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The mediator role of knowledge management and innovative capability affecting firm performance among commercial banks in Thailand

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ABSTRACT

Firm performance is the ultimate concern among stakeholders. The research objectives are two-fold—to determine the mediator role of knowledge management and innovative capability in driving performance among commercial banks in Thailand, and to provide recommendations and contributions based on the relevant findings. The sample comprising 600 bank officers from the six biggest commercial banks in Thailand was selected using the multi-stage sampling method. A questionnaire was used as the data collection tool and the data were analyzed via structural equation modeling (SEM). The empirically collected data generates a fit conceptual model ($\chi 2/df = 1.179$, $p = 0.116$, GFI = 0.976, AGF = 0.951, CFI = 0.978, NFI = 0.970, and RMSEA = 0.011). In the findings, organizational structure, organizational strategy, intellectual capital, innovative capability, and knowledge management have a direct influence on firm performance ($p < 0.05$). Knowledge management and innovative capability were found to be mediators in the paths of organizational structure, organizational culture, intellectual capital, and firm performance ($p < 0.05$).

Contribution/Originality: The two main contributions are firstly on theoretical extension in which moderating effect found resulting the empirical data, thus playing secondly on practitioners, the role among given relevant dimensions could be optionally applicable on the preferable alternatives to generate the firm performance.

1. RESEARCH BACKGROUND

In general, many firms encounter complex and turbulent situations in the business environment due to rising competition, and maintaining competitiveness is quite difficult (Doyle, 1998). The components of business success in the face of competition are cost, quality, delivery performance and flexibility (Santos, 2000). Although the processes and operations of manufacturing and service businesses might be different, all businesses have the same goals of being competitive and achieving financial profitability.

Management in both domestic and international business industries seek innovations that can be adapted to minimize the negative impact of change (Lertpachin, Wingwon, & Noithonglek, 2013). A learning environment in organizations can motivate personnel to conduct innovations in a productive aspect, working aspect, and managing aspect (Arh, Borka, & Vlado, 2012). Knowledge management is a contemporary management concept that emphasizes the value of human resources. In this era of a knowledge-based economy, everyone within an organization must work as a team to drive organizational performance (Butbamrung, 2012).

Globalization strengthens holistic transformation, enhancing dynamic business environments. It has a major impact on many business industries (Horvat, Rimac-Drlje, & Žagar, 2013). Innovative organizations maximize the skills and creativity of their employees, which can be a vital part of responding to changes in the economic system and business environment. Knowledge management and innovative capability are important to enhance organizational performance. In general, the generic competitive components that drive the performance of a firm comprise organizational structure, organizational culture, organizational strategy, and intellectual capital.

Commercial banks are businesses offering financial services and are the center of exchanges in the monetary system. They are directly impacted by dynamic and turbulent changes. The major roles of banks are funding and resourcing capital investment circulating in a country's economic system. In the past, the roles of banks were to collect deposits from customers and release loans to individuals, households and the business sector so that interest could be collected at the central bank's permission rate to declare revenue. They also conduct other kinds of funding to earn more income and reduce any financial risks. The other role of banks involves import and export activities. They serve as intermediaries that guarantee and confirm payment and transfer money between buyers and sellers.

Since financial technologies have evolved, there are a lot of challenges due to the changes that aim to provide better financial services to customers. For example, modern financial services allow customers to access their accounts and make their own transactions through smart telecommunication appliances. If any bank services are of poor quality, such as being too time-consuming, too complicated, or if the bank lacks new technological equipment, or the customer service is poor, it could adversely affect the bank's performance and directly impact the overall economic system of the country. Lastly, one bank's collapse could have a domino effect on the international banking system.

In previous studies, performance can be derived from many criteria depending on its philosophy and discipline. Performance assessment is traditionally examined through the three main dimensions: economic contribution, efficiency, and effectiveness. North, Probst, and Romhardt (1998) adapted the balanced scorecard method to evaluate the performance of knowledge management in organizations. The study uses financial, customer, internal operation, and organizational learning aspects as indicators of performance evaluation.

In the conclusion, commercial banks face dynamic changes driven by technology development and globalization. Management within an organization by considering the assets or any potential resources needs to be investigated.

2. LITERATURE REVIEW AND HYPOTHESIS FORMATION

The factors that impact the effectiveness of knowledge management within an organization comprise organizational structure (Wei & Miraglia, 2017), organizational culture (Wzhen, Yang, & Mclean, 2010), and a firm's strategy (Tarhini, Obeidat, Masa'deh, & Aqqad, 2017). Intellectual capital (Sayed & Pourmohammadi, 2014) is a registered and right-protected asset of any organization. Components of intellectual capital are represented in human resource, structure, and relationships among workers (Cabrita, da Silva, Rodrigues, & Dueñas, 2017; Rafieepour, Masjedi, & Akhavan, 2015; Rashed, 2016; Shahpasand, Savari, & Sarani, 2013). In fact, Budiarti (2017) found that intellectual capital had a positive relationship with knowledge management. Successful management of intellectual capital is related to effective operations in knowledge management (Hsu & Sabherwal, 2011), and intellectual capital is a vital part of knowledge management (Wang, Wang, Cao, & Ye, 2016).

Interestingly, many studies have shown relationships among intellectual capital, knowledge management, firm innovation, and firm performance. In one study, intellectual capital was found to influence knowledge management within organizations (Wzhen et al., 2010). Camelo-Ordaz, Garcia-Cruz, Sousa-Ginel, and Valle-Cabrera (2011) mentioned that knowledge management capability had significant role in improving a firm's performance. Mardani, Nikoosokhan, Moradi, and Doustar (2018) showed that activities in knowledge management both directly and indirectly impact firm performance and firm innovation. Additionally, the level and quality of innovation in conducting and implementing knowledge have been shown to affect firm performance. Castro (2015) stated that knowledge management influences innovation. Tarhini et al. (2017) addressed the mediator role of knowledge

management between intellectual capital and firm innovation. Intellectual capital was found to have an influence on firm innovation (Atalay, Anafarta, & Sarvan, 2013). Innovation influences firm performance (Tarhini et al., 2017). From the literature review, plenty of research has investigated the relationship between intellectual capital and the performance of organizations (see more in (Agostini, Nosella, & Filippini, 2017; Alfraih, 2018; Bontis, Ciambotti, Palazzi, & Sgro, 2018; Cabrilo & Dahms, 2018; Hamdan, 2018; Nadeem, Gan, & Nguyen, 2018)).

