

## Relationships among knowledge-oriented leadership, customer knowledge management, innovation quality and firm performance in SMEs



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### ABSTRACT

Drawing upon the literature on knowledge management, leadership, and innovation, this study investigates the possible associations among customer knowledge management, knowledge-oriented leadership, innovation quality, and firm performance in 283 small and medium-sized enterprises (SMEs) in Thailand. The mediating roles of customer knowledge management and knowledge-oriented leadership among these relationships are highlighted in the SMEs, wherein human resources and invested capital are limited. Therefore, the findings contribute to the extant literature by providing empirical evidence to support that customer knowledge management mediates in the relationship between knowledge-oriented leadership and innovation quality. In addition, innovation quality mediates the relationship between customer knowledge management and firm performance. Furthermore, the result supports the moderating effect of competitive intensity on the relationship between customer knowledge management and innovation quality. Finally, the theoretical implications for academics and managerial implications for SMEs' managers are discussed.

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### Introduction

Small and medium-sized enterprises (SMEs) play a vital role in developing countries by creating job opportunities and boosting economies. In Thailand, the country's economic growth is proportionate to the SMEs business activities expansion since the majority, 99.54 percent, of the total businesses in Thailand, are SMEs (OSMEP (The Office of Small and Medium Enterprises Promotion), 2021). Additionally, the Thai government has set a goal to boost SMEs' contribution to 50% of the country's GDP in the 13th national social and economic development plan for 2021 to 2025 (Theparat & Chantanusornsiri, 2018). However, most Thai SMEs face difficulties (e.g., limited knowledge resources, human resources, and capital) compared to large or well-established firms in Thailand. This implies that Thai SMEs need to pay attention to developing knowledge-

oriented leadership styles and managing their customer knowledge to improve the firm performance.

The knowledge-based economy makes knowledge prominent in cultivating competitive advantages and longevity for organisations more than ever. Due to human resources and capital shortage, most SMEs are obliged to exploit external knowledge for firms' welfare (Fidel, Schlesinger & Emilo, 2018). Since knowledge-oriented leaders encourage learning and support a learning environment that tolerates errors, employees can explore and exploit knowledge for their firms' benefit (Donate & de Pablo, 2015) through knowledge-oriented leadership (KOL). In other words, employees will learn best and react better to the uncertainty when their leaders support the firms to acquire and share knowledge. Thus, KOL deems to help firms manage their knowledge. Although the link between KOL and knowledge management has been studied in recent papers (Donate & de Pablo, 2015; Sadeghi & Rad, 2018), the impact of KOL on managing specific types of knowledge, such as customer knowledge, is still limited.

Since knowledge is regarded as one of the most crucial assets to manage nowadays, firms need to manage rudimentary knowledge and knowledge solicited from customers (Chaithanapat &

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Rakthin, 2021). According to Du Plessis and Boon (2004), customer knowledge management (CKM) can help companies better understand their customers' wants, demands, and behaviors. CKM is a dynamic capability of customer knowledge generation, sharing and protection (Fidel et al., 2018). Although several studies stated that firms utilizing CKM could improve their performances (Centobelli, Cerchione & Singh, 2019; Fidel et al., 2018; Taherparvar, Esmaeilpour & Dostar, 2014), scholars have overlooked the outcomes of CKM. Fidel et al. (2018) suggested that consequence variables of CKM such as financial performance and the mediating effect of innovation orientation should be further studied. The moderating variable between CKM and firm performance was also suggested for further investigation in Taherparvar et al. (2014)'s study.

Innovation is another key resource for a firm's success. In the last two decades, intense competition and technology have played dramatic roles in shaping the business industry, making innovation more critical than ever. Several studies have underlined the importance of innovation and how it influences firm performance (Bigliardi, 2013; Hult, Hurley & Knight, 2004). Since innovation can bring about competitive advantages for organisations of any size, the impact of innovation on firm performance has been a classic subject of study. Thus, we also highlight the role of innovation quality in our research model for Thai SMEs.

This study examines the effect of KOL, CKM, and innovation quality on firm performance by using competitive intensity as a moderator in the Thai SMEs context. Thereby, we filled several research gaps that suggest analyzing KOL, CKM, innovation quality, and firm performance in developing countries where these studies are rare (Al-Sa'di, Abdallah & Dahiyat, 2017; Donate & de Pablo, 2015). The most prominent contributions of the study lie in the examination of the mediating roles for two variables (CKM and innovation quality) and showing that CKM mediates in the relationship between KOL and innovation quality, while innovation quality mediates the relationship between CKM and firm performance. The remainder of the paper is organized into five sections: theoretical background, hypothesis development, methodology, results, and discussion.

## Theoretical background

### Knowledge-oriented leadership

Knowledge-oriented leaders promote, encourage, and appreciate employees' new ideas (Naqshbandi & Jasimuddin, 2018). According to DeTienne, Dyer, Hoopes and Harris (2004), KOL usually occurs when leaders are perceived as actively engaged and committed to supporting knowledge and learning activities within the organization. (Donate & de Pablo, 2015; Ribièrè & Sitar, 2003). In several studies, KOL is claimed as an integration of transformational leadership and transactional leadership, along with motivational and communicational elements (Donate & de Pablo, 2015; Ribièrè & Sitar, 2003). However, transactional leadership is best used to institutionalize, reinforce, and refine existing knowledge, while transformational leadership is best used to challenge the firm's current situation (Baškarada, Watson & Cromarty, 2017; Jansen, Van Den Bosch & Volberda, 2006). Following on DeTienne et al. (2004), Donate and de Pablo (2015), and Ribièrè and Sitar (2003), KOL in this study is defined as the integration of two leaderships, transformational and transactional leadership, in which management teams are regarded as actively involved and devoted in supporting the firm's learning environment.

