"Role of law enforcement, governance, and digital transformation in risk control and management at Vietnamese commercial banks"

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BUSINESS PERSPECTIVES

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ROLE OF LAW ENFORCEMENT, GOVERNANCE, AND DIGITAL TRANSFORMATION IN RISK CONTROL AND MANAGEMENT AT VIETNAMESE COMMERCIAL BANKS

Abstract

Risk control and management are essential tasks necessary to ensure the safe and sustainable development of commercial banks, especially in today's digital business environment. This study aims to identify the factors and their impact on risk control and management through intermediary variables, including law enforcement, corporate governance, and digital transformation, using the partial least square – structural equation modeling. Data for the study were collected through interviews assessing the perceptions of 765 managers in 35 Vietnamese commercial banks. The results indicate that factors directly affecting law enforcement include digital transformation, awareness of risks related to new technologies, training in law and technological knowledge, employee capabilities, monitoring and inspection procedures, size and complexity of bank operations, and corporate governance. However, only law enforcement and corporate governance have an indirect intermediary impact on risk control and management (digital transformation did not show a statistically significant impact). These findings highlight that, according to managerial perceptions in commercial banks, current digital transformations have not significantly influenced risk control and management, emphasizing the need for further enhancement in this area moving forward. This study makes a positive contribution to the development of models and measurement systems, laying the foundation for similar experimental research in the field of commercial banking in various countries in the future.

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INTRODUCTION

Under the powerful impact of the scientific and technological revolution, commercial banks, especially in emerging countries like Vietnam, are very concerned with risk control and management. This is because banking transactions and operations increasingly harbor higher risks of errors and fraud, with growing complexity and sophistication that are difficult to predict. This trend forces commercial banks to implement digital transformation to significantly reduce credit risk by enhancing risk management capabilities and reducing information asymmetry. At the same time, effective risk control and management also contribute to increasing the competitiveness and sustainable development of commercial banks.

Until now, research on risk control and management within the context of digital transformation has attracted significant interest from researchers across the globe. These studies have shown that the degree

of digital transformation in commercial banks in emerging countries varies based on different conditions and circumstances. Nevertheless, the advancement of technology has made the integration of tech solutions into banking increasingly accessible. Commercial bank managers are becoming increasingly aware of the importance of effective risk control and management, understanding that only banks with robust risk management systems can achieve long-term market viability.

Although digital transformation in commercial banks is advancing rapidly through the application of new technical and technological solutions in operational activities and the provision of products and services to enhance efficiency and customer experience, legal regulations related to digital transformation in commercial banking have not kept pace with technological advancements, new business models, and technology-based distribution channels. Increasing fraud, financial crime, and cybersecurity risks make the transactions and business activities of commercial banks increasingly fraught with safety risks.

The above context highlights the necessity for more research exploring and validating the impact relationships of digital transformation, corporate governance, legal enforcement, and risk control and management in commercial banking from the perspective and understanding of managers. These are also the reasons that underscore the importance and necessity of such research.

1. LITERATURE REVIEW

This section's content is based on reviewing the current research landscape related to the topic and developing research hypotheses for the theoretical research model.

Commercial banking is a specialized form of business, thus the risks associated with banking operations are uniquely different from other types of businesses. These risks faced by commercial banks can be classified from various perspectives. According to Tien (2023), these risks include interest rate risk, foreign exchange risk, credit risk, liquidity risk, off-balance sheet risk, technology and operational risk, country risk, and others. However, these risks can also be categorized as liquidity risk, strategic risk, operational risk, legal risk, market risk, reputational risk, and credit risk, according to Zhao (2024). Despite their different classifications, these risks significantly impact business efficiency, profitability, and sustainable development of banks. Therefore, in their operations, commercial banks must implement risk control and management practices to minimize these risks to the lowest possible level.

Risk control and management is a systematic process aimed at understanding, assessing, and addressing risks to maximize opportunities to achieve objectives and ensure sustainable development for stakeholders involved in commercial banking operations (Dugguh & Diggi, 2015). This process requires comprehensive knowledge of related risks, assessing their severity, and employing rigorous methods to monitor and control them. Therefore, despite various approaches, the risk control and management process in commercial banks typically involves steps such as identifying potential risks, analyzing them, and implementing preventive measures to minimize or mitigate risks. Research on this topic within the framework of commercial banks is diverse, ranging from general issues, as seen in studies by Li et al. (2016) and Sang (2024), to specific types of risk control and management studies, such as those conducted by Pyka and Nocoń (2024), Konovalova et al. (2016), and Bessler and Booth (1994). These studies highlight that numerous factors influence risk control and management in commercial banks. However, the specific methods employed vary depending on the type of risk being addressed.

Throughout their operations, commercial banks engage in transactions with a wide range of stakeholders, including individuals and organizations. These transactions are governed by legal frameworks within the banking sector and civil, criminal, commercial, investment, and intellectual property laws. Many studies have highlighted that effective law enforcement enhances the efficiency of commercial banks (Xia & Tian, 2012). The en-

forcement of laws within banks can be measured through aspects such as the legal environment, compliance with established legal systems, the effectiveness of operations, and the protection of intellectual property rights (Zhang et al., 2012). However, the context of digital transformation and intensive application of information technology, as well as expanding business scopes, can pose challenges to law enforcement (Machogu & Okiko, 2012).

Some studies have pointed out that adherence to regulations and rigorous monitoring of banking activities, coupled with enhanced supervisory powers of regulatory agencies, can improve banks' technical efficiency (Alam, 2013; Yang et al., 2019). Moreover, banks with better law enforcement maintain higher levels of legal protection for lenders and borrowers, positively impacting risk control and enhancing operational efficiency (Arias et al., 2020).

Digital transformation refers to the application of information technology and communication and automation processes to enhance capabilities for companies, governments, and individuals (Martin, 2008). Digital transformation involves using modern technologies such as embedded devices, social networks, and mobile devices to enable businesses to improve their core operations and create new business models, streamline production activities, and enhance customer experiences (Fitzgerald et al., 2013). Therefore, digital transformation in commercial banks can be understood as integrating digital technology into various operational areas of the bank, fundamentally changing operations and delivering value to customers. This requires banks to continually update to best satisfy customer experiences. The digital transformation in commercial banks typically involves five steps:

1) assessing the costs and effectiveness of current applications and technologies to identify technological weaknesses and financial waste;

2) simplifying infrastructure, applications, and processes based on insights gained from the assessment;

3) accelerating innovation through modular platforms;

4) designing processes and applications based on acquired experience;

5) developing new applications to support new business models, product portfolios, and distribution channels (Mersch, 2017).

