Customer knowledge management, innovation capability and business performance: a case study of the banking industry

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Abstract

Purpose – *This paper aims to examine the effect of customer knowledge management (CKM) on continuous innovation and firm performance in 35 private banks in Guilan (Iran). CKM emerges as an important and effective system for innovation capability and firm performance. However, the role of CKM in innovation and performance is not well understood.*

Design/methodology/approach – *Data have been collected via questionnaires from managers of private banks in Guilan. Feedback was received from 265 managers in 350 distributed questionnaires, and hypotheses were tested using the structural equation modelling.*

Findings – *The results of this paper indicate that knowledge from customers has a positive impact on both innovation speed and innovation quality as well as operational and financial performances. Also, our results demonstrate a different effect of knowledge about customer and knowledge for customers on various dimensions of innovation and firm performance. By using customer's knowledge flows, firms will be aware of external environment and new changes in customers' needs and so will be more innovative and perform better.*

Practical implications – *CKM is known as an important system to connecting internal environment to external environment to create novel ideas. The results of this paper shed light on the consequences of CKM on firms and provide support for the importance of CKM to enhance innovation capacity and firm performance.*

Originality/value – *This article is one of the first to find empirical support for the role of CKM within firms and its importance on innovation capability and firm performance. This study can provide valuable insights and guidance for researchers and managers as well.*

Keywords *Business performance, Innovation capability, Customer knowledge management*

Paper type *Research paper*

1. Introduction

Over the past years, the importance of external sources, particularly customer knowledge, has been highlighted by both practitioners and academics (Joshi, 2004). Today's customers have become more innovative and active and can easily communicate with other customers and firms anywhere in the world. Therefore, customers have valuable information and knowledge, which can be used as important sources for competition (von Hippel, 2001; Bolton and Shruti, 2009; van Doorn, 2010; Hoyer *et al.*, 2010). However, customer knowledge does not constitute a strategic advantage by itself; it needs to be managed (Hollebeek, 2013).

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By increasing the position of the customer in the marketplace, new approaches to essential questions such as "how to innovate", "how to achieve a competitive advantage", "how to create value" or "how to reach superior performance" have to be considered. For example, von Hipple (1986) and Chesbrough (2006) have pointed out the importance of customer information, knowledge and competence in the innovation process. According to Belkahla

> **"CKM is a new organizational approach to capturing, sharing and using the information, knowledge, experience and ideas related to customers."**

and Triki (2011), absorptive capability is necessary for innovation capability. Cohen and Levinthal (1990) have stated that absorptive capability allows firms to absorb external knowledge and manage it internally. This capability helps firms to identify outside opportunities and provides new knowledge for innovation. Matthing *et al.* (2004) have argued for a newly customer-centric view where competitive advantage is defined and cocreated with the customers. By rejecting the traditional models of closed innovation and the firm-centric view of value, these new approaches emphasize the use and management of customer knowledge as the main source for providing new outcomes (Smith and McKeen, 2005; Monica Hu *et al.*, 2009). Hence, firms have recently started to implement customer knowledge management (CKM) to engage customers in the firms' processes and utilize their knowledge and ideas (Nambisan, 2009; Ngo and O'Cass, 2012).

CKM is a new organizational approach to capturing, sharing and using the information, knowledge, experience and ideas related to customers. By engaging customers in a firm's process, CKM connects external environment to internal environment (Chen, 2008) and transfers and shares information not only among customers and within firms but also between customers and firms (Zhang, 2011). In fact, when CKM is applied, customers' roles change from being purely passive recipients of products/services to being coequal partners in the process of adding value (Gibbert *et al.*, 2002).

In recent years, CKM has been regarded as a key source for innovation capability and business performance (Tzokas and Saren, 2004; Rollins and Halinen, 2005; Rupak, 2008). Through effective use of CKM, absorptive capability can be increased by a process of identifying, disseminating and applying knowledge from, for and about customers (Sulaiman *et al.*, 2011; Hoyer *et al.*, 2010). As Adams (2003) and Cardinal (2001) have mentioned, availability of knowledge is essential for innovation. Therefore, by improving absorptive capability, more knowledge is provided for the innovation process and firms then have greater innovation capability.

On the other hand, according to the knowledge-based theory, competitive advantage and superior performance are strongly dependent on firms' knowledge. With CKM, firms create new knowledge and learn from it to enhance their competitive advantage (Su *et al.*, 2006) because new knowledge developed today will become the core knowledge of tomorrow. By considering customer knowledge as a main source of new knowledge, and through its effective management, firms can better improve their ability to perform and to compete against their competitors (Yeung *et al.*, 2008).

In this paper, we argue that CKM enables firms to extract more from external resources, which enhances their innovation capability and firm performance. Despite the importance of CKM, the fundamental relationships among CKM, innovation capability and business performance have not been examined yet in previous studies. The present research addresses this gap by exploring the relationships among CKM, innovation capability and business performance. Our research further differs from prior works in three ways. Few studies have linked CKM and business performance directly; this research tries to fill this gap. Moreover, this study not only testifies to the effect of CM on business performance but also explores the effect of CKM on innovation capability. Finally, by discussing the effect of CKM on innovation capability, which leads to superior business performance, this study proposes that when complex and unpredictable situations happen, managers should

simultaneously focus on customer-oriented strategies and innovation to outpace their competitors.