To conclude, commercial banks have a crucial role in controlling financial activities and keeping the economic system of the country operating continuously and smoothly through the linked stakeholders. Therefore, the management teams of commercial banks must focus on dynamic changes and the fast and fluctuating transformations in related technology in order to implement appropriate strategies and regulations to sustain a competitive advantage in the domestic and oversea markets. Importantly, non-banking businesses are becoming powerful competitors in financial service transactions and activities.

Generally, improvements have only been made in one division of a commercial bank or a part of banking operations rather than across the whole business. Therefore, having an implementation process that drives the performance of individual functions does not work successfully for all functions of the bank and doesn't lead to an effective business-wise learning experience. The notion of becoming a learning organization is widely believed to serve this goal. In brief, it is essential to study the relevant variables that affect firm performance, such as organizational structure, organizational strategy, intellectual capital, innovative capability, and knowledge management. Moreover, the role of knowledge management as a mediator represents the necessity of the present research.

This research aims to determine the mediator role of the competitive factors on firm performance among commercial banks in Thailand. Following the findings under the research objectives, it is recommended that banks or other service businesses should establish competitive guidelines.

2.1. Research Hypotheses

The following hypothesis are proposed based on the research topic:

H1: By the mediator role of knowledge management, organizational structure has an indirect influence on firm performance.

H2: By the mediator role of knowledge management, organizational culture has an indirect influence on firm performance.

H3: By the mediator role of knowledge management, organizational strategy has an indirect influence on firm performance.

H4: By the mediator role of knowledge management, intellectual capital has an influence on firm performance.

H5: By the mediator roles of knowledge management and innovative capability, organizational structure has an indirect influence on firm performance.

H6: By the mediator roles of knowledge management and innovative capability, organizational culture has an indirect influence on firm performance.

H7: By the mediator roles of knowledge management and innovative capability, organizational strategy has an indirect influence on firm performance.

H8: Through innovative capability, intellectual capital has an influence on firm performance.

H9: By the mediator roles of knowledge management and innovative capability, intellectual capital has an influence on firm performance.

H10: By the mediator role of knowledge management, intellectual capital has an influence on innovational capability.

H11: By the mediator role of innovative capability, knowledge management has an influence on firm performance.

3. RESEARCH METHODOLOGY

Population: The population of this research comprises 6,229 commercial bank branches that are under the supervision of the Bank of Thailand based on the information in the official register database. These are classified under the six biggest commercial banks with proportions as follows: Bangkok Bank (20.45%), Krung Thai Bank

(19.47%), TMBThanachart Bank (16.05%), Kasikorn Bank (15.93%), Siam Commercial Bank (15.59%), and Bank of Ayudhya (12.51%).

Sample: The sample size was defined by the rule of thumb (Hair, 2010; Schumacker & Lomax, 2010). Using the structural equation model (SEM) technique, 60 parameters were determined from the regression coefficients, variances, and covariance. The sample size was determined by the number of parameters multiplied by 10. Therefore, the minimum sample size is 60 x 10 = 600. To account for the possibility of incomplete questionnaires being returned, a total of 750 questionnaires were distributed.

Sampling Method: The multi-stage random sampling method was employed to select the target sample through the six biggest commercial banks in Thailand.

First, five geographical regions were selected, namely Bangkok and the Northern, Central, Northeastern, and Southern regions. Second, a provincial area was later chosen based on two criteria—the area has branches of all six biggest commercial banks and have the highest number of branches within the region. In this step, the selected provinces of each region were addressed, namely Bangkok, Chiang Mai (Northern region), Chonburi (Central region), Khon Kaen (Northeastern region), and Nakhon Si Thammarat (Southern region). Third, the geographical area of Muang District was selected similarly for all regions based on the above two criteria. Last, respondents were selected based on their position, job responsibility and working period. It was agreed between the researchers and the official branches to distribute a questionnaire.

4. RESEARCH RESULTS

4.1. Data Preparation

Response Rate: Out of the 750 questionnaires distributed, a total of 645 were returned, which gave a response rate of 86%. Based on the suggestion made by Baruch (1999), the minimum acceptable response rate is 70%; therefore, the present study can proceed. Additionally, non-response bias was checked and verified. The demographic data of gender was employed and it was found that the response pattern among the two groups (early and late responders) is not problematic for this research.

Missing Data Verification: All 645 returned questionnaires were verified. Any questionnaires that contained more than 5% errors or missing data were deemed to be incomplete and were omitted. Finally, a total of 600 completed questionnaires were verified for analysis.

Table 1. Level of agreement for all constructs.

Variable	$\bar{x}$	Standard deviation (SD)	Interpretation of level of agreement
1. Antecedences			
Organizational structure (OS)	3.92	0.74	High
Organizational culture (OC)	3.91	0.78	High
Organizational strategy (OST)	4.07	0.81	High
Intellectual capital (IC)			
Human capital (HC)	4.05	0.76	High
Structural capital (SC)	3.81	0.74	High
Relational capital (RC)	3.97	0.74	High
2. Mediators			
Knowledge management (KM)	4.03	0.69	High
Innovative capability (IN)	4.11	0.70	High
3. Consequence			
Firm performance (FP)	4.03	0.72	High

From Table 1, the respondents identified their level of agreement for all variables as high ($3.81 < \bar{x} < 4.11$, $0.69 < SD < 0.81$). Within the construct of antecedence roles, organizational strategy revealed the maximum level of

agreement ($\bar{x}$ = 4.07). For the mediator role, innovative capability has a higher mean than knowledge management (4.11 > 4.03). Last, the mean of firm performance, constructed as the consequence, has a value of 4.03 (SD = 0.72).