Numerous studies have highlighted the close and positive impact relationship between digital transformation and risk control and management in commercial banks (Hoque et al., 2024; Yao & Song, 2023). Digital transformation, particularly through fintech applications, effectively minimizes risks for banks by enhancing early warning indicators and risk control and management (Li et al., 2022). Additionally, the digital transformation trend has led to changes and the emergence of new legal frameworks from the perspective of state management and their enforcement within commercial banks.

Many studies have highlighted corporate governance characteristics in financial organizations and commercial banks, which significantly impact risk control and management, particularly operational risks, payment risks, and the Z-score of banks (Rashid et al., 2024). Corporate governance metrics such as audit committees, the scale and independence of the board of directors, CEO duality, and managerial ownership influence risk management and contribute to the financial soundness of banks (Ullah et al., 2023). Similar studies also emphasize that corporate governance plays a crucial role in the legal enforcement of activities, thereby enhancing the operational efficiency of commercial banks (Wadesango et al., 2020; Kafidipe et al., 2021).

Based on the analysis and filtering of studies related to the research topic, combined with the results of expert interviews, the following factors have been selected and presented:

1.1. Perception of risk regarding new technology in banks

The rapid development of new technology affects the perceptions of various stakeholders, including employees and managers at commercial banks. As technology advances, the risk of criminal attacks on banking services increases. This makes en-

hancing security, protecting privacy, and building customer trust in banking services more challenging (Machogu & Okiko, 2012). The enforcement of laws concerning banking operations and transactions faces increasing risks, reducing their effectiveness accordingly. Rapid technological changes also diminish the necessity and effectiveness of digital transformation in banks, making risk control and management in commercial banks more difficult.

1.2. Training in legal knowledge and new technology

In the current developmental context, commercial banks emphasize developing their human resources in line with digital transformation conditions by training in new technology knowledge and legal changes. Enhancing employee training will help stabilize banks better (Testa et al., 2024). Employee training aims to increase the ability to adapt and master digital technology devices and digitized applications in the banking sector. It also contributes to enhancing creativity, organization, and discipline, ensuring activities are precisely compliant with changes and adjustments in legal documents within the field. Through organizational training processes, errors and risks in executing operations and transactions are limited, helping commercial banks improve risk control and management and achieve higher operational efficiency (Qu & Zhang, 2011; Maina & Bula, 2019).

1.3. Employee competence

The human factor is always a crucial determinant of an organization's success, so businesses, especially banks, require their employees to be competent in fulfilling their assigned responsibilities. This necessitates that bank employees possess the necessary knowledge, skills, and competencies. Among various job positions, internal auditors (IAs) are particularly significant because they provide critical independent assessments of the risk management and control systems (Spira & Page, 2003; Subramaniam & Carey, 2011). Several aspects can be considered to evaluate the competence of an internal auditor, including understanding risk management systems, risk management frameworks, and information technology capabilities. Therefore, large-scale banks often require

employees to have international certifications in their training fields, international risk management certifications, specialized degrees, and certifications in information technology. Additionally, employees must participate in at least one training course on enterprise risk management and a course on the Basel risk management framework (Yen & Linh, 2022).

1.4. Monitoring and control process

In the actual operations of commercial banks, the monitoring and inspection process is carried out for the following purposes:

1) ensuring the stability and reliability of transactions and operations;

2) protecting individual and corporate deposits and preventing investor panic in crisis situations;

3) protecting customers from unprofessional management and reinforcing stakeholders' confidence in the bank;

4) ensuring the rights of depositors and creditors (Karpova & Kuznetsova, 2019).

The monitoring process is implemented through the role of the central bank (state) and conducted by closely combining the supervision of compliance with monetary and banking policies with risk-based supervision. This supervision helps better control and manage risks, contributing to higher efficiency in the operations of commercial banks. However, if conducted too strictly, it may be disadvantageous and create crises for the supervised banks (Chortareas et al., 2012; Barth et al., 2013).

1.5. Size and complexity in the organizational structure of banks

As organizations grow in scale and complexity, effective risk management becomes increasingly challenging. Additionally, increased organizational complexity leads to greater risks, and companies facing higher risks will enhance their supervision (Fraser & Henry, 2007; Carcello

et al., 2005). This also sets the stage for better enforcement and compliance with laws in the management process and significantly impacts corporate governance, particularly the extent to which risk-based internal auditing is applied (Yen & Linh, 2022).

The purpose of this study is to investigate the relationship between law enforcement, corporate governance, digital transformation, and risk control and management in Vietnamese commercial banks based on PLS-SEM. The following hypotheses and theoretical research model (Figure 1) were put forward:

H1:   The perception of risk regarding new technology negatively impacts the law enforcement in commercial banks.

H1a: The perception of risk regarding new technology negatively impacts risk control and management through the mediation of law enforcement in commercial banks.

H1b: The perception of risk regarding new technology negatively impacts risk control and management through the mediation of digital transformation in commercial banks.

H1c: The perception of risk regarding new technology negatively impacts law enforcement through the mediation of digital transformation in commercial banks.

H2:   Training in legal knowledge and technology positively impacts the law enforcement in commercial banking operations.

H2a: Training in legal knowledge and technology positively impacts risk control and management through the mediation of law enforcement in commercial banking operations.

H3:   Employee competence positively impacts the law enforcement in commercial banking operations.

H3a: Employee competence positively impacts risk control and management through the mediation of law enforcement in commercial banking operations.

H4:   The monitoring and inspection process positively impacts the enforcement of laws in commercial banking operations.

H4a: The monitoring and inspection process positively impacts risk control and management through the mediation of legal compliance in commercial banking operations.

H5:   Organizational structure positively impacts the enforcement of laws in commercial banking operations.

H5a: Organizational structure positively impacts risk control and management through the mediation of legal compliance in commercial banking operations.

H5b: Organizational structure positively impacts risk control and management through the mediation of corporate governance in commercial banks.

H5c: Organizational structure positively impacts the enforcement of laws through the mediation of corporate governance in commercial banks.

H6:   The digital transformation of commercial banks positively impacts law enforcement in operations.

H6a: The digital transformation of commercial banks positively impacts risk control and management through the intermediation of law enforcement.

H7:   Corporate governance positively impacts law enforcement in commercial banks.

H7a: Corporate governance positively impacts risk control and management through the intermediation of law enforcement.

H8:   Law enforcement in the operations of commercial banks positively influences risk control and management.

