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Exploring fintech adoption in cashless transactions: Evidence from the bank for investment and development of Vietnam

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ABSTRACT

In the era of Industry 4.0 and ongoing digital transformation in the banking sector, Fintech has become a vital catalyst for the growth of cashless payment services in Vietnamese commercial banks. The Bank for Investment and Development of Vietnam (BIDV) is among the leading banks at the forefront of Fintech adoption, aiming to improve customer experience and enhance the efficiency of electronic transactions. However, the extent of Fintech adoption varies significantly across BIDV branches and is influenced by various factors. Grounded in theoretical foundations and a comprehensive review of previous studies, this research develops a conceptual model to identify the main factors affecting the level of Fintech adoption in cashless payments at BIDV. Primary data were collected through a structured survey of 250 customers across multiple BIDV branches. The data were analyzed using SPSS software, beginning with reliability testing to confirm the consistency of measurement scales. Subsequently, exploratory factor analysis (EFA) was employed to uncover the underlying factor structure, followed by multiple regression analysis to assess the impact of each factor on Fintech adoption levels. The results indicate that all identified factors have a positive and statistically significant influence on the degree of Fintech adoption across BIDV branches. Based on these findings, the study offers several practical recommendations to promote more effective and consistent Fintech implementation. The main contribution of this research lies in providing empirical evidence and a validated analytical framework for understanding the key drivers of Fintech adoption within Vietnamese commercial banking.

Contribution/Originality: This study has clarified the factors affecting the level of Fintech application in non-cash payments at a typical commercial bank branch in Vietnam. It provides the main drivers for the application of Fintech in commercial banks in developing countries with similar characteristics.

1. INTRODUCTION

Fintech, short for Financial Technology, refers to the application of modern technology to innovate and improve the efficiency of financial services. In Vietnam, the rapid development of Fintech has significantly boosted cashless payment activities, contributing to the modernization of the national financial system and enhancing the customer experience. In the context of the Fourth Industrial Revolution and the strong growth of digital technologies, Fintech has become a crucial driving force, fundamentally transforming the banking industry. The advancement of Fintech not only helps banks reduce costs through modern payment methods and minimize risks associated with cash transactions but also creates convenience and speed in payment processes while expanding diverse access opportunities for customers.

The Bank for Investment and Development of Vietnam (BIDV), with its extensive branch network and large operational scale, is one of the pioneers in implementing Fintech solutions to promote cashless payments. However, in practice, the level of Fintech adoption at BIDV branches still varies considerably and has not yet achieved uniform effectiveness. Researching and clarifying the factors influencing the extent of Fintech adoption at BIDV branches is essential, as it provides the bank with a basis to adjust policies, improve services, and enhance customer experience in the digital age. Therefore, studying the factors that affect the degree of Fintech adoption in cashless payment activities at major commercial banks like BIDV is a highly practical and urgent issue.

2. LITERATURE REVIEW

2.1. Theoretical Basis

In the current phase of vigorous digital transformation, FinTech has evolved from merely a customer-service tool into a core element of strategic business model innovation and performance enhancement for commercial banks. From a management perspective, FinTech implementation enables banks to restructure internal processes and automate numerous payment operations, thereby reducing personnel and operational costs and shortening transaction processing times. Organizational efficiency theory posits that organizations which leverage technology to optimize resources and processes will gain a sustainable competitive advantage.

Moreover, Dynamic Capability Theory (Islam, Hasan, Tawfiq, Bhuiyan, & Faisal-E-Alam, 2024) emphasizes that an organization's ability to adapt and innovate technologically is the critical determinant of its long-term competitive prowess, especially in the financial-banking sector. FinTech adoption by commercial banks allows them to expand new payment forms and seamlessly integrate with third-party partners (Open Banking), thus fostering a richer digital financial ecosystem. This not only meets the growing demand for cashless payments but also broadens market reach, particularly among micro-customers and small enterprises.