### Customer knowledge management

Customer knowledge resides in the customers' values, experiences, and perceptions, obtained through the firm's association with its customers (Gebert, Geib, Kolbe & Riempff, 2002). Gibbert, Leibold and Probst (2002) classified customer knowledge into three types —

knowledge about customers, knowledge for customers, and knowledge from customers. According to Garcia-Murillo and Annabi (2002), customers are a source of a firm's knowledge. Firms can discern customers' problems, wants, and needs by directly interacting with them through CKM, which could explain why customers do what they do. Khosravi and Hussin (2016) stated that effective CKM depends greatly on how a firm can nurture and manage customer relationships to acquire, share, and exploit customer knowledge for the benefit of the customers and the firm. Gibbert et al. (2002) additionally elucidate that a firm can gain knowledge that resides in customers, and share and expand that knowledge by interacting with customers. Thus, CKM is the development of new platforms and processes for the firms and their customers to share knowledge (Gibbert et al., 2002). This study utilizes the CKM definition of Gibbert et al. (2002) and Garcia-Murillo and Annabi (2002).

### Innovation quality

Innovation is linked to inventiveness and unconventionality, whereas quality is associated with standardization, low error tolerance, and systematic process (Haner, 2002). According to Taherparvar et al. (2014), innovation quality is how newly launched products or services meet customers' needs and expectations. There are three levels of innovation quality: product or service level, process level, and firm-level. Regarding product or service level, innovation quality is identified through measuring variables like total amount, efficiency, features, reliability, timing, costs, value to the customers, innovation degree, complexity, and many other variables (Haner, 2002; Wang & Wang, 2012). In terms of process level, innovation quality reflects how well a firm seeks process innovation involving all measures which affect the quality of new processes and how this quality has been accomplished. However, determining innovation quality at the firm level may be more difficult due to the higher degree of complexity, difficulty determining the catalysts, and the need to assemble soft issues (Haner, 2002). Therefore, this study adopts the definition of innovation quality by Haner (2002), Taherparvar et al. (2014), and Wang and Wang (2012), where innovation quality is the total innovation performance at every level within an organization.

### Firm performance

Researchers and practitioners give various meanings and measurements for firm performance. Ngo and O'cass (2013) defined firm performance as evaluating a firm's success in the industry through financial and non-financial indicators. There are different variables to measure performance in SMEs, and several scholars use financial factors to measure it (Shu, Liu, Zhao & Davidsson, 2020). Although financial performance is viewed as the heart of a firm's efficiency (Nuryakin & Ardyan, 2018), financial performance alone cannot reflect how well a firm performs. Many scholars have suggested that marketing performance is the key factor in success (Clark, 1999; Nuryakin & Ardyan, 2018). Financial and operational performance is often used to measure firm performance in the knowledge management field (Al-Sa'di et al., 2017). Therefore, this study chooses marketing, financial, and operational performance to measure firm performance to determine how well businesses are administered (Antony & Bhattacharyya, 2010).

### Competitive intensity

Competitive intensity is when firms encounter competition in the industry (Jaworski & Kohli, 1993). According to Porter (1980), competitive intensity is reflected through price wars, intense advertising, various products, services offered, and extra services. Anning-Dorson (2016) claims that competitive intensity occurs when there is

rivalry among business units, promotional wars, competitive actions, and offers within a specific market. As there is a greater degree of competition in the market today, firms will have to deal with uncertainty more frequently. In this study, competitive intensity refers to the degree of competition that firms face in the industry related to cutthroat competition, promotional wars, price competitions, and competitive moves (Anning-Dorson, 2016; Grewal & Tansuhaj, 2001; Jaworski & Kohli, 1993).

**Hypothesis development**

*Knowledge-oriented leadership and customer knowledge management*

According to Nonaka, Toyama and Konno (2000), leadership plays a vital role in the knowledge-creation process of firms. Leadership provides vision, creates energy, and encourages continuous spiral learning in an organization (Nonaka et al., 2000; Owusu-Manu, Edwards, Pärn, Antwi-Afari & Aigbavboa, 2018). Many previous studies claimed that knowledge-oriented leaders induce open innovation (Chesbrough, 2003; Donate & de Pablo, 2015; Naqshbandi & Jasimuddin, 2018) by encouraging their teams to acquire, assimilate, and exploit knowledge accordingly to be commercialized in the market. Additionally, Attafar, Sadidi, Attafar and Shahin (2013)) claims that managing customer knowledge is impossible if senior management levels are not committed. Yang, Huang and Hsu (2014) found the relationships among knowledge leadership, CKM, project, and firm performance where knowledge leadership positively affects CKM. Thereby, this paper addresses the influence of KOL on CKM in the context of SMEs and suggests the following hypothesis (See also Fig. 1):

**Hypothesis 1.** Knowledge-oriented leadership (KOL) significantly affects customer knowledge management (CKM) in SME firms.