The rest of the paper is arranged as follows. First, a literature review of CKM, innovation capability and business performance provides an overview of the key issues. Second, we develop a research model to develop a hypothesis. We then provide a research methodology for the data collection and measure validation procedures. Finally, data analysis, findings and concluding remarks are presented, followed by the conclusion of the study.

2. Literature review

2.1 Customer knowledge management

Owing to the importance of customers and their increased competencies and abilities, firms should engage customers in their internal process (Teece, 2010) to manage customer knowledge and access to important sources of information and ideas (Rollins and Halinen, 2005). By acquiring, sharing, transferring and utilizing information, knowledge and ideas related to customers, CKM effectively manages knowledge from the customer perspective and provides important sources for novel ideas. These can be used to develop new products/services and new solutions for satisfying customers' needs and problems (Garcia-Murillo and Annabi, 2002; Xu and Walton, 2005; Peng *et al.*, 2009).

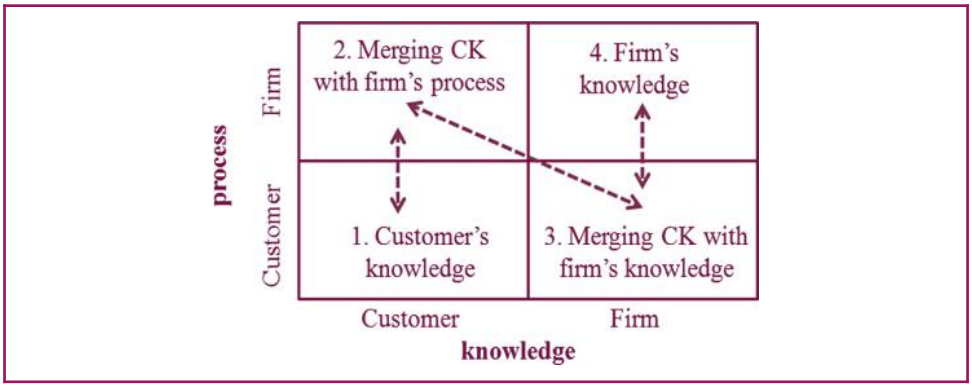
CKM supports the exchange of customer knowledge within a firm and between customers and firms to learn from, about and with customers. In fact, CKM is a learning process from which both customers and firms, sharing their experience and knowledge, learn from each other, solve their problems and take advantage of the exchange process benefits (Plessis, 2007).

CKM improves the absorptive capacity of a firm, which is defined by Cohen and Levinthal (1990) as a special capability that allows a firm to gain and absorb external knowledge and manage and develop it internally. In fact, CKM recognizes and identifies the value of new external knowledge and invests in customers' competencies to assimilate and utilize them for commercial ends, which is essential for a firm's innovation (Belkahla and Triki, 2011).

To access customer knowledge takes a lot of effort because it is embedded in the customer's mind as tacit knowledge. Through CKM, customers are encouraged to share their experiences with other customers to solve their problems. Knowledge workers can use these experiences and extract useful information from them; these then become an important source of innovative ideas and competitive advantage. However, exchanging customers' tacit knowledge (customers' experience, ideas, information, problems, needs and data) to explicit knowledge (useful ideas for solving customers' problems and helpful ideas for new innovative services or for improving current services) is not as easy as it may seem. In Figure 1, rectangle 1 shows the position of customer knowledge and rectangle 4 shows the position of firm knowledge. CK does not have a direct connection with FK. Therefore, knowledge workers must make some fundamental changes to change external and tacit knowledge into internal and explicit knowledge. CK exclusively stands for customer knowledge with customer-oriented processes, which must first merge with firms' processes (rectangle 2). This then becomes firms' knowledge with a customer-oriented process (rectangle 3) and finally converts to the last rectangle and becomes meaningful

"CKM enables firms to extract more from external resources, which enhances their innovation capability and firm performance."

Figure 1 Converting customer's knowledge to firm's knowledge



firms' knowledge with firms' processes. The linkage between rectangles 4 and 3 indicates the complete merger of customer knowledge with firm knowledge. In rectangle 4, customer knowledge has passed through different levels and has penetrated to a deeper layer of the firm. Therefore, the customers' usual data and information becomes useful, valuable and inimitable knowledge for firms, which can not only be used to solve customers' problems but also becomes an important source of innovative ideas and competitive advantage.

CKM pays attention to both customer knowledge and firm knowledge and invests in both external and internal competencies, so it enables firms to create new products and services to respond to variable market situations. Data, information and knowledge, which are gathered by CKM, are important sources for competitive advantage because they are embedded in a firm's process and are difficult for competitors to imitate (Garcia-Murillo and Annabi, 2002; Campbell, 2003; Zhang, 2011).

CKM consists of three main flows: knowledge from customers, knowledge about customers and knowledge for customers (Garcia-Murillo and Annabi, 2002; Gibbert *et al.*, 2002; Gebert *et al.*, 2003). Using knowledge from customers and knowledge about customers, CKM can inform firms of customers' changing needs, and through knowledge for customers, CKM can provide required information for customers.

