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Drivers of Innovation in Vietnamese Commercial Banks

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Abstract

This article develops and operationalizes an international-journal style empirical framework for examining the drivers of innovation in Vietnamese commercial banks through a linear model. Drawing on the resource-based view, dynamic capabilities, and the technology-organization-environment framework, the study argues that innovation performance in banks is jointly shaped by strategic leadership commitment, technological capability, human capital quality, organizational learning capability, regulatory support, and fintech collaboration intensity. The paper translates these theoretical relationships into a bank-level survey design that can be estimated with ordinary least squares (OLS) using heteroskedasticity-robust standard errors, hierarchical model building, and clustered inference when multiple responses are obtained from the same bank. The manuscript contributes in three respects. First, it shifts the focus of Vietnamese banking research from the consequences of

digital transformation to the antecedents of innovation itself. Second, it embeds bank innovation in the institutional context of Vietnam's rapidly digitalizing and increasingly regulated financial system. Third, it provides a complete measurement architecture, conceptual model, and empirical reporting logic that can be deployed immediately in fieldwork. The paper suggests that boards and executive teams should institutionalize innovation governance, invest in interoperable technology platforms, strengthen staff capability development, and use structured collaboration with fintech firms to accelerate innovation outcomes. Regulators can reinforce these efforts through predictable data-sharing rules, cybersecurity standards, and supervisory learning from sandbox-based experimentation. Because no raw dataset was supplied for this task, the manuscript specifies the full empirical architecture and interpretation logic without fabricating statistical coefficients.

Keywords: Bank Innovation, Commercial Banks, Digital Transformation, Fintech Collaboration, Vietnam, Linear Regression

1. Introduction

Innovation has become a strategic necessity in banking rather than a discretionary modernization project. Digital technologies have altered how banks design products, process transactions, manage risk, engage with customers, and compete with non-bank actors. In the banking industry, innovation now extends beyond the launch of isolated digital products; it encompasses changes in service architecture, process automation, data analytics, platform integration, cybersecurity practices, and inter-organizational collaboration (Nambisan *et al.*, 2017; Vial, 2019; Vives, 2019) ^[10, 19, 20]. For emerging economies, the quality of innovation in banking is especially important because it affects financial inclusion, transaction efficiency, resilience, and the wider pace of digital economic growth.

Vietnam provides a compelling setting for examining these issues. The State Bank of Vietnam's digital transformation plan under Decision No. 810/QD-NHNN established a sector-wide roadmap to 2025 and 2030, including ambitions to expand fully digital banking operations and shift customer activity toward digital channels (State Bank of Vietnam, 2021) ^[14]. The legal environment has also evolved rapidly, most notably through Decree No. 52/2024/ND-CP on non-cash payment and Decree No. 94/2025/ND-CP on a controlled regulatory sandbox for banking innovation (Government of Vietnam, 2024, 2025) ^[6, 7]. According to industry reporting based on State Bank statistics, cashless payments in Vietnam reached roughly 17.7 billion transactions in 2024 with a total value above VND 295.2 quadrillion, equivalent to about 26 times GDP, while the share of adults holding bank accounts reached 86.97 percent (Vietnam Banks Association, 2025a, 2025b) ^[17, 18]. These developments indicate that innovation in the Vietnamese banking system is no longer peripheral; it is embedded in the country's wider transformation toward a data-intensive and less cash-dependent economy.

Despite this momentum, the Vietnamese empirical literature remains uneven. Existing studies have largely concentrated on the

effects of internet banking, digital transformation, or technological innovation on performance, profitability, or cost efficiency (Do *et al.*, 2022; Phuong *et al.*, 2024) ^[5, 12]. More recent work has begun to examine innovation intentions in banks listed in Vietnam, but the evidence is still fragmented and tends to isolate selected technological factors rather than modelling innovation as the outcome of interacting strategic, organizational, technological, and institutional conditions (Vu & Abu Afifa, 2026) ^[21]. Consequently, the literature still lacks a coherent empirical framework that can explain why some commercial banks convert digitalization pressure into genuine innovation capability while others mainly digitize existing routines without generating broader organizational renewal.