Michel, Brown, and Gallan (2008) work on service innovation and organizational restructuring for new value creation, and Lusch and Nambisan (2015) study linking service innovation to service-dominant logic collectively asserts that technology-based product and service innovations enhance banks' ability to personalize offerings and develop micro-payment services, thereby expanding revenue streams and reinforcing market position. Additionally, Cost Management Theory Kaplan and Cooper (1998) and Davenport (1993) underscore that FinTech deployment helps banks minimize traditional operational costs such as manual processing, data management, and cash issuance.

Furthermore, FinTech enhances banks' risk control capabilities and cash-flow transparency through big-data analytics, artificial intelligence (AI), and blockchain. This aligns with the State Bank of Vietnam's long-standing encouragement of cashless payment development.

Thus, from the perspective of commercial bank management, the degree of FinTech adoption in cashless payments depends on the ability to diversify payment channels, accelerate and streamline transaction processing, promote micro-payment services, strengthen competitive advantage, and optimize operating costs.

2.2. Literature Review

In recent years, alongside the accelerating global trend of digital transformation, Fintech has attracted growing interest from international researchers, particularly in the context of commercial banking. Worldwide, an increasing number of studies have examined how Fintech adoption fosters cashless payment behavior and reshapes conventional banking models. For instance, recent studies by Liébana-Cabanillas, García-Maroto, Muñoz-Leiva, and Ramos-de-Luna (2020) and Sharma and Sharma (2019) highlight the importance of perceived usefulness, perceived ease of use, and user experience in motivating customers to adopt mobile and digital payment solutions. However, much of this research continues to approach Fintech adoption predominantly from the customer perspective, focusing on awareness, behavioral intentions, and perceived risks, while paying less attention to internal organizational factors within banks themselves such as strategies for product diversification, cost management efficiency, technological

capabilities, and the operational capacity of branch-level service delivery. Addressing this gap is essential for understanding how banks can successfully implement Fintech innovations not only to meet customer expectations but also to strengthen internal processes and maintain competitive advantage in the digital era.

Globally, numerous studies have examined FinTech adoption in cashless payments from an organizational management perspective, emphasizing FinTech's role in process restructuring, operational cost optimization, and competitive enhancement. Gomber, Koch, and Siering (2017) point out that FinTech not only provides convenient payment solutions for customers but also enables banks to innovate business processes, shorten processing times, and expand digital financial products tailored to micro-payment needs.

According to Hertog (2000), financial institutions that can rapidly develop and adapt to new technologies will secure sustainable competitive advantages over slower-moving rivals. Lusch and Nambisan (2015) further note that investing in digital payment technology infrastructure allows banks to reduce long-term operational costs, particularly those associated with paper-based processing, cash counting, and cash issuance.

Barnard (1968); Burns and Stalker (1994); Lawrence, Lorsch, and Garrison (1967); Simon (2013); Weber (2009) and Williamson (1981) consistently places organizational efficiency through resource optimization, cost reduction, speed improvement, and waste minimization at the core. Concurrently, heightened competition compels commercial banks not only to innovate products but also to control costs, boost operational efficiency, and leverage dynamic capabilities to maintain a competitive edge (Bhujel, 2024).

Building on these theoretical foundations organizational efficiency, dynamic capability, service innovation, and cost management this paper synthesizes and proposes a research model comprising five key factor groups: payment channel expansion; transaction speed and efficiency; promotion of micro-payments; competitive capability enhancement; and operational cost reduction. These factors reflect the core management dimensions that commercial banks must focus on when deploying FinTech to drive effective, sustainable, and policy-aligned cashless payment initiatives.

