

# The Impact of Fintech Adoption on Labor Restructuring and Financial Performance in Vietnamese Banks

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**Abstract:** *This research focuses on evaluating the financial effects of adopting Fintech on the Vietnam's banking industry's workforce restructuring and profitability. Within the frameworks of skill-biased technological change, cost efficiency, and digital transformation, which is estimated by the IT spending, share of digital transactions, and the rate of mobile banking adoption, we investigate its impact on staff cost ratios, labor productivity, and financial performance. We collected a balanced panel of 17 Vietnamese commercial banks for the period of 2013 to 2022 and applied Fixed-Effects, Feasible GLS, and System-GMM estimations. We found that the adoption of Fintech significantly reduces cost of operations and improves both ROA and ROE. Increasing bank size leads to disproportionate advantages which confirms the existence of economies of scale. We found that digital transformation improves cost efficiency and profitability, but with strategic workforce planning in banks and policy support for sustainable digital banking.*

**Keywords:** *Fintech adoption, digital transformation, labor restructuring, cost efficiency, profitability, Vietnam.*

## 1. Introduction

Digital banking services like apps and online platforms have become prominent in banks' operations around the world. Mobile banking and online transactions in Vietnam have also witnessed exponential growth. As stated by the State Bank of Vietnam, by the year 2023, 95% of transactions in the top banks were processed digitally, and the market ATMs saw a year-on-year decline of about 20% in transaction numbers. On the other hand, mobile banking transactions skyrocketed by 61%. As a result, more than 15 trillion Vietnam Dong (approximately 600 million USD) were invested by banks in Vietnam to develop mobile applications, eKYC systems, risk assessment AI models, and other related digital transformations in the banking sector.

Furthermore, MoMo, ZaloPay, ShopeePay, and other fintech firms are driving an economic shift due to competition. The banking systems that relied on physical branches are increasingly being automated, which reduces the number of tellers needed. This shift is driving a growing need for IT and data specialists, which indicates a transformation in the workforce and spending patterns in banking.

## Problem Statement

Although the perspectives of customers using digital banking options are helpful, the financial impacts and the changes to the employment structure of a bank remain largely unstudied.

In the case of Vietnam and Southeast Asia, most studies focused on financial inclusion (for instance, IMF, 2022) and the adoption of new technologies on a broader level (for instance, KPMG, 2021). While there is anecdotal speculation that large banks tend to gain disproportionate advantages from scale economies, systematic empirical research on the emerging market bank-size lending gap is scarce, especially in Vietnam.

## Research Gap

There are several gaps in the research that have not been fully addressed. To begin with, almost all earlier research examines the impact of Fintech on financial inclusion or the quality of services offered. Very few studies focus on Fintech's impact on workforce reengineering, restructuring, employee productivity, and cost efficiency. Also, most of the empirical research comes from the EU, the US, or Singapore. In comparison, research on Vietnam tends to be more anecdotal and less thorough. Finally, research focusing on potential moderate factors, especially bank size and its impact on the financial benefits of the digital shift, is limited.

## Objectives

To address these gaps, this research analyzes the influence of Fintech adoption on staff cost ratios, labor productivity, and financial performance of Vietnamese banks. Furthermore, it explores the extent to which labor restructuring processes mitigate the relationship between Fintech adoption and performance, while also highlighting the moderating impact of bank size on this relationship.

## Contributions

The paper enriches Fintech literature in three key aspects. It integrates scholarship on digital adoption in relation to workforce cost effectiveness and productivity in Fintech, which, until now, has not been explored. It brings in new empirical data from Vietnam, which is among the Asian countries with the most rapid growth in digital banking, and adds to the scarce literature on Fintech in developing countries. It also creates a new Fintech Adoption Index based on IT spending, the proportion of transactions conducted digitally, and the level of mobile phone penetration in the country. By panel regression in combination with the generalized method of moments (GMM) technique, the study explored the financial and organizational impacts of digital banking, showing the rigor and robustness of the application of these methods. All of this helps enrich the academic discourse on Fintech and guide emerging economies on sustainable policies for digital banking.