*Customer knowledge management and innovation quality*

Knowledge management is an important factor in innovation activities. Past studies have highlighted the knowledge

management’s repercussion on innovation (Alegre, Sengupta & Lapiedra, 2013; Lin, Che & Ting, 2012). Customers are perceived as the possessors of imperative knowledge and the contributors to better innovation (Gorry & Westbrook, 2013). Taherparvar et al. (2014) asserted that firms currently place more importance on connecting and developing (C & D) than on research and development (R & D). This C & D suggests that ideas from customers are more creative and useful than ideas from internal stakeholders such as staff, managers, and owners. These ideas contribute to a firm’s innovation (Taherparvar et al., 2014). In addition, Fidel et al. (2018) found that CKM directly and positively affects firms’ innovation capacity in their study of 210 Spanish SMEs. Furthermore, Taherparvar et al. (2014) discovered a positive influence of customer knowledge management on innovation quality in 35 private banks in Iran. Based on these studies, we propose the following hypothesis:

**Hypothesis 2.** Customer knowledge management (CKM) significantly affects innovation quality (INNOV) in SME firms.

*Knowledge-oriented leadership and innovation quality*

Donate and de Pablo (2015) claimed that KOL is essential for firms to achieve innovation through effective knowledge management. Studying the association between KOL, open innovation, and knowledge management in the international business context based in France, Naqshbandi and Jasimuddin (2018)) found that KOL directly affects open innovation. In an empirical study regarding KOL, knowledge management behavior, and innovation performance in the context of project-based SME firms in Pakistan, Zia (2020) found that KOL positively affects project-based innovation performance. Similarly, Sadeghi and Rad (2018) studied the relationship between KOL and knowledge management and innovation performance and found a significant positive effect of KOL on innovation performance. Hence, leadership that encourages learning activities in firms is expected to impact firms’ innovation quality. Thereby, we propose the following hypothesis:

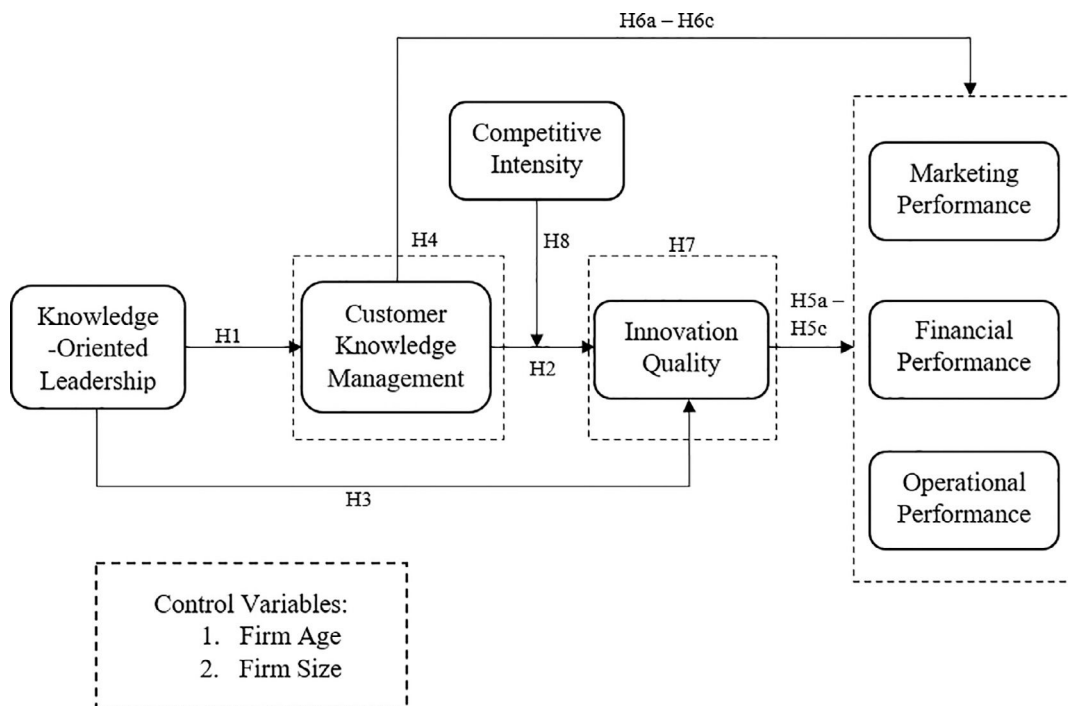


Fig. 1. Proposed conceptual framework.

**Hypothesis 3.** Knowledge-oriented leadership (KOL) significantly affects innovation quality (INNOV) in SME firms.

#### *Mediating effect of customer knowledge management*

The mediating effect of knowledge management capabilities on the association of KOL and open innovation was analyzed by [Naqshbandi and Jasimuddin \(2018\)](#) in the context of international business. They found that KOL positively influences knowledge management capability and open innovation while it mediates the relationship between KOL and open innovation ([Naqshbandi & Jasimuddin, 2018](#)). KOL has an imperative effect on knowledge management activities to promote a firm's innovation ([Jansen et al., 2006](#)), especially in technology-intensive companies where they are required to explore and exploit knowledge to survive in the market ([Donate & de Pablo, 2015](#)). [Donate and de Pablo \(2015\)](#) explored the mediating effect of knowledge management practices on the relationship between KOL and innovation performance. Their findings reflect that even though knowledge management practices are essential for innovation performance, KOL also supports knowledge practices in a firm. Although many empirical studies have examined the mediating role of knowledge management on the relationship between KOL and innovation, the investigation of CKM as a mediator is still lacking. Therefore, this study suggests the following hypothesis:

**Hypothesis 4.** Customer knowledge management (CKM) plays a mediating role in the relationship between knowledge-oriented leadership (KOL) and innovation quality (INNOV) in SME firms.

#### *Innovation quality and firm performance*

SMEs often encounter resource restrictions; however, they are considered successful innovators ([Verhees & Meulenbergh, 2004](#)). [Sok, O'Cass and Sok \(2013\)](#) developed a unified model to examine the combined effect of marketing, innovation, and learning capabilities on firm performance. They found a positive relationship among the variables while the capabilities interact, leading to synergy. In addition, [Afriyie, Du & Musah, 2019](#) recently found a significant positive relationship between innovation and marketing performance in SME service firms while transformational leadership positively moderates the relationship.

