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Innovation Capabilities in the Banking Sector Post-COVID-19 Period: The Moderating Role of Corporate Governance in an Emerging Country

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Abstract: The COVID-19 pandemic is damaging economies across the world, including financial markets and institutions in all possible dimensions. For banks in particular, the pandemic generates multifaceted crises. This is likely to be worse in developing economies with poor financial market architecture. Innovation is considered an important factor in organizational effectiveness and competitive advantage post-COVID-19. Understanding how the banking system can improve their innovation capabilities is an unsolved question, especially in an emerging economy. Hence, this paper aims to examine the impact of capital budgeting, knowledge management, and business strategy on innovation capabilities in the Vietnamese banking sector post-COVID-19. More specifically, this study investigates the moderating role of corporate governance in strengthening these proposed impacts. This research uses a sample of 23 listed banks in Vietnam to examine the moderating role of corporate governance in the context of an emerging country. Hierarchical regression analysis and the multiple indicator approach are employed. The results indicate that knowledge management and business strategy significantly impact innovation capabilities while capital budgeting has no effect. Corporate governance has been revealed as the moderator of the relationship between two factors (knowledge management and business strategy) and innovation capabilities.

Keywords: corporate governance; capital budgeting; banking sector; business strategy; innovation capabilities

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1. Introduction

The outbreak of a global epidemic has rapidly spread across the world. It spreads uncontrollably and severely in many countries, affects the economy of these countries, especially the financial sector. This outbreak is not merely a health problem, but it also disturbs the global economy and corporations in different respects due to the government's solutions to combat this pandemic. The effect of this outbreak has been widely reviewed on the financial sector (Aldasoro et al. 2021; Akhtaruzzaman and Umar 2022; Boubaker et al. 2022), the stock market (Mazur et al. 2021), the banking sector (Demirgüç-Kunt et al. 2021), and other sectors (Chi 2021a).

The banking sector is expected to play an essential role during the COVID-19 crisis in supplying needed capital for the economy (Mazur et al. 2021). However, the business performance of banks in the context of the COVID-19 epidemic decreased due to the negative impact of credit size and the decrease in beta coefficient of credit efficiency during the COVID-19 pandemic lower than the coefficient of the average beta of the entire active period (Roper and Turner 2020). According to IMF (2020), the pandemic slows "aggregate demand, production, trade, and economic activities, and unemployment" increases, "financial institutions in most countries fear the growing risk of losses increase without government support". In a pandemic or post-pandemic world, such damage could threaten the survival and sustainability of the banking sector, financial stability and security, and regulatory discipline among countries—whether they are developed or undeveloped ones (Barua and Barua 2021). Banks will face the heaviest blow because banks are generally exposed to more risks than other financial institutions (e.g., interest rate, liquidity, credit, market, and reputation risk) (Rabbani et al. 2021). Therefore, bank managers seek to be competitive through innovation and continuous improvement of processes or services in a competitive market (Bascand 2020). Unfortunately, understanding how to push the innovation capabilities in the banking sector is unclear.

The impact of the COVID-19 pandemic is even worse in emerging countries where banks serve millions of individuals and businesses with relatively poor economic and financial capacity in a weaker policy and market environment (Çolak and Öztekin 2021). In most emerging economies, banks are the engines of economic growth because they are the dominant sources of long-term and short-term capital. The role and power of banks are immense, especially in countries with underdeveloped financial systems due to weak or non-existent stock markets, lack of adequate regulatory infrastructure, effective regulatory infrastructure, and innovation capabilities (Barua and Barua 2021). Banks in emerging economies are "the main driver of rapid economic growth, and damage to capital mobilization can have significant negative economic effects in these countries" (Barua and Barua 2021). Therefore, innovation is becoming an essential element of "the recovery post-COVID-19" for the banking sector. Innovation capability is needed for banks to overcome the risks (Hassan et al. 2020) because it is an outcome of collective value creation by businesses, banks, governments (Mazzucato and Dibb 2020). Examining factors that influence innovation capabilities in the banking sector is increasingly important post-COVID-19. However, there is still scant research in an emerging economy like Vietnam.

This study investigates the impact of capital budgeting, knowledge management, and business strategy on innovation capabilities in the banking sector. In addition, this study also examines the moderating role of a minimal work factor which is corporate governance. Except Alia et al. (2022), who studied the moderating role of corporate governance in financial institutions of emerging economies such as Palestine, very little attention has been placed on the role of corporate governance as the moderator in the relationship between various determinants and firm performance (Hamdan et al. 2017). There is no research on the moderating role of corporate governance in the relationship between three factors (capital budgeting, knowledge management, and business strategy) and innovation capabilities in the banking sector.

Vietnam is selected as an empirical context to investigate the banks' innovation capabilities post-COVID-19 because of two main reasons. First, Vietnam is an Asian developing country whose economy has been the transition with a more significant connection to the world economy and a larger role of innovation (Nguyen et al. 2019). McNulty et al. (2007) stated that the financial system and financial intermediation play a crucial role in the transitional economy. Second, Vietnam's banking sectors are not immune to negative effects post-COVID-19. A study using the Vietnam context is relevant for this study, as it provides a setting for the development of effective strategies for enhancing the innovation capabilities in Vietnam and other developing countries. Consequently, this study aims to fill the gap in the literature by examining the role of corporate governance in the impact of capital budgeting, knowledge management, and business strategy on innovation capabilities in the banking sector post-COVID-19. The paper has both theoretical and practical implications. First, this is the first research to shed light on the important role of corporate governance on banks' innovation capabilities. Second, the paper highlights the impact of knowledge management and business strategy on innovation capabilities. Third, this study proposes meaningful implications to private banks, policy-makers, managers, and governments in emerging economies.