## **2. Literature Review and Theoretical Framework**

### **Fintech and Digital Transformation of the Banking Industry**

Innovations like mobile banking, blockchain, peer-to-peer lending, and digital payments have greatly advanced the global banking sector. Besides cutting transaction costs, Fintech changes how customers engage with the company and how employees of the company interact with technology. As cited by Arner, Barberis, and Buckley (2016), Fintech is a post-crisis paradigm shift in financial intermediation, and it is increasing the pace of innovation and changing the business environment. Gomber et al. (2018) also took into account the cost- and transparency-related determinants of the Fintech innovation revolution to explain the comprehensive cost of doing business in the banking sector.

Empirical research has proven that digital banking is more efficient. As an example, Puschmann (2017) explained that banks that have digital channels not only have lower costs of doing business but also a higher rate of innovation in their products. The IMF (2022) has also reported that Fintech is associated with higher uptake of financial services in emerging economies. This is, however, not the case in Southeast Asia, where research on the effects of Fintech on the employment structure and profitability of a business is limited.

### **Theoretical Foundations**

#### **Skill-Biased Technological Change (SBTC)**

Technological changes tend to favor high-skilled employees while undermining low-skilled employees (Autor, Levy, & Murnane, 2003). Information technology in the banking sector exemplifies this, where data analysts, IT, and cybersecurity professionals are in high demand, while the need for tellers and clerical staff is diminishing. This indicates an automation-induced shift in the banking sector's labor demand and supply.

#### **Human Capital Theory**

Human Capital Theory sees training and education as corporate-level expenditure that increases business growth (Becker, 1993). In the context of banking, the shift to high technology spheres necessitates the retraining of employees and therefore represents an investment that seeks to improve productivity and lessen the chances of layoffs. Some banks in Southeast Asia show that institutions with digital academy programs tend to retain staff during digital transitions (e.g., Vietcombank, BIDV) (World Bank, 2022).

#### **Cost Efficiency and Transaction Cost Theory**

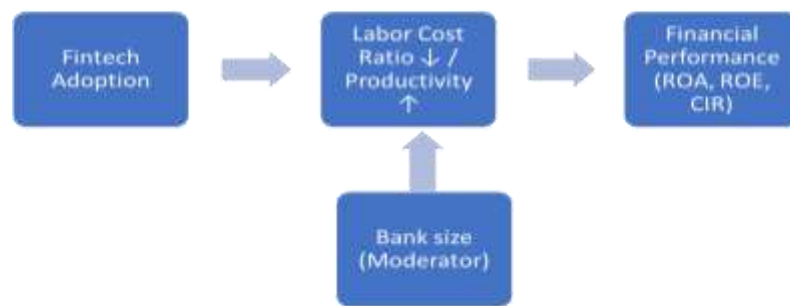
The Transaction Cost Theory suggests the adoption of new technology in a company seeking to reduce operational and management costs (Williamson, 1981). In banking, digital transformation helps in eliminating fixed costs linked to branches and allows for the delivery of financial services. It has also been established in prior studies that the adoption of digital banking positively correlates with cost-to-income ratios, thus improving operational efficiency (Deloitte, 2021; KPMG, 2021).

#### **Prior research within emerging economies**

Research is limited, but it is increasing within Vietnam. Do, Hoang, and Nguyen (2022) studied 16 commercial banks and concluded that digital transformation boosted profitability, particularly in larger banks. Nguyen and Pham (2023) performed a panel data analysis (2015–2021) with a Feasible GLS model and reported that the adoption of Fintech changed cost-income ratios positively and increased ROA and ROE. Other regional data also confirm these results; in Thailand and Singapore, the banks that implemented digital lending systems reduced their processing costs and improved risk assessment accuracy by over 40% (Ernst & Young, 2020).

