International Review of Management and Marketing

ISSN: 2146-4405

available at http: www.econjournals.com

International Review of Management and Marketing, 2026, 16(1), 405-413.

The Impact of Digital Transformation on Sustainable Business of Commercial Banks in an Emerging Economy

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Received: 05 July 2025 **Accepted:** 25 October 2025 **DOI:** https://doi.org/10.32479/irmm.21553

ABSTRACT

This study aims to clarify the mediating roles of three factors—corporate governance, perceived efficiency, and financial performance—in the relationship between digital transformation and sustainable business practices among Joint Stock Commercial Banks (JSCBs) in Vietnam. Data were collected from 270 customers with experience using services at JSCBs and analyzed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS-SEM) technique. The results indicate that corporate governance and financial performance play statistically significant mediating roles in the relationship between digital transformation and sustainable business. Conversely, no empirical evidence was found to support the mediating role of perceived efficiency in this relationship. These findings not only contribute empirical insights to the literature on digital transformation and sustainability in the banking sector but also offer practical managerial implications for JSCBs in designing digitalization strategies and enhancing competitiveness in an increasingly digital landscape.

Keywords: Digital Transformation, Sustainable Business, Financial Efficiency, Corporate Governance, Perceived Performance
JEL Classifications: M10, M21, G21, G30

1. INTRODUCTION

In the context of a rapidly expanding digital economy, the banking sector stands as one of the pioneering industries in Vietnam's digital transformation journey. From the adoption of digital banking and artificial intelligence to blockchain and big data, financial institutions are continuously innovating to meet evolving customer demands and adapt to a highly competitive environment. However, digital transformation goes beyond technological advancement—it is increasingly seen as a strategic lever for promoting sustainable business development, which has become a top concern for many banks. Currently, Vietnam has 30 Joint Stock Commercial Banks (JSCBs), yet most of these institutions have paid limited attention to the drivers of sustainable business growth. A sustainably developed enterprise is one that not only generates short-term benefits but also delivers long-term value. According to Siswanti et al. (2024), sustainable business (SUS) refers to an enterprise's ability to achieve business goals, increase long-term value, and maintain operational continuity over time. In this regard, digital transformation plays a critical role in business growth, particularly in the banking sector. Given that banks heavily rely on digitalization—and most institutions are in constant competition to upgrade and innovate—customers are likely to turn away from JSCBs that fail to develop robust technological capabilities to attract and retain them.

Moreover, digital transformation enables a business to create value not only for customers but also for other stakeholders (Nguyen et al., 2025; Siswanti et al., 2024). According to Lingyan et al. (2021) and Oktavenus (2019), digital transformation has a

favorable and significant impact on the sustainability of business operations. Regardless of the motivation—whether driven by market demand or modernization—digital transformation is essential for optimizing business profitability and is considered a key driver of organizational advancement today, including in the banking sector. Therefore, the relationship between digital transformation and sustainability (SUS) in the banking industry warrants greater attention. Previous studies have examined the relationship between digital transformation and SUS in the banking sector, including research by Pham and Vu (2022), Alodat et al. (2024), and Siswanti et al. (2024). Most of these studies focused on analyzing the direct effects of digital transformation on sustainability, with the expectation that digitalization contributes to enhancing business performance in commercial banks. The findings of earlier studies consistently suggest that digital transformation has a strong influence on the strategic orientation toward sustainability within the banking sector.

However, the relationship between these two concepts—as well as existing research findings—still reveals inconsistencies and leaves several dimensions of digital transformation unexplained. More importantly, there remain significant gaps in identifying and conceptualizing the mediating components within the existing theoretical frameworks. This suggests a need for further exploration of the mediating roles of factors such as corporate governance, perceived efficiency, and financial performance in the relationship between digital transformation and sustainability (SUS). Addressing these gaps would help refine the understanding of how digital transformation contributes to sustainable development, particularly in the banking sector. Therefore, to explore the intermediary mechanisms in this conceptual framework more comprehensively, this study sets out the following objectives: First, to propose a comprehensive and integrated conceptual framework for examining the relationship between digital transformation and sustainability among Joint Stock Commercial Banks (JSCBs) in Vietnam; Second, to identify and measure the impact of digital transformation on SUS through the mediating roles of three key factors—(1) corporate governance, (2) perceived efficiency, and (3) financial performance; and Third, to offer managerial implications that can assist JSCBs in formulating strategies and policies aimed at enhancing their competitive advantage and promoting long-term sustainable development.