Knowledge from customers is customers' information about products, competitors and markets, which is acquired from customers to understand the external environment (Garcia-Murillo and Annabi, 2002). This kind of knowledge has a tacit nature and improves innovation capability, which leads to new product advantages. However, a greater challenge for firms is to exploit knowledge from customers and turn it into explicit knowledge (Desouza and Awazu, 2005). The use of social media, such as discussion forums, is an important tool used by CKM that can help firms gain knowledge from customers. In these forums, diverse people with different levels of knowledge can express their needs, problems and doubts (Maswera *et al.*, 2006), and firms can use this information to make sense of community perspectives to develop new ideas, improve current products/services and launch new and innovative products/services.

Knowledge about customers has a explicit nature and includes looking into customers' backgrounds, transaction histories, customer motivations and wants, etc. which help firms better understand customer's needs (Smith and McKeen, 2005).

Knowledge for customers includes everything that a firm provides for customers to help them, satisfy their knowledge needs and promote the level of their knowledge. The nature of this knowledge is explicit and affects the customer's perception of service quality (Gebert *et al.*, 2003). Document repositories and workflow applications are CKM tools, which access information for customers and help them to make better decisions. Firms can

use these tools to provide knowledge for customers (Lopez-Nicolas and Molina-Castillo, 2008).

In general, knowledge from customers creates long-term benefits by developing new ideas and continuously improving products/services; knowledge about customers creates short-term value by improving effectiveness; and knowledge for customers creates short-term value by improving customers' experience and information and increasing a firm's validity (Smith and McKeen, 2005).

Using customer knowledge flows to establish a co-creative environment for customer participation and interaction can help firms attain superior performance (Rollins and Halinen, 2005). For this reason, firms must put themselves in customers' mindset and pay attention to their intrinsic motivation. For example, to provide an interactive environment, many banks now offer cost-effective interactive sites to create highly personalized services to customers (including the virtual counter) and to diminish the real impact of the economic slowdown on customers' investment portfolios, thereby increasing the motivation of customers to participate as well as reducing the cost. In this way, banks have a special database of customers which allow them to be accessible to the customer (Gibbert *et al.*, 2002).

Furthermore, creating a knowledge sharing platform can be useful for providing an interactive environment. This platform allows firms not only to transact business (pay online, place orders) but also share and exchange knowledge (e.g. share good and bad experiences with other customers). Holcim.com is one of the successful firms using a knowledge sharing platform for engaging customers in the firm's process. Holcim's customers say: "we like the firm's knowledge sharing platform, because it listens to what we tell it and really take our comments very seriously!"

Another example of a successful firm using CKM is Threadless.com, a T-shirt manufacturer. This firm obtains the graphic designs for its T-shirts from its consumers who submit designs online. The most popular designs that are chosen by the Web site's members are sent into production and sales. In addition, chosen designers receive a monetary award and get to keep the rights to their designs (Beer, 2007; Liu, 2007). This process not only encourages many customers to register on the Web site and share their ideas and designs with the firm but it also helps the firm to create new designs that are accepted by its customers.

2.2 Innovation capability

Paying attention to innovation and supplying products/services in accordance with the changing needs of customers are the most important goals of any firm in an era which is characterized by short product life cycles, dynamic markets and complex processes (Lolfsten, 2005). Innovation is creating new knowledge and ideas to facilitate business results and improve firms' processes and produce new products/services (Plessis, 2007). In recent years, due to the importance of customer knowledge and information as one of the main sources of knowledge and ideas, many firms are increasingly shifting to open innovation and customer-driven innovations models in which useful information, knowledge, ideas and competence are widely disseminated outside the borders of any particular firm (von Hipple, 1986, Chesbrough, 2003, 2006). In fact, firms put a stronger focus on connect and develop (C&D) than research and development (R&D). The C&D model assumes that innovative ideas suggested by customers are more creative and more effective than inside personnel's ideas and therefore affect innovation speed and innovation quality, both of which are two important dimensions of innovation (Sakkab, 2002; Magnusson, 2003). Innovation speed is the elapsed time between initial development (including the conception and definition of an innovation) and ultimate commercialization of new products/services (Wang and Wang, 2012). Innovation quality is how launched products/services meet customers' needs and expectations (Lanjouw and Schankerman, 2004). According to Lanjouw and Schankerman (2004), innovation quality reflects the standardization, low tolerance and systematic procedure. In general, speed and quality in

innovation differentiates firms from their competitors and ultimately affect a business's superior performance (Wang and Wang, 2012).

Innovation is a way to overcome complex and changing situations, especially if firms use open innovation or customer-oriented innovation (Chesbrough, 2003, 2006). In fact, customers have an outside view on firms and have more realistic ideas, which are often more creative and more effective than inside ideas (Magnusson, 2003). In addition, attention on customers' ideas and needs creates faster ideas and launch much better innovative products/services. Therefore, paying attention to knowledge flows, which impact innovation speed and quality, is important for firms (Wang and Wang, 2012). Firms must develop special systems for co-creation and reintegration to be able to meet the needs of customers and satisfy them and also provide appropriate environments for engaging customers in innovation processes to better access customer knowledge and ideas for innovation (Hoyer *et al.*, 2010; Hollebeek, 2013).