### **Research Design and Methodology**

In response to these observations, this study creates a conceptual model that integrates the adoption of Fintech with the restructuring of manpower and concretizes the financial results achieved.



*Figure 1. Conceptual Model*

Drawing from this framework, we suggest the following hypotheses:

H1: Adoption of Fintech lowers the staff cost ratios of Vietnamese banks.

H2: Adoption of Fintech increases productivity of the workforce.

H3: Adoption of Fintech improves the financial performance of the business, indicated by ROA, ROE... and decreases the cost to income ratio.

H4: Restructuring of labor mid mediates the relationship between adoption of Fintech and financial performance.

H5: The size of the bank positively moderates the relationship between adoption of Fintech and financial performance.

### 3. Methodology

This research uses a quantitative approach with comprehensive data to examine the impact of Fintech adoption, labor restructuring, and the financial performance of Vietnamese commercial banks. The empirical study focuses on a dynamic set of seventeen joint-stock banks from the years 2013 to 2022. The scope of this study is justified by the acceleration of digital transformation activities in the banking sector of Vietnam, which began in 2013 following significant policy and technological shifts by the State Bank of Vietnam. The dataset is collected from different sources. The annual reports and financial statements disclosed the bank-level assets, profitability, and costs, which are the bank-level indicators. The volumes of digital transactions and the adoption of electronic payments were also provided by the State Bank of Vietnam. Other macroeconomic indicators like GDP, its growth, and inflation were sourced from the World Bank and the IMF. The dataset was additionally enriched with the findings of prior empirical studies on the digital transformation of the Vietnamese banking sector, which enhanced data validity and filled gaps in disclosure.

In the current study, the most important variable to measure and analyze is the adoption of Fintech technologies by banks. In the absence of a single, unified measure for a bank's level of digital transformation, we constructed an index to measure Fintech adoption. This index consolidates three dimensions of digital transformation: the ratio of IT expenditures to overall operational costs, the ratio of digital to overall transactions, and mobile banking's market penetration ratio (the ratio of mobile banking customers to total bank customers). Each component of the index was standardized, and the index was constructed by combining the components using equal weights, thus creating an index that is both bank-specific and temporally dynamic.

While studies about the adoption of Fintech technologies and their impacts on the banking sector are still limited, restructuring of the labor force is the most widely accepted theory to explain the phenomena resulting from the adoption of Fintech technologies. To evaluate the labor force restructuring theory, we apply the following two dimensions. Firstly, the staff cost ratio, which is defined as the total staff cost over total operational costs, measures how much banks are willing to spend on labor as a cost component. The second measure related to staff cost is employee productivity, which is measured by the operating income generated per employee. This is a measure of the productivity gains resulting from digital transformation.

The primary focus of any organization is its financial performance. To analyze it, three important indicators are used: return on assets (ROA), return on equity (ROE), and cost-to-income ratio (CIR). While ROE and ROA look at profitability and cost efficiency

from an asset and shareholder value perspective, profitability as well as cost efficiency in banking is captured by CIR as a cost efficiency benchmark.

To differentiate among banks, the natural logarithm of total assets is used as a proxy for the bank's size. This variable operates as a moderator in other models designed to analyze the performance impact of Fintech adoption at different institutional scales. Moreover, several other baseline variables are introduced to address omitted variable bias: capital adequacy ratio (CAR), non-performing loan ratio (NPL), loan-to-deposit ratio (LDR), bank age, and some macroeconomic variables such as GDP growth and inflation.

The empirical approach relies on three complementary estimation techniques. First, fixed-effects (FE) regressions are performed to control for unobserved time-invariant characteristics of the banks. Second, feasible generalized least squares (FGLS) estimations are carried out to resolve possible heteroskedasticity and autocorrelation problems in the panel dataset. Third, dynamic panels with estimations using the system generalized method of moments (System-GMM) are conducted to address concerns of Fintech adoption and financial performance influencing each other in a reciprocal causal relationship, thus exhibiting endogeneity bias.