4.1.1. Construct Reliability and Convergent Validity

This step illustrates the results of the statistical analysis to verify the construct reliability (CR). The two main criteria of evaluating CR are highly precise (> 0.70), with the acceptable precision range being 0.60–0.70 (Hair, 2010). Convergent validity represents the extent of the similarity among the items under the same variable (within the same latent variable, it was higher than 0.5). The variance extracted (VE) showed the variance of the observable variables influenced by the latent variables. The mean of the VE of the observable variables within the same latent variable is the average variance extracted (AVE). AVE values above 0.50 indicate the consistency of the measurement model. However, the maximum shared variance (MSV) can be lower than the AVE.

Table 2. Construct reliability and convergent validity.

Latent variable	Eigenvalue/Cumulative	KMO (P-value)	Reliability	CR (> 0.70)	AVE (> 0.50)	MVS (MVS < AVE)
OS	2.753/68.823	0.724/(0.000)	0.842	0.864	0.685	0.611
OC	2.689/89.649	0.718/(0.000)	0.941	0.943	0.849	0.778
OST	2.627/87.562	0.740/(0.000)	0.927	0.930	0.817	0.792
HC	4.639/77.310	0.857/(0.000)	0.941	0.941	0.727	0.717
SC	4.474/74.563	0.805/(0.000)	0.931	0.936	0.711	0.701
RC	4.392/73.201	0.798/(0.000)	0.925	0.927	0.681	0.660
KM	7.909/65.908	0.914/(0.000)	0.953	0.930	0.548	0.544
IN	8.216/68.466	0.911/(0.000)	0.958	0.947	0.603	0.602
FP	5.186/64.825	0.865/(0.000)	0.910	0.927	0.648	0.641

Note: OS = Organizational structure, OC = Organizational culture, OST = Organizational strategy, HC = Human capital, SC = Structural capital, RC = Relational capital, KM = Knowledge Management, IN = Innovative capability, FP = Firm performance, KMO = Kaiser–Meyer–Olkin, CR = Construct reliability, AVE = Average variance extracted, MVS = Maximum shared variance.

In Table 2, the construct reliability and convergent validity are included to verify the qualification of data for further analysis. First, the reliability of all variables, revealed by Cronbach's alpha values (0.842–0.958), were greater than 0.70 (Hair, 2010). Second, factor loading revealed eigenvalues (2.627–8.216) greater than one (Hair, 2010). Third, the construct reliability (CR) values (0.864–0.947) for all variables were higher than 0.70 (Fornell & Larcker, 1981; Phorncharoen, 2020).

Fourth, the average variance extracted (AVE) values (0.548–0.849) were higher than 0.50 (Fornell & Larcker, 1981; Phorncharoen, 2020). Fifth, the maximum shared variance (MVS) (0.544–0.792) revealed values lower than the AVE (Fornell & Larcker, 1981; Phorncharoen, 2020). In summary, both construct reliability and convergent validity are proved and verified for the collected data.

4.1.2. Discriminant Validity

This part shows the results of discriminant validity. The validating model was highly discriminant and showed a low level of correlation among components. The correlations among the variables were verified to prevent multicollinearity.

A high level of correlation between two or more independent variables may affect the prediction of the dependent variable and interfere in the model equation; therefore, correlation between independent variables must be verified to ensure that the dependent variable can be maintained in the model equation. To prevent multicollinearity, verification was analyzed by utilizing the correlation coefficients of observable variables, which should be less than 0.80. The discriminant validity was verified by comparing the square root of AVE ($\sqrt{AVE}$) of the components and others in the same model. If $\sqrt{AVE}$ had a higher value than the correlation of components, then the model had good discriminant validity (Hair, 2010; Wanichbancha, 2019).

Table 3. Discriminant validity.

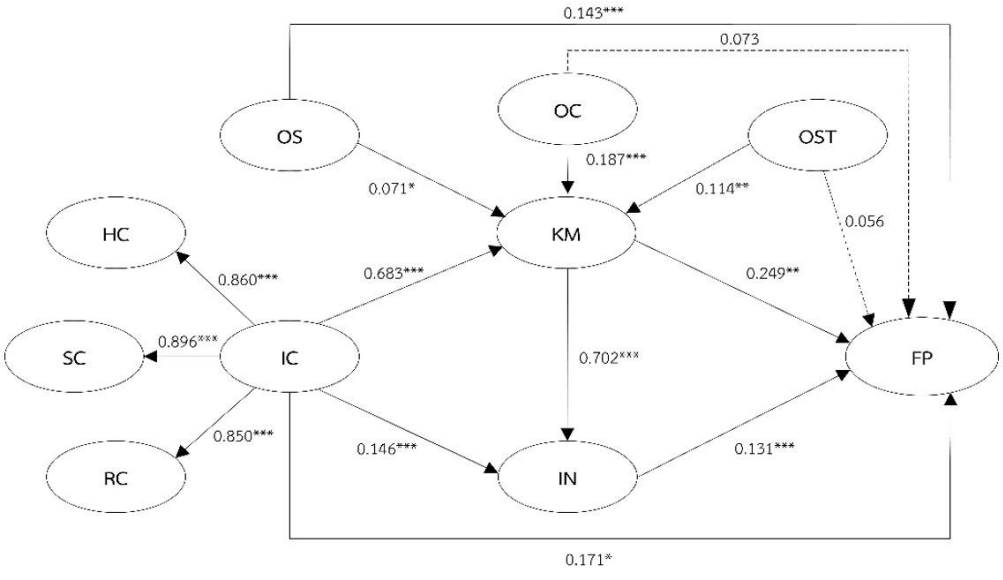
Variable	OS	OC	OST	HC	SC	RC	KM	IN	FP
OS	0.828								
OC	0.612	0.921							
OST	0.547	0.665	0.904						
HC	0.520	0.570	0.712	0.853					
SC	0.561	0.664	0.661	0.738	0.843				
RC	0.487	0.628	0.653	0.671	0.728	0.825			
KM	0.507	0.602	0.633	0.649	0.680	0.707	0.740		
IN	0.519	0.555	0.544	0.605	0.608	0.610	0.787	0.776	
FP	0.309	0.364	0.320	0.322	0.289	0.272	0.411	0.406	0.805

Note: $\sqrt{AVE}$ values are displayed on the diagonal in bold.
OS = Organizational structure, OC = Organizational culture, OST = Organizational strategy, HC = Human capital, SC = Structural capital, RC = Relational capital, KM = Knowledge Management, IN = Innovative capability, FP = Firm performance.