3. Research model and hypotheses

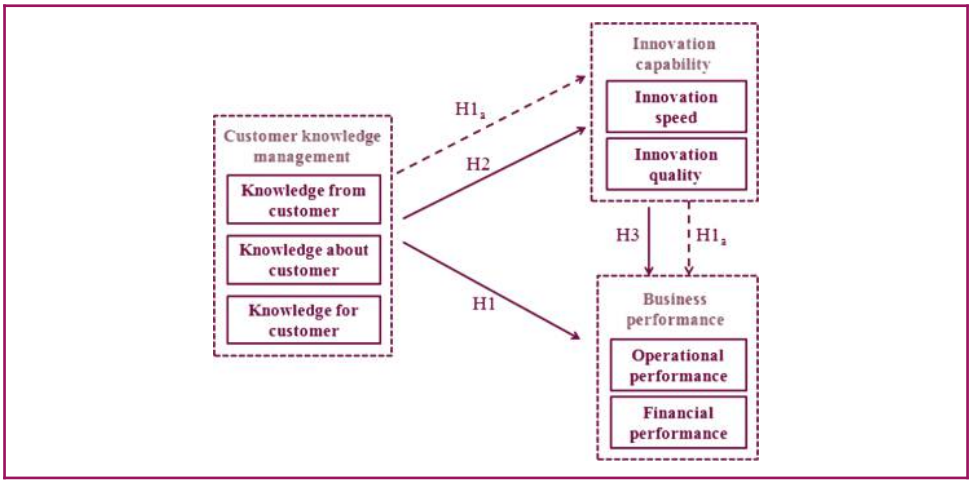
By providing appropriate feedback and a special environment for sharing information among customers, and between firms and customers, CKM enables firms to know what their customers know. So, through CKM, firms have access to an important source of novel ideas, which are suitable for innovation and performance. By proposing a conceptual model, which is shown in Figure 2, this paper aims to investigate the relationships among CKM, innovation capability and business performance.

3.1 CKM and business performance

Through increasing the number of competitors, customers have more options (Buckinx and Van den, 2005) and firms are matched with customers' needs and expectations. This attracts more customers and increases their satisfaction level (Das *et al.*, 2000). One of the effective practices aligned with the changing needs of customers is using and managing customers' knowledge as an important source of tacit knowledge.

In fact, to achieve a sustainable competitive advantage in comparison with competitors, not only are continuous observations of customers' perceptions and expectations of delivered products/services required but it is also vital to continuously interact with customers to exploit and apply their tacit knowledge. A successful knowledge partnership with important and valuable customers can strengthen business performance and create an inimitable competitive advantage that is difficult for the competition to duplicate.

Figure 2 The conceptual model



Customer knowledge allows firms to identify the unique features of market segments and formulate appropriate strategies for these segments. Therefore, firms that know their customers have better ability to identify opportunities and are more likely to better perform (Lee *et al.*, 2011). Moreover, the ideas acquired from CKM are more realistic, so they are more easily accepted by customers and market and better satisfy their needs. In fact, having a continuous ability to use and manage customer knowledge is vital for superior performance; therefore, firms need to continuously update their knowledge in accordance with their customers' information (Claycomb *et al.*, 2005; Da Silva *et al.*, 2002; Tuominen *et al.*, 2004).

Previously, Yang and Kang (2008) pointed to a direct and positive effect of customer capital on business performance and Lee *et al.* (2011) found that customer knowledge has a direct effect on firm performance. Ngo and O'Cass (2012) also explored the indirect effect of customer participation on operational performance. Although the empirical relationships between CKM and business performance have been investigated, only a few studies have considered the direct effects of CKM on business performance. In this study, based on the above discussions, we propose our first hypothesis:

H1. CKM has a direct and positive effect on business performance.

Prior research has shown that CKM can improve business performance indirectly through higher innovation capability (Garcia-Murillo and Annabi, 2002; Gibbert *et al.*, 2002; Gebert *et al.*, 2003; Rollins and Halinen, 2005). In addition, CKM is a kind of external knowledge management which is related to customers (Zhang, 2011). Therefore, prior research in the KM field can be used in the CKM field as well. Following Massey *et al.* (2002), Gloet and Terziovski (2004) and Yang (2010), we consider an intermediate variable between KM and business performance, that is, innovation capability (Lopez-Nicolas and Merono-Cerdan, 2011; Wang and Wang, 2012). Based on previous discussions, and considering that both academics and practitioners state that innovation capacity leads to superior performance and competitiveness (Calantone *et al.*, 2002), we posit the following:

H1a. CKM has an indirect and positive effect on business performance through an increase of innovation capacity.

3.2 CKM and innovation capability

In the knowledge economy, customer knowledge is becoming an important source of innovation process (Gann, 2000; Harty, 2005), which directly effects the discovery of innovative ideas and indirectly effects the efficiency of innovation (Lu, 2008). Hence, firms increasingly integrate their sources with sources of external actors, especially customers, to gain novel ideas for innovation capability. In fact, firms need to connect with customers to make them aware of the external changes and extract customers' ideas, information and knowledge. With the three main knowledge flows, CKM provides special feedback for firms to remain informed of customers' needs. Through CKM, customers can both receive and give immediate feedback and share their information, which is enhanced value creation and innovation (Johannessen and Olsen, 2010).

In general, customers play an active and significant role in innovation, as their ideas are much closer to market needs (Hoyer *et al.*, 2010). The ideas and knowledge of customers can produce new products/services or improve existing products/services, which may have been ignored by a firm. Therefore, if customers' knowledge is managed effectively, it can improve the innovation process and R&D activities (Rowley, 2002; Rollins and Halinen, 2005) and also affect the future of organizational innovation (Lopez-Nicolas and Molina-Castillo, 2008; Zhang *et al.*, 2009).