2. LITERATURE REVIEW

According to the Decision approving the Digital Transformation Plan of the banking sector to 2025, with a vision to 2030, issued by the State Bank of Vietnam, corporate governance in the banking sector is defined as focusing on the application of principles such as transparency, accountability, responsibility, professionalism, and fairness (Nguyen et al., 2024). The primary goal of this framework is to ensure the safety and soundness of the financial system, minimize risks, and enhance the operational efficiency of Joint Stock Commercial Banks (JSCBs). These elements are considered key to financial stability and play a crucial role in maintaining public trust in the banking system. At the same time, a bank that fails to implement sound corporate governance is likely to face significant issues in the future, such as fraud, liquidity problems, and other challenges that negatively affect the bank's performance (Kartika and Utami, 2019; Andriyani et al., 2021; Nguyen et al., 2024; Nguyen et al., 2025). Therefore, JSCBs are no longer solely responsible for meeting financial performance indicators or operating based on monetary principles alone. Instead, their obligations must encompass three fundamental objectives: serving customers, contributing to society, and protecting the environment.

Digital platforms have significantly influenced markets, society, and individuals, making their presence increasingly embedded in customer habits and behaviors. According to Manita et al. (2020), digital transformation refers to the use of technology to transition repetitive operational processes into digital solutions aimed at improving efficiency and performance. The advancement of digital technology has driven the emergence of new business models and innovative revenue-generating methods. A company's financial success demonstrates the resilience and strength of Joint Stock Commercial Banks (JSCBs) over a specific period (Siswanti et al., 2024).

2.1. The Impact of Digital Transformation on Corporate Governance

Corporate governance and digital transformation in the banking sector, Sama et al. (2022) approached this topic from both internal and external perspectives, highlighting the significant impact of digital transformation and corporate governance on the value of JSCBs in the Indonesian market. Digitalization processes have shown substantial effects on stakeholders who are increasingly concerned with improved corporate governance practices. These challenges arise from the critical need to maintain the trust of shareholders, investors, and other stakeholders in the governance process. Digital transformation is considered a key enabler in achieving effective corporate governance, especially under conditions of increasing complexity and scrutiny. In addition, studies by Alsayegh et al. (2020) and Grove et al. (2018) have also demonstrated the considerable influence of digital transformation on corporate governance. In the current digital era—characterized by enhanced governance practices—Boards of Directors are better positioned to monitor and investigate key performance indicators. This suggests that digital transformation contributes to greater transparency and operational efficiency in corporate governance at JSCBs. Therefore, the following hypothesis is proposed:

H_1: Digital transformation has a positive and significant impact on corporate governance in JSCBs.

2.2. The Impact of Digital Transformation on Perceived Efficiency

The capabilities enabled by digital transformation facilitate the creation of specialized opportunities and transform customer interactions in today's rapidly evolving digital environment (Nguyen et al., 2025). Therefore, a comprehensive understanding of digital transformation must acknowledge both its foundational contributions and recent advancements in developing organizational capabilities and shaping belief-driven perceptions. Digital technologies automate, optimize, and streamline processes, resulting in significant improvements in productivity and

operational efficiency. In the context of studying the relationship between technological adaptability and perceived efficiency within the JSCB sector in Jordan, research has shown that emerging digital technologies enhance operational processes, service delivery, and customer engagement, thereby increasing customers' perceived efficiency of the banking sector (Siswanti et al., 2024). Perceived efficiency, in this case, refers to the perceived value of JSCBs in Jordan, reflecting their profitability and operational performance. Based on Rogers and Singhal's (2003) well-established diffusion of innovation theory—which suggests that early adoption of technological advances can lead to competitive advantage—this study proposes the following hypothesis:

H_2: Digital transformation has a positive and significant impact on perceived efficiency in JSCBs.

2.3. The Impact of Digital Transformation on Financial Performance

Kurniawan et al. (2021) affirmed that digital transformation has a significant impact on the financial performance of banks. In addition, Pham and Vu (2022) demonstrated that the digital revolution has a strong and positive influence on the financial performance of small and medium-sized enterprises. To improve the performance of a business or a bank, digital transformation is necessary as it fosters innovation that enhances operational efficiency. Masoud and Basahel (2023) further confirmed that digital transformation directly and positively affects business performance. Conversely, Jardak and Ben Hamad (2022) argued that digital transformation can have negative effects on firm performance. Moreover, Guo and Xu (2021) showed that digital transformation exerts distinct impacts on various aspects of organizational performance and recommended that firms clearly define their digital transformation objectives to avoid inefficiencies. These findings suggest that the relationship between digital transformation and financial performance remains a subject of debate across different business and banking contexts. Therefore, to further explore this relationship in the context of JSCBs in Vietnam, the following hypothesis is proposed:

H_3: Digital transformation has a positive and significant impact on the financial efficiency in JSCBs.