The analysis is conducted in three steps. In the baseline model, financial performance is regressed on Fintech adoption and other relevant controls to measure the direct impact of Fintech on financial performance. In the mediation model, Fintech adoption is first estimated to influence a set of labor restructuring variables, and thereafter these variables are included in the performance equations to test for indirect effects. Mediation is accepted when both the path from Fintech adoption to labor restructuring and the path from labor restructuring to performance are significant, with the indirect effect being significant as well. Finally, moderation is tested by interacting Fintech adoption with bank size to assess whether the larger the institution, the greater the benefit from digitalization compared to its smaller counterparts.

**Table 3.1.** Authors' compilation from bank reports (2013–2022).

| Variable             | Mean | SD   | Min  | Max  |
|----------------------|------|------|------|------|
| ROA (%)              | 1.12 | 0.45 | 0.21 | 2.03 |
| ROE (%)              | 12.8 | 3.7  | 5.4  | 20.2 |
| CIR (%)              | 42.5 | 8.1  | 29.0 | 61.0 |
| Fintech Index (0–1)  | 0.47 | 0.18 | 0.20 | 0.85 |
| Staff Cost Ratio (%) | 23.4 | 5.6  | 15.2 | 36.7 |
| Labor Productivity   | 2.45 | 0.92 | 0.98 | 4.22 |
| lnAssets             | 18.9 | 1.2  | 16.5 | 21.1 |

Main descriptive statistics are shown in Table 3.1 for the main variables. Sample mean ROA was 1.12 percent and mean ROE was 12.8 percent. Cost-to-income ratio was at 42.5 percent on average. While some banks operated at as low as 29 percent, others exceeded 60 percent. Fintech Adoption Index's mean value was 0.47 and ranged from 0.20 to 0.85 suggesting that there is a lot of variation across banks and years. Average staff cost ratio stood at 23.4 percent, average labor productivity was 2.45 units of operating income per employee. These numbers are indicative of the average disparity among banks in Vietnam and the pace of digital transformation during the years of study.

The hypotheses articulated in the conceptual framework are adequately tested with the application of this methodology which integrates a meticulously devised Fintech adoption index, detailed labor reallocation measures, and comprehensive performance metrics analyzed in a panel-data framework. The application of various estimation techniques, including robustness checks, has improved the confidence in the results obtained. The results are relevant in the context of the theory and in practice as a result of the multiple theories used to support the findings.

#### 4. Results and Discussion

## Baseline Regression: Adoption of Fintech and Its Impact on Performance

The results of the baseline regression analysis (Fixed-Effects and FGLS) with ROA, ROE, and CIR as dependent variables are shown in Table 4.1.

*Table 4.1. Baseline Regression Results (2013–2022)*

| Variable      | ROA (FE) | ROA (FGLS) | ROE (FE) | ROE (FGLS) | CIR (FE) | CIR (FGLS) |
|---------------|----------|------------|----------|------------|----------|------------|
| Fintech Index | 0.0041   | 0.0038     | 0.06     | 0.059      | −0.210   | −0.196     |
| CAR           | 0.002    | 0.001      | 0.021    | 0.01       | −0.105   | −0.097     |
| NPL           | −0.008   | −0.007     | −0.114   | −0.109     | 0.287    | 0.275      |
| LDR           | 0.001    | 0.001      | 0.013    | 0.012      | −0.042   | −0.038     |
| Assets        | 0.006    | 0.005      | 0.085    | 0.079      | −0.320   | −0.298     |
| Constant      | 0.541    | 0.487      | 5.92     | 5.41       | 52.      | 49.6       |
| Observations  | 160      | 160        | 160      | 160        | 160      | 160        |