H9:   The perception of risk regarding new technology negatively impacts the digital transformation of commercial banks.
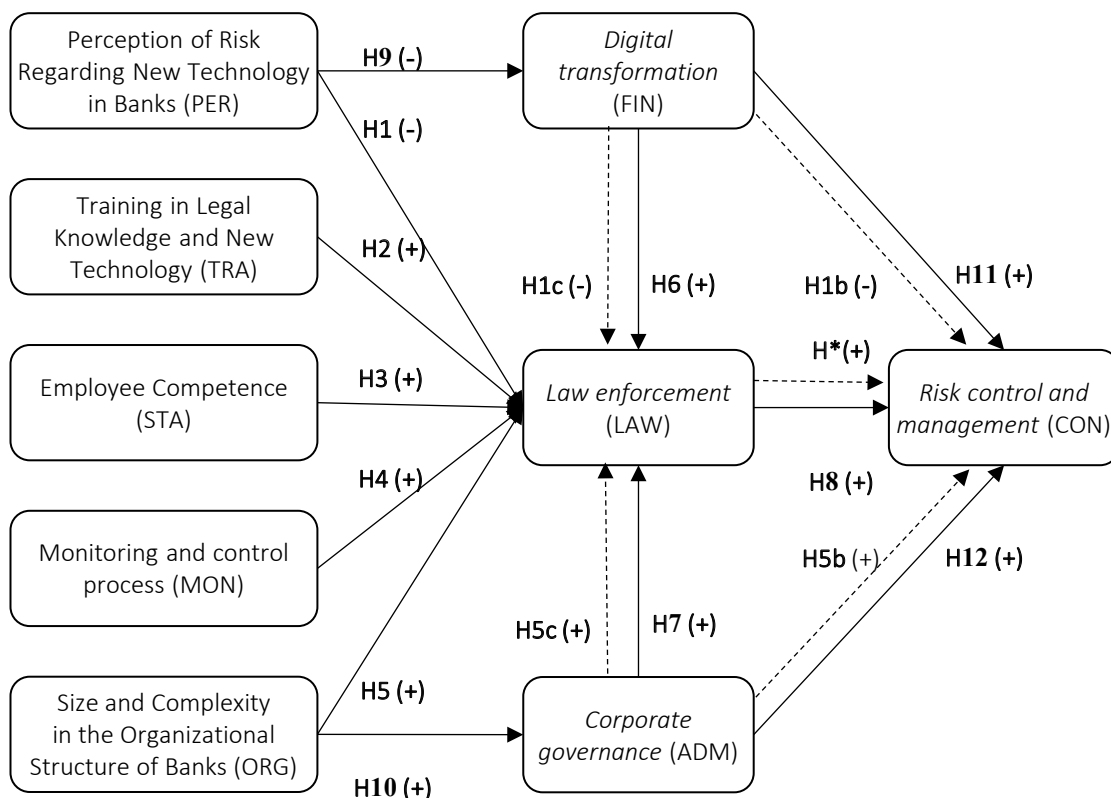
Note: H* includes hypotheses about intermediary relationships: H1a(−), H2a,3a,4a,5a,6a,7a(+), H1d, 5d (+); → Direct relationship; ---> Indirect relationship.

Figure 1. Model and hypotheses

H10: Organizational structure positively impacts corporate governance in commercial banks.

H11: The digital transformation of commercial banks positively impacts risk control and management.

H12: Corporate governance positively impacts risk control and management in commercial banks.

2. METHOD

2.1. Research design

The primary subjects for the survey to collect data for the research are managers currently working at commercial banks in Vietnam, from the Deputy Head of Department/Branch level and above. These subjects possess high professional qualifications due to strict professional ethics regulations and regularly participate in banks'

risk control and management processes. Based on the results of a literature review related to the topic as presented above, the initial theoretical research model on the factors affecting risk control and management through the mediation of digital transformation, law enforcement, and corporate governance, as well as the content of the measurement scales for each variable, were used in the content of interviews with 12 experts from two different groups. Group 1 included lecturers with a doctoral degree or higher and over 15 years of experience in teaching, especially in banking law and commercial bank management at universities. Group 2 included managers at banking regulatory agencies such as the Ministry of Finance, the State Bank of Vietnam, and the State Securities Commission, with the level of Deputy Head of Department and above and over 10 years of experience. All these individuals agreed to participate in in-depth interviews, each lasting an average of 30-45 minutes, and signed the working minutes with the research team. The results of this ex-

pert interview phase, although not changing the initially proposed theoretical model, led to significant adjustments to the measurement scales, such as proposing changes to some terms from the original scales for easier understanding and clarity and adding some new scales based on their management and operational experience. Finally, the complete measurement scale was fully presented in the questionnaire and deployed for a wide-scale survey from early March 2023 to the end of March 2024. After this period, the research team proceeded to extract and compile the data for analysis with the support of SPSS 26 and SmartPLS 4 software.

2.2. Research sample

According to Hair et al. (2014), to ensure statistical principles for analyzing structural equation modeling using PLS-SEM, if the number of factor groups is greater than 7, the minimum sample size must be 500. This study proposed a model that includes 9 main factors; therefore, a research sample larger than 500 must be collected.

According to data published by the State Bank of Vietnam at the end of 2022, Vietnam has 35 commercial banks (31 banks managed and operated by the State Bank, and 4 commercial banks owned by the State Bank). These banks have charter capital ranging from VND 3,000 billion to nearly VND 80,000 billion, and were established as early as 1957 and as recently as 2015 (see Appendix A).

Based on the list of these 35 commercial banks, the research team, through the introduction of the Ministry of Finance and the State Bank, obtained detailed information on the managers currently working at these banks. With the voluntary agreement of the commercial banks, the research team sent questionnaires in both paper form and Google Form links to the administrative departments of the banks to invite managers to participate in the survey. Due to the long survey period, 800 managers agreed and consented to participate by either clicking to confirm participation or signing the paper questionnaire. After filtering and analyzing the completeness of the responses, only 765 responses were confirmed as completely valid by the research team (a failure rate of 4.3% with 35 invalid responses). This sample size exceeds the

minimum of 500 to ensure the reliability of the analysis results. Detailed information about the research sample is presented in Appendix B.