2. Literature Review

2.1. Innovation Capabilities

In the literature review, innovation is the new application of a firm in their operational process, marketing activities, service quality (Manual 2005). Wong et al. (2013) suggested that innovation capabilities can be explored by new operating practice for obtaining the firm purpose. There are five categories in innovation capabilities which are physical product innovation, the effectiveness of service process, marketing, processes, administrative innovation (Migdadi 2020). The COVID-19 pandemic has caused many challenges to firms (Chi 2022). Therefore, firms need to innovate in their business after the COVID-19 pandemic. The current paper considers banks' innovation capabilities post the COVID-19 pandemic since their capabilities to adopt the new operating process, increase in quality of service after the difficulty period under the COVID-19 pandemic.

2.2. Corporate Governance

In the literature, corporate governance has been greatly studied in assessing innovation which can be formal or informal (Tachizawa and Wong 2015). Corporate governance can be formally considered as the organizational structure which includes a command structure, incentive system, standard operating procedures, and written dispute resolution procedures (Gallego-Álvarez and Pucheta-Martínez 2020), and is usually based on control management control (Gulati and Singh 1998). Informal corporate governance is defined as a structural arrangement to influence the behavior of organizational members based on social control and trust (Jia et al. 2019).

In the literature, Jensen and Meckling (1976) argued that a supervisory and consultative roles that attribute to management in terms of controlling and directing management activities improve company performance, including reducing agency costs. Policy-setting role of corporate governance in which directors influence corporate performance through policy setting (Khatib and Nour 2021). Furthermore, the COVID-19 crisis highlights the supervisory role of the board in mitigating the risk of uncertainty following the COVID-19 crisis. Chi (2021a) state that this pandemic brings higher external risks, prompting executives to restructure their funding, policies, and organizational design in light of long- and short-term emergencies. Therefore, post-COVID-19 corporate governance is essential as the current epidemic continues to disrupt all aspects of the company's operations (Khatib and Nour 2021).

The relationship between corporate governance and firm performance has widely drawn the attention of researchers, businesses, and policy-makers (Singh et al. 2010). Several studies also examined the mediating role and moderating role of corporate governance before and during the COVID-19 pandemic in the relationship between firm operation and their performance (García-Sánchez and García-Meca 2018; Gerged et al. 2021). However, there is no research investigating the moderating role of corporate governance, and firm innovation capabilities post the COVID-19 pandemic, especially in an emerging economy. Therefore, in the urgency of firm innovation post the COVID-19, this study examines the role of corporate governance in enhancing the relationship between capital budgeting, knowledge management, business strategy, and innovation capabilities in the banking sector of an emerging economy such as Vietnam.

2.3. Hypothesis Development

Capital budgeting(CB) is defined as "the evaluation and selection of long-term investments which is in line with the enterprise's objective of maximizing owner wealth" (Gitman 2007, p. 380). CB decisions are crucial to the operation of a business and not a trivial decision (Kwak et al. 2012) because budgeting capital aims at reasonably managing corporate finances to maximize the value of the company (Ermasova et al. 2021). Lazaridis (2004) suggests that a business that is able to develop a viable mechanism for capital budgeting efficiently can realize a better competitive advantage over its rivals in a competitive environment. Post the COVID-19 pandemic, capital budgeting of a particular firm has become more important in innovation capabilities.

Hatfield et al. (1998) initially demonstrated the consequences of CB decisions on a firm's performance and ability to innovate. They explained that firms that analyze their projects have a higher average share price than those that do not. Chittenden and Derregia

(2015) repeatedly assert that both corporate governance and capital budgeting are aimed at improving corporate innovation and overall organizational accountability to stakeholders". Therefore, focal budgeting and corporate governance have a relationship and influence each other (Zupic and Čater 2015). Otherwise, Andor et al. (2015) found that "capital budgeting in Central and Eastern Europe countries are influenced by multinational culture, executive ownership, code of ethics" and results in innovation. However, Rossi (2014), in his research about European countries (i.e., Italy, France, and Spain) showed that capital budgeting practices in different EU nations are influenced by corporate governance and lead to innovation in firms. Instead, Weiskirchner-Merten (2022) already demonstrated that good corporate governance leads to efficient financial management which boosts investors' expectation for better future performance which in turn boosts innovation. Ultimately, it leads to investors investing more in the institution after the COVID-19 pandemic. The investments are more aimed at maximizing the value of the company from the pandemic crisis and thus pushing the firm's innovation capabilities (Mendes-Da-Silva and Saito 2019; Biancone et al. 2022). From these findings, it can be suggested that since good corporate governance interacts with capital budgeting, this interaction confirms the innovation capabilities post the COVID-19 in the banking sector. The hypothesis is the following:

H1. *Corporate governance positively moderates the relationship between capital budgeting and innovation capabilities.*

According to Nahapiet and Ghoshal (1998), knowledge management is the total of actual and potential internal resources available through and derived from the network of relationships of a social unit. Knowledge management must be stored and transported throughout the organization. Chi et al. (2021) considers knowledge management to play an important role in innovation. With innovation and knowledge, knowledge management is about improving the responsiveness of enterprises (Chi 2021a). Ali and Ahmad (2006, p. 14) argue that "an important component of this future is for the Bank to fully grasp and apply knowledge management principles". While the central bank's primary goals remain unchanged, the new knowledge management strategies will focus on the Bank's policies and practices for managing knowledge as a key corporate asset.

Banks should focus on the combination of knowledge management and corporate governance to obtain a competitive advantage (Azmi and Maksum 2018; Nasrallah and Khoury 2022). Deliu (2020, p. 95) argued that "the COVID-19 outbreak raises corporate governance concerns and, consequently, may give rise to jeopardies and risks that should be taken into consideration by companies". From this perspective, the interaction between knowledge management and corporate governance support aims, objectives, and innovation process of a firm (Ng et al. 2015). Bhatti and Zaheer (2014) stated that knowledge management and corporate governance clearly locate and monitor the decision-making authority such that non-standardized establishment of board of directors and loosen supervisory board can be minimized. Thus, effective organizational knowledge transfer can be achieved through governance process as a means of pushing firms' innovation capabilities. Post the COVID-19 pandemic, corporate governance has a more important role in strengthening the effect of knowledge management on innovation capabilities in banking sector. It can be concluded that corporate governance has a moderating role in the relationship between knowledge management and innovation capabilities.