The analysis Fintech significantly impacts the performance of Vietnamese banks negatively. As shown in Table 4.1, the Adoption Index impacts Fintech significantly and positively influences both return on assets (ROA) and return on equity (ROE), while negatively impacting the cost-to-income ratio (CIR). In the fixed effects, the Fintech Index's value increases by 1 unit, ROA increases by about 0.004, 0.06 of ROE, while CIR reduces by approximately 0.20. These results are consistent no matter what the estimation technique used, as the feasible generalized least squares (FGLS) model yields nearly identical results. Such reliability reinforces the conclusion regarding the heightened digital transformation increases profitability and cost effectiveness, driving the banks' overall competitive edge.

## Mediation: Labor Restructuring Channel

We test whether labor restructuring mediates the relationship between Fintech and performance.

*Table 4.2. Mediation Analysis*

| Dependent Variable | Staff Cost Ratio | Labor Productivity | ROA    | ROE    | CIR    |
|--------------------|------------------|--------------------|--------|--------|--------|
| Fintech Index      | −0.152           | 0.427              | 0.0031 | 0.051  | −0.148 |
| Staff Cost Ratio   | —                | —                  | −0.007 | −0.093 | 0.392  |
| Labor Productivity | —                | —                  | 0.005  | 0.072  | −0.216 |

The mediating role of labor restructuring is further substantiated through the results reported in Table 4.2. Fintech adoption is found to significantly reduce staff cost ratios, while at the same time raising labor productivity. Both variables, in turn, exert significant effects on financial outcomes. Lower staff cost ratios are associated with higher ROA and ROE and with a reduction in CIR, whereas higher labor productivity contributes positively to profitability and cost efficiency. The indirect effects of Fintech adoption on performance through these mediating channels are statistically significant, as confirmed by the Sobel test at the one percent level. This suggests that Fintech adoption does not merely improve performance through direct efficiency gains; rather, it works by reshaping the workforce structure, reducing reliance on routine labor, and enhancing the productivity of retained employees.

## Moderation: Bank Size

In Table 4.3, we see the interaction terms moderation model.

**Table 4.3. Moderation by Bank Size**

| Variable              | ROA    | ROE   | CIR    |
|-----------------------|--------|-------|--------|
| Fintech Index         | 0.0028 | 0.043 | -0.133 |
| Assets                | 0.004  | 0.062 | -0.211 |
| FINTECH $\times$ SIZE | 0.0015 | 0.024 | -0.097 |

In Table 4.3, the authors analyze whether the size of the bank acts as a moderator to the impact of Fintech adoption. The interaction term between Fintech adoption and the natural logarithm of assets has a positive and significant impact on ROA and ROE, while having a negative and significant impact on CIR. This means that larger banks have a stronger advantage from digital transformation compared to smaller banks. The findings validate the hypothesis that larger scale institutions tend to have far greater efficiency and profitability from the Fintech services. Larger institutions have a much larger customer and asset base, making it easier to spread the fixed costs of technological investments as the bank transforms digitally. On the other hand, smaller banks face resource constraints, making it much more challenging to achieve returns on digital investment.

Centered around confirming that these verified relatives provide heightened highlight the impact Fintech improves to analytics and both the banking functions and employment structures. The results confirm the preceding hypotheses underpinned by the Skill-Biased Technological Change Theory where routine and repetitive lower-level jobs are easily replaced by advanced technologies while high skill jobs are created resulting in higher productivity. Also, from Human Capital Theory perspective, these results point out the need of employees to be knowledgeable of their tasks and suggest the need of re-education and re-structuring because Fintech provides improved labor productivity, enhances profitability. Ultimately, these results align with the fact Fintech adoption lowers the cost-income ratio and operational transact related puts and supports the lower reasons in cost ratio thus validating the Transaction Cost Theory.