Table 3 shows that the correlation coefficient values of the observable variables were between 0.272 and 0.787, which is less than 0.80; therefore, the measuring model did not contain multicollinearity. The correlation of each variable was less than the $\sqrt{AVE}$ indicated for each variable and thus passed the discriminant validity test.

4.2. Data Analysis

The hypotheses have been verified by inspecting the correlation between the rational models and the empirical data of knowledge management and innovative capability as mediators of fundamental factors that affect firm performance among commercial banks in Thailand. In Figure 1, the correlations have been inspected according to the conceptual model, which has been modified according to the modification indices (MI) and was found to be consistent with the empirical data (criterion), the goodness of fit measure (χ^2/df) =1.179 (less than 2), the p-value of 0.116 (more than 0.050), the goodness of fit index (GFI) = 0.976 (more than 0.900), the adjusted goodness of fit index (AGFI) = 0.951 (more than 0.900), the comparative fit index (CFI) = 0.978 (more than 0.900), the norm fit index (NFI) = 0.970 (more than 0.900), and the root mean square error of approximation (RMSEA) = 0.011 (more than 0.050).



$\chi^2/df = 1.179,\ p = 0.116, GFI = 0.976, AGFI = 0.951, CFI = 0.978, NFI = 0.970, RMSEA = 0.011$

Figure 1. Standardized regression weight of path relationships.

Note: *** Statistical significance level of 0.001, ** Statistical significance level of 0.010, * Statistical significance level of 0.050.
→ Statistical significance ...> Non-statistical significance
OS = Organizational structure, OC = Organizational culture, OST = Organizational strategy, IC = Intellectual capital, HC = Human capital, SC = Structural capital, RC = Relational capital, KM = Knowledge management, IN = Innovative capability, FP = Firm performance.

Table 4. Results of structural equation modeling (SEM)

Antecedence	Consequence	(β)	Estimate	SE	z	P	R^2
OS	FP	0.143	0.132	0.039	3.392***	0.000	0.324
OC		0.073	0.048	0.028	1.732	0.083	
OST		0.056	0.039	0.029	1.354	0.176	
IC		0.171	0.136	0.053	2.580**	0.010	
IN		0.131	0.114	0.058	1.966*	0.036	
KM		0.249	0.234	0.083	2.799**	0.005	
OS	KM	0.172	0.170	0.082	2.073*	0.029	0.520
OC		0.187	0.131	0.023	5.674***	0.000	
OST		0.114	0.083	0.024	3.458***	0.000	
IC		0.683	0.576	0.042	13.668***	0.000	
KM	IN	0.702	0.763	0.059	12.874***	0.000	0.654
IC		0.146	0.134	0.039	3.400***	0.000	

Note: *χ^2/df = 1.179, P = 0.116, GFI = 0.976, AGFI = 0.951, CFI = 0.978, NFI= 0.970, RMSEA = 0.011.*
*** Statistical significance level of 0.001, ** Statistical significance level of 0.010, * Statistical significance level of 0.050.
OS = Organizational structure, OC = Organizational culture, OST = Organizational strategy, IC = Intellectual capital, HC = Human Capital, SC = Structural capital, RC = Relational capital, KM = Knowledge management, IN = Innovative capability, FP = Firm performance, β = Unstandardized coefficient, Estimate = Standardized coefficient, SE = Standard error, Z = Z Score, P = P-value, R^2 = Coefficient of determinant.

Table 4 and Figure 1 show the verification results of the path coefficients of the variables affecting firm performance (FP) among commercial banks in Thailand, which were ranked from 0.131 to 0.249. Variables affecting FP are as follows: organizational structure (OS) ($P < 0.001$), knowledge management (KM) ($P < 0.01$), intellectual capital (IC) ($P < 0.01$), and innovative capability (IN) ($P < 0.05$) had a statistically significant influence on firm performance, while organizational culture (OC) and organizational strategy (OST) had no significant effect.

Additionally, the path coefficients of the variables affecting knowledge management (KM) were ranked from 0.114 to 0.683. The antecedent variables are as follows: intellectual capital (IC) ($P < 0.001$), organizational culture (OC) ($P < 0.001$), organizational strategy (OST) ($P < 0.001$), and organizational structure (OS) ($P < 0.05$), all of which had a statistically significant influence on knowledge management (KM).

Moreover, the results of the path coefficients of innovative capability as the consequence were 0.146 and 0.702. Both knowledge management and intellectual capital had a statistically significant influence ($P < 0.001$) on innovative capability.

Last, the coefficient of determination (R^2) shows that OS, IC, IN, and KM altogether can predict 32.40% of the performance of commercial banks in Thailand, while OS, OC, OST, and IC combined can predict 52% of knowledge management. Moreover, knowledge management and intellectual capital combined can predict 65.40% of innovative capability.

4.3. The Verification of Knowledge Management and Innovative Capability as Mediators

The effects of the mediator roles of knowledge management (KM) and innovative capability (IN) are shown below.

Table 5. Determination of mediator role effects.

Effect	Direct effect (DE)	Indirect effect (IE)	Total effect (TE)	Lower - Upper (LCI - UCI)
OS on FP	0.143*	0.057*	0.200*	-0.010 - 0.174
OC on FP	0.073	0.063*	0.136*	0.051 - 0.253
OST on FP	0.056	0.038	0.094	-0.065 - 0.139
IC on FP	0.171*	0.251*	0.422*	-0.267 - 0.022
KM on FP	0.249*	0.091*	0.340*	0.119 - 0.374

Note: * Statistical significance level of 0.050.
OS = Organizational structure, OC = Organizational culture, OST = Organizational strategy, IC = Intellectual capital, HC = Human capital, SC = Structural capital, RC = Relational capital, KM = Knowledge management, FP = Firm performance, LCI = Lower confidence interval, UCI = Upper confidence interval.