3. METHODOLOGY

3.1. Research Model

The author reviewed previous studies and integrated foundational theories to propose a research model identifying the factors influencing FinTech adoption in cashless payment activities at the branches of the Bank for Investment and Development of Vietnam (BIDV). The proposed model comprises the following factors: (i) expansion of payment channels, (ii) enhancement of transaction speed and efficiency, (iii) promotion of micro-payments, (iv) improvement of competitive capability, (v) reduction of operating costs. Details of Figure 1:

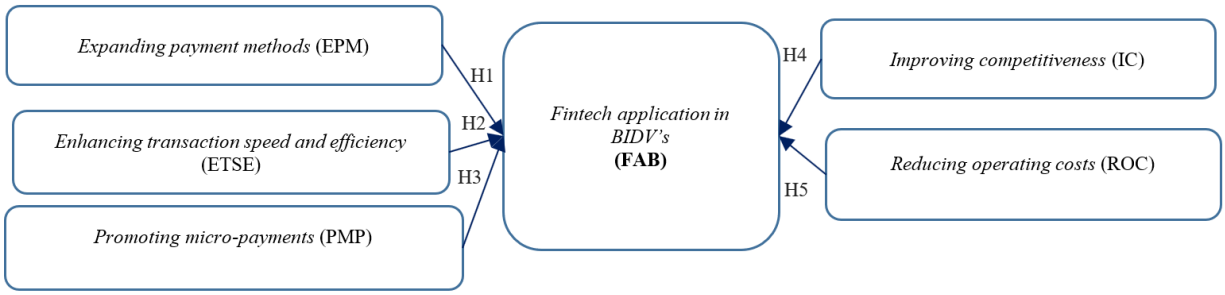

Figure 1. Model of factors influencing the level of fintech adoption in cashless payments at BIDV branches.

The specific research model is as follows:

$$FAB_i = \alpha + \beta_1 * EPM_i + \beta_2 * ETSE_i + \beta_3 * PMP_i + \beta_4 * IC_i + \beta_5 * ROC_i + \varepsilon$$

Where:

- Dependent variable:

FAB: Fintech Application in BIDV's Cashless Payment Activities.

- Independent variables:

EPM: Expanding Payment Methods.

ETSE: Enhancing Transaction Speed and Efficiency.

PMP: Promoting Micro-Payments.

IC: Improving Competitiveness.

ROC: Reducing Operating Costs.

Where: α is the constant term, β is the coefficient of the explanatory variable, ε is the residual, and i denotes the observation.

3.2. Research Hypotheses

Based on the five proposed factors influencing the extent of FinTech adoption in cashless payment activities at branches of the Bank for Investment and Development of Vietnam (BIDV), the author formulates the following research hypotheses:

(i) Expansion of Payment Channels

Expansion of payment channels reflects a bank's ability to diversify cashless payment methods through FinTech adoption. Dorfleitner, Hornuf, Schmitt, and Weber (2017) argue that a rich variety of payment options meets diverse customer needs, thereby increasing the use of digital services. BIDV's development of additional e-wallets, chip cards, QR-code payments, and online payment gateways will enhance convenience and attract customers to choose cashless transactions.

H₁: *Expansion of payment channels positively affects the extent of FinTech adoption in cashless payments at BIDV branches.*

(ii) Enhancement of Transaction Speed and Efficiency

Faster and more efficient transactions are core advantages offered by FinTech. Davis (1989) and Gefen, Karahanna, and Straub (2003) indicate that high processing speed and efficiency improve customer satisfaction and reinforce trust. When BIDV branches adopt FinTech, transaction processes become automated and streamlined, reducing procedures and enabling quick, accurate transactions with minimal waiting time.

H₂: *Enhancement of transaction speed and efficiency positively affects the extent of FinTech adoption in cashless payments at BIDV branches.*

(iii) Promotion of Micro-Payments

Promotion of micro-payments is a hallmark of modern FinTech applications. According to Zhou (2012) and Dorfleitner et al. (2017), the ability to conduct small-value transactions quickly and conveniently fosters a habit of cashless payments within the community. For BIDV, FinTech adoption enables customers to easily pay small bills such as utilities, online shopping, transport tickets, and mobile top-ups without cash. This increases the frequency and scope of digital payment service usage.