H2. *Corporate governance positively enhances the relationship between knowledge management and innovation capabilities.*

In the literature, Ormanidhi and Stringa (2008) argued that porter's models are very popular among business strategists and industrial economists due to their advantages of well-defined structure, feasibility, clarity, simplicity, and generality. Despite this popularity, the applicability of Porter's overall strategy can be questioned as over the past few decades, the global economy has transitioned from mechanized to digital age especially post the COVID-19 crisis, which has led to the pace and intensity of change in the business environment (Parnell 2006). According to Hajar (2015, p. 1), "the implementation of a business strategy that takes into account the fit between the competitive strategy and its internal processes will contribute to improved efficiency and outstanding performance". In this vein, business strategy in the banking sector is also considered the combination of competitive strategy and banks' internal process to enhance the banks' effectiveness. Post-COVID-19 pandemic, banks' business strategy is changing to adapt to market mobility.

Several studies have proposed the linkage between business strategy and firms' innovation, and the relationship between corporate governance and firms' innovation. However, there is no research examining the effect of corporate governance on the link between business strategy and firms' innovation capabilities in the post-COVID-19 pandemic. Hajar (2015) demonstrated a significantly positive link between business strategy and innovation in the airline industry. Recently, Cao et al. (2022) suggested that firm innovation is driven by business strategy. Several extant literature shows that business strategy has a huge role in the development and success of SMEs' innovation and growth (Latifah et al. 2020). In the past, Swamidass and Newell (1987) argued that banks which have presented strategies have achieved high performance and innovation. Similarly, business innovation was improved by implementing different strategies (Badri et al. 2000). Then, developing an effective business strategy leads to innovation and performance (Singh et al. 2010). When it comes to the banking sector, innovation is the key component of business strategy as it will solve operational issues, design new services and correlates with business policies (Bhaskaran 2006). Hence, efficiency of business strategies on different types of innovation is paramount as it will help banks creatively solve business problems and outperform competitor. Unfortunately, very few studies (i.e., Barako and Brown 2008; Goffetti et al. 2022) addressed the banking sector in emerging economies about the impact of corporate governance on business strategy, which all lead to increased banks' innovation capabilities. In the context of post-COVID-19 crisis, the interaction between corporate governance and business strategy will improve the banks' innovation capabilities. Therefore, the hypothesis is follows:

H3. *Corporate governance positively enhances the relationship between business strategy and innovation capabilities.*

Based on the above argument, the current paper proposes the interaction between corporate governance with each factor (capital budgeting, knowledge management, and business strategy) on innovation capabilities in banking sector in the context of post-COVID-19 pandemic (Figure 1).

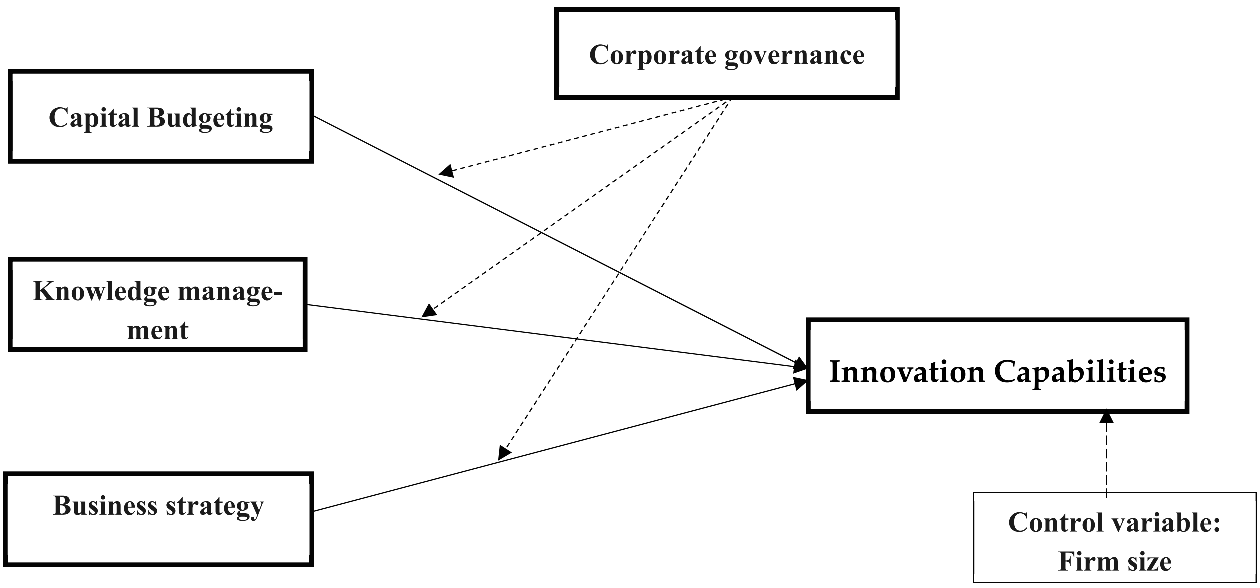

Figure 1. The proposed framework.

3. Methodology

3.1. Study Area

Due to the impact of the COVID-19 pandemic, Vietnam's economy in general and the financial and banking sectors, in particular, are not immune to negative effects. Several solutions have been proposed to overcome these negative effects. PWC (2020) shows that Vietnamese Central Bank incentives and government support for private banks and individuals have limited the damage to banks' balance sheets. However, resources for state-owned commercial banks (SBV) are still inadequate with their roles and responsibilities for implementing policies and improving financial capacity through increasing charter capital.

Some private banks in Vietnam are a very successful year for the banking industry when profits still grow very impressively despite the impact of the COVID-19 pandemic. To achieve growth figures during the pandemic, banks have diversified their revenue sources, reduced dependence on the interest income from lending activities, saved costs and increased non-interest income through cross-selling of insurance. Insurance, payment card. Notably, in the context of the prolonged pandemic, coupled with strict social distancing and contact restriction measures, banks have accelerated the application of digitalization to their operations to adapt to the current situation, as well as helping to add value to customers and competitive advantages in the market. This is also a year marking an important milestone in the digital transformation of Vietnam's banking industry post-COVID-19 pandemic (TTXVN 2022).