2.4. The Impact of Corporate Governance on Sustainable Business Practices

According to Nasrallah and El Khoury (2022) and Puni and Anlesinya (2020), corporate governance has a significant and positive influence on the ability of banks to pursue sustainable business practices. In addition, the study by Kartika and Utami (2019) provided empirical evidence supporting the claim that corporate governance significantly affects the capacity to conduct sustainable operations within the financial sector in India. Similarly, Al-Qudah et al. (2022) argued that corporate governance has a meaningful and beneficial impact on sustainability-related activities. These scholars also emphasized the need for further exploration across various organizational contexts. However, contrary to these findings, Kartika and Utami (2019) also noted that the relationship between corporate governance and sustainable performance is not always consistent. Overall, while many studies highlight a positive link between corporate governance and sustainability, others indicate that governance may not significantly influence a firm's sustainable development efforts. To clarify these conflicting perspectives, this study proposes the following hypothesis:

H_4: Corporate governance has a positive and significant impact on sustainability performance in JSCBs.

2.5. The Impact of Perceived Efficiency on Sustainable Business Practices

Han et al. (2023) and Sama et al. (2022) emphasized that perceived efficiency plays a crucial role in promoting sustainability within the operations of financial institutions, thereby enhancing their overall business performance. This improvement aims to streamline procedures, minimize resource consumption, and contribute to cost-effectiveness. As a result, it may lead to greater perceived operational efficiency, as well as increased transparency and accountability. Furthermore, when JSCBs demonstrate higher perceived efficiency, they are better positioned to proactively engage with stakeholders and effectively address social concerns, including—but not limited to—diversity, inclusion, and ethical practices (Siswanti et al., 2024). The adoption of such an integrated strategy facilitates the advancement of a sustainable and resilient future for both the organization and society at large. Additionally, banks that enhance perceived efficiency may leverage it as a tool to accelerate human productivity and expedite digital transformation exponentially. This is expected to improve the bank's perceived performance by delivering a range of operational benefits, thereby enabling sustainable business practices.

However, regarding the impact of perceived efficiency on sustainability (SUS), Katsamakas (2022), Nguyen et al. (2025) and Liu et al. (2025) found that perceived efficiency in digital transformation significantly influences the long-term viability of business operations. These findings suggest ongoing academic debate over the relationship between perceived efficiency and sustainability. To further clarify this relationship within the context of digital transformation among Joint Stock Commercial Banks (JSCBs) in Vietnam, the following hypothesis is proposed:

H_5: Perceived efficiency has a positive and significant impact on sustainability performance in JSCBs.

2.6. The Impact of Financial Performance on Sustainable Business Practices

According to Ayuba et al. (2019), a firm's financial performance influences its capital structure, as larger firms with strong financial growth are more likely to issue new equity and allocate capital to improve sustainable business practices. The financial performance of Joint Stock Commercial Banks (JSCBs) in Vietnam has significantly enhanced their sustainability, as reflected in their expansion and improved results documented in recent annual reports. Moreover, the purpose of this study is to examine whether financial success genuinely contributes to the sustainability efforts pursued by JSCBs. Prior research has shown that strong financial performance in the banking sector has a positive and significant impact on sustainability-related activities (Siswanti et al., 2024;

Alsayegh et al., 2020). To reinforce this relationship within the specific context of Vietnam's banking industry, the following hypothesis is proposed:

H_6: Financial efficiency has a positive and significant impact on sustainability performance in JSCBs.

