Humanities and Social Sciences Letters
2026 Vol. 14, No. 3, pp. 227-243
ISSN(e): 2312-4318
ISSN(p): 2312-5659
DOI: 10.18488/73.v14i3.5086

Digital transformation strategies, dynamic capabilities, and innovation performance: Evidence from the Chinese banking industry

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Article History
Received: 16 December 2025
Revised: 31 March 2026
Accepted: 3 July 2026
Published: 13 August 2026

Keywords
Digital transformation strategy
Dynamic capability
Information technology infrastructure
Innovation performance.

ABSTRACT

In the era of rapid digital transformation, commercial banks must leverage emerging technologies to sustain innovation advantages. This study examines the effect of digital transformation strategies (DTS) on innovation performance (IP) in Chinese commercial banks, emphasizing the mediating role of dynamic capabilities (sensing, seizing, reconfiguration) and the moderating effect of information technology infrastructure (ITI). Grounded in the Resource-Based View (RBV), survey data were collected from 514 middle- and senior-level managers across multiple banking divisions. The baseline model shows that DTS has a significant positive effect on IP ($\beta = 0.487$, $p < 0.01$), explaining $R^2 = 0.286$ (Adjusted $R^2 = 0.285$). Incorporating ITI further strengthens IP ($\beta = 0.070$, $p < 0.05$), increasing explanatory power to $R^2 = 0.293$. The interaction term (DTS × ITI) is significant and positive ($\beta = 0.188$, $p < 0.01$), raising overall explanatory power to $R^2 = 0.335$ (Adjusted $R^2 = 0.331$), thereby confirming the moderating role of ITI in amplifying the DTS–IP relationship. Dynamic capabilities serve as key pathways linking strategic digital initiatives to innovation outcomes. These findings demonstrate that digital transformation strategies substantially enhance innovation performance, particularly when supported by strong dynamic capabilities and robust IT infrastructure. Managerially, the results highlight the need for banks to pursue simultaneous investments in digital strategy, capability development, and IT infrastructure to achieve superior innovation outcomes in the digital era.

Contribution/Originality: This study empirically demonstrates how digital transformation strategy enhances innovation performance in Chinese commercial banks by integrating the resource-based view and dynamic capabilities theory. It reveals the mediating roles of sensing, seizing, and reconfiguration capabilities, and the moderating effect of IT infrastructure, offering both theoretical advancement and practical guidance.

1. INTRODUCTION

The accelerating diffusion of digital technologies is fundamentally reshaping the global economic landscape, with particularly profound implications for the financial services industry. Technologies such as cloud computing, big data analytics, artificial intelligence, blockchain, and digital payment systems have transformed how financial services are designed, delivered, and consumed. These developments have altered customer expectations, shortened innovation cycles, and facilitated the emergence of new data-driven business models. As a result, traditional commercial banks

are under increasing pressure to rethink their strategic orientations, organizational structures, and operational processes to remain competitive.

At the same time, the rapid expansion of FinTech firms has intensified competitive dynamics within the banking sector. Compared with incumbent banks, many FinTech companies benefit from lean organizational structures, technology-centric cultures, and agile decision-making processes, enabling them to introduce innovative financial products and services at a faster pace. This competitive environment has made digital transformation a strategic imperative rather than a discretionary option for commercial banks. When effectively implemented, digital transformation can enhance operational efficiency, reduce transaction costs, improve service quality, and expand financial inclusion through online and mobile platforms. However, the transformation process also entails substantial challenges, including high investment requirements, resistance to organizational change, increasing cybersecurity risks, and the complexity of managing and integrating large volumes of sensitive customer data.

Although academic interest in digital transformation within the financial sector has grown rapidly, several important gaps remain. Much of the existing literature has concentrated on outcomes such as cost efficiency, service quality, and customer satisfaction, while the implications of digital transformation for banks' innovation performance have received comparatively limited empirical attention. Moreover, prior studies often examine technological or organizational factors in isolation, providing insufficient insight into how strategic intent, internal capabilities, and technological infrastructure jointly shape innovation outcomes. In addition, empirical evidence remains heavily skewed toward developed economies, leaving the digital transformation experiences of banks in emerging markets where regulatory regimes, market conditions, and institutional environments differ substantially underexplored. China, in particular, offers a distinctive context characterized by rapid digital adoption, strong regulatory oversight, and intense competition among financial institutions.

Another limitation of existing research lies in the insufficient examination of dynamic capabilities as the underlying mechanisms through which digital transformation strategies influence innovation outcomes. While dynamic capabilities commonly conceptualized as sensing, seizing, and reconfiguration are widely recognized as critical for organizational adaptation, their mediating role in the digital transformation–innovation relationship within the banking sector has not been systematically analyzed. Addressing these gaps is essential for developing a more integrated and context-sensitive understanding of how digital transformation contributes to innovation in commercial banks.

Against this backdrop, the present study examines the impact of digital transformation strategy on the innovation performance of commercial banks in China, with particular emphasis on the mediating role of dynamic capabilities and the moderating role of information technology (IT) infrastructure. Drawing on the Resource-Based View (RBV), the study conceptualizes digital transformation strategy as a strategic resource whose effectiveness depends on banks' ability to develop and deploy sensing, seizing, and reconfiguration capabilities. Additionally, the study investigates how variations in IT infrastructure condition the strength of these relationships. Using a quantitative research design, the study provides empirical evidence on the mechanisms through which digital transformation strategies translate into innovation outcomes in the banking sector.

Accordingly, this research addresses the following questions:

1. How does a digital transformation strategy affect the innovation performance of commercial banks in China?
2. To what extent do sensing, seizing, and reconfiguration capabilities mediate the relationship between digital transformation strategy and innovation performance?
3. How does IT infrastructure moderate the impact of digital transformation strategy on innovation performance, and what strategic implications does this interaction hold for commercial banks?