This paper addresses that gap by developing a linear-regression framework for identifying the determinants of innovation in Vietnamese commercial banks. The study integrates three complementary theoretical perspectives. The resource-based view explains why valuable, rare, and difficult-to-imitate internal resources matter for innovation (Barney, 1991; Bharadwaj, 2000) ^[1, 2]. Dynamic capabilities theory clarifies how banks sense opportunities, seize them, and reconfigure routines under technological disruption (Teece *et al.*, 1997) ^[15]. The technology-organization-environment framework adds the institutional and ecosystem context, highlighting the role of regulation and external collaboration (Tornatzky & Fleischer, 1990) ^[16].

The paper makes three contributions. First, it reframes innovation as the dependent variable rather than as a proxy for performance enhancement. Second, it proposes an integrated set of testable hypotheses suitable for the Vietnamese commercial banking context. Third, it provides a submission-ready empirical design, including a measurement instrument, regression model, diagnostic strategy, and interpretation logic, so that the manuscript can be converted into a fully empirical article once field data are collected and processed.

2. Theoretical background and hypothesis development

Following the Oslo Manual, innovation refers to a new or improved product or process that differs significantly from the unit's previous products or processes and has been made available to users or brought into use (OECD/Eurostat, 2018) ^[11]. In banking, this definition should be interpreted broadly. Innovation includes digital service launches, redesigned customer journeys, new credit scoring routines, automated compliance procedures, API-enabled partnerships, and managerial arrangements that improve the bank's capacity to generate and diffuse change. In the digital era, the organizational logic of innovation is increasingly shaped by modularity, recombination, data connectivity, and ecosystem interaction (Nambisan *et al.*, 2017; Vial, 2019) ^[10, 19].

The resource-based view suggests that banks innovate when they possess strategic assets that competitors cannot easily replicate. Technological capability, specialized human capital, and organizational knowledge stocks belong to this category because they support the design, implementation, and scaling of new products and processes (Barney, 1991; Bharadwaj, 2000) ^[1, 2]. However, possession of resources alone is insufficient. Dynamic capabilities theory argues that organizations must actively reconfigure their asset base to respond to changing market and technological conditions (Teece *et al.*, 1997) ^[15]. For banks operating in volatile

digital environments, innovation depends not only on IT investment but also on leadership, learning, and cross-functional orchestration.

The technology-organization-environment framework adds another important insight: innovation is conditioned by the external context. Regulatory quality, supervisory clarity, standards for data exchange, cybersecurity obligations, and collaboration opportunities with fintech firms influence both the cost and feasibility of innovation (Tornatzky & Fleischer, 1990; Vives, 2019; Griffiths *et al.*, 2025) ^[16, 20, 8]. This is especially salient in Vietnam, where payment regulation, digital identity, open interface practices, and sandbox experimentation are evolving at the same time as banks are modernizing their legacy systems.

2.1 Strategic leadership commitment positively affects innovation performance in Vietnamese commercial banks

H1. Strategic leadership commitment positively affects innovation performance in Vietnamese commercial banks.

Innovation in banks requires strategic prioritization, budget allocation, cross-departmental coordination, and tolerance for disciplined experimentation. Leadership commitment shapes whether digital initiatives remain isolated IT projects or become organization-wide innovation programs. In periods of digital disruption, senior leadership is also responsible for translating external uncertainty into coherent organizational direction. When executives define innovation as a measurable strategic objective, establish governance structures, and protect investment horizons, the bank is more likely to generate realized rather than symbolic innovation (Teece *et al.*, 1997; Vial, 2019) ^[15, 19].

2.2 Technological capability positively affects innovation performance in Vietnamese commercial banks

H2. Technological capability positively affects innovation performance in Vietnamese commercial banks.