In Table 5, the direct effect, indirect effect, and total effect of knowledge management and innovative capability were determined to interpret the mediator role between antecedence and consequence. First, organizational structure (OS) had a statistically significant (P < 0.05) direct effect on firm performance and an indirect effect of 0.057 (P < 0.05)2, with a total effect of 0.200 (P < 0.05), and lowest-highest was -0.010 - 0.174.

Second, organizational culture (OC) had no direct effect on firm performance; however, it had an indirect effect of 0.063 (P < 0.05) with a total effect of 0.136 (P < 0.05), and the lowest-highest was 0.051 - 0.253.

Third, organizational strategy (OST) had no direct or indirect effect on firm performance. The total effect was 0.094, and the lowest-highest was -0.065 - 0.139.

Fourth, intellectual capital (IC) had a statistically significant (P < 0 .05) direct effect on firm performance and an indirect effect of 0.251 (P < 0.05) with a total effect of 0.422 (P < 0.05), and the lowest-highest was -0.267 - 0.022.

Finally, knowledge management (KM) had a statistically significant (P < 0.05) direct effect on firm performance with an indirect effect of 0.091 (P < 0.05) with a total effect of 0.340 (P < 0.05), and the lowest-highest was 0.119 - 0.374.

The details of the indirect effects of the factors affecting firm performance among commercial banks in Thailand are illustrated below in Table 6.

Table 6. Paths of indirect effects.

Path of effect	Indirect effect evaluation	Indirect effect
OS --> KM --> FP	0.172 x 0.249	0.042
OS --> KM --> IN --> FP	0.172 x 0.702 x 0.131	0.015
Total indirect effect		0.057
OC --> KM --> FP	0.187 x 0.249	0.046
OC --> KM --> IN --> FP	0.187 x 0.702 x 0.131	0.017
Total indirect effect		0.063
OST --> KM --> FP	0.114 x 0.249	0.028
OST --> KM --> IN --> FP	0.114 x 0.702 x 0.131	0.010
Total indirect effect		0.038
IC --> KM --> FP	0.683 x 0.249	0.170
IC --> IN --> FP	0.146 x 0.131	0.019
IC --> KM --> IN --> FP	0.683 x 0.702 x 0.131	0.062
Total indirect effect		0.251
IC --> KM --> IN	0.683 x 0.702	0.479
Total indirect effect		0.479
KM --> IN --> FP	0.702 x 0.131	0.091
Total indirect effect		0.091

Note: OS = Organizational structure, OC = Organizational culture, OST = Organizational strategy, IC = Intellectual capital, HC = Human capital, SC = Structural capital, RC = Relational capital, KM = Knowledge management, IN = Innovative capability, FP = Firm performance.

4.4. Research Summary

The SEM technique was employed to determine the causal relationship and the fit of the conceptual model for the empirical data. Based on the results, the following can be confirmed:

1. There is an indirect effect of organizational structure on firm performance, shown by two path coefficients, namely 1) knowledge management as a mediator had an effect of 0.042, and 2) knowledge management and innovative capability as joint mediators had an effect of 0.015, supporting H1 and H5.
2. There is an indirect effect of organizational culture on firm performance based on the two path coefficients, namely 1) knowledge management as mediator had an effect of 0.046, and 2) knowledge management and innovative capability as joint mediators had an effect of 0.017, supporting H2 and H6.
3. There is an indirect effect of organizational strategy on firm performance revealed by two path coefficients, namely 1) knowledge management as mediator had an effect of 0.028, and 2) knowledge management and

innovative capability as joint mediators had an effect of 0.010. This shows that organizational strategy had no indirect effect on firm performance. Therefore, H3 and H7 are not supported.

4. There is an indirect effect of intellectual capital on firm performance based on three path coefficients, namely 1) knowledge management as a mediator had an effect of 0.170, 2) innovative capability as a mediator had an effect of 0.019, and 3) knowledge management and innovative capability as joint mediators had an effect of 0.062, supporting H4, H8, and H9.
5. There is an indirect effect of intellectual capital on innovative capability based on the path coefficient of knowledge management as mediator, which had an effect of 0.479, supporting H10.
6. There is an indirect effect of knowledge management on firm performance based on the path coefficient of innovative capability as mediator, with an effect of 0.091, supporting H11.

In brief, all 11 hypotheses in the present research that aimed to determine the mediator role of knowledge management and innovative capability on firm performance among commercial banks in Thailand, nine hypotheses (H1, H2, H4, H5, H6, H8, H9, H10 and H11) are supported and the other two (H3 and H7) are not supported.

5. DISCUSSION

As mentioned by Kearns and Lederer (2003), knowledge is seen as the most important resource for a firm and it is the primary factor of economic growth (Beijerse, 1999). Knowledge management affects the performance of organizations, according to the study by Rezaei, Khalilzadeh, and Soleimani (2021), which presented how knowledge management in an organization affects performance. This research encourages management and employees to apply knowledge and develop practical guidelines on knowledge and human resource management to effectively utilize the most valuable resource and maintain a competitive advantage.

Hassanpoor, Vaezi, and Safidkar (2014) studied factors that affect knowledge management in banking and insurance businesses. They showed that knowledge, as an intangible asset, is an important part of an organization. It requires knowledge management to enhance the knowledge and efficiency of organizations together with the culture in an organization, and this will lead to significant improvements in the economy, society, and culture. On the other hand, improper knowledge management can be extremely costly to an organization. Knowledge management has recently been a core component of success. An organization has to improve performance to survive in turbulent and highly competitive situations, and individuals with quality, creativity, and who are dynamic will be an advantage. Many organizations are trying to learn and implement modern technologies and processes that will help to improve their products and services.