By addressing these questions, the study seeks to provide a comprehensive understanding of the strategic and organizational drivers of innovation performance in digitally transforming commercial banks. This research contributes to both theory and practice. From a theoretical perspective, it extends the digital transformation literature

by integrating RBV with the dynamic capabilities framework, thereby offering a strategic explanation of how internal resources and capabilities enable banks to convert digital initiatives into innovation outcomes. From a practical perspective, the findings offer actionable insights for bank executives and policymakers by identifying specific capability and infrastructure conditions that enhance the effectiveness of digital transformation. More broadly, the study contributes to social science research by clarifying how strategic digital initiatives shape organizational innovation within complex and highly regulated financial systems.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The Resource-Based View (RBV) remains one of the most influential perspectives in strategic management. It argues that sustained competitive advantage is rooted in the acquisition, development, and deployment of resources that are valuable, rare, difficult to imitate, and non-substitutable (VRIN) (Mowery, Oxley, & Silverman, 1998). In this view, performance differences across firms are explained not only by market position, but also by heterogeneity in internal resource endowments and how effectively those resources are orchestrated. RBV therefore highlights the strategic relevance of both tangible and intangible resources, including technological know-how, organizational culture, human capital, and other strategic assets as key drivers of firm outcomes (Déniz-Déniz & Saá-Pérez, 2003). Importantly, intangible assets such as dynamic capabilities are particularly critical in turbulent environments because they enable organizations to interpret environmental signals, take timely action, and reconfigure resources to support renewal, innovation, and long-term growth (Memon & Ooi, 2023).

Building on RBV, this study uses the framework to examine how digital transformation strategies are associated with innovation performance in commercial banks. Digital transformation is treated here as a strategic and resource-intensive undertaking that typically requires coordinated investment in digital technologies, IT infrastructure, and talent development. From an RBV perspective, digital transformation initiatives do not automatically generate superior outcomes; rather, their benefits depend on whether banks can mobilize these resources in ways that strengthen innovation capacity, improve operating effectiveness, and sustain competitiveness. Innovation performance understood as the ability to develop and implement new products, services, or processes has become especially consequential in banking, where competition increasingly depends on speed, personalization, and data-driven service delivery (Fischer, Imgrund, Janiesch, & Winkelmann, 2020; Usai et al., 2021). Digital transformation strategies can contribute to innovation performance by upgrading technological foundations, automating standardized processes, and improving decision quality through analytics-enabled information processing (Setzke, Riasanow, Böhm, & Krcmar, 2023). In turn, these changes can expand the bank's innovation space, accelerate product development, and enhance customer experience.

Under this logic, a digital transformation strategy can be interpreted as a strategic resource that supports innovation directly and indirectly through capability building. In particular, RBV suggests that digital transformation may foster dynamic capabilities that help banks respond to changing customer preferences, regulatory requirements, and technological trajectories. Sensing capability enables banks to identify emerging opportunities and threats; seizing capability supports commitment and execution by mobilizing resources toward promising opportunities; and reconfiguration capability allows banks to realign structures and processes to maintain fit with changing conditions. Prior studies report that banks advancing digital initiatives often experience improvements in service quality, customer satisfaction, and operating efficiency (Fischer et al., 2020; Setzke et al., 2023). For example, mobile banking platforms and digital payment systems not only increase convenience but also create avenues for new product and service innovation. These considerations lead to the first hypothesis:

Hypothesis 1: Digital transformation strategy positively affects the innovation performance of commercial banks.

Digital transformation strategy is also expected to shape the three core dimensions of dynamic capabilities in banking (Setzke et al., 2023). Dynamic capabilities, typically conceptualized as sensing, seizing, and reconfiguration, enable organizations to recognize opportunities, act on them, and adapt internal arrangements in environments

characterized by rapid change (Ambrosini & Bowman, 2009). A coherent digital transformation strategy should strengthen these capabilities by supplying enabling technologies, data resources, and managerial processes that support faster learning and more effective resource allocation.

Sensing capability refers to the organization's capacity to scan the environment, detect meaningful shifts, and anticipate customer needs and competitive threats (Alshanty & Emeagwali, 2019). Digital transformation can reinforce this capability through tools such as advanced analytics, artificial intelligence, and big data technologies that support real-time monitoring and insight extraction. By analyzing behavioral and transactional data at scale, banks can identify demand patterns, anticipate emerging preferences, and recognize market trends earlier, thereby improving their ability to sense opportunity in a fast-moving environment.

Seizing capability captures the organization's ability to convert identified opportunities into concrete initiatives through timely decisions and resource mobilization (Min & Kim, 2022). Digital transformation strategies may enhance seizing capability by providing platforms and architectures that enable banks to prototype, launch, and scale innovative services more quickly. For example, cloud infrastructure and digital platforms can reduce development cycles for new offerings such as mobile services, virtual cards, or digitally enabled lending, supporting rapid execution and faster market response. Reconfiguration capability reflects the ability to renew and realign resources, processes, and structures to maintain competitiveness as technologies and market conditions evolve (Hu, Wang, Feng, & Duan, 2021). Digital transformation strategies can promote reconfiguration by enabling process redesign, automation, and modularization of operations. Technologies such as blockchain may improve transaction transparency and reduce friction, while automation can improve efficiency and reduce costs. Collectively, these changes contribute to organizational agility and adaptability.

On the basis of RBV and prior empirical work suggesting that analytics and automation support adaptability and faster innovation cycles (Hanif & Asgher, 2018), the study proposes:

Hypothesis 2: Digital transformation strategy positively affects sensing capability in commercial banks.

Hypothesis 3: Digital transformation strategy positively affects seizing capability in commercial banks.

Hypothesis 4: Digital transformation strategy positively affects reconfiguration capability in commercial banks.

The link between dynamic capabilities and innovation performance is also well established. Each capability contributes to innovation in a distinct but complementary way: sensing helps identify where innovation is needed; seizing enables commitment and execution; and reconfiguration ensures ongoing alignment between innovation objectives and organizational arrangements (Hu et al., 2021). Sensing capability supports opportunity recognition and reduces the risk of strategic misalignment by keeping the bank attentive to external changes (Khristianto, Suharyono, Pangestuti, & Mawardi, 2021). Seizing capability enables effective implementation by mobilizing resources toward promising innovation opportunities. Reconfiguration capability sustains innovation by adapting routines, structures, and processes as technologies and market demands evolve.

Taken together, these capabilities support continuous innovation in products and processes, strengthening the bank's capacity to evolve offerings and operational models in line with customer and market requirements. From an RBV perspective, dynamic capabilities operate as strategically valuable resources that can underpin sustained competitive advantage. Accordingly, the following hypotheses are advanced.