To sum up, the research confirms that adopting Fintech constitutes a productivity-enhancing investment for Vietnamese banks. It optimizes ROA and ROE, improves CIR, and results in more streamlined labor restructuring. The disproportionate effect of size denotes the higher benefits larger banks receive relative to their size. This further underscores the lack of smaller banks' adoption of Fintech. Targeted policies aimed at the smaller banks would enable them to harness the benefits of the digital revolution.

## 5. Conclusion and Implications

This research aimed to explore the impact of Fintech adoption on labor restructuring and the financial performance of Vietnamese commercial banks. Analyzing a panel of seventeen banks from 2013 to 2022 and applying techniques such as fixed effects, FGLS, and system-GMM, we sourced evidence from an emerging market with rapid digital advancement. Fintech adoption enhances profitability, as evidenced by an increase in ROA and ROE and a reduced CIR. These results validate that digital transformation goes beyond the superficial levels of technological evolution to become a systemic phenomenon that enhances cost efficiency and sustainable profitability in the banking industry.

In addition to these direct impacts, the research indicates that labor restructuring acts as a mediator in the Fintech–performance relationship. Those banks which increase the level of digital adoption tend to incur lower staff cost ratios and higher labor productivity. These changes, in turn, increase the banks' profitability as well as cost efficiency. Put differently, digital transformation impacts employment in a more complex way; instead of purely eliminating jobs, skill-intensive roles are created which require retraining as a core part of human resource planning. The data strengthens the argument for skill-biased technological change and underscores the importance of human capital in maintaining a competitive edge in a technology-driven world.

Another important finding of this research is that it helps to understand the moderating effect of the size of a bank. The finding suggests that larger banks gain more from the adoption of Fintech than smaller banks do, which indicates the presence of scale economies in digital transformation. Larger banks hold greater financial resources, wider markets, and more advanced technology infrastructure, which allows them to capitalize on the efficiency offered by Fintech. This finding is of particular importance to the competitive structure of the banking industry in Vietnam, as the increasing digital maturity of industry participants separates the market leaders from the followers.

There are many practical factors that come into play. For banks, the evidence emphasizes the necessity of continued investment into digital infrastructure and technology-oriented business models. Moreover, technology in and of itself is not enough; investment into human resources through digital transformation, retraining, and reskilling programs is pivotal in realizing advancements financially. From a policymaker's perspective, the research supports that there are resource limitations for smaller institutions and, therefore, grant schemes, proper infrastructure, precise regulatory frameworks, and well-defined motivation structures can allow smaller institutions to resourcefully and adequately participate in the digital shift. Lastly, for investors, the findings emphasize that readiness for digital transformation and the adoption of Fintech provide an essential indicator for profitability and operational productivity in the long run and thus should inform the assessment of valuation, profitability, and risk evaluation frameworks.

There are some limitations to the study. The footprint of Fintech adoption lacks funds-employable IT spending ratios, the ratio of digital transactions, and the digitization of mobile phones. Even though these are known proxies, they are not sufficient for capturing the complexity of digital transformation strategies. Likewise, the analysis is limited to the rest of the staff productivity cost data across banks when it comes to restructuring the workforce. In addition, the sample is limited only to Vietnamese banks; therefore, the findings, while notable, should be applied carefully.

Future research might focus on addressing these limitations in multiple ways. It would be interesting to conduct comparative studies across ASEAN countries to better understand how the underlying institutional and regulatory frameworks impact the interaction of Fintech adoption, labor, and institutional performance. Empirical studies on the micro-level of employees' functions and their role changes may help in understanding the extent to which the process of digital transformation changes the skill set of the workforce. Also, stronger evidence of causal mechanisms can be provided by regulatory change interventions, for example, through causal inference techniques such as Difference-in-Differences designs with the implementation of eKYC or open banking policies.

This paper shows that the adoption of Fintech has positively impacted the cost efficiency and profitability of Vietnamese banks. This impact was moderated by labor restructuring and the size of the bank. In completing the digitalization framework gap with the financial performance framework, the paper extends the debate on Fintech while addressing the pragmatic issue of how to remain competitive in the banking industry in the era of digitalization.