2.3. Measurement scale

The research is based on the inheritance of measurement scales from several studies in Vietnam and other countries related to factors affecting digital transformation, law enforcement, corporate governance, and risk control and management. Some of the studies include Machogu and Okiko (2012), Xia and Tian (2012), Zhang et al. (2012), Quynh and Luan (2023), Yen and Linh (2022), Subramaniam and Carey (2011), Fraser and Henry (2007), and Quyet (2021). Based on the original scales and the results of in-depth interviews with experts, the measurement scale of the study was adjusted and developed with 9 variables comprising 39 observations, including 1 dependent variable (risk control and management), 3 mediating variables (digital transformation, law enforcement, corporate governance), 5 independent variables (awareness of risks associated with new technology, training in law and new technology, employee competence, scale and complexity of the bank's operational structure, monitoring and inspection), and 3 control variables (gender and age, education level of bank managers). The content of the measurement observations for the scale is detailed in Tables 2 and 3, using a Likert scale ranging from 1 to 7 points (1: Completely disagree; 2: Strongly disagree; 3: Disagree; 4: Neutral; 5: Agree; 6: Strongly agree; 7: Completely agree). The details of the measurement scales are presented in Appendix C.

3. RESULT

3.1. Results of the measurement model evaluation

Based on the proposal by Hair et al. (2014), the criteria for the measurement model are that outer loadings should be greater than 0.7, Cronbach's Alpha and Composite Reliability should exceed 0.8, and Average Variance Extracted (AVE) should be higher than 0.5 to ensure reliability. Based on the results in Table 1, it can be concluded that the study's measurements fully meet these reliability criteria for conducting further analyses.

Table 1. Descriptive statistics, internal reliability and convergent reliability

Constructs	Items	Factor Loading	Mean	CA	C.R	AVE
Size and Complexity in the Organizational Structure of Banks (ORG)	ORG1	0.790	4.395	0.843	0.851	0.613
	ORG2	0.772	5.005			
	ORG3	0.781	4.376			
	ORG4	0.817	4.979			
	ORG5	0.752	4.408			
Monitoring and control process (MON)	MON1	0.866	4.452	0.891	0.892	0.753
	MON2	0.872	4.370			
	MON3	0.872	4.473			
	MON4	0.860	4.471			
Employee Competence (STA)	STA1	0.845	3.672	0.879	0.884	0.674
	STA2	0.815	3.595			
	STA3	0.832	3.782			
	STA4	0.796	3.742			
	STA5	0.817	3.744			
Training in Legal Knowledge and New Technology (TRA)	TRA1	0.851	3.971	0.881	0.882	0.737
	TRA2	0.854	3.970			
	TRA3	0.870	3.965			
	TRA4	0.858	3.956			
Perception of Risk Regarding New Technology in Banks (PER)	PER1	0.838	4.592	0.867	0.872	0.715
	PER2	0.855	4.652			
	PER3	0.851	4.620			
	PER4	0.838	4.603			
Digital transformation (FIN)	FIN1	0.887	4.763	0.867	0.895	0.787
	FIN2	0.909	4.731			
	FIN3	0.865	4.634			
Corporate governance (ADM)	ADM1	0.825	4.588	0.857	0.860	0.636
	ADM2	0.778	4.570			
	ADM3	0.781	4.573			
	ADM4	0.796	4.541			
	ADM5	0.806	4.529			
Law enforcement (LAW)	LAW1	0.854	4.752	0.892	0.892	0.755
	LAW2	0.878	4.758			
	LAW3	0.870	4.791			
	LAW4	0.874	4.795			
Risk control and management (CON)	CON1	0.797	4.780	0.873	0.873	0.663
	CON2	0.820	4.795			
	CON3	0.801	4.817			
	CON4	0.812	4.838			
	CON5	0.841	4.824			

Note: CA: Cronbach's Alpha; *C.R:* Composite reliability (rho_a)*; AVE:* Average Variance Extracted.

Table 2. Discriminant reliability

Constructs	ADM	CON	FIN	LAW	MON	ORG	PER	STA	TRA
Fornell–Larcker									
ADM	**0.797**	–	–	–	–	–	–	–	–
CON	0.251	**0.814**	–	–	–	–	–	–	–
FIN	0.056	0.087	**0.887**	–	–	–	–	–	–
LAW	0.328	0.553	0.167	**0.869**	–	–	–	–	–
MON	0.175	0.206	0.050	0.462	**0.868**	–	–	–	–
ORG	0.178	0.458	0.007	0.360	0.186	**0.783**	–	–	–
PER	−0.068	−0.321	−0.099	−0.262	−0.012	−0.180	**0.845**	–	–
STA	0.118	0.361	0.053	0.342	0.139	0.216	−0.145	**0.821**	–
TRA	0.150	0.499	0.088	0.433	0.153	0.276	−0.199	0.220	**0.858**

Table 2 (cont.). Discriminant reliability

Constructs	ADM	CON	FIN	LAW	MON	ORG	PER	STA	TRA
				Heterotrait–monotrait ratio (HTMT)					
ADM	–	–	–	–	–	–	–	–	–
CON	**0.289**	–	–	–	–	–	–	–	–
FIN	0.064	**0.095**	–	–	–	–	–	–	–
LAW	0.374	0.626	**0.188**	–	–	–	–	–	–
MON	0.199	0.233	0.054	**0.518**	–	–	–	–	–
ORG	0.203	0.531	0.025	0.410	**0.212**	–	–	–	–
PER	0.084	0.368	0.109	0.295	0.025	**0.206**	–	–	–
STA	0.135	0.410	0.059	0.383	0.155	0.250	**0.166**	–	–
TRA	0.171	0.570	0.095	0.488	0.173	0.318	0.224	**0.250**	–

Note: The bold and italic figures are the square root of AVE for the constructs.

According to Fornell and Larcker (1981), the discriminant validity of measurements is assessed based on the square root of AVE for each variable being greater than 0.7, or the Heterotrait-Monotrait Ratio (HTMT) value between each pair of variables being less than 0.85, as suggested by Henseler et al. (2015). The results presented in Table 2 show that the square root of AVE values range from 0.797 to 0.887, all of which are > 0.7, and the HTMT values range from 0.095 to 0.518, all of which are < 0.85. Therefore, it can be concluded that the measurements used in the study have achieved discriminant validity.

3.2. Results of the structural model evaluation

According to Henseler et al. (2015) and Hu and Bentler (1999), to assess the structural model, it is necessary to check for multicollinearity using Inner VIF values (should be less than 10) and SRMR coefficient (should be less than 0.08). Additionally, as per Hair et al. (2019), model predictive ability is evaluated using R^2 and Q^2 values, where higher values indicate greater practical significance of the experimental model. Based on Table 3, all Inner VIF coefficients range from 1.000 to 1.168 < 10, and SRMR = 0.069 < 0.08, indicating no issues with multicollinearity and alignment with the collected empirical data.