H₃: *Promotion of micro-payments positively affects the extent of FinTech adoption in cashless payments at BIDV branches.*

(iv) Improvement of Competitive Capability

Improvement of competitive capability reflects FinTech's role in enhancing a bank's position in the digital financial services market. Venkatesh, Morris, Davis, and Davis (2003) and Ajzen (1991) emphasize that technological innovation creates differentiation, retains existing customers, and attracts new ones. For BIDV, adopting FinTech in cashless payments is a solution to improve service quality, respond promptly to digital trends, and maintain competitiveness against nimble FinTech startups.

H₄: *Improvement of competitive capability positively affects the extent of FinTech adoption in cashless payments at BIDV branches.*

(v) Reduction of Operating Costs

Reduction of operating costs is a significant benefit FinTech brings to commercial banks. DeLone and McLean (2003) Demonstrate that FinTech adoption helps banks save on printing, storage, cash transportation, and personnel costs for traditional teller transactions. For BIDV, promoting cashless payments via FinTech not only optimizes resources but also frees up funds for reinvestment in other value-added services, thereby enhancing operational efficiency.

H₅: *Reduction of operating costs positively affects the extent of FinTech adoption in cashless payments at BIDV branches.*

3.3. Scale Development

The measurement scales for the factors influencing the extent of FinTech adoption in cashless payment activities at BIDV branches are presented in Table 1.

Table 1. Measurement scales for factors influencing the extent of fintech adoption in cashless payment activities at BIDV branches.

Numerical order	Scale	Encryption	References	Expectation sign.
Dependent variable				
Fintech application in BIDV's cashless payment activities (FAB)	Degree of meeting digital transformation requirements at the branch	FAB1	Dorfleitner et al. (2017)	
	Degree of enhancing competitive capability against FinTech companies	FAB2	Ajzen (1980)	
	Degree of meeting customer needs and experience at the branch	FAB3	Gefen et al. (2003) and Ajao, Oludamilare, and Sadeeq (2023)	
Independent variable				
Expansion of payment channels (EPM)	Deployment of diverse payment channels	EPM1	Dorfleitner et al. (2017)	+
	Number of cashless payment methods	EPM2		
	Degree of partnership integration with FinTech providers	EPM3		
Enhancement of transaction speed and efficiency (ETSE)	Transaction processing time is reduced	ETSE1	Davis (1989) and Gefen et al. (2003)	+
	Instant transaction response speed	ETSE2		
	Work efficiency is improved	ETSE3		
Promotion of micro-payments (PMP)	Degree of acceptance of small-value transactions	PMP1	Zhou (2012) and Dorfleitner et al. (2017)	+
	Convenience of daily consumer payments	PMP2		
	Increase in the proportion of microtransactions	PMP3		
Improvement of competitive capability (IC)	Competitive capability compared to other banks	IC1	Venkatesh et al. (2003) and García-Merino, San-Jose, and San-Martin (2025)	+
	Customer retention capability	IC2	Ajzen (1991) and Saadah and Setiawan (2024)	
	Capability to attract new customers	IC3	Islam et al. (2024)	
Reduction of operating costs (ROC)	Paperwork and teller transaction costs are reduced	ROC1	DeLone and McLean (2003) and Hu, Ding, Li, Chen, and Yang (2019)	+
	Personnel costs for teller transactions are reduced	ROC2		
	Overall cost efficiency	ROC3		

The study uses a 5-point Likert scale (Likert, 1932) with attributes measured from 1 - "Strongly Disagree" to 5 - "Strongly Agree," reflecting respondents' levels of agreement with the factors influencing the extent of FinTech adoption in cashless payment activities at BIDV branches.