Through CKM, firms increase their integrative capacity, which is defined as a firm's ability to involve customers in the innovation process to create value (Belkahla and Triki, 2011). In passive integration, CKM gathers knowledge about customers through several methods, such as customers' purchase frequencies, their complaints analysis, their socio-demographic features, etc. On the other hand, in active integration, CKM gathers knowledge from customers

through several techniques, such as market studies, online discussion forums, social networks, focus groups with customers, etc. By providing knowledge about and from customers, CKM helps firms gain valuable information and ideas, which can be useful for the innovation process.

In the literature, CKM has been frequently identified as a main antecedent of innovation capacity. According to Berghman (2006) and Mukherji (2012), customers' participation and absorption of their knowledge is vital for innovation capability. Therefore, using CKM to engage customers in the innovation process and utilizing their ideas and knowledge is essential for firms (Auh *et al.*, 2007; Yi *et al.*, 2011). Gibbert *et al.* (2002) and Rollins and Halinen (2005) have also argued that CKM is one of the methods for improving innovation. Although the relationships between CKM and innovation capability have been empirically stated, none have explicitly considered the direct effect of CKM on innovation capability. To fill this gap, this paper proposes its next hypothesis:

H2. CKM has a direct and positive effect on innovation capability.

3.3 Innovation capability and business performance

In many studies, innovation capability has been considered a significant factor and an intangible asset for firms to create value and sustainable competitive advantage, which finally leads to superior performance (Weerawardena and O'Cass, 2004; Sher and Yang, 2005; Subramaniam and Youndt, 2005; Yang and Kang, 2008). In an innovation process, firms make continued efforts to achieve improvements and changes, which lead not only to making full use of current resources but also to bringing new intangible assets to firms (Plessis, 2007). On the other hand, firms with superior innovativeness are more successful in responding to customers' demands and needs (Calantone *et al.*, 2002; Sadikoglu and Zehir, 2010). A significant and positive relationship between innovation capability and business performance is fairly well established in the extant literature. For example, Jenny (2005), Lopez-Nicolas and Merono-Cerdan (2011) and also Wang and Wang (2012) have argued that innovation has a positive effect on business performance. On this basis, we propose our last hypothesis:

H3. Innovation capability has a direct and positive effect on business performance.

4. Research methodology

In this paper, a quantitative survey was used to empirically test the hypotheses. In the next part, we explain the sample, operational definitions and measurements of main variables.

4.1 Sample

This paper examined a sample of 35 private banks in Guilan, including the Pasargad Bank, Parsian Bank, Sina Bank, Ansar Bank, Ghavamin Bank, Iran-Zamin Bank, Eghtesade Novin Bank, Shahr Bank and Sarmaye Bank. Choosing private banks as a sample for this study has two advantages. First, due to fierce competition, customers play an essential role in private banks and most banks have CKM systems to connect with their customers and apply external ideas which can be used to launch innovative services more quickly than their competitors. Second, due to the diversity of different private banks in Iran, customers have a wide range of options from which to choose. Therefore, to attract customers, private banks are strongly dependent on innovation capability. This feature makes private banks a good setting for examining the link among CKM, innovation capability and business performance.

Data were collected from 350 bank managers as the key information source due to their direct and indirect relationships with customers, their knowledge of banks and their familiarity with the CKM system and external environment. Questionnaires were distributed among 49 marketing managers, 56 CRM managers, 67 new service managers, 69 research and innovation managers, 49 complaints managers and 60 customer service managers (Table I). Two hundred and sixty five usable questionnaires for analyzing were collected. Table II shows the number of managers and their roles in each bank.

Table I Number and role of respondents

Bank	*Number of branches*	*Number of respondents*	*Role of respondents*
Pasargad	8	4	Marketing manager
		5	CRM manager
		6	New service manager
		8	Research and innovation manager
		6	Complaints manager
		7	Customer service manager
Parsian	9	5	Marketing manager
		6	CRM manager
		8	New service manager
		8	Research and innovation manager
		5	Complaints manager
		6	Customer service manager
Sina	13	7	Marketing manager
		9	CRM manager
		8	New service manager
		11	Research and innovation manager
		6	Complaints manager
		8	Customer service manager
Sarmaye	3	2	Marketing manager
		1	CRM manager
		2	New service manager
		3	Research and innovation manager
		2	Complaints manager
		2	Customer service manager
Shahr	2	1	Marketing manager
		2	CRM manager
		2	New service manager
		2	Research and innovation manager
		1	Complaints manager
		2	Customer service manager
Iran-Zamin	4	2	Marketing manager
		2	CRM manager
		1	New service manager
		3	Research and innovation manager
		2	Complaints manager
		3	Customer service manager
Eghtesade Novin	3	2	Marketing manager
		1	CRM manager
		2	New service manager
		3	Research and innovation manager
		2	Complaints manage
		3	Customer service manager
Ghavamin	14	6	Marketing manager
		9	CRM manager
		11	New service manager
		9	Research and innovation manager
		7	Complaints manager
		9	Customer service manager
Ansar	12	5	Marketing manager
		7	CRM manager
		6	New service manager
		10	Research and innovation manager
		6	Complaints manager
		9	Customer service manager

After analyzing the data, it was found that 82 per cent of the respondents were male. Most respondents were 30-40 years old (55 per cent), and most of them had 5-10 years of work experience (27 per cent). Also, 43 per cent of the respondents had bachelor's degree. Table II summarizes the respondents' profiles.