Additionally, with the advantages of the PLS-SEM model analyzed using the SmartPLS 4.0 software, the predictive ability of the research model based on actual data is reflected in the R^2 (predictive accuracy) and Q^2 (predictive relevance) indices. The higher these coefficients, the more significantly the model is explained by the established factors (Hair et al., 2019). According to the results in Table 4, law enforcement is explained by the independent factors up to 47.3% and 35.7%. Specifically, for risk control and management, it is explained by 30.8% and 20.4%. Meanwhile, for digital transformation and corporate governance, the model's predictive indices are very low and insignificant (8% and 7% for digital transformation, 3% and 1.8% for corporate governance, respectively). However, the purpose of this study is to identify the factors influencing law enforcement and risk control and management, thus mainly focusing on the predictive accuracy for 2/4 models identified from the SmartPLS output.

Table 3. Results of inner VIF coefficient testing

Source: SmartPLS output (2024).

Constructs	ADM	CON	FIN	LAW	MON	ORG	PER	STA	TRA
ADM	–	1.121	–	1.070	–	–	–	–	–
CON	–	–	–	–	–	–	–	–	–
FIN	–	1.029	–	1.020	–	–	–	–	–
LAW	–	1.149	–	–	–	–	–	–	–
MON	–	–	–	1.079	–	–	–	–	–
ORG	1.000	–	–	1.168	–	–	–	–	–
PER	–	–	1.000	1.078	–	–	–	–	–
STA	–	–	–	1.101	–	–	–	–	–
TRA	–	–	–	1.161	–	–	–	–	–

Table 4. Results of the model's predictive capability evaluation

Constructs	R-square	R-square adjusted	Q-square
ADM	0.032	0.030	0.018
FIN	0.010	0.008	0.007
CON	0.311	0.308	0.204
LAW	0.478	0.473	0.357

The next step in evaluating the structural model is to re-examine the initially proposed hypotheses through the results of the direct, indirect, and moderating relationships among the established factors. Table 5 shows that out of the 12 hypotheses with direct relationships, 11 are accepted, while only hypothesis H9 is rejected (β = -0.006, p-value = 0.867 > 0.05). This result indicates that digital transformation currently does

not have a significant and meaningful impact on risk control and management at Vietnamese commercial banks, from the perspective and perception of managers working directly at these banks.

In addition to the direct relationships, PLS-SEM analysis through Bootstrapping with a sample size of 5,000 tests the indirect relationships between independent and dependent variables. Based on Table 6, it is shown that 9 out of 13 indirect relationships are accepted, except for the relationships: ORG → ADM → CON (β = 0.014, p-value = 0.057 > 0.05); PER → FIN → LAW → CON (β = −0.005, p-value = 0.066 > 0.05); PER → FIN → CON (β = 0.001, p-value = 0.876 > 0.05); PER → FIN → LAW (β = −0.009, p-value = 0.059 > 0.05). This indicates that the organizational structure of the bank does not impact risk control and management through

**Table 5.** Results of testing the research hypotheses with direct effects

Relationship	Original sample	Standard deviation	P values	Bias	f^2	VIF	Hypotheses	Conclusion
ADM → CON	0.079	0.032	0.014	0.001	0.008	1.121	H12	Accept
ADM → LAW	0.173	0.027	0.000	0.000	0.054	1.070	H7	Accept
FIN → CON	−0.006	0.034	0.867	0.000	0.000	1.029	H11	Reject
FIN → LAW	0.095	0.028	0.001	0.000	0.017	1.020	H6	Accept
LAW → CON	0.528	0.029	0.000	0.000	0.352	1.149	H8	Accept
MON → LAW	0.339	0.027	0.000	0.000	0.205	1.079	H4	Accept
ORG → ADM	0.178	0.036	0.000	0.003	0.033	1.000	H10	Accept
ORG → LAW	0.136	0.030	0.000	0.001	0.030	1.168	H5	Accept
PER → FIN	−0.099	0.040	0.013	−0.003	0.010	1.000	H9	Accept
PER → LAW	−0.139	0.030	0.000	0.000	0.034	1.078	H1	Accept
STA → LAW	0.166	0.028	0.000	0.000	0.048	1.101	H3	Accept
TRA → LAW	0.245	0.026	0.000	−0.001	0.099	1.161	H2	Accept