3.4. Research Sample

The author collected research samples from branches of the Bank for Investment and Development of Vietnam (BIDV) nationwide, based on data relating to the attributes constructed in the measurement scale from 2022 to 2024. BIDV is currently one of the four largest state-owned commercial banks in Vietnam, with a network of over 190 branches and nearly 1,000 transaction offices covering all 63 provinces and cities. This extensive network spans key economic regions such as the Red River Delta, the Central Coastal region, the Central Highlands, the Southeast, and the Mekong River Delta. The data collection method was implemented by distributing survey questionnaires either directly at transaction counters or indirectly via email and Google Forms to staff and customers of branches located in different geographical areas. The distribution of the survey was designed according to the stratified sampling principle, ensuring that the sample size was balanced across regions, branch types (urban – rural), and operational scales (large – medium – small). In addition, the survey was conducted continuously from 2022 to 2024, allowing the collection of updated data, minimizing the impact of short-term fluctuations, and enhancing the reliability of the research results.

Respondents: At each BIDV branch, the author distributed a minimum of 5 questionnaires to the following specific respondent groups:

(i) 1 questionnaire to the Branch Director or Deputy Director.

(ii) 1 questionnaire to the Head/Deputy Head of Customer Service Department.

(iii) 1 questionnaire to a representative of the Risk Management Department.

(iv) 1 questionnaire to a representative of the IT Department.

(V) 1 questionnaire for each customer service staff member with at least 3 years of experience working at the branch.

Sample Size: In this study, the author distributed 250 survey questionnaires and received 243 responses. After data screening and validation, 238 valid responses were included in the analysis. This sample size meets the requirements for statistical analysis, specifically:

- For Exploratory Factor Analysis (EFA): the minimum required sample size is typically at least 5 times the number of observed variables (Comrey & Lee, 2013; Hair, 2009; Rogers, 2003). In this study, with 18 observed variables, the minimum required sample size is 90 responses.
- For multiple regression analysis: the minimum required sample size is calculated using the formula N = 50 + 8*m (where m is the number of independent variables) according to Tabachnick and Fidell (1996). With 5 independent variables, the minimum required sample size is 90 observations.

Therefore, the final sample of 238 valid responses is appropriate to ensure reliability and representativeness while meeting the requirements for the statistical methods used in this study.

4. RESULTS

The descriptive statistics results are presented in Table 2.

Table 2. Descriptive statistics.

Variable	N	Minimum	Maximum	Mean	Std. deviation
FAB	238	1	5	3.12	0.543
EPM	238	1	4	2.68	0.678
ETSE	238	1	4	2.89	0.571
PMP	238	1	5	3.46	0.629
IC	238	1	5	3.52	0.587
ROC	238	1	5	3.41	0.615

The results in Table 2 show that the level of FinTech adoption (PAF) has a mean value of 3.12 with a standard deviation of 0.543. The independent variables EPM, ETSE, PMP, IC, and ROC have mean values ranging from 2.68 to 3.52 and standard deviations between 0.571 and 0.678, indicating reasonable and stable data variability.

4.1. Measurement Scale Reliability Test

The author tested the measurement scale using Cronbach's Alpha coefficient. The results are presented in Table 3.

Table 3. Reliability test of the scale using Cronbach's alpha coefficient.

Observed variable	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
Cronbach's alpha = 0.915				
FAB1	11.25	8.954	0.872	0.972
FAB2	11.12	8.789	0.931	0.960
FAB3	11.18	8.812	0.915	0.967
Cronbach's alpha = 0.792				
EPM1	12.05	4.125	0.631	0.815
EPM2	11.90	3.905	0.582	0.876
EPM3	12.00	4.210	0.629	0.808
Cronbach's alpha = 0.839				
ETSE1	12.34	4.850	0.569	0.899
ETSE2	12.28	4.015	0.711	0.833
ETSE3	12.42	3.799	0.739	0.842
Cronbach's alpha = 0.827				
PMP1	9.10	2.120	0.705	0.889
PMP2	8.95	2.030	0.712	0.887
PMP3	9.00	2.045	0.698	0.865
Cronbach's alpha = 0.818				
IC1	8.85	2.110	0.730	0.838
IC2	8.70	1.985	0.682	0.889
IC3	8.78	1.980	0.642	0.831
Cronbach's alpha = 0.824				
ROC1	8.40	1.890	0.665	0.871
ROC2	8.42	1.895	0.689	0.882
ROC3	8.45	1.885	0.624	0.844