Table II Profiles of respondents

Characteristics	*Percentage (100 per cent)*	*Frequency*
Gender:		
Female	18.11	48
Male	81.89	217
Total	100.00	265
Age (years)		
> 30	12.83	34
30-40	51.33	136
40-50	26.04	69
50 >	9.8	26
Total	100.00	265
Job experience		
> 5	16.24	43
5-10	27.18	72
10-15	20.75	55
15-20	10.94	29
20-25	11.7	31
25-30	7.9	21
30 >	5.29	14
Total	100.00	265
Education		
Diploma	18.11	48
Associated Diploma	24.53	65
Bachelor	42.64	113
Master >	14.72	39
Total	100.00	265

4.2 Questionnaire design

In this study, the quantitative research methodology was used for the collection of primary data. Before the data collection, a questionnaire was developed and pilot tested. Whenever possible, we used existing scales from the literature for measurement items. However, this differed in the case of CKM. CKM did not have a standard questionnaire; therefore, we developed a scale based on the interpretation of the literature. In the end, we made some modifications to align the scales with the private banks' context. The five-point Likert-type scale ranging from "1" (totally disagree) to "5" (totally agree) was used to gather the managers' responses. The Appendix shows the details of the measurement items.

4.3 Measurement of CKM

This study adopts the work of Garcia-Murillo and Annabi (2002), Gibbert *et al.* (2002) and Gebert *et al.* (2003) for the CKM measurement. Three components of CKM of the questionnaire include knowledge from customer (four items), knowledge about customer (seven items) and knowledge for customer (four items). Knowledge from customer can be viewed as knowledge and ideas that are acquired from customers through interaction. Knowledge about customer is accumulated to understand customers' motivations and requirements. Knowledge for customer includes everything that a firm provides for its customers.

4.4 Measurement of innovation capability

Innovation speed and innovation quality were used for measuring innovation capability. Innovation speed includes five items: firms' speed in generating original and novel ideas, new service launching, new service development, new technology and equipment deployment and new problem solving (Liao *et al.*, 2010). This study adopts the work of Lahiri (2010) on innovation quality. Innovation quality includes five items, which show the newness and creativity of new and novel ideas, services, processes, technology and equipment and problems.

4.5 Measurement of business performance

Operational performance and financial performance were used for measuring business performance. This study confirms the work of Wang and Wang (2012) on operational performance measures. Six items were used for operational performance including customer satisfaction, developed service, cost management, responsiveness, past performance and company management. Financial performance was measured with four items adapted from Inman *et al.* (2011). They consist of shares profit, previous period profit, customers' deposits and shareholders' investment.

5. Analysis and results

5.1 Measurement model

To evaluate the overall measurement model, we first tested the convergent validity and internal reliability. Convergent validity is defined as the degrees to which items that are supported measure a single construct and agree with each other. Average variance extracted (AVE) was used for testing convergent validity, which should be >0.5. In our model, all constructs ranged from 0.632 to 0.655 and were >0.50 cut-off value (Fornell and Larcker, 1981). The internal reliability was tested using Cronbach's alpha (C-a), which should be > 0.7. As shown in Table III, internal reliability is acceptable, as all contracts are > 0.70 cut-off value (Nunnly and Bernstein, 1994).

Before testing the hypotheses, we evaluated the measurement model fit by LISREL 8/7. We used fit indices which include:

- root mean square error of approximation (RMSEA);
- chi-square (χ^2);
- goodness-of-fit index (GFI);
- normal fit index (NFI);
- non-normal fit index (NNFI);
- adjusted goodness-of-fit (AGFI);
- comparative fit index (CFI);
- parsimony goodness-of-fit index (PGFI); and
- parsimony normal fit index (PNFI).

As shown in Table IV, all fit indices met satisfactory levels; therefore, the model was able to explain the research hypotheses.

Table III AVE and Cronbach's alpha reports

Constructs	*Items*	*AVE*	*Cronbach's alpha*	*Results*
Customer knowledge management (CKM)	15	0.650	0.872	Both validity and reliability are accepted
Innovation capability (IC)	10	0.655	0.792	Both validity and reliability are accepted
Business performance (BP)	10	0.632	0.818	Both validity and reliability are accepted

Table IV Overall fit indices of the CFA mode

Fit index	*RMSEA*	*χ^2/df*	*GFI*	*AGFI*	*CFI*	*NFI*	*NNFI*	*PGFI*	*PNFI*
Scores	0.076	2.93	0.97	0.91	0.98	0.97	0.96	0.76	0.83
Recommended cut-off value	<0.08	3>	≥0.90	≥0.90	≥0.90	≥0.90	≥0.90	The higher, the better	The higher, the better

Table V Standardized path coefficients

Hypotheses	*Path*	*Estimate*	p	*Remarks*
H1	CKM→BP	0.15*	2.21	Supported
H2	CKM→IC	0.34**	4.39	Supported
H3	IC→BP	0.72**	9.00	Supported

Notes: *Significant at the 0.10 level (2-tailed); **Significant at the 0.05 level (2-tailed)