Hypothesis 5: Sensing capability positively affects innovation performance in commercial banks.

Hypothesis 6: Seizing capability positively affects innovation performance in commercial banks.

Hypothesis 7: Reconfiguration capability positively affects innovation performance in commercial banks.

In addition, IT infrastructure is widely viewed as a foundational enabler of digital transformation in banks (Roberts & Grover, 2012). IT infrastructure includes the core technological base that supports digital operations, hardware, software, networks, and data management systems (Ferreira, Nery, & Pinheiro, 2016). Because digital transformation relies on technology integration, platform stability, and data availability, the quality and flexibility of a bank's IT infrastructure may shape the extent to which digital transformation strategies translate into innovation

outcomes. Prior research suggests that robust IT infrastructure facilitates digital channel deployment, analytics capabilities, and automation, thereby enhancing efficiency and customer experience. It also strengthens a bank's ability to collect, process, and apply large-scale data for decision-making and product innovation (Al-Sabaawi & Alyouzbaky, 2022). Therefore, IT infrastructure is expected to influence the strength of the digital transformation strategy–innovation performance relationship. When infrastructure is strong, banks can integrate new technologies more effectively, scale innovations faster, and reduce implementation frictions. When infrastructure is weak or fragmented, strategic digital initiatives may face execution bottlenecks and yield smaller innovation returns. Consistent with RBV, IT infrastructure can be treated as a strategic resource that amplifies (or constrains) the value captured from a digital transformation strategy.

Hypothesis 8: IT infrastructure moderates the relationship between digital transformation strategy and innovation performance.

Finally, this study argues that sensing, seizing, and reconfiguration capabilities operate as key mediating mechanisms linking digital transformation strategy to innovation performance. Digital transformation strategies can improve innovation outcomes not only directly, but also by strengthening banks' capacity to detect opportunities, execute initiatives, and realign resources in support of continuous innovation. Sensing capability enables banks to align transformation efforts with evolving customer needs and market signals (Hu, Hao, & Wang, 2022). Seizing capability supports converting insights into implementable initiatives by mobilizing resources and committing to innovation actions (Min & Kim, 2022). Reconfiguration capability allows banks to adapt processes, structures, and technologies, sustaining innovation as conditions change (Jiang, Shi, & Liu, 2025). Accordingly, the following mediation hypotheses are proposed.

Hypothesis 9: Sensing capability mediates the relationship between digital transformation strategy and innovation performance.

Hypothesis 10: Seizing capability mediates the relationship between digital transformation strategy and innovation performance.

Hypothesis 11: Reconfiguration capability mediates the relationship between digital transformation strategy and innovation performance.

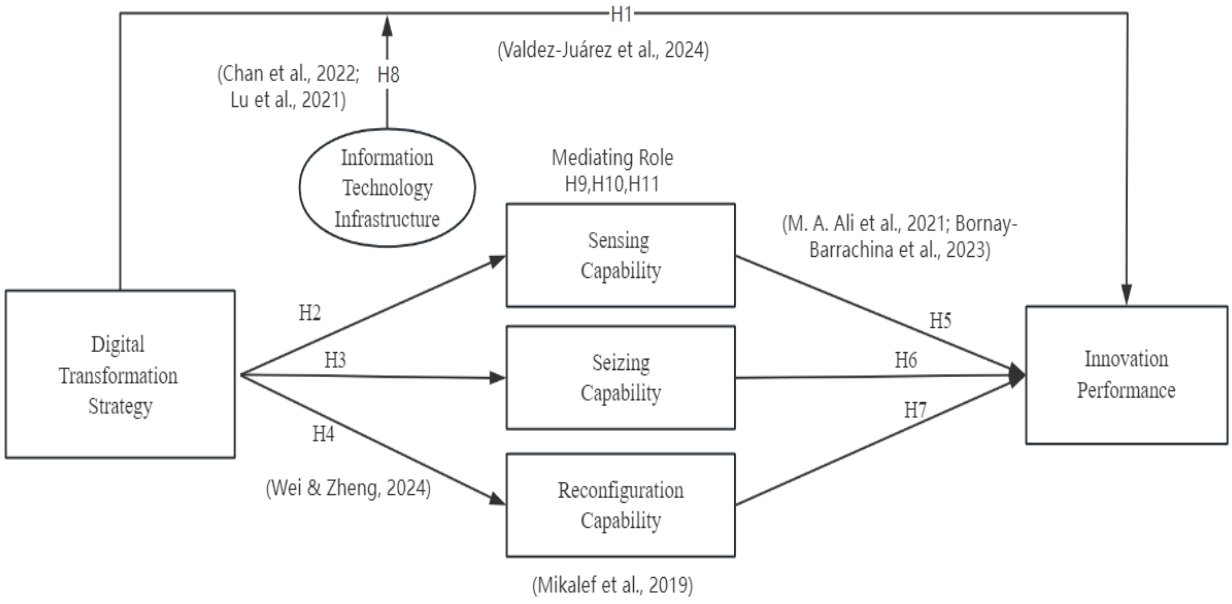

Figure 1. Conceptual Framework.

Source: Chen et al. (2022); Lu, Papagiannidis, and Alamanos (2018); Valdez-Juárez, Castillo-Vergara, and García-Pérez-de-Lema (2024); Ali, Kan, and Sarstedt (2016); Borney-Barrachina, García-Morales, and Martín-Rojas (2023); Wei and Zheng (2024) and Mikalef, Boura, Lekakos, and Krogstie (2019).

Figure 1 delineates the theoretical model in which digital transformation strategy functions as the primary antecedent of innovation performance, with sensing, seizing, and reconfiguration capabilities mediating the relationship, and information technology infrastructure moderating the direct effect.