Table 3 shows that all factor groups have Cronbach's Alpha coefficients above 0.79, ensuring high reliability. The observed variables have item-total correlations above 0.6, meeting the required standards.

The results of the Exploratory Factor Analysis (EFA) are presented in Table 4.

Table 4. Rotation matrix.

Variable	EPM	ETSE	PMP	IC	ROC
EPM1	0.748				
EPM2	0.653				
EPM3	0.579				
ETSE1		0.679			
ETSE2		0.732			
ETSE3		0.604			
PMP1			0.678		
PMP2			0.645		
PMP3			0.598		
IC1				0.764	
IC2				0.812	
IC3				0.547	
ROC1					0.711
ROC2					0.729
ROC3					0.621

Note: Rotated component Matrix[a]
Extraction method: Principal component analysis.
Rotation method: Varimax with Kaiser normalization.
a. Rotation converged in 7 iterations.

4.2. Exploratory Factor Analysis (EFA)

The results in Table 4 show high factor loadings of the variables on their corresponding factors, indicating that the factor structure fits the research hypotheses.

4.3. Person Correlation Analysis

The results of the Pearson correlation analysis are presented in Table 5.

Table 5. Pearson correlation analysis.

	FAB	EMP	ETSE	PMP	IC	ROC
FAB	1	0.654*	0.621*	0.598*	0.522*	0.543*
EPM		1	0.562*	0.481*	0.412*	0.376*
ETSE			1	0.493*	0.398*	0.364*
PMP				1	0.421*	0.389*
IC					1	0.346*
ROC						1

Note: *. Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows that all independent factors have positive and statistically significant correlations with the level of FinTech adoption. The factors also exhibit appropriate correlations among themselves, indicating a reasonable linkage within the model.

4.4. Model Fit Test

The results of the model fit test are presented in Table 6.

Table 6. Model summary.

Model	R	R squared	Adjusted R-squared	Std. Error	Durbin-Watson
1	0.715	0.511	0.504	0.471	1.956

Note: *. Correlation is significant at the 0.05 level (2-tailed).

According to Table 6, the Durbin-Watson statistic is 1.956, and the adjusted R^2 is 0.504, indicating that the model fits well and explains 50.4% of the variance in the dependent variable.

4.5. Regression Analysis

The results of the regression analysis are presented in Table 7.

Table 7. Multiple Regression Results.

Coefficients[a]							
Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
	B	Std. error	Beta			Tolerance	VIF
(Constant)	2.512	0.578		4.346	0.000		
EPM	0.127	0.136	0.058	0.935	0.035	0.963	1.039
ETSE	0.064	0.148	0.052	0.432	0.041	0.969	1.033
PMP	0.103	0.119	0.043	0.866	0.028	0.985	1.015
IC	0.074	0.063	0.036	1.174	0.021	0.991	1.009
ROC	0.026	0.061	0.025	0.426	0.009	0.996	1.004

Note: a. Dependent Variable: CCB.

From Table 7, the following regression equation is derived: FAB = 2.512 + 0.103* EPM + 0.064 *ETSE + 0.127 *PMP + 0.074* IC + 0.026* ROC

5. DISCUSSION

5.1. Research Findings

The research results indicate that there are five significant factors influencing the level of Fintech adoption in cashless payment activities at BIDV's branches in Vietnam. These include: (i) expanding payment methods, (ii) increasing transaction speed and efficiency, (iii) promoting micro-payments, (iv) enhancing competitiveness, and (v) reducing operating costs. All of these factors have a positive and statistically significant impact, aligning with the proposed research hypotheses.