On the contrary, another extant study claimed that SMEs faced limited access to the resources necessary for innovative activity; therefore, SMEs should develop other abilities instead of innovativeness, as innovativeness in many configurations does not lead to increases in the financial and marketing performance of the firm ([Kusa, Duda & Suder, 2021](#)). Although discrepant views exist in the literature, recent studies suggest a positive relationship between innovation and financial performance. For example, [Bigliardi \(2013\)](#) examined the effect of innovation on the financial performance of 98 SME firms in the food machinery industry and found that higher levels of innovation increased financial performance. [Wang and Wang \(2012\)](#) studied knowledge sharing, innovation, and firm performance, particularly on operational and financial performance, and found that innovation quality significantly affects financial performance.

Several scholars provided empirical evidence to support a relationship between innovation and firm operational performance. [Lai, Hsu, Lin, Chen and Lin \(2014\)](#) examined the relationship between knowledge management practices on innovation and innovation and firm operational performance among Malaysian SMEs in the manufacturing and services industry. They found that a positive relationship exists between innovation and operational performance. [Taherparvar et al. \(2014\)](#) also found that CKM has a significant positive effect of innovation quality on both financial and operational

perspectives of firm performance in their study. Based on these past studies, we propose the following hypotheses:

**Hypothesis 5a.** Innovation quality (INNOV) has a significant positive effect on (a) marketing performance (MK), (b) financial performance (FIN), and (c) operational performance (OPER) in SME firms.

#### *CKM and firm performance*

[Soliman \(2011\)](#) found a strong positive relationship between CKM and marketing performance in his study of financial institutions in the Arab Republic of Egypt. Similarly, [Fidel, Schlesinger and Cervera \(2015\)](#) found that CKM possessed a stronger effect on marketing results when compared to customer collaboration's effect on marketing results in their study of 210 SMEs in Valencia. As far as we know, only a few empirical studies have investigated the relationship between CKM and marketing performance ([Fidel et al., 2015, 2018; Soliman, 2011](#)). Thus, this presents an opportunity for this paper to fill the research gap.

According to [Fallatah \(2018\)](#), firms that generate more valuable knowledge are anticipated to have better financial performance than firms that generate less valuable knowledge. [Forstenlechner, Lettice and Bourne \(2009\)](#) confirmed that knowledge management activities contributed positive financial results (fee, income, productivity, and cost transparency), even for law firms. Interestingly, [Luhn, Aslanyan, Leopoldseeder and Priess \(2017\)](#) studied knowledge management processes in Austrian firms and found a positive relationship with financial performance in terms of economic value-added, net profit, market share, and return on investment.

Although [Ngo and O'cass \(2013\)](#) studied the indirect effect of customer participation on operational performance, only a few papers ([Taherparvar et al., 2014](#)) have studied the direct effect of CKM on operational performance. [Taherparvar et al. \(2014\)](#) study confirmed that CKM significantly positively affects operational performance. This means that if firms adopted CKM, they would have better performance. However, this relationship is also understudied in literature. From these studies, we hypothesize:

**Hypothesis 6.** Customer knowledge management (CKM) has a significant positive effect on (a) marketing performance (MK), (b) financial performance (FIN) and (c) operational performance (OPER) in SME firms.

#### *Mediating effect of innovation quality*

Many past studies have mentioned that CKM can enhance firm performance indirectly through innovation capability ([Garcia-Murillo & Annabi, 2002; Gibbert et al., 2002; Taherparvar et al., 2014](#)). [Ferraresi, Quandt, dos Santos and Frega \(2012\)](#) studied effective knowledge management, strategic orientation, innovativeness, and business performance among 241 Brazilian companies investigating whether knowledge management leads to strategic orientation to improve innovativeness and whether the three factors lead to better firm performance. Interestingly, the researchers found no significant direct relationship between knowledge management and innovativeness; however, the relationship is significant when mediated by strategic orientation. [Fidel et al. \(2018\)](#) discovered that firms could integrate and employ CKM, customer orientation, and innovation orientation for promoting firm performance, such as innovation quality and marketing outcomes. Besides a positive direct effect of CKM on financial and operational performance, [Taherparvar et al.'s \(2014\)](#) study also proved the significant indirect effect of CKM on firm performance through innovation capability. Based on this discussion, we posit the following hypotheses:

**Hypothesis 7.** Innovation quality (INNOV) mediates the relationships between (a) customer knowledge management (CKM) and marketing



performance (MK), (b) customer knowledge management (CKM) and financial performance (FIN), and (c) customer knowledge management (CKM) and operational performance (OPER) in SME firms.

### *The moderating role of competitive intensity*

Since the competitiveness in the market can decrease the knowledge resources for innovation quality, especially for SMEs, CKM is deemed to be disturbed when competitive intensity increases. In an intensely competitive environment, customers can easily and quickly switch to other products and service providers. This makes SMEs' attempts to engage with their customers more difficult; therefore, the CKM-innovation relationship will likely be affected. Although an empirical study supports the moderating effect of competitive intensity on the relationship between knowledge management and innovativeness (Kmieciak & Michna, 2018), no study has investigated the moderating effect of competitive intensity on the CKM and innovation quality. Regardless of the CKM's possible positive impact on innovation quality, a crucial condition like competitive intensity in the market may negatively moderate the association of the two variables. Therefore, we propose the following hypothesis:

**Hypothesis 8.** A higher level of competitive intensity (COMP INT) decreases the influence of customer knowledge management (CKM) on innovation quality (INNOV).