The proposed conceptual framework is developed based on a comprehensive review of the literature and an expanded perspective on the research issue. The framework is presented in Figure 1 below:

3. RESEARCH METHODOLOGY

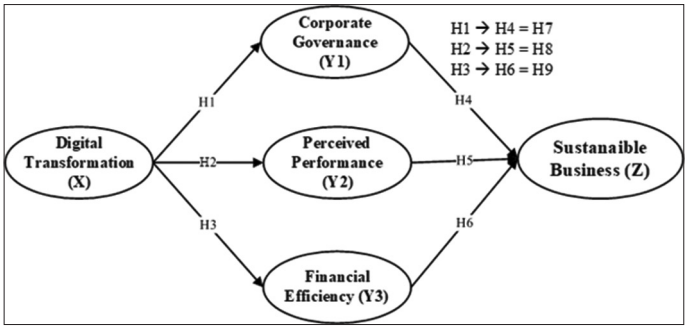
3.1. Measurement Scales

The measurement scales for the structural variables in the research model were adapted from previous studies and revised to suit the context of Joint stock commercial banks in Vietnam. The survey employed a 5-point Likert scale, with 1 = Strongly Disagree, 3 = Neutral, and 5 = Strongly Agree, to assess the independent variables, mediating variables, and the dependent variable in this study. The proposed research model includes five constructs and nine hypotheses, which are inherited and further developed from prior research to establish appropriate measurement items for each conceptual construct. However, since constructs may differ across markets and contexts, the measurement scales were carefully adjusted and refined through in-depth interviews with five experts to ensure the wording, terminology, and meaning were contextually appropriate. The observed variables are presented in Table 1 below:

3.2. Data collection

The target respondents of this study are customers who have previously conducted transactions with joint stock commercial banks in Vietnam. Data was collected from 30 JSCBs using structured questionnaires, administered through a combination of direct distribution and online surveys. A non-probability convenience sampling method was employed, allowing for flexible and efficient access to the target group—those with actual experience using services provided by JSCBs. A total of 290 questionnaires were distributed and returned. After eliminating invalid responses (e.g., incomplete or inconsistent answers), 270 valid responses were retained for quantitative analysis, resulting in a valid response rate of 93.1%. The use of convenience sampling was deemed appropriate given the practical constraints of the study, enabling cost and time efficiency while ensuring that the sample consists of individuals relevant to the research objectives. Moreover, the combination of direct and online survey administration helped optimize the response rate and improve data quality by providing flexibility and better guidance to respondents. Although convenience sampling may limit the generalizability of the findings to the broader customer base of all banks, it remains an acceptable and effective approach in exploratory research and model testing, particularly when conducted within a specific context such as the Vietnamese JSCB sector.

Figure 1: Conceptual framework, Direct relationships: H_1, H_2, H_3, H_4, H_5, H_6. Indirect relationships: $H_7 = H_1$ and H_4; $H_8 = H_2$ and H_5; $H_9 = H_3$ and H_6



Source: Author's proposal

3.3. Data analysis and processing method

The study employs a mixed-methods approach, combining qualitative and quantitative research. The qualitative phase was conducted through desk research and in-depth interviews with five experts who have extensive experience in teaching and management within the banking sector. This process contributed to the development of the research model, hypotheses, and survey questionnaire. The quantitative phase involved hypothesis testing, measurement, and validation using statistical software and estimation techniques. Specifically, the study utilized SmartPLS 3.0 software and the Partial Least Squares (PLS) method, which is a robust path analysis technique in structural equation modeling (SEM). This approach is suitable for confirming relationships between the research constructs. The PLS-SEM method served as the primary statistical tool to analyze the reliability of measurement scales, assess construct validity, evaluate model fit, and test the significance of path coefficients in the proposed model.

4. RESEARCH FINDINGS AND DISCUSSION

4.1. Research Findings

Cronbach's Alpha reliability testing: The analysis results presented in Table 2 indicate that all constructs achieved satisfactory reliability, with Cronbach's Alpha coefficients exceeding 0.7, specifically ranging from 0.883 to 0.906. Additionally, most of the factor loadings for each indicator were >0.7 (Table 2). Therefore, the indicator reliability is confirmed, and the scale reliability for all variables is considered appropriate. Moreover, the results for Composite reliability (CR) of all latent variables show the following values: X = 0.934; Y1 = 0.922; Y2 = 0.936; Y3 = 0.935; and Z = 0.928. Overall, the CR scores for each construct are above 0.8, which demonstrates that the measurement scales used in this study exhibit strong internal consistency reliability.

Convergent validity assessment of the measurement scale: The results in Table 1 show that the Average Variance Extracted (AVE) values for all constructs are greater than 0.5, ranging from 0.746 to 0.830, thus meeting the required threshold. According to Hair et al. (2017), a measurement scale achieves convergent validity when the AVE value exceeds 0.5, indicating that the construct explains at least 50% of the variance of its indicators. An AVE value below 0.5 would suggest that error variance exceeds the explained variance. Therefore, the estimation results confirm that each construct demonstrates good convergent validity.