First, according to the results, expanding payment methods is the most influential factor, which is consistent with the findings of Dorfleitner et al. (2017). This demonstrates that diversifying payment methods such as e-wallets, QR codes, mobile app payments, and online payment gateways has contributed to increasing the level of Fintech adoption at BIDV. In the context of Vietnam's ongoing digital transformation, expanding payment methods is regarded as an effective solution to attract and retain customers while encouraging cashless payment habits.

Second, the factor of increasing transaction speed and efficiency is also confirmed to be important, which aligns with the research of Davis (1989) and Gefen et al. (2003). This result supports the view that when the payment process is streamlined and transactions are fast and stable, customers have a better experience, which in turn increases trust and frequency of service use. At BIDV, applying Fintech solutions helps reduce manual workloads, automate processes, and deliver clear benefits in terms of time savings and service quality.

Third, the factor of promoting micro-payments also shows a positive impact, consistent with the findings of Zhou (2012) and Dorfleitner et al. (2017). Fintech facilitates small-value transactions and everyday spending, helping to shape a cashless payment habit in daily life. This confirms Fintech's role in popularizing micro-payments, meeting the diverse and high-frequency spending needs of BIDV's customers.

Fourth, the factor of enhancing competitiveness shows a positive and statistically significant effect, in line with studies by Venkatesh et al. (2003) and Ajzen (1991). Investing in and developing Fintech-based payment solutions has helped BIDV maintain its competitive capacity compared to other banks and independent Fintech companies. This factor accurately reflects the general trend in Vietnam's banking sector, where digital transformation and technological innovation are key to maintaining market advantages.

Fifth, the factor of reducing operating costs has a significant impact, aligning with the studies of DeLone and McLean (2003). Applying Fintech helps BIDV branches optimize processes, save costs related to paperwork and counter operations, and reduce the manual workload for routine tasks. This result confirms that Fintech not only brings benefits to customers but also contributes to improving financial efficiency and the bank's reinvestment capacity.

Thus, these research findings strengthen the theoretical arguments regarding the role of Fintech in payment activities while reflecting the practical application of digital technology at BIDV branches in Vietnam. In particular, expanding payment methods, increasing transaction speed and efficiency, and promoting micro-payments are key factors that should continue to be leveraged. At the same time, enhancing competitiveness and reducing operating costs are long-term benefits that help BIDV affirm its market position and optimize resources during comprehensive digital transformation.

5.2. Limitations and Future Research Directions

Based on the analyzed research results, the author puts forward several strategic recommendations to enhance the level of FinTech adoption in cashless payment activities at BIDV branches in Vietnam, focusing on five key dimensions:

(i) Diversification and Expansion of Payment Methods

To fully leverage payment method expansion, BIDV should continue diversifying modern payment options that align with evolving digital consumption trends. This includes strengthening partnerships with leading e-wallet

providers, developing QR code-based payments, advancing contactless technologies such as NFC, and integrating online payment gateways tailored for e-commerce platforms. Furthermore, BIDV should proactively explore and pilot emerging technologies like smart wearable payments and biometric authentication to elevate customer convenience and satisfaction. These initiatives mirror global best practices seen in emerging markets where banks innovate to keep pace with rapidly changing consumer behaviors and technology adoption.

(ii) Enhancing Transaction Speed and Operational Efficiency

BIDV needs to maintain robust investment in upgrading its technological infrastructure to ensure digital payment platforms operate with high stability and process transactions swiftly, minimizing downtime and technical disruptions. The adoption of automation, big data analytics, and artificial intelligence (AI) should be accelerated to optimize transaction handling times and predictive maintenance. Additionally, cultivating a workforce with strong IT and digital competencies is vital for providing seamless customer support during service use. Similar challenges are faced by many banks in emerging economies, where infrastructure gaps and skill shortages must be addressed to ensure digital transformation success.