Abualoush, Masa'deh, Bataineh, and Alrowwad (2018) studied the role of knowledge management processes and intellectual capital as mediators of organizational performance, and they showed that knowledge management affects the performance of an organization. Studies by Migdadi, Zaid, Zaidbauedujo, Yousif, and Al-hyari (2017); Balasubramanian, Al-Ahbabi, and Sreejith (2019) and Tarhini et al. (2017) showed the effect of knowledge management on the performance of organizations in the Thai food industry. The study by Irawan, Bastian, and Hanifah (2019) mentioned that knowledge management, specifically knowledge distribution, had a positive influence on performance. Wendra and Alhadar (2020) discovered that knowledge management directly affects innovational performance.

Knowledge management affects innovational capability, according to the study by Yaklai, Suwunnamek, and Srinuan (2018), who revealed that knowledge management has a positive influence on innovational capabilities in the Thai food industry. Omoush (2019) studied the effect of intangibles (intellectual capital and knowledge management) on the innovation of tourism organizations in Jordan. The results showed that knowledge management influences innovational capability. Rahimi, Rostami, Shad, and Vafaei (2017) indicated that knowledge management and innovation are two major factors which need to be included in business operations. Knowledge management is a modern concept, and a company's knowledge base expands as customers demand more creativity. Since knowledge

management is significant to innovation, we must understand its role. This study emphasizes the importance of innovational knowledge management in business. Mardani et al. (2018) studied the effect of knowledge management activities on innovation both directly and indirectly via increasing innovational capabilities. Conduction, integration, and adaptation helped to advance performance and innovation. Conduction strongly affected agility, quality, and quantity of innovation. Quality, conduction, and integration strongly affected performance. This research helps to create guidelines for researchers and management to design knowledge management programs that can drive innovation, efficiency, effectiveness, and profitability. Kremer, Villamor, and Aguinis (2019) stated that the factor that encourages innovation is sharing; it is impossible to innovate without sharing knowledge. Belso-Martinez and Diez-Vial (2018) stated that businesses looking to increase their participation in networks had to escalate their innovative capabilities. Podrug, Filipovic, and Kovac (2017) found that businesses in Croatia increased their innovative capabilities by sharing knowledge.

Innovative capability affects firm performance. The study by Ali, Hussin, Haddad, Al-Araj, and Abed (2021) that reviewed intellectual capital and innovative capital showed that intellectual capital strongly affected the innovation of financial businesses. Acquisition of intellectual capital will affect innovative performance of financial businesses. New empirical methods and theories must be promoted to evaluate the impact of intellectual capital and innovative performance in organizations. Smart and integrated strategies will be beneficial in managing intangibles and increase economic sustainability and performance. Meles, Porzio, Sampagnaro, and Verdoliva (2016) stated that many of the challenges that the financial sector faces in maintaining high levels of intellectual capital are caused by the lack of proper measurement.

Anifowose, Rashid, Annuar, and Ibrahim (2018) stated that to gain a better understanding of knowledge-based interpretation in innovative performance, emphasis must be placed on evaluating the effect of intellectual property to gain a competitive advantage. Cabrilo, Dahms, Mutuc, and Marlin (2020) stated that concept combinations from several empirical studies showed that appropriate application of intellectual capital in the banking sector in various countries had a positive influence on innovative performance. Romyen (2019) stated that innovative capabilities consisting of process, strategy, and behavior aspects showed that process and strategy had a positive influence on the performance of businesses, while behavior had no influence. Also, process and strategy aspects both determine the level of performance, with the most effective variable being strategy followed by process.

However, the study by Werlang and Rossetto (2019) showed that innovational capabilities had no positive influence on the performance of an organization. The variables of innovational capabilities are creativity (applying a new concept), risk management (allocating resources for risky decisions), focusing on the future (adjustment in a rapidly changing market), and proactive action (being proactive in anticipating changes and opportunities).

6. RECOMMENDATION AND CONTRIBUTION

The intangible assets of organizational structure, organizational culture, organizational strategy, and intellectual capital were found to affect firm performance among commercial banks in Thailand. However, knowledge management and innovative capability play a mediator role within this causal relationship, which means that knowledge in working or providing any financial services should be effectively managed. Both tacit and explicit knowledge should be employed and derived systematically through a learning environment. In other words, firm and staff must be integrated and cooperate in order to generate superior performance through the process of knowledge management (Alavi & Leidner, 2001). Therefore, the creation, storage, transfer, application, and evaluation of knowledge should be employed. As mentioned earlier, technical, systemic, and strategic knowledge could be progressed (Hong & Nguyen, 2009). Moreover, innovation is diverse and has developed hugely in recent times. At the present, there are new financial products (fintech) that banks use to serve their customers. Importantly, the Personal Data Protection Act BE 2562 (2019) has been launched which helps to reassure people regarding their

individual rights and privacy. Innovation in financial service processes leads to both easy and comfortable use among customers; however, personal data and privacy have to be protected.

Emphasis on the implementation of knowledge management and innovative capability in Thailand is not sufficient. Only having guideline plans is not enough, operational plan for the short and long terms must be clarified and implemented in businesses that provide services. Investment in information technology infrastructure is a necessity for Thailand. Moreover, skilled workers are required for any firms. To be competitive, a combination of tangible and intangible resources needs to be effectively implemented and managed.

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REFERENCES

Abualoush, S., Masa'deh, R., Bataineh, K., & Alrowwad, A. (2018). The role of knowledge management process and intellectual capital as intermediary variables between knowledge management infrastructure and organization performance. *Interdisciplinary Journal of Information, Knowledge, and Management, 13*(1), 279-309. https://doi.org/10.28945/4088

Agostini, L., Nosella, A., & Filippini, R. (2017). Does intellectual capital allow improving innovation performance? A quantitative analysis in the SME context. *Journal of Intellectual Capital, 18*(2), 400-418. https://doi.org/10.1108/jic-05-2016-0056

Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly, 25*(1), 107-136. https://doi.org/10.2307/3250961

Alfraih, M. (2018). Intellectual capital reporting and its relation to market and financial performance. *International Journal of Ethics and Systems 34*(3), 266-281. https://doi.org/10.1108/ijoes-02-2017-0034