3. METHODOLOGY

Prior to the formal survey, a conservative estimate of the required sample size was calculated to ensure the adequacy and representativeness of the sample. Data were collected using an online survey platform that supports multi-channel questionnaire distribution, including social media, email, and internal organizational networks, thereby enabling broad coverage of technology-based firms. In addition, the platform provides real-time data monitoring functions, allowing researchers to track response rates and implement rigorous data quality control measures. Throughout the data collection process, survey progress was continuously monitored, and predefined screening criteria were applied to ensure the validity and representativeness of the final dataset, thereby providing a robust empirical foundation for this study. This study employed judgmental and snowball sampling techniques to obtain data from middle- and senior-level managers across various commercial banks in China. Data were collected between August 1 and October 1, 2024, using a combination of online questionnaires and face-to-face interviews, with respondents selected for their involvement in strategic and operational decision-making within their institutions. A total of 689 questionnaires were returned. To enhance data quality and reliability, the survey instrument incorporated reverse-coded items, and responses were screened for inattentive or patterned answering behavior. After data cleaning and validation, 516 responses were deemed usable and retained for subsequent analysis.

Table 1. Summary of constructs, items, scale sources, and measurement dimensions.

Construct	Measurement dimensions	Example measurement items	Scale sources
Digital transformation strategy (DTS)	Strategic alignment, technology adoption, process digitalization	• Our bank clearly prioritizes digital transformation in its strategic planning. • Digital technologies are widely integrated into key processes. • Digital initiatives receive strong managerial support.	Matt, Hess, and Benlian (2015); Zhang, Jiang, and Li (2023) and (Correani, De Massis, Frattini, Petruzzelli, & Natalicchio, 2020)
Sensing capability (SC) (Dynamic capability)	Market sensing, technology sensing	• The bank actively scans for emerging technologies. • We quickly recognize changes in customer needs. • The bank systematically collects market intelligence.	Teece (2007) and Pavlou and El Sawy (2011)
Seizing capability (SZC) (Dynamic capability)	Opportunity mobilization, resource allocation	• The bank effectively allocates resources to promising digital opportunities. • We respond rapidly to market opportunities with new digital services.	Teece (2007) and Helfat and Martin (2015)
Reconfiguration capability (RC) (Dynamic capability)	Organizational reconfiguration, process Renewal	• The bank regularly restructures processes to support digital initiatives. • Legacy systems are updated to align with new digital technologies.	Teece (2018) and Eisenhardt and Martin (2017)
Information technology infrastructure (ITI)	IT Flexibility, IT integration, IT connectivity	• Our IT systems are flexible and can easily support new applications. • Information flows smoothly across departments. • IT platforms are well-integrated and scalable.	Zhang (2005); Roberts and Grover (2012) and Tallon (2008)
Innovation performance (IP)	Product innovation, process innovation	• The bank has launched new digital products/services in recent years. • Digital technologies have significantly improved operational processes. • Innovation outcomes have strengthened our competitiveness.	Khin and Ho (2019); Ardito, Raby, Albino, and Bertoldi (2021) and Hanelt, Bohnsack, Marz, and Antunes Marante (2021)

Table 1 outlines the conceptual constructs employed in the research and details their measurement dimensions, representative items, and original scale sources, thereby establishing the basis for construct operationalization and empirical measurement.

The digital transformation of traditional commercial banks refers to the systematic integration of emerging digital technologies such as mobile internet, big data analytics, cloud computing, and artificial intelligence into existing organizational structures and operational systems. Through this process, banks seek to improve development quality by fostering digital innovation, reshaping business processes, upgrading products and services, and reconfiguring business models. Ultimately, digital transformation aims to establish new operational paradigms within the banking industry and enhance overall innovation performance. Drawing on internationally validated measurement instruments, this study operationalizes digital transformation strategy using an 11-item scale adapted to the banking context. All items are assessed on a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"), to capture respondents' evaluations of the scope, depth, and effectiveness of digital transformation initiatives within their institutions.

Dynamic capability, a core construct in organizational and strategic management research, has attracted increasing scholarly attention in response to intensifying competition and environmental uncertainty. Although prior studies differ in how dynamic capabilities are conceptualized and measured, they generally converge on the notion that such capabilities reflect an organization's capacity to identify external opportunities, mobilize resources, and continuously adapt internal structures and routines. In the banking sector, these capabilities are particularly important given the dual pressures of innovation and risk management. This study adopts the dynamic capability scale developed by Kump, Engelmann, Kessler, and Schweiger (2019), which has been widely validated in prior research, and adapts it to the operational realities of Chinese commercial banks. Feedback from senior bank managers and domain experts was incorporated to enhance contextual relevance and content validity (Kump et al., 2019). Each dimension of dynamic capability sensing, seizing, and reconfiguration is measured using three items on a five-point Likert scale.

Information technology infrastructure (ITI) is measured using the scale proposed by Roberts and Grover (2012), which has been extensively validated in subsequent empirical studies. ITI is conceptualized as a critical enabler of organizational agility and competitiveness in the banking industry (Roberts & Grover, 2012). In this study, IT infrastructure is assessed across three functional dimensions: decision-support tools that facilitate strategic choices, simulation and analytical tools that enhance managerial judgment, and data trend analysis tools that support strategic planning and customer management.

Innovation performance in commercial banks is captured through two complementary dimensions: process innovation performance and product innovation performance (Ardito et al., 2021; Pesch, Endres, & Bouncken, 2021). Process innovation performance reflects the bank's ability to optimize and improve internal operations and service delivery, measured using five items related to technology utilization, operational efficiency, and service quality. Product innovation performance focuses on developing and introducing new financial products or services, measured using four items assessing technological advancement, market impact, innovation speed, and customer acceptance.

Beyond examining statistical significance, this study emphasizes the magnitude of estimated effects and their strategic implications. Effect sizes are evaluated through standardized path coefficients, indirect effects, and interaction terms derived from structural equation modeling (SEM). The use of standardized coefficients allows for meaningful comparisons across constructs measured on similar Likert scales, enabling the identification of relationships that are not only statistically significant but also substantively important. This analytical approach responds to calls in strategic management research to move beyond dichotomous significance testing toward a more nuanced assessment of managerial relevance.

From a strategic perspective, interpreting effect magnitude provides insights into priority-setting in digital transformation initiatives. Stronger path coefficients highlight areas where managerial attention and resource

allocation are likely to generate disproportionate innovation returns. Likewise, comparing the relative strength of mediating effects associated with sensing, seizing, and reconfiguration capabilities helps clarify which capabilities function as the most influential transmission mechanisms through which digital transformation strategies affect innovation outcomes. In this way, the empirical model serves not only as a causal framework but also as a strategic decision guide for commercial banks.