Table 1: Summary of measurement scales

Research variables	Coding	Scale items	Source of reference
Digital transformation (X)	X1	The enterprise has applied digital technology to its processes.	Vial (2019)
	X2	The enterprise has transformed its business model through digital technology.	
	X3	Digital transformation is at the core of the enterprise's strategy.	
	X4	Employees are prepared to adapt to digital transformation.	
	X5	Decision-making is based on digital data.	
Corporate governance (Y1)	Y11	The governance structure is clear and transparent.	Al-Bassam et al. (2018)
	Y12	The board of directors operates effectively.	
	Y13	There is an internal control and monitoring mechanism in place.	
	Y14	There is a clear risk control policy.	
	Y15	Compliance with legal and ethical regulations.	
Perceived efficiency (Y2)	Y21	Digital transformation helps improve operational efficiency.	Chen et al. (2014)
	Y22	Employee productivity has improved.	
	Y23	Customer satisfaction has increased.	
	Y24	Services are delivered faster and more efficiently.	
	Y25	Increased ability to meet market demand.	
Financial efficiency (Y3)	Y31	The enterprise's revenue has increased.	Norton David (1996)
	Y32	Operating costs have been effectively reduced.	
	Y33	Net profit has improved.	
	Y34	Profitability has increased.	
	Y35	Financial indicators (ROA, ROE) have shown stable growth.	
Sustainable business (Z)	Z1	The enterprise is concerned about environmental benefits.	Elkington and Rowlands (1997)
	Z2	The enterprise has social responsibility.	
	Z3	The enterprise pursues long-term benefits instead of short-term gains.	
	Z4	The enterprise focuses on overall sustainable development.	
	Z5	Economic, social, and environmental goals are balanced.	

Source: Author's compilation

Table 2: Construct reliability and validity

Structure	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted (AVE)
X	0.905	0.906	0.934	0.779
Y1	0.886	0.887	0.922	0.746
Y2	0.898	0.901	0.936	0.830
Y3	0.906	0.908	0.935	0.781
Z	0.883	0.886	0.928	0.810

Source: Author's compilation

Assessment of discriminant validity of the measurement scale: For a measurement scale to achieve discriminant validity, the square root of the AVE for any latent variable must be greater than the variance shared with any other latent variable. In SmartPLS, within the Fornell-Larcker criterion table, the square roots of the AVEs appear in the diagonal cells, while the correlations between variables appear below them. According to the results in Table 4, this analysis shows that discriminant validity for the constructs has been established, as the square roots of the AVEs (bolded diagonal values) are higher than the off-diagonal correlations. In addition, the study also employed the Heterotrait–Monotrait Ratio (HTMT) method to estimate discriminant validity. The results indicate that the HTMT values for all pairs of first-order constructs are less than 0.9, thereby meeting the established threshold (as shown in Table 5).

Based on these findings, the author concludes that the measurement scales used in the research model have achieved both reliability and validity.

Structural model assessment: Multicollinearity and model fit testing.

Table 3: Outer loadings and collinearity statistics (VIF)

Observed Variables	X	Y1	Y2	Y3	Z	VIF
X1	0.869					2.787
X2	0.898					3.327
X3	0.915					3.783
X4	0.845					2.653
X5	0.823					2.534
Y11		0.866				2.545
Y12		0.887				2.900
Y13		0.834				2.121
Y14		0.868				2.462
Y15		0.815				2.231
Y21			0.904			2.631
Y22			0.920			2.831
Y23			0.910			2.836
Y24			0.889			2.316
Y25			0.902			2.457
Y31				0.896		3.421
Y32				0.901		3.490
Y33				0.901		3.059
Y34				0.837		2.226
Y35				0.843		2.272
Z1					0.891	2.197
Z2					0.898	2.657
Z3					0.911	2.820
Z4					0.873	2.536
Z5					0.907	2.205

Source: Author's compilation

According to Hair et al. (2017), multicollinearity may occur if the tolerance is <0.2 or if the Variance Inflation Factor (VIF) exceeds 5. VIF is the inverse of tolerance and provides the same information about multicollinearity. Tolerance is calculated as 1 minus the R^2 of the construct. This means that if the R^2 of a construct is <0.8, multicollinearity is not considered a problem, as it satisfies the