Ali, M. A., Hussin, N., Haddad, H., Al-Araj, R., & Abed, I. A. (2021). Intellectual capital and innovation performance: Systematic literature review. *Risks, 9*(9), 1-19. https://doi.org/10.3390/risks9090170

Anifowose, M., Rashid, H. M. A. R., Annuar, H. A., & Ibrahim, H. (2018). Intellectual capital efficiency and corporate book value: Evidence from Nigerian economy. *Journal of Intellectual Capital, 19*(3), 644-668. https://doi.org/10.1108/jic-09-2016-0091

Arh, T., Borka, J. B., & Vlado, D. (2012). The impact of technology-enhanced organisational learning on business performance: An empirical study. *Journal for East European Management Studies, 17*(3), 369-383. https://doi.org/10.5771/0949-6181-2012-3-369

Atalay, M., Anafarta, N., & Sarvan, F. (2013). The relationship between innovation and firm performance: An empirical evidence from Turkish automotive supplier industry. *Procedia-Social and Behavioral Sciences, 75*(1), 226-235. https://doi.org/10.1016/j.sbspro.2013.04.026

Balasubramanian, S., Al-Ahbabi, S., & Sreejith, S. (2019). Knowledge management processes and performance: The impact of ownership of public sector organizations. *International Journal of Public Sector Management, 33*(1), 1-21. https://doi.org/10.1108/ijpsm-05-2019-0131

Baruch, Y. (1999). Response rate in academic studies-A comparative analysis. *Human Relations, 52*(4), 421-438. https://doi.org/10.1177/001872679905200401

Beijerse, R. P. (1999). Questions in knowledge management: Defining and conceptualizing a phenomenon. *Journal of Knowledge Management, 3*(2), 94-109.

Belso-Martinez, J. A., & Diez-Vial, I. (2018). Firm's strategic choices and network knowledge dynamics: How do they affect innovation? *Journal of Knowledge Management, 22*(1), 1-20. https://doi.org/10.1108/jkm-12-2016-0524

Bontis, N., Ciambotti, M., Palazzi, F., & Sgro, F. (2018). Intellectual capital and financial performance in social cooperative enterprises. *Journal of Intellectual Capital, 19*(4), 712-731. https://doi.org/10.1108/jic-03-2017-0049

Butbamrung, C. (2012). *The influence of changes in leadership, knowledge management and innovation on the performance of commercial banks*. Doctor of Philosophy Program Management Innovation Suan Sunandha Rajabhat University.

Cabrilo, S., & Dahms, S. (2018). How strategic knowledge management drives intellectual capital to superior innovation and market performance. *Journal of Knowledge Management, 22*(3), 621-648. https://doi.org/10.1108/jkm-07-2017-0309

Cabrilo, S., Dahms, S., Mutuc, E. B., & Marlin, J. (2020). The role of IT practices in facilitating relational and trust capital for superior innovation performance: The case of Taiwanese companies. *Journal of Intellectual Capital, 21*(5), 753-779. https://doi.org/10.1108/jic-07-2019-0182

Cabrita, M. D. R. M. F., da Silva, M. D. L. R., Rodrigues, A. M. G., & Dueñas, M. D. P. M. (2017). Competitiveness and disclosure of intellectual capital: An empirical research in Portuguese banks. *Journal of Intellectual Capital, 18*(3), 486-505. https://doi.org/10.1108/jic-11-2016-0112

Camelo-Ordaz, C., Garcia-Cruz, J., Sousa-Ginel, E., & Valle-Cabrera, R. (2011). The influence of human resource management on knowledge sharing and innovation in Spain: The mediating role of affective commitment. *The International Journal of Human Resource Management, 22*(07), 1442-1463. https://doi.org/10.1080/09585192.2011.561960

Castro, M.-D. G. (2015). Knowledge management and innovation in knowledge-based and high-tech industrial markets: The role of openness and absorptive capacity. *Industrial Marketing Management, 47*(1), 143-146. https://doi.org/10.1016/j.indmarman.2015.02.032

Doyle, P. (1998). Radical strategies for profitable growth. *European Management Journal, 16*(3), 253-261. https://doi.org/10.1016/s0263-2373(98)00002-4

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.2307/3150979

Hair, J. F. (2010). *Multivariate data analysis* (7th ed.). New York: Pearson Prentice-Hall.

Hamdan, A. (2018). Intellectual capital and firm performance: Differentiating between accounting-based and market-based performance. *International Journal of Islamic and Middle Eastern Finance and Management, 11*(1), 139-151. https://doi.org/10.1108/imefm-02-2017-0053

Hassanpoor, A., Vaezi, R., & Safidkar, P. (2014). Factors affecting knowledge management in banking and insurance industry. *Journal of Development & Evolution Mnagement, 1392*(15), 31-37.

Hong, J. F., & Nguyen, T. V. (2009). Knowledge embeddedness and the transfer mechanisms in multinational corporations. *Journal of World Business, 44*(4), 347-356. https://doi.org/10.1016/j.jwb.2009.01.001

Horvat, G., Rimac-Drlje, S., & Žagar, D. (2013). Fade depth prediction using human presence for real life WSN deployment. *Radioengineering, 22*(3), 758-768.

Hsu, I.-C., & Sabherwal, R. (2011). From intellectual capital to firm performance: The mediating role of knowledge management capabilities. *IEEE Transactions on Engineering Management, 58*(4), 626-642. https://doi.org/10.1109/tem.2011.2111455

Irawan, D., Bastian, E., & Hanifah, I. A. (2019). Knowledge sharing, organizational culture, intellectual capital, and organizational performance. *Journal of Accounting and Investment, 20*(3), 267-282. https://doi.org/10.18196/jai.2003128

Kearns, G. S., & Lederer, A. L. (2003). A resource-based view of strategic IT alignment: How knowledge sharing creates competitive advantage. *Decision Sciences, 34*(1), 1-29. https://doi.org/10.1111/1540-5915.02289

Kremer, H., Villamor, I., & Aguinis, H. (2019). Innovation leadership: Best-practice recommendations for promoting employee creativity, voice, and knowledge sharing. *Business Horizons, 62*(1), 65-74. https://doi.org/10.1016/j.bushor.2018.08.010

Lertpachin, C., Wingwon, B., & Noithonglek, T. (2013). The effect of marketing focus, innovation and learning organization on the building of competitive advantages: empirical evidence from ISO 9000 certified companies. *Journal of Strategic Marketing, 21*(4), 323-331. https://doi.org/10.1080/0965254x.2013.790469

Mardani, A., Nikoosokhan, S., Moradi, M., & Doustar, M. (2018). The relationship between knowledge management and innovation performance. *The Journal of High Technology Management Research, 29*(1), 12-26.