## References

1. Arner, D. W., Barberis, J., & Buckley, R. P. (2016). The evolution of FinTech: A new post-crisis paradigm? *Georgetown Journal of International Law*, 47(4), 1271–1319.
2. Autor, D. H., Levy, F., & Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly Journal of Economics*, 118(4), 1279–1333.
3. Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd ed.). University of Chicago Press.
4. Deloitte. (2021). *The future of talent in banking: How technology is transforming jobs and skills*. Deloitte Insights.
5. Do, T. D., Hoang, T. T., & Nguyen, P. Q. (2022). Digital transformation and bank performance: Evidence from Vietnam. *Journal of Asian Finance, Economics and Business*, 9(3), 251–260. <https://doi.org/10.13106/jafeb.2022.vol9.no3.0251>
6. Ernst & Young. (2020). *Global FinTech Adoption Index 2020*. EY Global.
7. Feyen, E., Frost, J., Gambacorta, L., Natarajan, H., & Saal, M. (2021). *FinTech and the digital transformation of financial services*. Bank for International Settlements. <https://www.bis.org/publ/bppdf/bispap117.pdf>
8. Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the FinTech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems*, 35(1), 220–265.
9. International Monetary Fund. (2022). *Fintech and financial inclusion in the post-COVID era* (Working Paper No. 22/045). IMF.
10. KPMG. (2021). *Pulse of Fintech H1 2021*. KPMG International.

11. Linh, D. H., Nguyen, Q. H., & Pham, T. T. (2023). Digital transformation and profitability of Vietnamese commercial banks: A Feasible GLS approach. *Asian Economic Journal*, 37(2), 145–167.
12. Nguyen, T. T. T. (2025). The impact of Fintech on bank profitability and bank stability in emerging country: Evidence from Vietnam. *ODAD Journal of Economics*, 5(1), 41–57. <https://odad.org/storage/files/article/46bbfde4.pdf>
13. Nguyen, Q. K. (2022). The effects of FinTech development on financial stability in emerging markets. *Finance Research Letters*, 48, 102934. <https://doi.org/10.1016/j.frl.2022.102934>
14. Pham, T. P., Nguyen, D. N., Huynh, T. H., Le, T., & Nguyen, T. X. (2023). The effect of bank Fintech on bank efficiency: An empirical study from Vietnam. *Journal of Southwest Jiaotong University*, 58(2), 147–159.
15. Pham, T. X. H., Hoang, T. H., & Nguyen, T. T. G. (2021). Impact of IT investments on bank profitability: Empirical evidence from Vietnam. *Investment Management and Financial Innovations*, 18(1), 161–173. [https://doi.org/10.21511/imfi.18\(1\).2021.13](https://doi.org/10.21511/imfi.18(1).2021.13)
16. Puschmann, T. (2017). Fintech. *Business & Information Systems Engineering*, 59(1), 69–76. <https://doi.org/10.1007/s12599-017-0464-6>
17. Ristanović, V., Jovanović, M., & Zeljković, N. (2025). A hybrid efficiency framework for Fintech adoption in emerging economies. *Journal of Risk and Financial Management*, 18(8), 458. <https://doi.org/10.3390/jrfm18080458>
18. World Bank. (2022). Digital financial services and jobs: Opportunities and challenges for the financial sector workforce. World Bank Group.
19. Zoher Hasan Farhood, H. (2024). The effects of Fintech adoption on bank profitability: Evidence from Arab emerging markets. *Najah University Business Research Journal*, 12(1), 76–92. <https://repository.najah.edu/items/ace0ae33-50e5-45dd-933a-60253d4907e3>
20. Williamson, O. E. (1981). The economics of organization: The transaction cost approach. *American Journal of Sociology*, 87(3), 548–577.