Table 4: Fornell-Larcker criterion

Variables	X	Y1	Y2	Y3	Z
X	**0.882**				
Y1	0.637	**0.864**			
Y2	0.539	0.706	**0.911**		
Y3	0.638	0.704	0.726	**0.884**	
Z	0.575	0.638	0.611	0.666	**0.900**

Source: Author's compilation

Table 5: Heterotrait-Monotrait ratio (HTMT)

Variables	X	Y1	Y2	Y3	Z
X					
Y1	0.711				
Y2	0.596	0.793			
Y3	0.704	0.787	0.804		
Z	0.644	0.721	0.680	0.742	

Source: Author's compilation

threshold of either tolerance >0.2 or VIF <5. The results presented in Table 3 show that all VIF values are below the threshold of 5. Specifically, the maximum VIF value is VIF_{Y32} = 3.490 and the minimum is VIF_{Y13} = 2.121, indicating that there is no multicollinearity among the latent variables in the model.

Model fit evaluation based on R^2 values. The model fit was assessed using the coefficient of determination (R^2). The analysis results indicate that the adjusted R^2 values for the model are as follows: $R^2_{Y1} = 0.403$; $R^2_{Y2} = 0.287$; $R^2_{Y3} = 0.404$; and $R^2_{Z} = 0.503$. These values meet the statistical standards for model adequacy and suggest that the adjusted R^2 coefficients explain a moderate to substantial level of variance in the endogenous variables (Hock and Ringle, 2010; Henseler et al., 2009), as presented in Table 6 below.

In addition, the author employed the communality index to assess model fit within the structural model. According to Tenenhaus et al. (2005) and Wetzels et al. (2009), the communality index is equivalent to AVE in the PLS-SEM model and should exceed 0.5 to indicate a good model fit. Based on the results in Table 2, the structural model shows that all AVE values are >0.5 for each construct. The study also uses Cohen's (1988) f^2 effect size index to categorize the magnitude of effects into three levels: a large effect size for f^2 values >0.4; a medium effect size for f^2 values between 0.25 and 0.40; and a small effect size for f^2 values below 0.1 (Henseler and Sarstedt, 2013) as shown in Table 8. Moreover, the model's quality was evaluated using the Q^2 index (Construct cross-validated redundancy). The estimated Q^2 values were as follows: $Q_{Y1}^2 = 0.296$; $Q_{Y2}^2 = 0.236$; $Q_{Y3}^2 = 0.311$; and $Q_{Z}^2 = 0.401$. Since all values are >0, this indicates that the model has a moderate predictive relevance (Hair et al., 2016). In addition, the model's Standardized Root mean square residual (SRMR) value, shown in Table 7, is 0.055, which is less than the recommended threshold of 0.08. This demonstrates that the model has a good overall fit with the empirical data (Hu and Bentler, 1998). Taken together, all of these results confirm that the PLS-SEM model demonstrates an excellent fit with the empirical data used in this study (Figure 2).

Hypothesis confirmation: Using the Bootstrapping function with 5,000 iterations (Hair et al., 2016), the statistical results of the path coefficients are presented in Table 8. The findings

Table 6: R square

Structure	R Square	R Square Adjusted
Y1	0.406	0.403
Y2	0.290	0.287
Y3	0.407	0.404
Z	0.510	0.503

Source: Author's compilation

Table 7: Model_Fit

Fit summary	Saturated model	Estimated model
SRMR	0.055	0.156
d_ULS	0.516	4.141
d_G	0.465	0.649
Chi-square	564.393	686.431
NFI	0.825	0.788

Source: Author's compilation

indicate that all hypothesized relationships in the model are statistically significant. When comparing the impact of the digital transformation variable (X) on corporate governance (Y1) with β = 0.637; on perceived performance (Y2) with β = 0.539; and on financial performance (Y3) with β = 0.638 — it can be concluded that digital transformation has a strong influence on all three factors. In descending order, the strength of influence is: financial performance, corporate governance, and perceived performance. Furthermore, when comparing the effects of the three variables — corporate governance, perceived performance, and financial performance — on sustainable business (Z), financial performance shows the strongest influence (β = 0.360), followed by corporate governance (β = 0.275), and lastly, perceived performance, which has the weakest influence (β = 0.156).