In addition, moderation analysis sheds light on how IT infrastructure conditions strategic effectiveness. Rather than treating IT infrastructure as a simple enabling factor, the study examines whether variations in infrastructure strength amplify or constrain the impact of digital transformation strategies on innovation performance. This approach offers a more refined understanding of the complementarities between strategic intent and technological foundations—an issue of particular importance for banks operating under regulatory constraints and limited resources.

Overall, by explicitly incorporating effect magnitude into the analytical framework, this study enhances the interpretability and practical value of its empirical findings. The results are positioned to inform not only theory development but also managerial decision-making and policy design, thereby aligning methodological rigor with real-world strategic relevance.

To test the main effects of the two dimensions of boundary-spanning search (Boundary-spanning search for technology knowledge and boundary-spanning search for market knowledge) on innovation resilience (Innovation stability and innovation adaptability), this study constructed the following model.

$$Innovation\ Resilience=\beta_0+\beta_1\times Boundary\_Spanning\_Search+\varepsilon \quad (1)$$

Where: *Innovation Resilience* is the dependent variable of this study which is innovation stability and innovation adaptability, respectively. *Boundary_Spanning_Search*are the independent variables, which are boundary-spanning search for technology knowledge and boundary-spanning search for market knowledge, respectively. This study is concerned with the coefficient of β_1 . ε represents the random error term.

In order to investigate the mechanism of boundary-spanning search on innovation resilience, this study considers the role of knowledge integration, i.e., boundary-spanning search → knowledge integration → innovation resilience. Drawing on the research of Wang, Zhang, and Liu (2022), this study constructed the following model.

$$Me=\beta_0+\beta_1\times Boundary\_Spanning\_Search+\varepsilon \quad (2)$$

$$Innovation\ Resilience=\beta_0+\beta_1\times Boundary\_Spanning\_Search+\beta_2\times Me+\varepsilon \quad (3)$$

Where *Me* is the mediating variable (knowledge integration) in this study. Equation 2 represents the relationship between boundary-spanning search and knowledge integration, and Equation 3 represents the relationship between knowledge integration and innovation resilience. In this study, we are concerned with the coefficients ofβ_1 for Equation 2, andβ_2 for Equation 3. ε represents the random error term.

In addition, this study investigates how environmental turbulence affects the relationship between boundary-spanning search and innovative firms' innovation resilience. The following model is constructed.

$$Innovation\ Resilience=\beta_0+\beta_1\times Boundary\_Spanning_{Search}+\ \beta_2\times Mo+\beta_3\times Boundary\_Spanning_{Search}\times Mo+\varepsilon \quad (4)$$

Where, *Mo* is the moderating variable (Environmental turbulence) in this study. In this study, we are concerned with the coefficient ofβ_3 in Equation 4. ε represents the random error term.

4. RESULTS

To evaluate the reliability and convergent validity of the measurement model, multiple standard indicators were examined, including Cronbach's Alpha (Cα), Composite Reliability (CR), and Average Variance Extracted (AVE). The detailed results for each construct are reported in Table 2. All constructs exhibit strong internal consistency, as evidenced by Cronbach's Alpha values exceeding the recommended threshold of 0.70. Among the variables, Digital Transformation Strategy (DTS) demonstrates the highest level of internal reliability (Cα = 0.940), followed by Innovation Performance (IP) (Cα = 0.922) and Reconfiguration Capability (RC) (Cα = 0.914). The remaining

constructs Sensing Capability (SSC) and Seizing Capability (SZC) also show satisfactory reliability, with Cα values of 0.890 and 0.831, respectively.

Further support for construct reliability is provided by the Composite Reliability (CR) results. All CR values range between 0.821 and 0.941, comfortably exceeding the recommended minimum of 0.70. Consistent with the Cronbach's Alpha results, DTS and IP display the strongest construct reliability, with CR values of 0.941 and 0.923, respectively, indicating stable and consistent measurement across items. Convergent validity was assessed using Average Variance Extracted (AVE). As shown in Table 2, AVE values for all constructs are above the commonly accepted threshold of 0.50, ranging from 0.560 to 0.642. Reconfiguration Capability (RC) achieves the highest AVE value (0.642), suggesting a high degree of shared variance among its indicators, while Seizing Capability (SZC) records the lowest AVE value (0.560), which nevertheless remains within acceptable limits.

Overall, these results indicate that the measurement model demonstrates adequate internal consistency, strong construct reliability, and satisfactory convergent validity, providing a sound foundation for subsequent structural model analysis.

Table 2. Reliability and validity test.

Variables	Cα	CR	AVE
Digital transformation strategy	0.940	0.941	0.591
Sensing capacity	0.890	0.891	0.576
Seizing capacity	0.831	0.836	0.560
Reconfiguration capacity	0.914	0.915	0.642
Information technology infrastructure	0.817	0.821	0.605
Innovation performance	0.922	0.923	0.573

The correlation results indicate statistically significant and positive associations among the principal constructs examined in this study. Digital Transformation Strategy (DTS) shows strong positive correlations with Sensing Capability (SSC), Seizing Capability (SZC), and Innovation Performance (IP), suggesting that banks with more developed digital transformation strategies tend to exhibit stronger opportunity-recognition and opportunity-exploitation capabilities, alongside higher innovation outcomes. Moreover, sensing, seizing, and reconfiguration capabilities are each positively related to innovation performance, underscoring the importance of dynamic capabilities in supporting innovation activities within commercial banks. Although Information Technology Infrastructure (ITI) displays comparatively weaker correlations with other constructs, its associations with both DTS and innovation performance remain positive, indicating a supportive though less direct role. Taken together, the correlation findings provide preliminary evidence that digital transformation strategies, when complemented by dynamic capabilities and an adequate IT infrastructure, are conducive to enhanced innovation performance in the banking sector.

Table 3. Correlations analysis.