(iii) Promotion of Micro-Payment Services

To tap into the underutilized potential of micro-payments, BIDV should design tailored service packages that cater to low-value transactions, including fee waivers or reductions for payments below certain thresholds. Collaborations with service providers in utilities, telecommunications, and e-commerce sectors can help expand acceptance points for cashless payments. Promotional campaigns such as cashback offers, loyalty points, and discounts are effective tools to encourage customers' transition from cash to digital payments. This approach aligns with trends observed in other emerging markets, where incentivizing small payments significantly drives digital financial inclusion.

(iv) Strengthening Competitive Advantage

To sustain and enhance competitiveness, BIDV must continuously innovate by developing payment services that closely align with the evolving needs of its customer base. Regular customer satisfaction surveys and feedback mechanisms should be institutionalized to enable timely product and service adjustments. Additionally, BIDV should invest in strengthening its digital banking brand, emphasizing its unique advantages compared to both traditional competitors and independent FinTech firms, thereby attracting and retaining customers. This strategy reflects a global pattern where incumbent banks in emerging economies seek to consolidate their positions amid rising FinTech competition.

(v) Operational Cost Optimization

BIDV should deepen digitalization of operational workflows and actively encourage customers to shift transactions from physical counters to online platforms. The application of Robotic Process Automation (RPA) and cloud computing technologies will further reduce reliance on manual paperwork and traditional data storage, yielding significant cost savings. These savings should be reinvested into upgrading cybersecurity measures, technology infrastructure, and developing value-added services, thus creating a virtuous cycle supporting the sustainable growth of cashless payment initiatives. Such cost optimization efforts are critical and commonly pursued by banks in emerging economies facing pressure to improve efficiency while scaling digital services.

In summary, the coordinated implementation of these recommendations will play a pivotal role in accelerating FinTech adoption at BIDV, expanding the cashless payment ecosystem, enhancing competitive positioning, and achieving sustainable development in Vietnam's digital banking landscape. From a global perspective, BIDV's challenges and strategic priorities resonate with those encountered by banks in other emerging economies striving to balance rapid technological change, regulatory environments, and customer adoption hurdles. Learning from international experiences, while tailoring strategies to local contexts, will be essential for BIDV to maintain its leadership in Vietnam's fast-evolving FinTech sector.

6. CONCLUCION

In the context of the Fourth Industrial Revolution and the Vietnamese government's ongoing promotion of cashless payments, this study has examined the key factors influencing the extent of FinTech adoption in cashless payment activities at branches of the Bank for Investment and Development of Vietnam (BIDV). Grounded in solid theoretical foundations, this research developed and empirically tested a conceptual model using data collected from 250 customers across multiple BIDV branches nationwide. The findings indicate that all identified factors expansion of payment channels, transaction speed and efficiency, promotion of micro-payment services, enhancement of competitive capability, and reduction of operational costs positively and significantly influence the level of FinTech adoption in cashless payments at BIDV branches. This confirms that FinTech is not only a technological tool but also a strategic driver for banks to restructure processes, optimize costs, enhance customer experience, and strengthen their competitive position in Vietnam's rapidly evolving digital financial landscape. The study's main contribution lies in providing empirical evidence and a tested analytical framework for understanding how various internal and external factors collectively shape the successful implementation of FinTech solutions in a large state-owned commercial bank. The insights derived from this research can serve as a valuable reference for BIDV and other Vietnamese banks seeking to develop more effective, consistent, and customer-oriented FinTech strategies.

To overcome these limitations, future studies could expand the survey scope to include multiple commercial banks, allowing comparisons and contrasts of Fintech adoption levels across different operational models. Further research should also include control variables such as the regulatory environment, government support policies, technological readiness, and organizational culture to refine the analytical model and provide more specific and feasible recommendations for banks to expand and optimize cashless payments on Fintech platforms.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
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