Thus, the research findings indicate that the hypotheses proposed by the author: H_1, H_2, H_3, H_4, and H_6 are all accepted at a 97.5% confidence level, except for hypothesis H_5, which is rejected. Additionally, hypothesis H_8 (the impact of digital transformation on sustainable business through the mediating factor of perceived performance) is also rejected. Moreover, the impact of digital transformation on sustainable business through the two mediating factors corporate governance and financial performance is supported (Table 9). In other words, digital transformation has a positive effect on both corporate governance and financial performance, and both of these factors, in turn, positively influence the sustainable business practices of JSCBs in Vietnam.

4.2. Discussion

Discussion on the impact of digital transformation on corporate governance, financial performance, and perceived performance: In the context of Vietnam's banking sector, which is facing increasing competitive pressure and a growing demand for technological innovation, digital transformation has emerged as a top strategic priority to enhance operational capacity and move toward sustainable development. The research results show that digital transformation has a positive and statistically significant impact on all three mediating factors: corporate governance, perceived performance, and financial performance. Among them, the impact on financial performance is the strongest (β = 0.638), followed by corporate governance (β = 0.637), and perceived performance

Table 8: Results of direct relationship testing

Causal relationship	Hypothesis	Path coefficients (β)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	f^2	P-values	Result
X → Y1	H_1	0.637	0.054	11.804	0.685	0.000	Accepted
X → Y2	H_2	0.539	0.066	8.205	0.409	0.000	Accepted
X → Y3	H_3	0.638	0.061	10.414	0.686	0.000	Accepted
Y1 → Z	H_4	0.275	0.102	2.697	0.065	0.007	Accepted
Y2 → Z	H_5	0.156	0.096	1.620	0.020	0.105	Rejected
Y3 → Z	H_6	0.360	0.088	4.088	0.106	0.000	Accepted

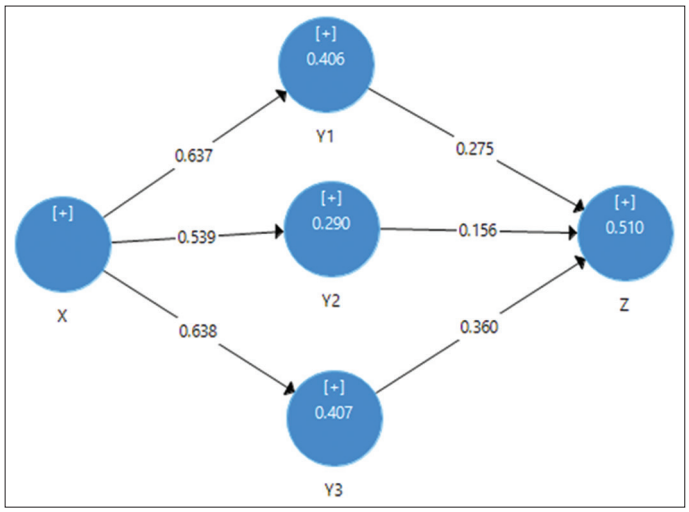
Source: Author's compilation

Table 9: Results of indirect relationship testing

Causal relationship	Hypothesis	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result
X → Y1 → Z	H_7	0.180	0.069	2.524	0.012	Accepted
X → Y2 → Z	H_8	0.079	0.051	1.647	0.100	Rejected
X → Y3 → Z	H_9	0.229	0.062	3.687	0.000	Accepted

Source: Author's compilation

Figure 2: PLS-SEM model estimation results



Source: Author's compilation

(β = 0.539). This finding reinforces the view of Kurniawan et al. (2021), who asserted that digital transformation is a strategic lever for improving financial performance in the banking sector. At the same time, the study aligns with Siswanti et al. (2024) in emphasizing the clear mediating role of financial performance in the relationship between digital transformation and sustainable business. This highlights that financial institutions need to invest strategically in digital technologies not only to optimize processes but also to create tangible financial value, which serves as the foundation for long-term sustainability. However, a notable point in this study is the discovery of a meaningful mediating role of corporate governance — a finding not reported in the earlier study by Siswanti et al. (2024). This divergence may stem from the intensely competitive environment among JSCBs in Vietnam, which compels these organizations to invest not only in customer-facing digital technologies but also in enhancing transparency, accountability, and internal control mechanisms. The application of digital transformation goes beyond the automation of transactions; it extends to the establishment of clearer governance structures and the use of data to support more accurate and informed managerial decision-making — all of which contribute to fostering sustainable business practices. This finding suggests that corporate governance is playing a critical linking role in the value chain of sustainable digital transformation, thereby extending the current theoretical framework.