## **Methodology**

### *Sample and data collection*

Data were collected from SMEs that were previous or are existing members of Business Networking International (BNI) in Thailand. BNI Global is the world's leading business networking and referral organization, which brings entrepreneurs from different industries together. In terms of representing Thailand, BNI has 45 chapters with over 1500 members in many provinces all over Thailand, including Chiang Mai, Chiang Rai, Khon Kaen, Phuket, Korat, Phitsanulok. Therefore, it is expected that the sample could represent SMEs in Thailand. SMEs in this study refer to firms that employ not more than 200 people in the manufacturing industry; employ not more than 100 people in the trade and service industry, or which earn a sales revenue not more than 500 million THB (approximately 15 million USD) in the manufacturing industry; earn a sales revenue not more than 300 million THB (approximately 9 million USD) in the trade and service industry (OSMEP (The Office of Small and Medium Enterprises Promotion), 2017).

We used the minimum sample size recommended by Hair, Sarstedt, Matthews and Ringle (2016) for a statistical power of 80% in PLS-structural equation modeling (SEM) to calculate the minimum sample size. The study requires 137 observations for a significant level of 5% and a minimum R-squared value of 0.1. The convenient sampling method was employed for data collection. We sent the web-based online questionnaire to 731 previous and existing BNI members, either enterprise owners or managers and 303 answers were returned. After deleting incomplete responses, 283 valid data were left, which is about a 38.71% valid response rate.

### *Measurement*

After conducting the comprehensive literature review, we developed the questionnaire items by adopting from previous studies. All items were measured on the seven-point Likert scale. We translated the questionnaires to the Thai language using the back-translation method since the samples were SMEs in Thailand. Additionally, another Thai faculty member, who specializes in marketing, revised

the questionnaire. A pilot study was carried out by distributing 30 questionnaires to the respondents.

The questionnaire was comprised of six main parts. Ten questions about the respondents' background information and their firms were asked in the first part. In the second part, seven items from Donate and de Pablo (2015) were adapted to assess KOL. These items involve the aspects of the interaction between the leader and employees in the firm and how the leader encourages a learning environment through leadership.

CKM was assessed in the third part with 13 items adapted from Taherparvar et al. (2014). These items measure three aspects of CKM: the firm's knowledge about customers, knowledge for customers, and knowledge from customers.

Five items from Taherparvar et al. (2014) and Wang and Wang (2012) were adopted in the fourth part for innovation quality. The items include how well a firm generates new ideas, develops new products and services, launches new products and services, uses new technology and equipment, and solves customers' problems.

The fifth part aimed to assess the firm's marketing, financial, and operational performance. The marketing performance assessment included five items adapted from Fidel et al. (2018) to measure the extent to which firms achieve their goals and objectives in terms of the market. For financial performance, 12 items were adapted from Inman, Sale, Jr, K. and Whitten (2011), Khamwon and Speece (2005), and Day and Fahey (1988) to measure sales, return on investment, profit, profit growth, business growth, and cash flow by comparing the overall performance of the firm in the past two years and the average competitor in the past two years. Operational performance was measured through six items which Taherparvar et al. (2014) and Wang and Wang (2012) developed. The items included customer satisfaction, product development, cost management, service quality through responsiveness, past performance, and management.

The last part contained four items adapted from Grewal and Tan-suhaj (2001), who adapted the items from Jaworski and Kohli (1993), to measure competitive intensity. The questionnaire items of this construct reflect cutthroat competition, promotion wars, strong price competition, and new competitive moves; and were measured through self-report data.

### *Data analysis method*

This study employed the SEM technique, a class of multivariate techniques that merge factor analysis and regression (Hair et al., 2016). To assess the research model, we used partial least squares (PLS), which is a multivariate analysis technique, to test the structural models (Barroso, Carrión & Roldán, 2010) in SmartPLS software. PLS is suitable when many latent variables are studied but when the sample size is not big (Chin, 2010). Following Chin (2010), we analyzed the PLS model using a two-step approach. First, we assessed the reliability and validity of the measurement model. Second, the study evaluated the structural model to examine how the proposed model's causal relationships are related to the collected data.

## **Results**

### *Validity and reliability*

Cronbach's alpha and composite reliability were investigated to measure construct reliability. The measurement model in Table 1 shows that Cronbach's alpha coefficient of each construct ranged from 0.85 to 0.95, meaning that all constructs are acceptable according to the recommended threshold value of 0.70 (Fornell & Larcker, 1981). In terms of composite reliability, all values ranged from 0.90 to 0.96, which is more than the recommended value of 0.70; hence, the constructs in our model are acceptable (Hair et al., 2016).