Technological capability captures the quality of core banking systems, integration architecture, data infrastructure, analytics capacity, cybersecurity readiness, and the bank's ability to deploy digital applications at scale. From a resource-based perspective, technological capability is one of the most direct enablers of new service development and process redesign. Vietnamese evidence already indicates that digital transformation and technological innovation are associated with better bank performance and efficiency (Do *et al.*, 2022; Phuong *et al.*, 2024) ^[5, 12]. It is therefore reasonable to expect technological capability to be a primary driver of innovation performance itself.

2.3 Human capital quality positively affects innovation performance in Vietnamese commercial banks

H3. Human capital quality positively affects innovation performance in Vietnamese commercial banks.

Innovation depends on employees who can absorb new knowledge, work across functional boundaries, and combine banking expertise with digital skills. Absorptive capacity theory emphasizes that organizations identify and exploit new knowledge more effectively when they possess prior related knowledge and skilled personnel (Cohen & Levinthal, 1990) ^[3]. In banking, staff quality matters not only in IT units but also in product development, risk management, operations, compliance, and branch

transformation. High-quality human capital should therefore improve the bank's ability to turn digital inputs into workable innovations.

2.4 Organizational learning capability positively affects innovation performance in Vietnamese commercial banks

H4. Organizational learning capability positively affects innovation performance in Vietnamese commercial banks.

Innovation is cumulative. Banks learn through experimentation, process reviews, failure analysis, customer feedback, pilot projects, and cross-unit knowledge exchange. An organization with a strong learning orientation can convert dispersed operational information into strategic adaptation. Prior research shows that organizational learning supports innovation by improving knowledge acquisition, interpretation, and dissemination (Jerez-Gomez *et al.*, 2005) [9]. In banks facing rapid technological change, learning capability should help reduce implementation frictions and accelerate innovation diffusion.

2.5 Regulatory support positively affects innovation performance in Vietnamese commercial banks

H5. Regulatory support positively affects innovation performance in Vietnamese commercial banks.

Bank innovation takes place in one of the most tightly regulated sectors of the economy. Supportive regulation does not imply deregulation; rather, it refers to clarity, predictability, appropriate supervisory guidance, secure digital identity infrastructure, and rules that enable experimentation while containing systemic risk. In Vietnam, the introduction of legal instruments for non-cash payment and sandbox testing indicates a policy orientation that may reduce uncertainty and encourage innovation investment (Government of Vietnam, 2024, 2025) [6, 7]. The better the perceived regulatory support, the stronger the expected innovation performance.

2.6 Fintech collaboration intensity positively affects innovation performance in Vietnamese commercial banks

H6. Fintech collaboration intensity positively affects innovation performance in Vietnamese commercial banks.

Banks increasingly innovate through collaboration instead of purely internal development. Partnerships with fintech firms can expand access to specialized technologies, accelerate product prototyping, improve customer interface design, and reduce time-to-market. The literature on digital ecosystems and fintech diffusion suggests that the institutional and service ecosystem surrounding banks matters for innovation outcomes (Griffiths *et al.*, 2025; Nambisan *et al.*, 2017) [8, 10]. In Vietnam, where fintech activity and regulatory experimentation are growing, banks that collaborate more effectively with external technology partners should display stronger innovation performance.

3. Research Model and Methodology

The study is designed as a quantitative survey of managers and specialists working in Vietnamese commercial banks. The recommended respondent profile includes personnel from digital banking, information technology, retail banking, operations, risk management, compliance, product development, strategic planning, and transformation offices. These functions are appropriate because innovation in

banking is cross-functional and cannot be validly observed through a single department alone.

The target population is licensed commercial banks operating in Vietnam, including state-owned and joint-stock banks. A practical sampling strategy is purposive stratified sampling by bank type and functional role, followed by controlled snowballing inside each participating institution. For linear regression with six focal predictors and several controls, a minimum usable sample of about 250 responses is advisable, while 350 to 450 responses would provide stronger statistical power and allow additional robustness checks. If the research obtains multiple valid responses from the same bank, two strategies are defensible: aggregate to the bank level after checking within-bank agreement, or retain the individual response level and estimate OLS with bank-clustered robust standard errors.