The limitation of perceived performance as a mediating factor: Contrary to expectations, perceived performance—although significantly influenced by digital transformation—did not demonstrate a clear mediating role in the relationship with sustainable business practices (hypothesis H_8 was rejected). This may be explained by the specific characteristics of Vietnamese joint-stock commercial banks at present: digital transformation initiatives have largely focused on optimizing customer experience or accelerating processing speed, without leading to long-term changes in strategic orientation or overall organizational effectiveness. In other words, while digital transformation activities offer short-term operational benefits, they lack the depth needed to generate strategic value that moves businesses closer to sustainable development goals. This finding diverges from theoretical expectations but reflects the reality in Vietnam, where digital transformation programs tend to follow trends rather than being truly integrated with long-term development objectives. Many JSCBs may still view digital transformation as a marketing tool or technological enhancement, rather than as a comprehensive organizational strategy tied to restructuring governance models, risk management systems, and resource management.

5. CONCLUSION AND MANAGEMENT IMPLICATIONS

The research findings have clarified the strategic role of digital transformation in promoting sustainable development among JSCBs in Vietnam, through two key mediating mechanisms: corporate governance and financial performance. Based on these findings, several important managerial implications are proposed to help JSCBs optimize the value that digital transformation can bring:

First, digital transformation should be redefined as a comprehensive development strategy rather than merely a technological solution.

Many organizations still approach digital transformation as an effort to upgrade infrastructure or streamline operational processes. However, the study indicates that real value is only created when digital transformation is integrated into the entire governance system, business model, and long-term strategic direction of the organization. This includes restructuring processes, training digital skills for employees, and shifting organizational culture toward agility and customer-centricity.

Second, JSCBs—especially small and medium-sized banks—need to proactively build their technological absorption capacity, from infrastructure to human capital. To achieve this, it is essential to establish ecosystems of collaboration with financial technology (FinTech) firms, digital transformation consultants, and research institutions. Such collaboration can help banks access innovative solutions more rapidly while reducing investment costs and technology transfer risks.

Third, an important implication comes from the finding of the significant mediating role of corporate governance. This highlights that digital transformation cannot be fully effective without corresponding improvements in internal governance quality. Banks must strengthen internal control systems, enhance transparency in information disclosure, and improve supervisory mechanisms. Modern governance should be driven by digital data and responsible decision-making capabilities, aiming for long-term transparency and sustainability.

Fourth, financial performance is not only an outcome of digitalization but also a critical condition for maintaining investments in sustainable development objectives. JSCBs should ensure that investments in digital technology are evaluated from both perspectives: financial performance and contributions to ESG (Environmental – Social – Governance) goals. The combination of traditional financial indicators with non-financial metrics will create a more comprehensive framework for measuring digital transformation effectiveness.

Fifth, the development of ESG-oriented digital financial products should be promoted. JSCBs can expand their service portfolios to include green credit, ESG bonds, or sustainable finance products tailored for small and medium enterprises. At the same time, banks should personalize digital financial services to support more effective and transparent financial management for businesses, thereby contributing to broader sustainability goals.

Sixth, JSCBs need to reposition themselves from being mere "financial service providers" to becoming "strategic digitalization partners" for their customers. This requires banks to build integrated service packages that go beyond finance, including technology consulting, governance advisory, and sustainability guidance. This shift will not only enhance service value but also create a distinct competitive advantage in the context of a rapidly evolving digital transformation across the entire industry.

Although this study provides valuable empirical evidence, several limitations should be acknowledged to guide future research efforts. First, the study focuses on JSCBs in Vietnam as the main survey population. As a result, the findings may not fully capture the characteristics of other types of banks, such as state-owned banks, foreign banks, or non-banking financial institutions. Expanding the scope of research to include these entities would help verify the generalizability and robustness of the theoretical model across different banking contexts. Second, the current research model only tests linear mediating relationships and does not account for moderating effects or nonlinear relationships. In practice, the impact of digital transformation may vary depending on factors such as the level of digital maturity, bank size, or market competitiveness. Therefore, future studies should incorporate moderating variables such as the degree of digitalization, level of technology investment, governance capacity, or extent of policy support to provide a more comprehensive understanding. Finally, the study recommends expanding the theoretical model by integrating Environmental – Social – Governance (ESG) factors within the banking sector. Introducing variables such as green innovation, sustainable credit, or environmental governance would contribute to the development of a more holistic theoretical framework while aligning with the global financial sector's post-digital transformation direction—where sustainable development is no longer optional but imperative.

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