	DTS	SSC	SZC	RC	ITI	IP
DTS	1					
SSC	0.459**	1				
SZC	0.461**	0.260**	1			
RC	0.428**	0.271**	0.222**	1		
ITI	0.138**	0.099*	0.062	0.105*	1	
IP	0.535**	0.434**	0.521**	0.447**	0.156**	1

Note: ** $p < 0.01$, * $p < 0.05$. DTS = Digital Transformation Strategy; SSC = Sensing Capacity; SZC = Seizing Capacity; RC = Reconfiguration Capacity; ITI = Information Technology Infrastructure; IP = Innovation Performance.

In the structural equation model, no negative error variances or improper residual estimates were detected, indicating that the model estimation was statistically sound. Overall, the model demonstrates a strong fit to the observed data, with fit indices exceeding commonly accepted benchmarks (χ^2/df = 1.383, GFI = 0.915, RMSEA = 0.027, NFI = 0.925, CFI = 0.978, TLI = 0.976). These results suggest a high level of consistency between the theoretical model and the empirical data. In addition, the Pearson correlation analysis reported in Table 3 reveals significant associations among the independent variable, mediating variables, and the dependent variable, providing preliminary support for the proposed relationships.

The structural path analysis further confirms the hypothesized relationships among digital transformation strategy, dynamic capabilities, and innovation performance in commercial banks. Digital Transformation Strategy (DTS) exhibits a positive and statistically significant effect on Innovation Performance (IP) (β = 0.140, p = 0.007), indicating that stronger strategic commitment to digital transformation is associated with higher innovation outcomes. DTS also shows a substantial positive influence on the three dimensions of dynamic capabilities. Specifically, its effect on Sensing Capability (SSC) is strong (β = 0.506, p < 0.001), suggesting that digital transformation enhances banks' ability to identify emerging opportunities. Similarly, DTS significantly improves Seizing Capability (SZC) (β = 0.525, p < 0.001), reflecting its role in enabling banks to act on identified opportunities, and it positively affects Reconfiguration Capability (RC) (β = 0.460, p < 0.001), supporting organizational adaptation and resource realignment.

The results also indicate that dynamic capabilities play an important role in driving innovation performance. Sensing Capability is positively related to Innovation Performance (β = 0.227, p < 0.001), highlighting the value of opportunity recognition in fostering innovation. Seizing Capability demonstrates an even stronger effect on innovation outcomes (β = 0.385, p < 0.001), emphasizing the importance of timely resource mobilization and execution. Reconfiguration Capability likewise shows a significant positive relationship with Innovation Performance (β = 0.269, p < 0.001), confirming that the ability to adjust structures and processes contributes meaningfully to innovation success. Taken together, the path analysis provides consistent empirical support for all proposed hypotheses and underscores the central role of digital transformation and dynamic capabilities in enhancing innovation performance within commercial banks.

Table 4. Standardized direct effects.

X	→	Y	S.E.	C.R.	P-value	Beta	Result
DTS	→	IP	0.121	0.045	0.007	0.140	H1 Support
DTS	→	SSC	0.367	0.035	0.000	0.506	H2 Support
DTS	→	SZC	0.439	0.042	0.000	0.525	H3 Support
DTS	→	RC	0.443	0.044	0.000	0.460	H4 Support
SSC	→	IP	0.271	0.053	0.000	0.227	H5 Support
SZC	→	IP	0.400	0.051	0.000	0.385	H6 Support
RC	→	IP	0.243	0.038	0.000	0.269	H7 Support

Note: Standardized estimations of 5000 bootstrap samples, DTS=Digital Transformation Strategy; SSC=Sensing Capacity; SZC=Seizing Capacity; RC=Reconfiguration Capacity; ITI= Information Technology Infrastructure; IP=Innovation Performance.

Table 4 summarizes the standardized direct path coefficients estimated in the structural model and indicates that all hypothesized relationships are statistically significant. Digital transformation strategy positively predicts the three dimensions of dynamic capability: sensing, seizing, and reconfiguration and also directly enhances innovation performance. In turn, dynamic capabilities exert significant positive effects on innovation performance, confirming their mediating role in the model.

To test the moderating effect of Information Technology Infrastructure (ITI) on the relationship between Digital Transformation Strategy (DTS) and Innovation Performance (IP), we employed the Bootstrap method using (Hayes, 2013) PROCESS plugin in SPSS 25.0, with 5000 bootstrap samples and a 95% confidence interval. The analysis involved three models: Model 1, Model 2, and Model 3, with the interaction term (DTS*ITI) included in Model 3.

The results showed that the interaction between DTS and ITI was statistically significant (t = 5.703, p = 0.000), confirming that ITI plays a significant moderating role. Specifically, higher levels of ITI strengthen the positive impact of DTS on IP, indicating that a robust IT infrastructure enhances the effectiveness of digital transformation in driving innovation performance. This finding underscores the importance of ITI in amplifying the benefits of digital transformation.

Table 5. Moderating Effect.

	Model 1	Model 2	Model 3
Constant	3.722** (122.267)	3.722** (122.749)	3.699** (124.566)
DTS	0.487** (14.323)	0.477** (13.932)	0.496** (14.864)
ITI		0.070* (2.245)	0.090** (2.967)
DTS*ITI			0.188** (5.703)
R2	0.286	0.293	0.335
F Value	F (1,512)=205.139,p=0.000	F (2,511)=105.900,p=0.000	F (3,510)=85.796,p=0.000

Note: *p < 0.05, **p < 0.01. Values in parentheses indicate t-values.

Table 5 summarizes the hierarchical regression results testing the moderating role of information technology infrastructure. The significance of the interaction term supports the moderation hypothesis, demonstrating that IT infrastructure enhances the effectiveness of the digital transformation strategy in driving innovation performance. The progressive increase in R^2 across Models 1–3 further corroborates the strengthening effect of IT infrastructure.

To test the mediating effects of Sensing Capability (SSC), Seizing Capability (SZC), and Reconfiguration Capability (RC) on the relationship between Digital Transformation Strategy (DTS) and Innovation Performance (IP), we employed the Bootstrap method using (Hayes, 2013) PROCESS plugin in SPSS 25.0 with 5000 bootstrap samples and a 95% confidence interval. The results supported all three hypotheses (H9, H10, and H11), confirming that each capability partially mediates the DTS-IP relationship. Specifically, DTS positively influences IP both directly and indirectly through SSC (indirect effect = 0.082), SZC (indirect effect = 0.138), and RC (indirect effect = 0.093), with all mediating effects being statistically significant (p < 0.01).