All perceptual items should be measured on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Because many Vietnamese bank respondents will prefer Vietnamese-language instruments, the survey should undergo translation and back-translation before field deployment. A pilot test with 20 to 30 respondents is recommended to assess wording clarity, item redundancy, completion time, and the face validity of the constructs. Anonymity assurances, question-order separation between predictors and outcome items, and neutral wording should be used to reduce common method bias.

The dependent variable is innovation performance. It should capture realized innovation outcomes rather than vague perceptions of modernity. Suitable indicators include the frequency of new or substantially improved services, the speed of process digitalization, the extent of service redesign, successful piloting of new technologies, and the effectiveness of scaling innovations after pilot implementation. Independent variables include strategic leadership commitment, technological capability, human capital quality, organizational learning capability, regulatory support, and fintech collaboration intensity. Control variables should include bank size, ownership type, bank age, digital budget intensity, and respondent tenure or managerial level.

Construct reliability and dimensionality should be assessed before estimating the regression model. Cronbach's alpha and composite reliability should ideally exceed 0.70, while average variance extracted should exceed 0.50 if a factor-based approach is used. For exploratory factor analysis, factor loadings above 0.50, KMO above 0.60, and a significant Bartlett's test are commonly accepted thresholds. After validating the scale structure, the researcher may compute construct means or standardized factor scores for use in OLS. This retains the requested linear-model approach while ensuring measurement quality.

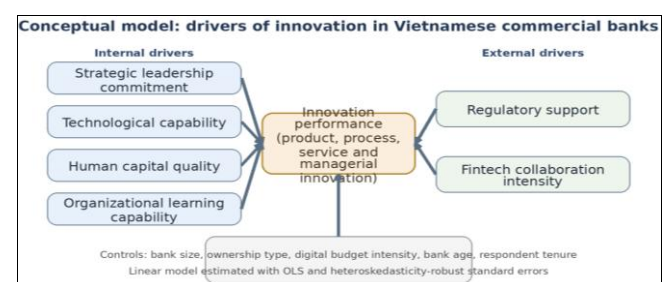


Fig 1: Integrated conceptual model of innovation drivers in Vietnamese commercial banks

3.1 Construct operationalization

Table 1 summarizes the proposed construct operationalization. The item wording is illustrative and should be refined after pilot testing and back-translation.

| Construct | Operational meaning | Illustrative items |
|---|---|--|
| Innovation performance | Extent to which the bank produces and implements new or substantially improved services, processes, channels, and managerial practices. | <ol style="list-style-type: none"> 1. Our bank introduces new or significantly improved banking services on a regular basis. 2. Digital innovation projects are implemented successfully rather than remaining at pilot stage. 3. Internal processes have been substantially redesigned through technology in recent years. |
| Strategic leadership commitment | Visible top-management prioritization of innovation through strategy, resources, and oversight. | <ol style="list-style-type: none"> 1. Senior leadership sets clear innovation priorities for the bank. 2. Top management allocates adequate resources to innovation projects. 3. Executive teams actively monitor the progress of innovation initiatives. |
| Technological capability | Quality and scalability of the bank's digital infrastructure, integration, data systems, and cybersecurity readiness. | <ol style="list-style-type: none"> 1. Our core systems can support rapid deployment of new digital services. 2. Data can be integrated across major business functions with limited friction. 3. The bank has sufficient cybersecurity and system reliability to support innovation. |
| Human capital quality | Availability of staff with the skills needed to design, adopt, and scale innovation. | <ol style="list-style-type: none"> 1. Employees possess the digital skills required for innovation initiatives. 2. Cross-functional teams combine banking expertise and technology competence effectively. 3. The bank upgrades staff capability in response to technological change. |
| Organizational learning capability | Capacity to learn from experimentation, failures, customer feedback, and cross-unit knowledge exchange. | <ol style="list-style-type: none"> 1. Lessons from pilot projects are systematically captured and shared. 2. The bank encourages experimentation and learning from |