**Table 1.**  
Measurement Model.

Latent Variable	Indicators	Loads	Cronbach's Alpha	Composite Reliability	Convergent validity (AVE)				
Customer Knowledge Management	CKM_KAB1	0.62	0.90	0.92	0.51				
	CKM_KAB3	0.71							
	CKM_KAB4	0.68							
	CKM_KAB5	0.68							
	CKM_KFO1	0.73							
	CKM_KFO2	0.75							
	CKM_KFO3	0.80							
	CKM_KFO4	0.77							
	CKM_KFR1	0.74							
	CKM_KFR3	0.72							
Competitive Intensity	CKM_KFR4	0.62	0.85	0.90	0.69				
	COMP_INT1	0.79							
	COMP_INT2	0.88							
	COMP_INT3	0.80							
Firm Age Financial Performance	COMP_INT4	0.84	1.00	1.00	1.00				
	FIRM_AGE	1.00							
	FIRM_CFIN1	0.80							
	FIRM_CFIN2	0.83							
	FIRM_CFIN3	0.85							
	FIRM_CFIN4	0.88							
	FIRM_CFIN5	0.87							
	FIRM_CFIN6	0.85							
	FIRM_FIN1	0.79							
	FIRM_FIN2	0.71							
	FIRM_FIN3	0.74							
	FIRM_FIN4	0.78							
	FIRM_FIN5	0.81							
	FIRM_FIN6	0.74							
	Marketing Performance	FIRM_MK1				0.78	0.86	0.90	0.64
		FIRM_MK2				0.78			
FIRM_MK3		0.79							
FIRM_MK4		0.82							
FIRM_MK5		0.82							
Operational Performance	FIRM_OPER1	0.68	0.90	0.92	0.67				
	FIRM_OPER2	0.80							
	FIRM_OPER3	0.85							
	FIRM_OPER4	0.86							
	FIRM_OPER5	0.89							
	FIRM_OPER6	0.79							
Firm Size Innovation Quality	FIRM_SIZE	1.00	1.00	1.00	1.00				
	INNOV1	0.91							
	INNOV2	0.92							
	INNOV3	0.90							
	INNOV4	0.87							
Knowledge-Oriented Leadership	INNOV5	0.78	0.91	0.93	0.65				
	KOL1	0.84							
	KOL2	0.84							
	KOL3	0.86							
	KOL4	0.83							
	KOL5	0.77							
	KOL6	0.78							
KOL7	0.69								

Notes: Items CKM\_KAB2, and CKM\_KFR2 were dropped from the scale after measurement purification.

To assess convergent validity, the minimum threshold of average variance extracted (AVE) should be more than 0.50 (Bagozzi & Yi, 1988). In Table 1, AVE was in the range of 0.51 to 0.77, which exceeded the minimum threshold value of 0.50, confirming convergent validity. The discriminant validity was tested before analyzing the relationships among the constructs and between indicators and constructs. We calculated the square roots of AVEs and compared them with the correlations among the latent constructs to test discriminant validity (Fornell & Larcker, 1981). The square roots of AVEs are more than the 0.7 minimum threshold, and all values are more than the correlations among the latent constructs; thus, it is valid.

*Analysis of structural model*

The results indicate that all independent variables explained the dependent variables well. R-square of 0.48 in CKM indicates that 48%

of CKM variance was explained by the independent variable - KOL. The latent variables explain 43% of the variance ( $R^2 = 0.43$ ) in MK, 38% of the variance ( $R^2 = 0.38$ ) in FIN and 46% of the variance ( $R^2 = 0.46$ ) in OPER.

The positive and significant effect of KOL ( $\beta = 0.69, p < .001$ ) on CKM supports Hypothesis 1, which claimed that KOL has a positive and significant effect on CKM in SME firms. For Hypothesis 2 (CKM has a positive and significant effect on INNOV in SME firms), the result indicates that the hypothesis is supported ( $\beta = 0.37, p < .001$ ). Hypothesis 3 is also supported with a positive and significant effect of KOL ( $\beta = 0.22, p < .01$ ) on INNOV.

We found that INNOV has a significant positive effect on MK for innovation and marketing performance. Therefore, Hypothesis 5a is supported ( $\beta = 0.27, p < .001$ ). Regarding INNOV and FIN, the result shows that INNOV positively influences FIN and Hypothesis 5b is supported ( $\beta = 0.46, p < .001$ ). For the last relationship between INNOV

**Table 2.**  
Structural Model.

Hypotheses	Relationship between constructs	Coefficients	t-Statistics	Results
H1	KOL → CKM	0.69***	19.399	Supported
H2	CKM → INNOV	0.37***	4.467	Supported
H3	KOL → INNOV	0.22**	2.769	Supported
H5a	INNOV → MK	0.27***	4.785	Supported
H5b	INNOV → FIN	0.46***	8.080	Supported
H5c	INNOV → OPER	0.53***	10.286	Supported
H6a	CKM → MK	0.41***	6.684	Supported
H6b	CKM → FIN	0.17**	2.470	Supported
H6c	CKM → OPER	0.20***	3.432	Supported
Control variables	AGE → MK	0.00	0.054	
	AGE → FIN	-0.05	1.047	
	AGE → OPER	-0.03	0.572	
	SIZE – EMP → MK	0.15**	3.220	
	SIZE – EMP → FIN	0.02	0.346	
	SIZE – EMP → OPER	0.03	0.755	
	SIZE – REV → MK	0.01	0.187	
	SIZE – REV → FIN	0.17**	3.003	
	SIZE – REV → OPER	0.15**	2.917	

Notes: \**p* < .05; \*\**p* < .01; \*\*\**p* < .001 (One-tailed test for hypotheses and two-tailed test for control variables).

and firm performance, the result proves that INNOV has a positive relationship with OPER supporting Hypothesis 5c ( $\beta = 0.53, p < .001$ ). Among the firm performance variables, INNOV has the greatest influence on OPER. The detailed results are shown in Table 2.

CKM and the three firm performance indicators also show significant positive relationships between the variables. In terms of CKM and MK, Hypotheses 6a is supported where the t values of the relationship are at 6.684 ( $\beta = 0.41, p < .001$ ). For Hypothesis 6b, CKM and FIN also show a significant positive effect supporting the hypothesis ( $\beta = 0.17, p < 0.01$ ). Regarding CKM and OPER, the study’s result also indicates that CKM positively affects OPER. Therefore, Hypothesis 6c is supported ( $\beta = 0.20, p < 0.001$ ). And CKM has the greatest influence on MK among the firm performance variables.