5.2 Structural model

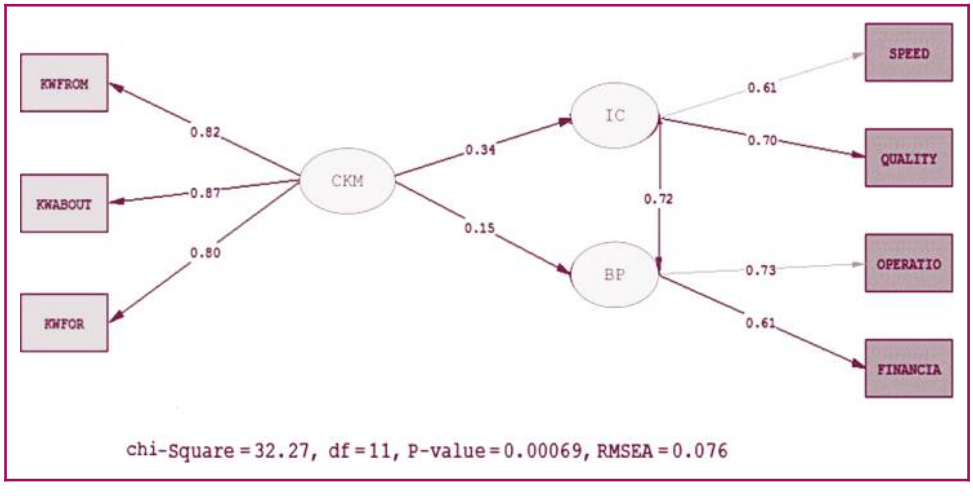
Table V shows the results of the hypothesis, and Figure 3 shows the structural model, which was tested by LISREL 8/7 (Jöreskog *et al.*, 1999). In Figure 3, the model was tested by considering latent variables.

According to Table III, the overall fit of the research model was acceptable (RMSEA = 0.076; χ^2/df = 2.93; GFI = 0.97; AGFI = 0.91; CFI = 0.98; NFI = 0.97; NNFI = 0.96; PGFI = 0.76; and PNFI = 0.83), and, according to Figure 3, all hypotheses were supported. In the following paragraphs, we separately describe the details of each hypothesis.

First of all, we examined the effects of CKM on business performance. As shown in Table IV, the effect of CKM on business performance has values of 0.15 ($p < 0.01$), so *H1* was supported. Previously, Yang and Kang (2008) argued that customer capital positively influences business performance. Also, Lee *et al.* (2011) reported the positive impact of CKM on firm performance. They explained that by using CKM, firms are able to identify the unique features of market segments and formulate appropriate strategies for these segments and, therefore, have superior performance on the market. Furthermore, Ngo and O'Cass (2012) explored an indirect effect of customer participation on operational performance. Our findings show that CKM has a positive and significant effect on business performance. This means that applying CKM can create new competitive advantage for firms, which eventually leads to better performance.

Regarding *H2*, we examined the effects of CKM on innovation capability. As the results show, the effect of CKM on innovation capability has values of 0.34 ($p < 0.05$). Therefore, *H2* was supported. Findings support the statement by Gibbert *et al.* (2002) and Gebert *et al.* (2003) that CKM improves the ability to innovate. Moreover, Garcia-Murillo and Annabi (2002) argued that CKM creates new ideas for firms; therefore, it is especially critical for innovation. Based on previous studies and the present findings, we can conclude that CKM

Figure 3 Research model



has a positive and significant effect on business performance. This means that firms should focus on CKM to gain more novel and realistic ideas for enhancing innovation capabilities.

Finally, we examined the effects of innovation capability on business performance. As Table IV shows, the effect of innovation capability on business performance has a value of 0.72 and is statistically significant ($p < 0.05$). So, *H3* was supported and innovation capability showed a positive and significant effect on business performance. This finding is evidenced in many practices (Capon *et al.*, 1992; Han *et al.*, 1998; Li and Calantone, 1998; Jenny, 2005; Lopez-Nicolas and Merono-Cerdan, 2011; Wang and Wang, 2012).

5.3 Effect analysis

This study not only testifies to the direct impact of CKM on business performance but also explores how this mechanism works through innovation capability. Therefore, after testing the direct effects of independent variables on dependent variables, we calculated the indirect effects of CKM on business performance through innovation capability. Table VI shows the result of direct/indirect effects and total effects, respectively.

Direct effects in Table VI show that CKM has a larger effect on innovation capability than business performance ($0.34 > 0.15$). Also, business performance is more influenced by innovation capability than CKM ($0.72 > 0.15$).

Indirect effect in Table VI confirms the mediator role of innovation capability between CKM and business performance. Furthermore, CKM has a significant indirect effect on business performance through innovation capability ($0.646 \gg 0.15$). So, *H1a* was supported.

As to the total effects, we can infer from Table VI that CKM can be more effective for business performance if firms use innovation capability as a mediator variable between CKM and business performance ($0.796 > 0.646 > 0.15$).

6. Conclusions

6.1 Implications for theory

The main purpose of this paper is to advance the marketing literature by untangling the relationships among CKM, innovation capability and business performance. In this study, we found that CKM affects business performance. Managers who solely pay attention to innovation capability may not achieve their expected objectives in performance if they do not take advantage of customer knowledge as an essential source of competitive advantage. Therefore, firms that put their effort into reaching better performance should effectively manage their customers' knowledge (Lee *et al.*, 2011; Ngo and O'Cass, 2012).