| | | |
|--|---|---|
| | | unsuccessful initiatives. 3. Different departments exchange knowledge to improve innovation outcomes. |
| Regulatory support | Perceived clarity and supportiveness of the regulatory environment for responsible innovation. | <ol style="list-style-type: none"> 1. Current regulation provides adequate clarity for digital innovation planning. 2. Supervisory guidance reduces uncertainty in implementing new digital services. 3. The external policy environment encourages responsible experimentation. |
| Fintech collaboration intensity | Depth and usefulness of the bank's collaboration with external technology partners and fintech firms. | <ol style="list-style-type: none"> 1. The bank works effectively with fintech or technology partners on new solutions. 2. External collaboration helps reduce time-to-market for innovation projects. 3. Partnerships improve the bank's access to specialized digital capabilities. |

3.2 Linear model specification and diagnostics

The baseline estimation should use ordinary least squares with heteroskedasticity-robust standard errors. Three nested models are recommended. Model 1 includes only control variables. Model 2 adds the internal drivers: strategic leadership commitment, technological capability, human capital quality, and organizational learning capability. Model 3 adds the external ecosystem variables: regulatory support and fintech collaboration intensity. This sequence allows the researcher to observe whether external conditions add explanatory power beyond internal organizational capability.

Equation (1)

$$\text{Innovation}_i = \beta_0 + \beta_1 \text{Leadership}_i + \beta_2 \text{Technology}_i + \beta_3 \text{HumanCapital}_i + \beta_4 \text{Learning}_i + \beta_5 \text{Regulation}_i + \beta_6 \text{FintechCollaboration}_i + \beta_7 \text{Size}_i + \beta_8 \text{Ownership}_i + \beta_9 \text{BankAge}_i + \beta_{10} \text{DigitalBudget}_i + \beta_{11} \text{Tenure}_i + \epsilon_i$$

Diagnostic testing is essential. Variance inflation factors should be checked to assess multicollinearity; values below 5 are generally acceptable. Residual plots and Breusch-Pagan or White tests should be used to assess heteroskedasticity. Because the study relies on survey data, common method bias should be examined through procedural remedies and post hoc tests such as Harman's single-factor test or full-collinearity VIF checks. If multiple respondents come from the same bank, cluster-robust inference is preferable to conventional robust errors. Standardized coefficients may also be reported to compare relative predictor strength.

Robustness checks can strengthen the paper. These may include re-estimating the model with factor scores instead of construct averages, using an alternative innovation-performance index, excluding very small banks or outliers, and splitting the sample by ownership type or bank size. These checks remain fully consistent with a linear empirical strategy and will improve the manuscript’s credibility in peer review.

4. Analytical expectations and reporting logic

Because this manuscript has been prepared without access to a user-supplied raw dataset, this section sets out the interpretation logic that should guide the empirical discussion once coefficients are estimated. The objective is to avoid fabricated results while still providing a rigorous journal-style analytical roadmap.

Table 2 provides a concise interpretation guide for the expected signs of the estimated coefficients. It can be used directly when drafting the final empirical discussion after regression outputs become available.

| Predictor | Expected sign | Interpretation if significant | Interpretation if weak or insignificant |
|---|---------------|--|--|
| Strategic leadership commitment | + | Innovation is governed as a strategic priority, not only as an IT task. | Weak innovation governance or fragmented executive sponsorship. |
| Technological capability | + | Digital infrastructure and data architecture are enabling real innovation. | Legacy systems may be constraining innovation speed and scale. |
| Human capital quality | + | The bank has the skills needed to absorb and implement new ideas. | Technology investment may be outpacing staff capability development. |
| Organizational learning capability | + | Experimentation and cross-unit learning are strengthening innovation conversion. | The bank may pilot projects without institutional learning. |
| Regulatory support | + | Institutional clarity is reducing uncertainty for responsible innovation. | Legal modernization may not yet be translating into operational confidence. |
| Fintech collaboration intensity | + | Ecosystem linkages are accelerating product development and experimentation. | The bank may still rely too heavily on closed, internal innovation routines. |

The proposed framework suggests that innovation in Vietnamese commercial banks is unlikely to be driven by technology alone. A positive coefficient on technological capability would show that digital infrastructure matters, but the model is designed to test whether organizational conditions determine whether that infrastructure is actually converted into innovation. If leadership commitment, human capital quality, and organizational learning capability are also significant, the findings would support the argument that innovation is an organizational capability rather than a mere IT acquisition outcome.