3.2. Measurement Scale

The 5-point-Likert-scale is employed to evaluate the level of capital budgeting, knowledge management, business strategy, corporate governance, and innovation capabilities. Capital budgeting has 04 items and is adjusted from Chen (1995). Knowledge management has four categories and is developed based on Chi (2021a). Business strategy has four sections and is adapted from Vickery et al. (1993), Pereira et al. (2022). Corporate government has four categories and has been confirmed by Black et al. (2006), Tachizawa and Wong (2015). Innovation capabilities have five items and is adjusted from Chi (2021a), Migdadi (2020) (Table 1).

Table 1. Measurement scale.

	Item Code	Item Description	Source
Capital Budgeting			
	BUD1	Discounted cash flow methods such as net present value and internal rate of return	Chen (1995)
	BUD2	Payback period	
	BUD3	Accounting rale of return	
	BUD4	Non-financial techniques	
Knowledge management			
	KM1	Employees understand the importance of knowledge for business success post-COVID-19 period	Chi (2021a)
	KM2	A high degree of participation in knowledge acquisition and transfer is expected post-COVID-19 period	
	KM3	Our bank encourages employees to explore and experiment post-COVID-19 period	
	KM4	Our bank focus on knowledge sharing as its benefits outweigh the costs post-COVID-19 period	
Business strategy			
	STR1	We are the technological leader in banking system	Vickery et al. (1993)
	STR2	We place high emphasis on our R&D activities post-COVID-19 period	
	STR3	We take technological risks post-COVID-19 period	
	STR4	We constantly develop our services post-COVID-19 period	

Table 1. *Cont.*

	Item Code	Item Description	Source
Corporate governance			
	GOV1	Official plan for innovation adoption post-COVID-19 period	Black et al. (2006), Tachizawa and Wong (2015)
	GOV2	Dedicated cross-functional team to execute innovation adoption post-COVID-19 period	
	GOV3	Structure of departments to support interaction in the adoption of innovation post-COVID-19 period	
	GOV4	Management actively participates in vision setting and strategy formulation for innovation post-COVID-19 period	
Innovation capabilities			
	INC1	Our banking system needs to have marketing innovation post-COVID-19 period	Chi (2021a) Migdadi (2020)
	INC2	Our banking system to have process innovation post-COVID-19 period	
	INC3	Our banking system needs services with outstanding quality post-COVID-19 period	
	INC 4	Our banking system adopts innovation in management post-COVID-19 period	
	INC 5	Our banking system needs to have new combinations of marketing, services, and information post-COVID-19 period	

3.3. Sample and Data Collection

Empirical data to test the proposed relationships were collected by directly interviewing bank managers through questionnaires in Vietnam. The questionnaire items were justified by expert interviews and a pilot test to ensure the validity of these items. During the pilot test, six experts were kindly invited to give feedback on the questions. The comments of ten professionals formed the basis for the revision of the structures. The participants in this study were randomly selected from 23 banks which are listed on the Vietnamese stock market. The questionnaire was translated from English to Vietnamese and then back again to English by two bilingual experts to guarantee translation quality. Ten research assistants were trained to interview bank managers face-to-face.

Initially, the researcher contacted the manager of each bank personally and delivered an information sheet about the study, identifying the need and significance of the research. If the bank manager agrees to participate, they provided a list of their full-time and part-time employees for data collection purposes. Questionnaires were distributed to approximately 276 participants who are bank managers, head of the department. By way of follow-up, authors visited each bank to explain the significance of the study and the survey procedures to all participants. The completed questionnaires were returned directly to authors by post or in person, without the managers' participation or direct knowledge of who participated. After all questionnaires are returned, the questionnaires that were incomplete or contained disengaged responses were discarded and only complete questionnaires were used for data analysis. This study follows proper ethical procedure by ensuring that all the answers of participants are kept confidential. In addition, all the questionnaires are anonymous.

The large-scale survey was launched from January to March 2020. The total number of valid responses was 211, or a response rate of 76.4%. Regarding respondents' information, the survey was completed exclusively by first-level managers (74.4%), middle managers (23.1%), and top-level managers (4.5%). Regarding the size of the firm, the largest proportion is firms having 500 to 1000 employees (25%) and the largest revenue in 2020 is above USD 1 billion (33.6%).

3.4. Data Analysis Method

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), Structural Equation Modelling (SEM) using SPSS AMOS 22.0 were used to test the research validity. EFA is used to decipher the underlying structure of the data that underpins survey responses (Hair et al. 2006). In CFA, hypothesized models reflect an approximation to reality (Chi 2021b). To examine the proposed hypotheses about the interaction effect between three proposed factors and corporate governance, this research follows the guidance by multivariate analysis literature. Specifically, approach was used for hierarchical regression analysis, together with the multiple indicator approach suggested by Kenny and Judd (1984).

4. Results

4.1. Measurement Model

The convergent reliability of all factors evaluated in the measurement model is reached with factor loading, average variance extracted values (AVE) of more than 0.5 (Hair et al. 2006), and Cronbach's alpha (CA), composite reliability (CR) values of more than 0.7 (Fornell and Larcker 1981). Table 2 shows the AVE of the constructs, as well as the FL of items and descriptive statistics covering mean and standard deviation (SD) (Table 3).

Table 2. The reliability and convergent validity.

Constructs/Variables	Standard Loadings	Cronbach's Alpha	Composite Reliability	AVE
Capital Budgeting			0.845	0.55
BUD1	0.777			
BUD2	0.798			
BUD3	0.690			
BUD4	0.783			
Knowledge management			0.878	0.59
KM1	0.820			
KM2	0.795			
KM3	0.763			
KM4	0.756			
Business strategy			0.873	0.56
STR1	0.716			
STR2	0.779			
STR3	0.726			
STR4	0.815			
Corporate governance			0.866	0.60
GOV1	0.850			
GOV2	0.744			
GOV3	0.713			
GOV4	0.826			
Innovation capabilities			0.836	0.61
INC1	0.877			
INC2	0.729			
INC3	0.776			
INC4	0.705			
INC5	0.712			

Table 3. Discriminant validity.