**Mediating analysis**

We also applied bootstrap routines to test the significance of the indirect effect. In Smart-PLS, the bootstrap routines provide direct

effects. The standard error of  $a \times b$  obtained from the bootstrap statistic was used to conduct the pseudo *t*-test and assess whether the indirect effect  $a \times b$  is significant or not. From these calculations, the indirect effects are demonstrated in Table 3. This study follows Zhao et al. (2010) to determine (1) the significance of the indirect effect and (2) the type of mediation. Table 3 demonstrates that there is a significant indirect effect in the relationship. Since the direct effect of KOL and innovation quality is significant, CKM has a partial mediating effect in the relationship between KOL and INNOV; therefore, Hypothesis 4 is supported ( $\beta = 0.26, p < .001$ ). This means INNOV is more effective due to KOL when having CKM as a mediator.

We also explored the mediating effect of INNOV in the relationship between CKM and firm performance (marketing, financial, and operational performance). There are both significant direct and indirect effects between CKM and firm performance (marketing, financial, and operational performance). This means INNOV possesses a partial mediating effect in the relationship between CKM and all three dimensions of firm performance. Hypothesis 7a ( $\beta = 0.10, p < .01$ ), Hypothesis 7b ( $\beta = 0.17, p < .001$ ) and Hypothesis 7c ( $\beta = 0.20, p < .001$ ) are supported.

**Moderating analysis**

To explain ‘when’ in the model, this research tested the moderation effect of COMP INT. Table 4 shows that the moderating effect of COMP INT on the relationship of CKM with INNOV is significant supporting Hypothesis 8 ( $\beta = -0.14, p < .05$ ). Hypothesis 8 predicts that a higher level of COMP INT decreases the influence of CKM on INNOV. Thus, the COMP INT weakens or negatively moderates the relationship between CKM and INNOV, and the hypothesis is supported.

**Discussion**

Considering the positive relationship between KOL and CKM, this study’s results are congruent with many similar empirical studies of Donate and Sánchez de Pablo (2015) and Naqshbandi and Jasimuddin (2018), who studied KOL and knowledge management. This study also confirms Yang et al.’s (2014) finding that firms adopting knowledge leadership can improve CKM. With KOL, positive cultural orientation towards CKM will emerge in organisations. This means

**Table 3.**  
Structural Model: Mediation.

H:	Relationship between constructs	Direct effect	Indirect Effect	t-statistics	Results	Mediation
H1	KOL → CKM	0.69***		19.399		
H2	CKM → INNOV	0.37***		4.467		
H3	KOL → INNOV	0.22**		2.769		
H4	KOL → CKM → INNOV		0.26***	4.354	Supported	Partial
H5a	INNOV → MK	0.27***		4.785		
H5b	INNOV → FIN	0.46***		8.080		
H5c	INNOV → OPER	0.53***		10.286		
H6a	CKM → MK	0.41***		6.684		
H6b	CKM → FIN	0.17**		2.470		
H6c	CKM → OPER	0.20***		3.432		
H7a	CKM → INNOV → MK		0.10**	3.273	Supported	Partial
H7b	CKM → INNOV → FIN		0.17***	3.918	Supported	Partial
H7c	CKM → INNOV → OPER		0.20***	4.097	Supported	Partial

Notes: \**p* < .05; \*\**p* < .01; \*\*\**p* < .001 (one-tailed test for hypotheses H1 – H3, H5a – H6c) and two-tailed test for H4, H7a–H7c).

**Table 4.**  
Structural Model: Moderation.

Hypotheses	Relationship between constructs	Coefficients	t-statistics	Results
H8	CKM * COM INT → INNOV	-0.14*	1.714	Supported

Notes: \**p* < .05; \*\**p* < .01; \*\*\**p* < .001 (one-tailed).

knowledge-oriented leaders encouraged open innovation together with trial and error, leading to acquiring, assimilating, and exploiting knowledge for the customers.

This study's results indicate that CKM contributes to innovation quality in SME firms. Gathering knowledge from the customers may help create innovation quality by bringing in external points of view and practical and more creative ideas to connect and develop the products or services in SMEs. The findings align with previous findings that claimed CKM could enhance innovation (Fidel et al., 2018; Gorry & Westbrook, 2013; Taherparvar et al., 2014). This study also conforms with prior studies (Fidel et al., 2018; Lin et al., 2012; Taherparvar et al., 2014) that found positive relationships of CKM with innovation. Since customers are the holders and contributors of new ideas and knowledge for firms (Gorry & Westbrook, 2013), especially SMEs, customer engagement and other customer knowledge activities should be encouraged for firms' innovation.

The positive relationship between KOL and innovation quality supports Naqshbandi's and Jasimuddin's (2018) study, which found that KOL is the key factor for firms to gain innovation performance in the international business context. Additionally, the findings of this study comply with Zia's (2020) result, which found a positive association between KOL and innovation performance in the project-based SME firm context. From these results, SME firms that focus on innovation quality should adopt KOL to enhance innovation performance.

A positive relationship between innovation quality and three dimensions of firm performance (marketing, financial, and operational performance) was also found. This means innovation quality improves SME firms' performance in all three dimensions. With limited resources, SMEs need to be innovative to compete with other competitors. This study has also found a positive relationship between innovation quality and marketing performance. It agrees with Afriyie et al. (2019), who assert that innovation positively affects marketing performance in SME service firms. This finding also fills the research gap of Fidel et al. (2018), who empirically studied the effects of customer orientation and CKM on innovation and capacity and marketing performance but did not examine the relationship between innovation capacity and marketing performance. Since innovation quality can play a critical role in influencing marketing performance, SME firms should emphasize innovation quality to achieve competitive advantage.

This study shows a positive association between innovation and financial performance, similar to Wang and Wang's (2012) empirical study about knowledge sharing, innovation, and firm performance of high technology firms in China. Additionally, this result confirms Bilgiliradi's (2013) findings in the SMEs that higher levels of innovation lead to better financial performance. In sum, the empirical evidence supports the notion that innovation quality enhances the financial performance of SME firms.