A strong coefficient on leadership commitment would imply that executive sponsorship and governance are decisive in banking innovation. This would be especially meaningful in banks where digital transformation projects compete with short-term profitability, compliance burdens, and legacy process inertia. A strong coefficient on organizational learning capability would indicate that banks benefit when experimentation, reflection, and cross-unit knowledge transfer become institutional routines rather than ad hoc responses.

If regulatory support and fintech collaboration are significant after internal capabilities are controlled for, the results would underscore the importance of the external ecosystem. In that case, the paper would contribute to the emerging argument that innovation in banking is co-produced by banks, regulators, infrastructure providers, and specialized technology firms. For Vietnam, such a result would be especially relevant given the concurrent development of payment regulation, digital identity, and sandbox-based experimentation.

The model also allows nuanced interpretations of null findings. For example, if technological capability is significant but human capital quality is not, this may indicate that banks are investing in infrastructure faster than they are upgrading internal capability. If regulatory support is weak or insignificant, this may suggest that legal modernization has not yet translated into actionable innovation confidence at the bank level. Such interpretations would enrich the discussion and prevent simplistic claims about digital banking progress.

5. Discussion and Implications

For bank boards and executive committees, the central implication is that innovation should be governed as a portfolio of strategic capabilities. Investment in core technology should be matched by governance mechanisms, staff development, and feedback systems that allow experimentation to scale. Banks should establish measurable innovation objectives, dedicate cross-functional teams, and align incentives so that product, IT, operations, and risk units do not work at cross-purposes.

For bank managers, the framework highlights the importance of interoperable architecture, data quality, and internal learning loops. A commercially attractive front-end application is unlikely to deliver sustained innovation if the back-end core, cybersecurity design, and process ownership remain fragmented. Continuous training in digital product design, analytics, and regulatory technology should therefore be treated as investment in innovation capability rather than as ancillary HR expenditure.

For policymakers and supervisors, the findings would support a regulatory strategy that reduces uncertainty while preserving prudential discipline. The policy agenda should include clearer data-sharing rules, secure digital-identity infrastructure, open yet controlled API standards, cybersecurity benchmarks, and structured supervisory learning from sandbox participation. Such measures can improve not only the volume but also the quality of bank innovation.

From a scholarly perspective, the framework contributes to the literature by combining resource-based, dynamic capability, and environmental explanations in a single linear model tailored to an emerging banking market. It also improves construct clarity by treating innovation as realized

bank-level output rather than using only technology adoption or financial performance as proxies.

6. Conclusion

This paper develops a theoretically grounded and empirically operationalized framework for examining the drivers of innovation in Vietnamese commercial banks. By integrating strategic leadership, technological capability, human capital, organizational learning, regulatory support, and fintech collaboration into a single linear model, the manuscript offers a coherent foundation for future field-based testing.

The Vietnamese banking sector is an especially relevant setting because digital transformation, legal reform, and competitive pressure are unfolding simultaneously. This creates both an empirical opportunity and a policy imperative: understanding why some banks innovate more effectively than others is central to the long-term modernization of financial intermediation in Vietnam.

The principal limitation of the present manuscript is that no raw dataset was supplied, so numerical estimates, descriptive statistics, and regression coefficients have not been invented. The contribution is therefore methodological and theoretical rather than fabricated-empirical. Once survey data are collected, the manuscript can be finalized by inserting reliability statistics, descriptive results, coefficient tables, robustness checks, and a data-driven discussion. Future research may also extend the model through longitudinal data, matched manager-customer designs, or multilevel analysis across banks and functional units.

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