Present findings also show that CKM enhances innovation capability, which supports the views of Gibbert *et al.* (2002) and Rollins and Halinen (2005). Customers must be seen as important outside resources for creating knowledge and ideas. Therefore, firms must invest in the potentials and abilities of customers to be more innovative. In line with Lopez-Nicolas and Molina-Castillo (2008) and Wang and Wang (2012), this study finds that innovation capability has a positive and significant effect on business performance.

Table VI Direct, indirect and total effects analysis

Predictor/dependent	*IC*	*BP*
Direct effects		
CKM	0.34	0.15
IC		0.72
Indirect effect		
CKM		0.646
Total effects		
CKM		0.796

> **"Managers who solely pay attention to innovation capability may not achieve their expected objectives in performance if they do not take advantage of customer knowledge as an essential source of competitive advantage."**

Through effects analysis, this study provides a mechanism by which CKM practices contribute to innovation capability and firm performance. The mediator role of innovation capability is also confirmed. As we see in the analysis, although both CKM and innovation capability have positive and significant effects on business performance, innovation capability has a higher effect. Consequently, we can get a better result if we use innovation capability as the moderating variable between CKM and business performance.

This study offers a new insight that innovation capability makes CKM a valuable tool in achieving superiority in performance. In fact, innovation capability plays a specific role between CKM and performance. In particular, CKM is necessary, but not sufficient for superiority in performance, while the potential value of CKM is realized through effective innovation capability.

Compared to existing literature, the present study practically depicts the effects of CKM on innovation capability and business performance. Using this study, firms can evaluate the positive impact of CKM on innovation capability and business performance. Specifically, banks, by applying CKM, can become more innovative and achieve better performance results.

6.2 Implication for managers

CKM has been hailed as a new organizational approach. Unfortunately, the results of using CKM are not discussed extensively in knowledge management literature. This study is the first attempt to fill this gap by examining the relationship among CKM, innovation capability and business performance. According to our findings, we recommend that bank managers consider and manage both internal and external knowledge to enhance innovation capability and performance. We also propose that managers need to be continuously aware of customers' needs, problems, ideas and knowledge and use them as an important source to better compete in the marketplace. In general, external KM should have equal importance to bank managers as internal KM, and managers should pay attention not only to employees' experience, ideas, information and knowledge but also to customers' problems, needs, information and ideas.

6.3 Limitations

Like any research, this paper faced some limitations. First, as data were collected from a sample of private banks in Iran, the generalization of the findings was limited. Moreover, the effect of industry type, firm size or market share on CKM is unknown. For example, it might transpire that firms with more market share better attract and manage customer knowledge and effectively use it in the innovation process. In addition, the type of industry can influence CKM and the customers' tendency to share their knowledge and experience. Moreover, due to the newness of the present research topic, this study did not examine the effects of moderating variables between CKM and performance. Considering appropriate variables can facilitate the relationship between CKM and business performance.

6.4 Future research

Future research should investigate the relationship among CKM, innovation capability and business performance in different contexts, such as insurance industries, cosmetics

industries and mobile industries in other countries. Furthermore, the effect of moderating variables like organizational learning, organizational structure, etc. could be studied in the future to complete the research model. Finally, this research did not consider the psychological characteristics of the customer. Because this element has an important impact on customers' willingness to share their knowledge, it is suggested that future research should consider it in a model.

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Appendix

A.1 Knowledge from customer

1. Our bank asks customers about current service quality.
2. Our bank asks customers about competitor's service quality.
3. Our bank asks customers about their required services.
4. Gaining customer's ideas affects development of novel and innovative services of our bank.

A.2 Knowledge about customer

1. Our bank has been informed about customer's background.
2. Our bank has been informed about number of customer's referrals.
3. Our bank has been informed about customer's requirements and prerequisites.
4. Our bank has been informed about customer's demands and requests.
5. Our bank has been informed about customer's problems.
6. Our bank has been informed about customer's job and income level.
7. Our bank has been informed about customer's credit and validity.

A.3 Knowledge for customer

1. Our bank provides information about current services for customers.
2. Our bank provides information about innovative and new services for customers.
3. Our bank provides information about benefits of innovative and new services for customers.
4. Our bank helps customers to make better decisions by providing information.

A.4 Innovation speed

1. Our bank has fast speed in generating novel ideas.
2. Our bank has fast speed in launching new service.
3. Our bank has fast speed in developing new service.
4. Our bank has fast speed in using new technology and equipment.
5. Our bank has fast speed in solving customers' problems.

A.5 Innovation quality

1. Our bank has good performance in generating novel ideas.

2. Our bank has good performance in launching new service.
3. Our bank has good performance in developing new service.
4. Our bank has good performance in using new technology and equipment.
5. Our bank has good performance in solving customers' problems.

A.6 firm's operational performance

1. Customer satisfaction of our bank is high.
2. Our bank's services are developed.
3. Cost management of our bank is good.
4. Responsiveness of our bank is good.
5. Past performance of our bank is good.
6. Our bank management is good.

A.7 firm's financial performance

1. Shares profit of our bank is high.
2. Previous period profit of our bank is high.
3. Customers' deposit in our bank is high.
4. Shareholders' investment in our bank is high.

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