Contrary to Wang's and Wang's (2012) findings, this study shows a positive association between innovation quality and operational performance. In fact, innovation quality has the greatest influence on operational performance among the firm performance variables. This could be because innovation quality is the total innovation performance at every level within an organization (Haner, 2002; Taherparvar et al., 2014; Wang & Wang, 2012), while operational performance is the progress a firm makes in response to changes. And operational performance indicates how well a firm responds to the changing environment compared to its competitors (Flynn, Huo & Zhao, 2010; Lai et al., 2014). The results also confirm Lai et al.'s (2014) study that found a positive relationship between innovation and operational performance.

Besides innovation quality, CKM was also positively affected marketing, financial, and operational performance. This means that the better SMEs manage and utilize the knowledge from customers, the higher marketing, financial, and operational performance the SMEs will be. Although few papers examined the association of CKM and

marketing performance, the results of this study are in line with previous empirical studies (Fidel et al., 2015, 2018; Soliman, 2011). According to Santos-Vijande, González-Mieres and López-Sánchez (2013), customer involvement has a favourable impact on customer outcomes (satisfaction and loyalty) as well as company performance (revenues and market share). Since marketing performance assesses how well companies can achieve their market-related goals, including customers (Fidel et al., 2018), undoubtedly, CKM has the greatest influence on marketing performance among the firm performance variables.

Moreover, this study highlights the mediating effect of CKM as this study is one of the very few to empirically test CKM as a mediator. Since CKM is considered as external knowledge management associated with customers (Zhang, 2011), the results of this study correspond to the preceding research that study knowledge management where CKM plays a mediating role in the relationship between KOL and innovation quality (Jansen et al., 2006; Donate & Sánchez de Pablo, 2015; Naqshbandi & Jasimuddin, 2018). This means KOL is an important driving force for CKM and CKM leads to KOL's indirect effect on innovation quality for SMEs. In other words, even though CKM is important for innovation quality, managers and owners of SMEs also need to focus on KOL since KOL is a key driver for CKM in SMEs, and it can indirectly affect innovation quality.

Finally, this paper emphasizes another mediating effect we found in the mediation of innovation quality on the relationship of CKM and firm performance. If considering CKM as external knowledge management associated with customers (Zhang, 2011), the results of this study, which show that innovation quality partially mediates the relationship, agree with several past studies (Ferraresi et al., 2012; Garcia-Murillo & Annabi, 2002). This means that the correlation between CKM and SME performance is greater when innovative quality is considered in your model. Since Fidel et al. (2018) studied only the mediating effect of innovation capability in the relationship between CKM and marketing performance while Taherparvar et al. (2014) studied only the mediating effect of innovation capability on the relationship between CKM and financial performance and between CKM and operational performance, our findings extend the literature on these variables.

This study found that competitive intensity negatively affects the relationship between CKM and innovation quality. In other words, a higher level of competitive intensity decreases the influence of CKM on innovation quality. The rationale for this result could be that SME firms may encounter more difficult situations when competition becomes more intense. Customers might switch to other products or service providers, making SME firms unable to engage with their customers effectively; therefore, innovation quality may decline.

#### *Practical implications*

The conceptual framework of this paper could be used for further studies in other contexts and longitudinal research. In addition, this study fills in the research gap of Fidel et al. (2018), who suggested studying the consequence variables of CKM such as financial performance and the mediating effect of innovation orientation, such as innovation quality. It also fills in the research gap of Taherparvar et al. (2014), who suggested that the effect of moderating variables could be studied to complete their research model, and Zahari, Wahid and Mahmood (2019), who suggested that other external factors such as competition should be included. Finally, this study fills the research gap of several studies that suggested testing KOL, CKM, innovation quality, and firm performance in developing countries where these studies are rare (Al-Sa'di et al., 2017; Donate & de Pablo, 2015; Fidel et al., 2018).

This article has numerous managerial ramifications for managers and business owners. The findings of the study show how KOL, CKM, and innovation quality may help managers and owners achieve



better marketing, financial, and operational results. This study aims to persuade managers and owners to recognize the value of KOL in promoting CKM and boosting company performance. It also encourages SMEs to work more closely with their consumers, as they are the key to gaining a competitive edge. Managers and owners of SME businesses will benefit from having knowledge about customers, knowledge for customers, and knowledge from customers. Finally, solving customer problems efficiently and effectively should also be one of the primary key success factors for SME firms to gain a competitive advantage.

#### Limitations and suggestions for further research

Regardless of the contributions of the paper, there are still some limitations. Since the data were collected from a sample of SMEs from various industries in Bangkok, the generalization of the results can be limited. As this study is cross-sectional, data is collected at one specific time point. The influence of industry type and market share on CKM is not determined in the present study. For instance, firms in the service industry can have more CKM than the manufacturing industry since they are closer to the customers; therefore, it is more likely that customers will share their knowledge and experience with them. In addition, the importance of CKM may vary across different industries. The study also proposes only one moderator (competitive intensity); thus, other applicable variables should also be considered to facilitate the relationships among the variables.

As this study was carried out in Thailand, we suggest testing our research model in other geographical areas for future research. Longitudinal research is suggested over multiple time points to examine whether KOL, CKM, and innovation quality sustainably improve firm performance. Using the conceptual framework as a foundation to examine SME firms in specific industries like the cosmetic industry, lodging industry, and restaurant industry is also recommended. Besides the type of industry, future research could also focus on a certain stage of the product life cycle. For instance, CKM and innovation quality can be more important in certain stages like the “introduction and growth” stage rather than the “maturity” stage.

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