It should be noted that the DTS→IP coefficient reported in the moderation analysis represents the total effect estimated in a regression framework without mediators, whereas the SEM coefficient reflects the direct effect after accounting for mediation by dynamic capabilities. Accordingly, the two coefficients do not represent conflicting results but rather reflect different estimates derived from complementary analytical approaches, each serving a distinct inferential purpose in the study.

Table 6. Mediating effect.

	Direct effect	Indirect effect	Total effect	Z-value	P-value	95% BootCI	Result
DTS→SSC→IP	0.174**	0.082	0.487**	4.469	0.000	0.055 ~ 0.128	H9 support
DTS→SZC→IP	0.174**	0.138	0.487**	6.567	0.000	0.113 ~ 0.194	H10 support
DTS→RC→IP	0.174**	0.093	0.487**	5.007	0.000	0.069 ~ 0.142	H11 support

Note: ** indicates statistical significance at the 1% level (p < 0.01).
Direct, indirect, and total effects were estimated using the bootstrap method with 5,000 resamples.
BootCI refers to the bias-corrected 95% bootstrap confidence interval.

Table 6 summarizes the estimated direct, indirect, and total effects derived from the bootstrap mediation analysis. The results reveal significant indirect effects through sensing, seizing, and reconfiguration capabilities, demonstrating that each capability partially mediates the digital transformation strategy–innovation performance relationship and validating the proposed mediation framework.

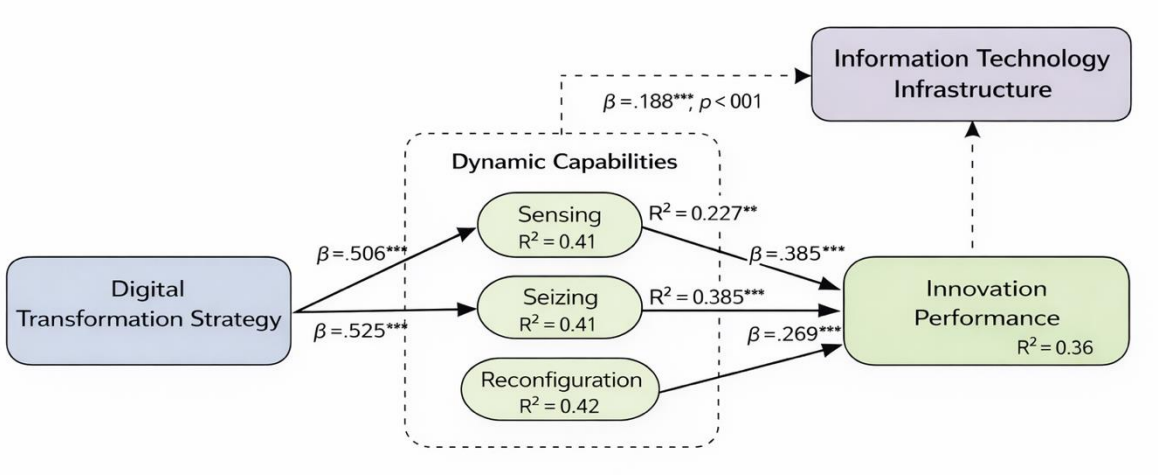

Figure 2. Path analysis of SEM.

Note: Standardized path coefficients (β) are reported. *** p < 0.001; ** p < 0.01; * p < 0.05. R^2 values indicate the explained variance of each endogenous construct.

Figure 2 depicts the hypothesized structural relationships, showing that sensing, seizing, and reconfiguration capabilities mediate the link between digital transformation strategy and innovation performance, and that information technology infrastructure moderates the digital transformation strategy–innovation performance relationship.

5. CONCLUSION

This study offers several important theoretical contributions to the literature on digital transformation, dynamic capabilities, and innovation performance, particularly within the banking sector. By examining the relationships between Digital Transformation Strategy (DTS), dynamic capabilities (sensing, seizing, and reconfiguration), and Information Technology Infrastructure (ITI), this research enriches the understanding of how these elements interact to foster innovation and drive competitive advantage.

First, this study extends the literature on digital transformation by conceptualizing DTS as a key enabler of innovation performance in commercial banks. While previous studies have generally emphasized the importance of digital transformation, few have examined the specific mechanisms through which digital transformation influences innovation outcomes. By highlighting the role of dynamic capabilities in mediating the relationship between DTS and innovation performance, this research offers a more comprehensive understanding of how digital strategies directly impact innovation in the banking sector. The findings suggest that effective digital transformation not only influences strategic decisions but also enhances banks' ability to sense market trends, seize opportunities, and reconfigure their resources to support innovation. Second, this research contributes to the dynamic capabilities framework by empirically validating the roles of sensing, seizing, and reconfiguration in driving innovation performance. Although these capabilities have been widely discussed in the literature, their specific contributions to innovation within the context of digital transformation had not been clearly established. This study demonstrates that sensing enables banks to identify emerging market opportunities, seizing allows for the rapid adoption of these opportunities, and reconfiguration facilitates the restructuring of resources to sustain innovation. By examining these capabilities in the banking industry, this research provides new insights into how dynamic capabilities function in industries undergoing rapid digital change. Finally, the study introduces ITI as a moderating variable, offering a novel theoretical contribution by demonstrating how IT infrastructure amplifies the effect of DTS on innovation performance. The role of ITI as both a strategic enabler and a moderator of digital transformation efforts extends the boundaries of dynamic capabilities theory. It underscores the importance of technological infrastructure not only as a supportive resource but also as a critical element in ensuring the success of digital transformation strategies. This

contribution broadens the theoretical scope of digital transformation research, positioning IT infrastructure as a dynamic and essential component in driving innovation and organizational agility in digitally mature industries.