Constructs	BUD	KM	STR	GOV	INC
BUD	**0.742**				
KM	0.630	**0.768**			
STRr	0.507	0.598	**0.748**		
GOV	0.668	0.573	0.634	**0.775**	
INC	0.541	0.657	0.660	0.563	**0.781**

4.2. Hypothesis Testing Result

The results from the first stage of hierarchical regression analysis presented in Model 1 of Table 4 show that except for capital budgeting, the other two factors (knowledge management and business strategy) are significantly and positively associated with innovation capabilities. The results also indicate the significant positive relationship between corporate governance and innovation capabilities.

Table 4. Results of hierarchical regression analysis.

Relationship with Ecotourism Intention	First Stage Model 1			Second Stage Model 2			Hypothesis Testing Results
	β	Sig	t	β	Sig	t	
Capital Budgeting	0.077	0.064	1.848	0.082	0.075	1.974	
Knowledge management	0.196	***	3.896	0.171	**	3.398	
Business strategy	0.256	***	4.967	0.214	***	4.134	
Corporate governance × Capital Budgeting				0.103	0.115	1.644	H1: Not accepted
Corporate governance x Knowledge management				0.147	*	1.783	H2: Accepted
Corporate governance × Business strategy				0.138	**	2.147	H3: Accepted
	F-value = 86.480 R-squared (R^2) = 0.498, p = 0.000			*F-value = 62.948, R-squared (R^2) = 0.597, p = 0.000*			

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, VIF < 2 in all cases, β = standardized β, F-value is the mean Square Regression divided by the Mean Square Residual.

Table 4 (Model 2) shows the second stage results when all interaction terms between each dimension of corporate governance and innovation capabilities are simultaneously examined. The coefficients of interaction terms between each factor, except capital budgeting and the corporate governance, are significant and positive, indicating the significance of interaction effects of these factors on innovation capabilities.

In addition to verifying the significance of interaction terms, measuring the change of R-square value between original main effects (the first stage) and interaction effect (the second stage) is an additional method to examine the interaction effect using the hierarchical regression analysis. Table 4 shows that the F-value is also statistically significant (63.949), and the R square value increases after adding interaction terms between the corporate governance and each proposed factor. In conclusion, all the results show that except for the link between capital budgeting and innovation capabilities, corporate governance significantly strengthens the relationships between two proposed factors (i.e., knowledge management and business strategy) and innovation capabilities. Therefore, H2 and H3 are accepted, except for H1.

5. Discussion

This study proposed the framework for understanding the role of four proposed factors (corporate governance, capital budgeting, knowledge management, and business strategy) on innovation capabilities in the banking sector in an emerging economy post-COVID-19. The significant path relationships show that knowledge management and business strategy positively impact innovation capabilities, and corporate governance has a moderating role in enhancing the association between three proposed factors (capital budgeting, knowledge management, and business strategy) and innovation capabilities. Based on the findings, this paper has some discussion as follows:

The research's findings reveal that business strategy has the highest impact on innovation capabilities in the banking sector post-COVID-19. A primary reason is that banks should focus on their strategies because the banking system in developing countries such as Vietnam has not yet reached high standard as in developed countries such as the United Kingdom, or the United States. This finding is in accordance with the research of Ng et al. (2015) who confirmed the importance of business strategy on banks' innovation capabilities. Second, knowledge management is the second influencer of innovation capabilities in the context of post-COVID-19. This finding responds to the call of Cao et al. (2022) in enhancing innovation capabilities through having business strategies.

Unfortunately, capital budgeting is non-significant with innovation capabilities in the banking sector. This finding is somewhat different from Andor et al. (2015), who found that "capital budgeting in Central and Eastern Europe countries are influenced by multinational culture, executive ownership, code of ethics" and results in innovation. In an emerging economy such as Vietnam, the capital budgeting of each bank will be supported by the government, State Bank. In Vietnam, one of the notable tasks mentioned by the State Bank is the increase of capital budgeting for commercial banks post-COVID-19.

Finally, corporate governance in this study is presented as the moderator in strengthening the linkages between two factors (knowledge management and business strategy) and innovation capabilities. This result is somewhat similar to the findings of Bhatti and Zaheer (2014), who revealed the role of corporate governance. Similarly, Goffetti et al. (2022) suggested the role of corporate governance in monitoring banks' innovation capabilities in the context of post-COVID-19. However, there is no research examining the role of corporate governance in the linkages between each proposed factor and innovation capabilities in the banking sector. Therefore, these new findings of this paper could not be compared to and confirmed from other studies, but might help future research scrutinize this issue.

These findings filled those gaps in relating to the moderator (corporate governance) on the linkage between knowledge management and business strategy on innovation capabilities. In conclusion, the results clearly discovered that bank managers need to adopt and implement good governance disclosure to push their innovation capabilities.

6. Theoretical and Practical Implications

This study empirically demonstrates the new thinking on corporate governance in the banking sector post-COVID-19. First, corporate governance plays a moderating role in enhancing the link between knowledge management and innovation capabilities in the banking sector. This study highlights that those responsible for governance in a bank must first identify the most critical information and relevant knowledge that the bank needs in its innovation process post-COVID-19. This will provide an understanding of the challenges, dangers, and risks associated with knowledge gaps and, therefore, an assessment of the knowledge management behaviors of the entire bank toward their innovation is required. Second, corporate governance moderates the association between business strategy and innovation capabilities of banks. The strategic planner of a bank is responsible for checking and evaluating the implementation of the strategy in each period to make adjustments to their innovation process in the context of post-COVID-19. Responding to the COVID-19 pandemic, its consequences will be one of the biggest challenges for the banking system in this era. The management team will be primarily responsible for risk management for the business. Third, this study highlights the highest impact of business strategy on banks' innovation capabilities. As banks move into the next phase of the COVID-19 response, banks need to come up with innovative solutions to ensure sustainable development.