Table 6. Results of testing the indirect effects of the research hypotheses

Relationship	Original sample	Standard deviation	P values	Bias	Hypotheses	Conclusion
STA → LAW → CON	0.088	0.015	0.000	0.000	H3a	Accept
ORG → ADM → CON	0.014	0.007	0.057	0.001	H5b	Reject
ORG → ADM → LAW	0.031	0.008	0.000	0.001	H5c	Accept
FIN → LAW → CON	0.050	0.015	0.001	0.000	H6a	Accept
TRA → LAW → CON	0.129	0.017	0.000	0.000	H2a	Accept
ADM → LAW → CON	0.092	0.015	0.000	0.000	H7a	Accept
ORG → ADM → LAW → CON	0.016	0.004	0.000	0.000	H5d	Accept
PER → LAW → CON	−0.073	0.017	0.000	0.000	H1a	Accept
PER → FIN → LAW → CON	−0.005	0.003	0.066	0.000	H1d	Reject
PER → FIN → CON	0.001	0.004	0.876	0.000	H1b	Reject
MON → LAW → CON	0.179	0.016	0.000	0.000	H4a	Accept
ORG → LAW → CON	0.072	0.017	0.000	0.001	H5a	Accept
PER → FIN → LAW	-0.009	0.005	0.059	0.000	H1c	Reject
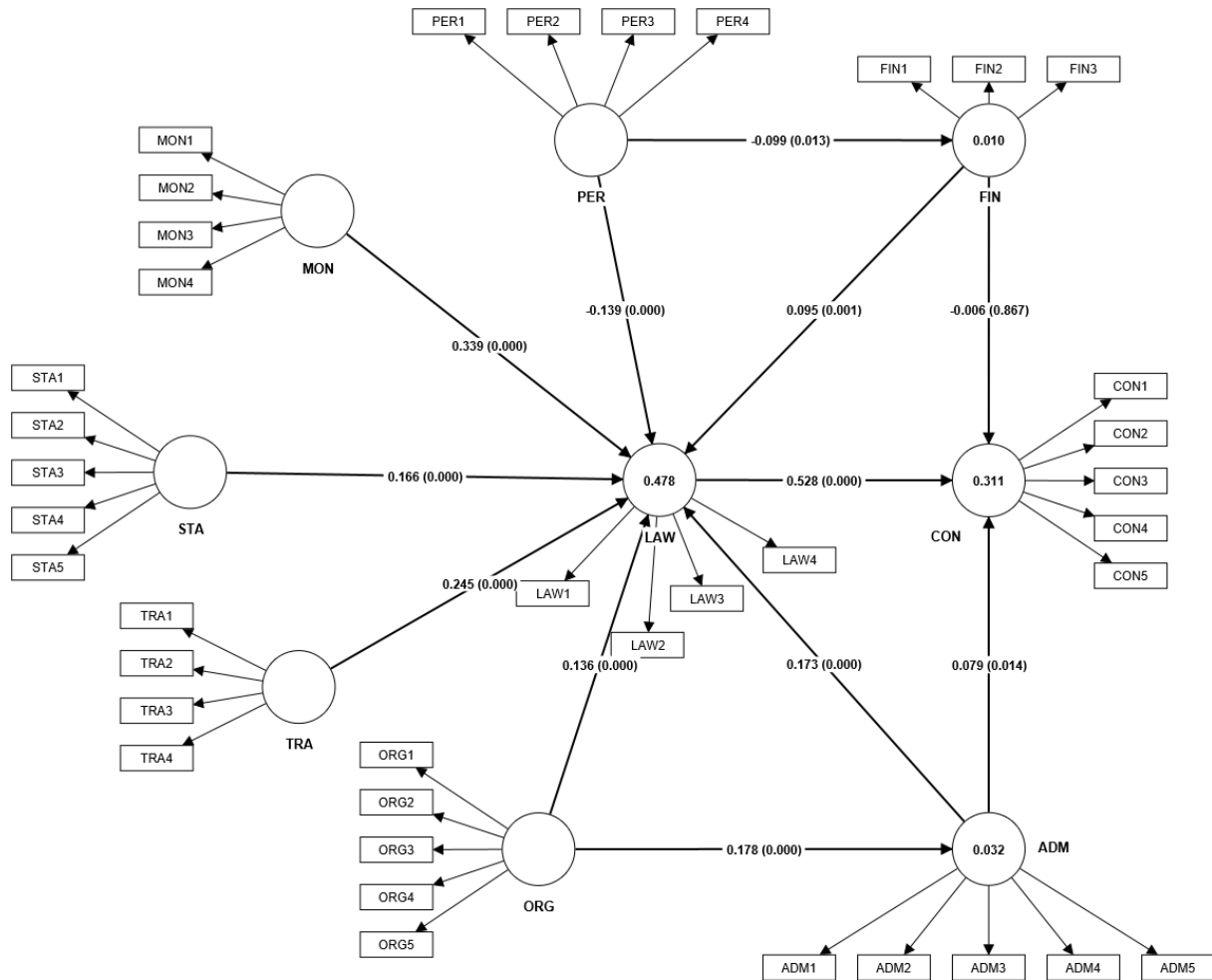
Figure 2. Results of the linear PLS-SEM structural model

the corporate governance factor. Additionally, the perception of risks related to new technologies does not influence law enforcement in banking nor risk control and management through the mediation of digital transformation.

Based on the analysis presented, the study findings are evident across several aspects:

(1) It is clearly indicated that all 7 factors directly impact law enforcement at commercial banks in emerging markets like Vietnam, in decreasing order of positive impact: monitoring and auditing processes, legal and technological knowledge training, corporate governance, employee capabilities, organizational scale and complexity, and digital transformation. However, the perception of risks related to new technologies has a negative impact on law enforcement;

(2) There is a strong positive relationship between law enforcement and risk control and management. Corporate governance also positively impacts at a smaller scale, whereas digital transformation does not significantly influence risk control and management;

(3) There are 9 out of 13 significant indirect relationships affecting risk control and management at Vietnamese commercial banks. Among these, the strongest relationship between monitoring and auditing processes and risk control and management through law enforcement is observed.

4. DISCUSSION

Thus, the data analysis results clearly demonstrate that in the commercial banking sector, due to its

specific business nature, law enforcement is influenced by multiple factors. Higher levels of law enforcement correlate with reduced business risks for banks, leading to enhanced effectiveness in risk control and management, operational efficiency, and overall reputation. These findings are consistent with studies by Zhang et al. (2012) and Xia and Tian (2012) on commercial banks in China.

The factors that strongly and directly impact law enforcement and indirectly influence risk control and management in commercial banks, such as monitoring and auditing processes, legal and technological knowledge training, and employee capabilities, are reasonably consistent with several previous studies, including Qu and Zhang (2011), Maina and Bula (2019), Wadesango et al. (2020), and Kafidipe et al. (2021). However, the study also reveals some relatively different results compared to previous research in several aspects.

Digital transformation does not statistically significantly impact risk control and management (hypothesis $H1l$). This indicates that from the perspective and perception of managers, the level of digital transformation in the systems of Vietnamese commercial banks remains uneven. Despite efforts by banks such as BIDV, TPB, VietinBank, and VIB to integrate digital technologies like strong biometric applications and new login authentication methods (Push Authentication) into their online customer transactions on a broader scale, some banks like VietinBank, VIB, and TPBank have also experimented with blockchain technology for money transfers. Additionally, banks like HSBC, Vietcombank, and BIDV have successfully executed Letter of Credit (L/C) transactions on blockchain platforms, reducing document exchange times to within 24 hours from the previous 5-10 days. TPBank uses blockchain technology via RippleNet to facilitate international money transfers within minutes. These examples demonstrate that Vietnamese commercial banks are beginning to digitize their operations to innovate and modernize services for enhanced customer experiences. However, this digital transformation is still in its early stages or experimental phases with new technologies aimed at attracting and retaining customers and improving service quality. Nevertheless, bank managers acknowledge that adopting these new technologies also introduces vulnerabilities to high-tech crimes, information se-

curity challenges, financial fraud, and potential loss of customer data control. Consequently, risk control and management has become more difficult and complex than before. Moreover, the availability of advanced technologies to support risk control and management remains limited.

In contrast, regarding the perception of risks related to new technologies, this factor does not significantly impact risk control and management through law enforcement (hypothesis $H1c$), and digital transformation ($H1d$, $H1b$). This also indicates that awareness of the risks associated with new technologies among current managers at commercial banks remains limited. They have not fully assessed the cybersecurity risks, operational risks, and complexities in complying with legal regulations. Therefore, ideally, this awareness at the management level should prompt commercial banks to invest heavily in security systems, enhance data analytics capabilities, and establish stricter control processes. Such actions are aimed not only at protecting banks from risks but also at ensuring stability and reliability in an increasingly digitized financial environment.