This study offers valuable practical insights for commercial banks seeking to enhance their innovation performance through digital transformation. One key implication is the importance of aligning Digital Transformation Strategy (DTS) with the bank's strategic goals. The findings suggest that banks should prioritize developing a robust DTS that not only focuses on technological adoption but also integrates dynamic capabilities such as sensing, seizing, and reconfiguring into their operational processes. By doing so, banks can create a more agile and responsive organization, capable of identifying new opportunities, making informed decisions, and adapting resources quickly to sustain innovation. Banks are advised to view digital transformation as a comprehensive strategy rather than a series of isolated technology initiatives.

Moreover, the study highlights the critical role of dynamic capabilities in fostering innovation. Banks that enhance their sensing, seizing, and reconfiguration capabilities are better equipped to navigate the complexities of the digital landscape. Sensing capabilities, for example, help banks detect emerging market trends and customer needs, enabling them to adjust their offerings accordingly. Seizing capabilities empower banks to act swiftly on these opportunities, while reconfiguration allows them to restructure resources and processes to support new initiatives. For managers, this emphasizes the need to invest in training, organizational culture, and technology that build these dynamic capabilities, which are essential for maintaining a competitive edge in an increasingly digitalized environment.

Finally, the study underscores the importance of Information Technology Infrastructure (ITI) as a moderating factor that amplifies the effectiveness of digital transformation efforts. Banks should invest in advanced IT infrastructure to create a solid foundation for digital transformation initiatives. A strong ITI not only supports the seamless integration of digital technologies but also enhances the organization's ability to adapt and innovate. By ensuring that their IT infrastructure is scalable, flexible, and capable of supporting advanced technologies, banks can maximize the return on their digital investments and better align their strategic objectives with technological advancements. In practice, this suggests that banks should view IT infrastructure not just as a technical asset but as a strategic enabler that directly influences the success of digital transformation and innovation outcomes.

This study provides a comprehensive exploration of the relationship between digital transformation strategies, dynamic capabilities, and innovation performance in commercial banks. By developing and empirically validating a model that integrates digital transformation, sensing, seizing, and reconfiguration capabilities, as well as IT infrastructure, the research offers valuable insights into how these factors collectively influence innovation outcomes. The findings demonstrate that digital transformation strategies, through dynamic capabilities, play a crucial role in enhancing innovation performance, while IT infrastructure moderates this relationship. This study contributes to the existing literature by offering a deeper understanding of the mechanisms driving innovation in the banking sector, with practical implications for banks aiming to leverage digital transformation for sustained competitive advantage. However, the study also acknowledges its limitations, particularly in terms of industry focus and data scope, and suggests avenues for future research to further explore the evolving impact of digital transformation on innovation across different sectors and over time.

Despite the theoretical and practical contributions of this study, several limitations should be acknowledged. First, the use of cross-sectional survey data restricts the ability to draw strong causal inferences and to capture the dynamic, evolutionary nature of digital transformation and capability development over time. Second, reliance on self-reported perceptual measures may introduce common method bias, despite the procedural and statistical remedies employed. Third, the empirical analysis focuses exclusively on commercial banks in China, which may limit the generalizability of the findings to other institutional contexts or financial systems with different regulatory environments. Finally, while this study conceptualizes dynamic capabilities at the organizational level, it does not explicitly examine their microfoundations, such as managerial cognition or individual digital skills. These limitations

provide important avenues for future research and suggest that the findings should be interpreted with appropriate caution. The findings of this study offer concrete and actionable guidance for commercial banks seeking to enhance innovation performance through digital transformation. First, digital transformation strategy should be operationalized as a portfolio of prioritized initiatives rather than a broad vision statement. Bank executives are advised to translate digital transformation goals into clearly defined strategic programs such as data-driven risk management, intelligent customer relationship management, and process automation each with explicit performance indicators (e.g., time-to-market for new digital products, reduction in processing time, or percentage of services delivered digitally). The relatively strong effects of digital transformation strategy on sensing and seizing capabilities suggest that banks should allocate early-stage resources to market intelligence systems, customer analytics platforms, and digital experimentation units, rather than dispersing investments evenly across unrelated technologies.

Second, the results indicate that dynamic capabilities require targeted managerial interventions rather than generic capability-building efforts. To strengthen sensing capability, banks should institutionalize mechanisms such as cross-functional digital scanning teams, partnerships with fintech firms, and real-time customer data dashboards that enable early identification of emerging technologies and customer needs. To enhance **seizing capability**, senior management should streamline decision-making processes by empowering digital project leaders with budget authority and shortening approval cycles for digital innovation initiatives. The relatively larger effect size of seizing capability on innovation performance implies that delays in resource allocation can substantially weaken innovation outcomes. To improve reconfiguration capability, banks should redesign organizational structures to support flexibility, such as establishing modular IT architectures, rotating digital talent across departments, and revising performance evaluation systems to reward experimentation and process renewal. Third, the moderating role of information technology infrastructure (ITI) suggests that banks should treat IT infrastructure investment as a strategic enabler rather than a support function. Instead of focusing solely on cost efficiency, banks should prioritize infrastructure characteristics that directly amplify strategic impact, including system interoperability, data integration, and scalability. For example, investments in cloud-based core banking systems and unified data platforms can significantly enhance the effectiveness of digital transformation strategies by enabling faster deployment of innovative services and more efficient resource reconfiguration. Finally, from a policy and governance perspective, the findings imply that bank-level digital transformation efforts should be aligned with regulatory and institutional support mechanisms. Policymakers and regulators can facilitate innovation by encouraging standardization of data interfaces, supporting regulatory sandboxes for digital banking experimentation, and promoting talent development programs that combine financial expertise with digital skills. Such measures can reduce institutional friction and enable banks to convert digital strategies into tangible innovation outcomes more effectively.

Overall, these practical implications emphasize that successful digital transformation in commercial banks depends not only on technology adoption but also on deliberate strategic choices, capability-specific managerial actions, and infrastructure investments that directly support innovation execution.

Funding: This paper was prepared with the support of the ODDEA Horizon Europe-MSCA-SE project ID 10108638. This support is gratefully acknowledged. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.
Institutional Review Board Statement: The research protocol was reviewed and approved by the Institutional Review Board of the National Institute of Development Administration (NIDA), Thailand, under protocol number [IRB No. 7214/243].
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.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.
Disclosure of AI Use: The author(s) used ChatGPT to edit and refine the wording of the Introduction. All outputs were reviewed and verified by the authors.

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