Moreover, the paper's findings also contribute some significant implications for practices. First, top management in a bank should identify existing gaps in the availability of the knowledge needed to support key business processes. All of these opportunities should be prioritized based on business need and subsequently, business cases and pilot projects should be proposed to the relevant governing body for approval. Bank managers should connect employees to information and experts faster (or even in less time), store and facilitate the sharing of important knowledge, allowing faster searching, finding and applying information. Second, the business strategy of banking system post-COVID-19 may focus on customer orientation. Banks are also active in digital transformation to increase convenience for their customers. For example, banks use technology to enhance their innovation capabilities. The strategic adoption of technology has facilitated the bank's transformation into a global bank, providing timely and efficient access to a wide range of financial services. In the context of the complicated developments of the COVID-19 epidemic on a global scale, negatively affecting the world economy and Vietnam, the banking industry is accelerating the process of digital transformation to be ready to "turn the risk of death", ready to seize the opportunity for rapid growth in the post-COVID-19 period. Finally, government and policy-makers accelerate the completion of the national database on population, allowing open connection sharing with service industries such as banking, telecommunications, insurance. Amending or replacing the Law relating to the banking system or Electronic Transactions in 2005 is needed to create a synchronous legal basis for promoting electronic transactions. Government and policy-makers in an emerging economy develop regulations on protection of user data, digital identity, complete regulations, transaction security, information security; raising people's awareness and understanding of digital applications, focusing on training human resources to adapt to digital transformation.

Finally, this study suffers from some limitations, which can be seen as future research. The first limitation is on the factors (capital budgeting, knowledge management, and business strategy) affecting innovation capabilities in the banking sector because there are other factors which may affect banks' innovation capabilities. Future research may expand or find more determinants in studying innovation process in the context of post-COVID-19. The second limitation is on the analytical method since this study employed the multivariate analysis literature of Baron and Kenny's (1986) and Kenny and Judd (1984). Further research may conduct SPSS Process 22.0 to analyze the moderating role of corporate governance. Finally, besides the factors proposed in this paper, many other control factors such as uncertainty market, government regulation also influence the framework. Future studies should consider the effects of these control variables on studying banks' innovation capabilities.

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References

Akhtaruzzaman, Sabri Boubaker, and Zaghum Umar. 2022. COVID–19 media coverage and ESG leader indices. *Finance Research Letters* 45: 102170. [CrossRef]

Aldasoro, Iñaki, Jon Frost, Leonardo Gambacorta, and David Whyte. 2021. *COVID-19 and Cyber Risk in the Financial Sector*. No. 37. Basel: Bank for International Settlements.

Alia, Muiz Abu, Islam Abdeljawad, Sara Emad Jallad, and Mamunur Rashid. 2022. Voluntary disclosure-cost of equity nexus and the moderating role of corporate governance: Evidence from an extremely politically unstable context. *International Journal of Islamic and Middle Eastern Finance and Management*, ahead-of-print. [CrossRef]

Ali, Hafizi Muhamad, and Nor Hayati Ahmad. 2006. Knowledge management in Malaysian banks: A new paradigm. *Journal of Knowledge Management Practice* 7: 1–13.

Andor, Gyorgy, Sunil Mohanty, and Tamas Toth. 2015. Capital budgeting practices: A survey of Central and Eastern European firms. *Emerging Markets Review* 23: 148–72. [CrossRef]

Azmi, Misral, and Aldin Maksum. 2018. Knowledge Management, the Role of Strategic Partners, Good Corporate Governance and Their Impact on Organizational Performance. *Prosiding CELSciTech* 3: 20–26.

Badri, Masood, Donald Davis, and Donna Davis. 2000. Operations strategy, environmental uncertainty and performance: A path analytic model of industries in developing countries. *Omega* 28: 155–73. [CrossRef]

Barako, Dulacha, and Alistair Brown. 2008. Corporate social reporting and board representation: Evidence from the Kenyan banking sector. *Journal of Management and Governance* 12: 309–24. [CrossRef]

Baron, Reuben, and David Kenny. 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* 51: 1173. [CrossRef]