The scale and complexity of the operational organizational structure of a commercial bank, while potentially posing numerous challenges, do not affect risk control and management through corporate governance (hypothesis $H5b$). This demonstrates that with a transparent governance system, robust internal control processes, and independent monitoring mechanisms, commercial banks can maintain effective risk management capabilities regardless of their size and complexity. The adoption of modern technologies, regular staff training, and the cultivation of a risk management culture throughout the organization also play crucial roles. Therefore, no matter how large or complex a bank may be, a strong corporate governance model ensures safe and sustainable operations.

Thus, the study's findings have contributed several significant insights, enriching and diversifying related research on the topics of law enforcement, digital transformation, corporate governance, and risk control and management in commercial banks within emerging markets conditions similar to Vietnam. However, the study has limitations, such as the selection of influencing factors on risk control and management based solely on the anal-

ysis of a few studies and the opinions of a limited number of experts. The study's data collection used a primary data collection method focused on the perceptions and awareness of surveyed individuals, necessitating integration with secondary data indicators and quantitative metrics. Moreover, the study surveyed managers from departmental level upwards, lacking a concentrated exploration of perceptions and awareness among bank employees and customers.

CONCLUSION

This study was conducted with the objective of exploring the factors influencing risk control and management at commercial banks in the emerging Southeast Asian market, specifically Vietnam. It also investigates the mediating role of three factors: digital transformation, law enforcement, and corporate governance in relation to risk control and management. The data for the analysis in this study was meticulously collected through a survey of the perceptions of 765 managers working at 35 commercial banks. The study results indicate that law enforcement and corporate governance directly and positively impact risk control and management, whereas the impact of digital transformation is not significant. Factors such as monitoring and auditing, legal and technological knowledge training, employee capabilities, corporate governance, and organizational scale and complexity affect risk perception regarding technology and digital transformation, decreasing in impact on law enforcement. Furthermore, only 9 out of 13 intermediary relationships from these factors to risk control and management were identified, with moderate impact levels. This suggests that the level of digital transformation in commercial banks in emerging countries like Vietnam remains relatively low and needs stronger implementation to enhance risk control, operational efficiency, and reputation.

In addition to practical contributions, through the presented results, this study contributes to theoretical development, particularly proposing measurement scales for collecting primary data based on the perceptions and awareness of commercial bank managers. This serves as a foundation for future empirical research in other fields and countries.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Surveyed commercial banks in Vietnam

No	Bank name in Vietnamese	Bank name	Transaction name and stock code	Established date	Chartered capital (billion VND)	Surveyed votes
Joint stock commercial banks are managed and operated by the State Bank					
1	Ngân hàng TMCP Việt Nam Thịnh Vượng	Vietnam Prosperity Bank, JSC	VPBank, VPB	12/08/1993	79,339	41
2	Ngân hàng TMCP Đầu tư và Phát triển Việt Nam	Bank for Investment and Development of Vietnam, JSC	BIDV, BID	26/04/1957	57,004	80
3	Ngân hàng TMCP Ngoại Thương Việt Nam	Bank for Foreign Trade of Vietnam, JSC	Vietcombank, VCB	01/04/1963	55,980	84
4	Ngân hàng TMCP Công thương Việt Nam	Vietnam Bank for Industry and Trade, JSC	VietinBank, CTG	26/03/1988	53,699	67
5	Ngân hàng TMCP Quân Đội	Military Bank, JSC	MBBank, MBB	04/11/1994	52,140	45
6	Ngân hàng TMCP Á Châu	Asia Commercial Bank, JSC	ACB	04/06/1993	38,841	15
7	Ngân hàng TMCP Sài Gòn – Hà Nội	Saigon-Hanoi Bank, JSC	SHB	13/11/1993	36,194	5
8	Ngân hàng TMCP Kỹ Thương	Vietnam Technological and Commercial Bank, JSC	Techcombank, TCB	27/09/1993	35,172	43
9	Ngân hàng TMCP Phát triển Thành phố Hồ Chí Minh	Ho Chi Minh City Development Bank, JSC	HDBank, HDB	04/01/1990	29,076	12
10	Ngân hàng TMCP Bưu điện Liên Việt	Lien Viet Postal Bank, JSC	LPBank, LPB	28/03/2008	25,576	15
11	Ngân hàng TMCP Quốc Tế	Vietnam International Bank, JSC	VIB	18/09/1996	25,368	12
12	Ngân hàng TMCP Đông Nam Á	Southeast Asia Bank, JSC	SeABank, SSB	24/03/1994	24,537	6
13	Ngân hàng TMCP Tiên Phong	Tien Phong Bank, JSC	TPBank, TPB	05/05/2008	22,016	17
14	Ngân hàng TMCP Phương Đông	Orient Commercial Bank, JSC	OCB	10/06/1996	20,548	11
15	Ngân hàng TMCP Hàng Hải	Vietnam Maritime Joint Stock Commercial Bank	MSB	12/07/1991	20,000	8
16	Ngân hàng TMCP Sài Gòn Thương Tín	Sai Gon Thuong Tin Joint Stock Commercial Bank	Sacombank, STB	21/12/1991	18,852	53
17	Ngân hàng TMCP Xuất Nhập Khẩu	Vietnam Export-Import Bank, JSC	Eximbank, EIB	24/05/1989	17,470	42
18	Ngân hàng TMCP Sài Gòn	Saigon Commercial Bank, JSC	SCB	01/01/2012	15,231	12
19	Ngân hàng TMCP Nam Á	Nam A Bank, JSC	Nam A Bank, NAB	21/10/1992	10,580	6
20	Ngân hàng TMCP An Bình	An Binh Bank, JSC	ABBANK, ABB	13/05/1993	10,350	7
21	Ngân hàng TMCP Đại Chúng Việt Nam	Vietnam Public Joint Stock Commercial Bank	PVCombank	16/09/2013	9,000	5
22	Ngân hàng TMCP Bắc Á	Bac A Bank, JSC	Bac A Bank, BAB	01/09/1994	8,959	12
23	Ngân hàng TMCP Quốc dân	National Citizen Bank, JSC	NCB	18/09/1995	11,802	5
24	Ngân hàng TMCP Việt Nam Thương Tín	Viet Nam Thuong Tin Joint Stock Commercial Bank	VietBank, VBB	02/02/2007	5,780	5
25	Ngân hàng TMCP Việt Á	Viet A Bank, JSC	Viet A Bank, VAB	04/07/2003	5,400	6
26	Ngân hàng TMCP Bản Việt	Ban Viet Bank, JSC	BVBank, BVB	25/12/1992	5,140	7
27	Ngân hàng TMCP Đông Á	Dong A Bank, JSC	DongA Bank	01/07/1992	5,000	10
28	Ngân hàng TMCP Kiên Long	Kien Long Joint Stock Commercial Bank	Kienlongbank, KLB	27/10/1995	4,375	11
29	Ngân hàng TMCP Sài Gòn Công Thương	Saigon Bank for Industry and Trade, JSC	Saigonbank, SGB	16/10/1987	3,388	6
30	Ngân hàng TMCP Bảo Việt	Bao Viet Bank, JSC	Baoviet Bank	14/01/2009	3,150	4
31	Ngân hàng TMCP xăng dầu Petrolimex	Petrolimex Group Commercial Joint Stock Bank	PGBank, PGB	13/11/1993	3,000	5
Commercial banks are owned and operated by the State					
32	Ngân hàng NN&PT Nông thôn Việt Nam	Vietnam Bank for Agriculture and Rural Development, LLC	Agribank	26/03/1988	41,268	89
33	Ngân hàng Thương mại TNHH MTV Đại Dương	Ocean Bank, LLC	Oceanbank	30/12/1993	4,000	8
34	Ngân hàng Thương mại TNHH MTV Dầu khí toàn cầu	Global Petro Bank, LLC	GPBank	13/11/1993	3,018	6
35	Ngân hàng Thương mại TNHH MTV Xây dựng Việt Nam	Vietnam Construction Bank, LLC	CB	05/03/2015	3,000	5
	Total					765

