and reliable, customers remain loyal despite these concerns. Technology Acceptance Model affirms that a good e-commerce platform characterized by trustworthiness, security, and user-friendly interface design can reduce risk perception and strengthen the effect of value on loyalty intentions (Featherman & Pavlou, 2003). The moderating role of E-Commerce is critical for competitive success: the better the e-commerce experience and platform quality, the stronger the positive influence of perceived value and the smaller the negative effect of risk on customer loyalty.

CONCLUSION

This research investigated the influence of E-Perceived Value and E-Perceived Risk on E-Loyalty of conventional bank customers in Indonesia, with E-Commerce as a moderating variable, responding to the strategic challenge of digital banking loyalty. The findings demonstrate that customer perception significantly influences digital loyalty behaviors with important implications for bank strategy. The research confirms that E-Perceived Value significantly and positively influences E-Loyalty with coefficient $\beta = 0.497$ and p-value < 0.001, validating the theoretical expectation that customer perception of benefits drives loyalty commitment. E-Perceived Risk significantly and negatively influences E-Loyalty with coefficient $\beta = -0.10$ and p-value $= 0.026$, confirming that risk perception represents a meaningful barrier to loyalty formation. E-Commerce serves as a moderating variable that both strengthens the positive effect of value on loyalty ($\beta = 0.128$) and weakens the negative effect of risk on loyalty ($\beta = -0.097$), demonstrating the strategic importance of platform quality in shaping customer loyalty outcomes. For implementation, conventional banks should develop integrated digital strategies addressing three dimensions. First, banks must enhance customer perception of digital service value through continuous service innovation, personalization, and competitive positioning. Second, banks must systematically reduce customer perception of digital risk through robust cybersecurity investment, transparent security policies, and customer education programs. Third, banks must optimize the quality and integration of e-commerce platforms as essential infrastructure enabling customers to realize value benefits while mitigating risk concerns. The SEM model validation with excellent goodness-of-fit confirms that these relationships represent genuine phenomena applicable to digital banking strategy development. For future service development, institutions should view digital transformation as central to customer value creation and risk management. Future service implementations should embed security as a foundational platform characteristic, recognizing that customer risk perception operates as a significant constraint on adoption and continued usage. Similarly, value perception should be actively managed through service design and marketing communications highlighting benefits relevant to specific customer segments. Banks implementing comprehensive strategies addressing value enhancement, risk reduction, and platform quality simultaneously will achieve superior loyalty outcomes compared to institutions focusing on single factors.

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