Barua, Bipasha, and Suborna Barua. 2021. COVID-19 implications for banks: Evidence from an emerging economy. *SN Business and Economics* 1: 1–28. [CrossRef]
Bascand, Geoff. 2020. *Banking the Economy in Post-COVID Aotearoa. A Speech Delivered to Banking Industry Representatives in Wellington*. Wellington: Reserve Bank of New Zealand, pp. 56–72.
Bhaskaran, Suku. 2006. Incremental innovation and business performance: Small and medium-size food enterprises in a concentrated industry environment. *Journal of Small Business Management* 44: 64–80. [CrossRef]
Bhatti, Waheed Akbar, and Arshad Zaheer. 2014. The role of intellectual capital in creating and adding value to organizational performance: A conceptual analysis. *Electronic Journal of Knowledge Management* 12: 185–92.
Biancone, Paolo Pietro, Valerio Brescia, Federico Lanzalonga, and Gazi Mahabubul Alam. 2022. Using bibliometric analysis to map innovative business models for vertical farm entrepreneurs. *British Food Journal* 124: 2239–61. [CrossRef]
Black, Benard, Inesa Love, and Andrel Rachinsky. 2006. Corporate governance indices and firms' market values: Time series evidence from Russia. *Emerging Markets Review* 7: 361–73. [CrossRef]
Boubaker, Sabri, Zhenya Liu, and Yaosong Zhan. 2022. Customer relationships, corporate social responsibility, and stock price reaction: Lessons from China during health crisis times. *Finance Research Letters*, ahead-of-print. [CrossRef]
Cao, Zhangfan, Steven Xianglong Chen, and Edward Lee. 2022. Does business strategy influence interfirm financing? Evidence from trade credit. *Journal of Business Research* 141: 495–511. [CrossRef]
Chen, Shimin. 1995. An empirical examination of capital budgeting techniques: Impact of investment types and firm characteristics. *The Engineering Economist* 40: 145–70. [CrossRef]
Chi, Nguyen Thi Khanh. 2021a. Innovation capability: The impact of e-CRM and COVID-19 risk perception. *Technology in Society* 67: 101725. [CrossRef]
Chi, Nguyen Thi Khanh. 2021b. Understanding the effects of eco-label, eco-brand, and social media on green consumption intention in ecotourism destinations. *Journal of Cleaner Production* 321: 128995. [CrossRef]
Chi, Nguyen Thi Khanh. 2022. Environmentally responsible behaviour in outdoor recreation: The moderating impact of COVID-19 related risk perception. *Journal of Tourism Futures*, ahead-of-print. [CrossRef]
Chi, Nguyen Thi Khanh, Le Thai Phong, and Kien Dinh Cao. 2021. The impact of organizational factors on E-CRM success implementation. *VINE Journal of Information and Knowledge Management Systems*, ahead-of-print.
Chittenden, Francis, and Mohsen Derregia. 2015. Uncertainty, irreversibility and the use of 'rules of thumb'in capital budgeting. *The British Accounting Review* 47: 225–36. [CrossRef]
Çolak, Gonui, and Özde Öztekin. 2021. The impact of COVID-19 pandemic on bank lending around the world. *Journal of Banking and Finance* 133: 106207. [CrossRef]
Deliu, Delia. 2020. The Intertwining between Corporate Governance and Knowledge Management in the Time of COVID-19–A Framework. *Journal of Emerging Trends in Marketing and Management* 1: 93–110.
Demirgüç-Kunt, Asli, Alvaro Pedraza, and Claudia Ruiz-Ortega. 2021. Banking sector performance during the COVID-19 crisis. *Journal of Banking and Finance* 133: 106305. [CrossRef] [PubMed]
Ermasova, Natalia, Tatyana Guzman, and Erica Ceka. 2021. Legacy effect of soviet budgeting system on public capital budgeting: Cases of Russia, Moldova, and Uzbekistan. *International Journal of Public Administration* 44: 1090–102. [CrossRef]
Fornell, Claes, and David Larcker. 1981. *Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics*. London: American Marketing Association.
Gallego-Álvarez, Isabel, and Maria Consuelo Pucheta-Martínez. 2020. Corporate social responsibility reporting and corporate governance mechanisms: An international outlook from emerging countries. *Business Strategy and Development* 3: 77–97. [CrossRef]
García-Sánchez, Isabel-Maria, and Emma García-Meca. 2018. Do talented managers invest more efficiently? The moderating role of corporate governance mechanisms. *Corporate Governance: An International Review* 26: 238–54. [CrossRef]
Gerged, Ali meftah, Khaldoon Albitar, and Lara Al-Haddad. 2021. Corporate environmental disclosure and earnings management—The moderating role of corporate governance structures. *International Journal of Finance and Economics*, ahead-of-print. [CrossRef]
Gitman, Lawrece. 2007. *Principles of Managerial Finance*, 11th ed. London: Pearson International.
Goffetti, Giuia, Daniel Böckin, Henrikke Baumann, Tillman Anne-Marie, and Thomas Zobel. 2022. Towards sustainable business models with a novel life cycle assessment method. *Business Strategy and the Environment*, ahead-of-print. [CrossRef]
Gulati, Ranjay, and Harbir Singh. 1998. The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliances. *Administrative Science Quarterly* 54: 781–814. [CrossRef]
Hair, Elizabeth, Tamara Halle, Elizabeth Terry-Humen, Bridget Lavelle, and Julia Calkins. 2006. Children's school readiness in the ECLS-K: Predictions to academic, health, and social outcomes in first grade. *Early Childhood Research Quarterly* 21: 431–54. [CrossRef]
Hajar, Ibnu. 2015. The effect of business strategy on innovation and firm performance in the small industrial sector. *The International Journal of Engineering and Science* 4: 1–9.
Hamdan, Allam Mohammed, Amina Mohammed Buallay, and Bahaaeddin Ahmed Alareeni. 2017. The moderating role of corporate governance on the relationship between intellectual capital efficiency and firm's performance: Evidence from Saudi Arabia. *International Journal of Learning and Intellectual Capital* 14: 295–318. [CrossRef]

Hassan, Kabir, Mustafa Raza Rabbani, and Mahmood Asad Ali. 2020. Challenges for the Islamic Finance and banking in post COVID era and the role of Fintech. *Journal of Economic Cooperation and Development* 41: 93–116.

Hatfield, Patricia, Philip Horvath, and Allen Webster. 1998. Financial criteria, capital budgeting techniques, risk analysis and manufacturing firm performance. Paper presented at the Annual Meeting of the Multinational Finance Society, Helsinki, Finland, June 24–27, pp. 24–27.

IMF. 2020. The IMF's Rapid Financing Instrument (RFI). April 9. Available online: https://www.imf.org/en/About/Factsheets/Sheets/2016/08/02/19/55/Rapid-Financing-Instrument (accessed on 10 April 2022).

Jensen, Michael, and William Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3: 305–60. [CrossRef]

Jia, Nan, Kenneth Huang, and Cyndi Man Zhang. 2019. Public governance, corporate governance, and firm innovation: An examination of state-owned enterprises. *Academy of Management Journal* 62: 220–47. [CrossRef]

Kenny, David, and Charles Judd. 1984. Estimating the nonlinear and interactive effects of latent variables. *Psychological Bulletin* 96: 201. [CrossRef]

Khatib, Saleh, and Abdul-Naer Ibrahim Nour. 2021. The impact of corporate governance on firm performance during the COVID-19 pandemic: Evidence from Malaysia. *Journal of Asian Finance, Economics and Business* 8: 943–52.