Meles, A., Porzio, C., Sampagnaro, G., & Verdoliva, V. (2016). The impact of the intellectual capital efficiency on commercial banks performance: Evidence from the US. *Journal of Multinational Financial Management*, *36*, 64-74. https://doi.org/10.1016/j.mulfin.2016.04.003

Migdadi, M. M., Zaid, M. K. A., Zaidbauedujo, M., Yousif, M., & Al-hyari, K. (2017). An empirical examination of knowledge management processes and market orientation, innovation capability and organisational performance: Insights from Jordan. *Journal of Information and Knowledge Management*, *16*(1), 1-32.

Nadeem, M., Gan, C., & Nguyen, C. (2018). The importance of intellectual capital for firm performance: Evidence from Australia. *Australian Accounting Review*, *28*(3), 334-344. https://doi.org/10.1111/auar.12184

North, K., Probst, G., & Romhardt, K. (1998). Measuring knowledge - approaches, experiences and critical questions. *Journal for Leadership and Organization*, *3*(1), 158 - 166.

Omoush, M. M. (2019). Impact of intangible assets (Intellectual Capital, Knowledge Management) on innovation: A study on tourist agencies in Jordan (Tourist Agencies in Irbid). *International Journal of Business and Management*, *14*(6), 138-149.

Phorncharoen, I. (2020). Influence of market orientation, learning orientation, and innovativeness on operational performance of real estate business. *International Journal of Engineering Business Management*, *12*, 1847979020952672. https://doi.org/10.1177/1847979020952672

Podrug, N., Filipovic, D., & Kovac, M. (2017). Knowledge sharing and firm innovation capability in Croatian ICT companies *International Journal of Manpower*, *38*(4), 632-644.

Rafieepour, E., Masjedi, S., & Akhavan, P. (2015). Exploring the relationship between knowledge management and intellectual capital: An Iranian university case study. *International Journal of Management Academy*, *3*(1), 7-15.

Rahimi, E., Rostami, N. A., Shad, F. S., & Vafaei, V. (2017). The importance of knowledge management on innovation. *Applied Mathematics in Engineering, Management and Technology*, *5*(1), 68-73.

Rashed, M. (2016). The readiness of banks in knowledge management: A study of three private commercial banks in Bangladesh. *Journal of Business and Financial Affairs*, *5*(1), 1-16. https://doi.org/10.4172/2167-0234.1000181

Rezaei, F., Khalilzadeh, M., & Soleimani, P. (2021). Factors affecting knowledge management and its effect on organizational performance: Mediating the role of human capital. *Advances in Human-Computer Interaction*, 1-16. https://doi.org/10.1155/2021/8857572

Romyen, S. (2019). *Innovation and marketing capabilities that affect the performance of small and medium-sized enterprises. In the area of Songkla Province.* Master of Business Administration Thesis Prince of Songkla University.

Santos, F. C. (2000). Integration of human resource management and competitive priorities of manufacturing strategy. *International Journal of Operations & Production Management*, *20*(5), 610-628. https://doi.org/10.1108/01443570010318986

Sayed, A., & Pourmohammadi, R. (2014). Evaluating the relationship between intellectual capital and financial performance in Iranian biotechnological production companies. *European Journal of Experimental Biology*, *4*(1), 168-173.

Schumacker, R. E., & Lomax, R. G. (2010). *A Beginner's guide to structural equation modeling*. New Jersey: Lawrence Erlbaum Associates.

Shahpasand, M., Savari, M., & Sarani, V. (2013). The effect of intellectual capital on knowledge management: Study on agriculture organization experts in Kurdistan province. *International Journal of Business and Social Science*, *4*(12), 321-327.

Tarhini, A., Obeidat, B. Y., Masa'deh, R. e., & Aqqad, N. O. (2017). The impact of intellectual capital on innovation via the mediating role of knowledge management: A structural equation modelling approach. *International Journal of Knowledge Management Studies*, *8*(3-4), 273-298. https://doi.org/10.1504/ijkms.2017.10007246

Wang, Z., Wang, N., Cao, J., & Ye, X. (2016). The impact of intellectual capital–knowledge management strategy fit on firm performance. *Management Decision*, *54*(8), 1861-1885. https://doi.org/10.1108/md-06-2015-0231

Wanichbancha, K. (2019). *Analysis of structural equations (SEM) by AMOS* (3rd ed.). Bangkok: Samlada Limited Partnership.

Wei, Y., & Miraglia, S. (2017). Organizational culture and knowledge transfer in project-based organizations: Theoretical insights from a Chinese construction firm. *International Journal of Project Management*, *35*(4), 571-585. https://doi.org/10.1016/j.ijproman.2017.02.010

Wendra, W., & Alhadar, F. M. (2020). The influence of knowledge management processes on intellectual capital and innovation performance. *Journal of Management and Marketing Review, 5*(3), 179-187.

Werlang, N. B., & Rossetto, C. R. (2019). The effects of organizational learning and innovativeness on organizational performance in the service provision sector. *Management & Production, 26*(1), 1-18.

Wzhen, W., Yang, B., & Mclean, G. N. (2010). Linking organizational culture, structure, strategy, and organizational effectiveness: Mediating role of knowledge management. *Journal of Business Research, 163*(1), 763-771.

Yaklai, P., Suwunnamek, O., & Srinuan, C. (2018). How intellectual capital, knowledge management, and the business environment affect Thailand's food industry innovation. *Asia-Pacific Social Science Review, 18*(3), 30-42.