APPENDIX B

Table B1. Descriptive statistics about the samples

Characteristics	Frequency	Percentage
Gender	N = 765	100
Male	444	58.0
Female	321	42.0
Position/Management position	N = 765	100
Chairman/Member of the Board of Directors/Board of Members	32	4.3
irector/Deputy Director of Operations/Finance	62	8.1
Branch Director/Deputy Director	89	11.6
Head/Deputy Head of Department at branches	359	46.9
Chief Accountant/Member of the Control Board/Internal Auditor	223	29.1
Education	N = 765	100
Bachelor/Engineer and equivalent	317	41.4
Master	422	55.1
Doctor	26	3.5

APPENDIX C

Table C1. Measurement summary

Symbol	Scales	Sources
Size and Complexity in the Organizational Structure of Banks (ORG)		
ORG1	I believe that the scale of a bank is best represented by its total assets indicator	Yen and Linh (2022), Expert opinion, Authors' development
ORG2	I believe that the scale of a bank is reflected in the number of employees	
ORG3	I believe that the scale and complexity of a bank's operational structure are reflected in the number of offices and branches managed by the bank	
ORG4	I believe that the scale and complexity of a bank's operational structure are reflected in the volume of transactions it has to handle daily	
ORG5	I think that the scale and complexity of a bank's operational structure are reflected in the number of services the bank can provide to customers	
Monitoring and control process (MON)		
MON1	I observe that all tasks at the bank are closely monitored and evaluated	Yen and Linh (2022), Expert opinion, Authors' development
MON2	I sense that the process of monitoring tasks at the bank is well-organized	
MON3	I observe that inspections are conducted regularly, periodically, and unexpectedly by authorized departments and individuals	
MON4	I feel confident in the quality of work of the internal audit department due to its independence, objectivity, and confidentiality	
Employee Competence (STA)		
STA1	Being fully qualified with specialized certifications in my assigned field enables me to perform my job effectively	Quyet (2021), Yen and Linh (2022), Expert opinion, Authors' development
STA2	Proficiency in information technology is an advantage that helps me enhance work efficiency	
STA3	My knowledge of enterprise risk management is relatively up-to-date.	
STA4	I have gradually accumulated skills related to risk management through work experience	
STA5	I understand my position clearly and the importance of the assigned tasks, so I strive to maximize efforts.	
Training in Legal Knowledge and New Technology (TRA)		
TRA1	If trained in legal documents and new technologies, I won't encounter any issues regardless of how complex the tasks are	Machogu and Okiko (2012), Expert opinion, Authors' development
TRA2	I have been trained in legal documents and new technologies before executing tasks at my bank	
TRA3	It is mandatory for me to participate in internal courses related to legal documents and new technologies	
TRA4	The training on legal documents and new technologies is conducted in various forms at my bank	

Table C1 (cont.). Measurement summary

Symbol	Scales	Sources
Perception of Risk Regarding New Technology in Banks (PER)		
PER1	I am always cautious if the new innovation will actually work	Machogu **and** Okiko (2012), Expert opinion, Authors' development
PER2	I don't use the new technology if I perceived it to have or produce any errors	
PER3	I always inquire if the new technology works well before I use it	
PER4	The new technology must be tested first if I have to agree to use it	
Digital transformation (FIN)		
FIN1	I have noticed that the bank has focused on investing in technological innovation and implementing better security solutions recently	Quynh **and** Luan (2023), Expert opinion, Authors' development
FIN2	My bank has been and is currently deploying services in the form of digital banking and applications such as E-banking (Mobile banking, Internet banking, etc)	
FIN3	My bank is innovating and revamping its services to enhance customer experience	
Corporate governance (ADM)		
ADM1	I believe that the members of the Board of Directors should bear ultimate responsibility for risk control and management	Yen and Linh **(2022)**, Expert opinion, Authors' development
ADM2	I think that if the bank I am working for has the presence of strategic shareholders such as foreign banks, it would be beneficial	
ADM3	I think that the corporate governance will be influenced by the number of members in the bank's Board of Directors.	
ADM4	I think that corporate governance will be influenced by the proportion of non-executive members in the Board of Directors of the bank	
ADM5	I think that corporate governance will be influenced by the ownership rights of managers within the bank	
Law enforcement (LAW)		
LAW1	I always carry out assigned tasks in accordance with the bank's regulations	Xia **and** Tian (2012), Zhang et al. (2012), Expert opinion, Authors' development
LAW2	I always strive to understand and implement job-related regulations seriously	
LAW3	The job execution processes are always fully adhered to and followed in order	
LAW4	I always discuss with colleagues or seek advice from superiors regarding sensitive tasks that may violate bank regulations	
Risk control and management (CON)		
CON1	I am confident that I can identify risks related to the tasks assigned to me	Subramaniam **and** Carey (2011), Fraser **and** Henry (2007), Expert opinion, Authors' development
CON2	The risks related to the tasks assigned to me can be measured and analyzed	
CON3	I carefully plan and implement control measures for risks associated with the tasks assigned to me	
CON4	I always have preventive measures in place for potential risks	
CON5	I have contingency plans for losses caused by risks.	