Kwak, Wikil, Yong Shi, and Gang Kou. 2012. Bankruptcy prediction for Korean firms after the 1997 financial crisis: Using a multiple criteria linear programming data mining approach. *Review of Quantitative Finance and Accounting* 38: 441–53. [CrossRef]

Latifah, Lyna, Doddy Setiawan, Anni Aryani, and Rahmawati Rahmawati. 2020. Business strategy—MSMEs' performance relationship: Innovation and accounting information system as mediators. *Journal of Small Business and Enterprise Development* 28: 1–21. [CrossRef]

Lazaridis, Ioannis. 2004. Capital budgeting practices: A survey in the firms in Cyprus. *Journal of Small Business Management* 42: 427–33. [CrossRef]

Manual, Oslo. 2005. The measurement of scientific and technological activities. *Proposed Guidelines for Collecting an Interpreting Technological Innovation Data* 30: 162.

Mazur, Mieszko, Man Dang, and Miguel Vega. 2021. COVID-19 and the march 2020 stock market crash. Evidence from S&P1500. *Finance Research Letters* 38: 101690. [PubMed]

Mazzucato, Mariana, and George Dibb. 2020. Innovation policy and industrial strategy for post-Covid economic recovery. In *UCL Institute for Innovation and Public Purpose, Policy Brief series (IIPP PB 10)*. London: UCL Institute for Innovation and Public Purpose.

McNulty, James, Joel Harper, and Anita Pennathur. 2007. Financial intermediation and the rule of law in the transitional economies of Central and Eastern Europe. *The Quarterly Review of Economics and Finance* 47: 55–68. [CrossRef]

Mendes-Da-Silva, Wesley, and Richard Saito. 2019. Stock Exchange Listing and Capital Budgeting Practices. In *Individual Behaviors and Technologies for Financial Innovations*. Cham: Springer, pp. 363–83.

Migdadi, Mahmoud. 2020. Knowledge management, customer relationship management and innovation capabilities. *Journal of Business and Industrial Marketing* 36: 111–24. [CrossRef]

Nahapiet, Janine, and Sumantra Ghoshal. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review* 23: 242–66. [CrossRef]

Nasrallah, Nohade, and El Khoury. 2022. Is corporate governance a good predictor of SMEs financial performance? Evidence from developing countries (the case of Lebanon). *Journal of Sustainable Finance and Investment* 12: 13–43. [CrossRef]

Ng, Peggy Mei Lan, Man Fung Lo, and Ellesmere Choy. 2015. Improving China's Corporate Governance Within the Big Data era: Integration of Knowledge Management and Data Governance. Paper presented at the International Conference on Intellectual Capital and Knowledge Management and Organisational Learning, Academic Conferences International Limited, Bangkok, Thailand, November 5–6.

Nguyen, Thanh Trung, Thanh Tung Nguyen, Viet Ngu Hoang, Clevo Wilson, and Shunsuke Managi. 2019. Energy transition, poverty and inequality in Vietnam. *Energy Policy* 132: 536–48. [CrossRef]

Ormanidhi, Orges, and Omer Stringa. 2008. Porter's model of generic competitive strategies. *Business Economics* 43: 55–64.

Parnell, John. 2006. Generic strategies after two decades: A reconceptualization of competitive strategy. *Management Decisio* 32: 1–19. [CrossRef]

Pereira, Carla Santos, Bruno Veloso, Natercia Durão, and Frenando Moreira. 2022. The influence of technological innovations on international business strategy before and during COVID-19 pandemic. *Procedia Computer Science* 196: 44–51. [CrossRef] [PubMed]

PWC. 2020. Nen kinh tê hau Covid: Cac xu huong chinh nganh dich vu tai chinh. Available online: https://www.pwc.com/vn/vn/media/press-release/201009-pr-fs-report-vn.pdf (accessed on 3 May 2022).

Rabbani, Mustafa Raza, Abu Bashar, Nishad Nawaz, Sitara Karim, Mahmood Asad Ali, Habeeb Ur Rahiman, and Md Shabbir Alam. 2021. Exploring the role of Islamic fintech in combating the aftershocks of COVID-19: The open social innovation of the Islamic financial system. *Journal of Open Innovation: Technology, Market, and Complexity* 7: 136. [CrossRef]

Roper, Stephen, and Joanne Turner. 2020. R&D and innovation after COVID-19: What can we expect? A review of prior research and data trends after the great financial crisis. *International Small Business Journal* 38: 504–14.

Rossi, Matteo. 2014. Capital budgeting in Europe: Confronting theory with practice. *International Journal of Managerial and Financial Accounting* 6: 341–56. [CrossRef]

Singh, Rajesh, Suresh Garg, and S. G. Deshmukh. 2010. The competitiveness of SMEs in a globalized economy. *Management Research Review* 33: 54. [CrossRef]

Swamidass, Paul, and William Newell. 1987. Manufacturing strategy, environmental uncertainty and performance: A path analytic model. *Management Science* 33: 509–24. [CrossRef]

Tachizawa, Elcio, and Chee Yew Wong. 2015. The performance of green supply chain management governance mechanisms: A supply network and complexity perspective. *Journal of Supply Chain Management* 51: 18–32. [CrossRef]

TTXVN. 2022. So hoa giup cac ngan hang giam dau mua COVID-19. Available online: https://ncov.vnanet.vn/tin-tuc/so-hoa-giup-cac-ngan-hang-giam-dau-mua-COVID-19/4c77558a-a51d-413d-80c8-8f2031594c7a (accessed on 2 February 2022).

Vickery, Shawnee, Cornelia Droge, and Robett Markland. 1993. Production competence and business strategy: Do they affect business performance? *Decision Sciences* 24: 435–56. [CrossRef]

Weiskirchner-Merten, Katrin. 2022. Capital budgeting and managerial empire building. *Accounting and Business Research*, ahead-of-print. [CrossRef]

Wong, Christina, Chee Yew Wong, and Sakun Boon-Itt. 2013. The combined effects of internal and external supply chain integration on product innovation. *International Journal of Production Economics* 146: 566–74. [CrossRef]

Zupic, Iva, and Tomaz Čater. 2015. Bibliometric methods in management and organization. *Organizational Research Methods* 18: 429–72. [CrossRef]