Volume 1, Issue 3 (July 2025), pp. 175-186 *Journal of Digital Business and International Marketing*
| Regular Article | Open Access

Analyzing the Impact of CKM on Business Performance and Innovation through SEM

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Article Info
Journal of Digital Business and International Marketing
https://www.ansispublications.com/journals/jdbim/jdbim.html

https://doi.org/10.64026/JDBIM/2025018

Received 16 February 2025
Revised from 20 April 2025
Accepted 02 May 2025
Available online 05 July 2025
Published by Ansis Publications.

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Abstract – This research aims to examine the links between Innovation Capability (IC), Business Performance (BP), and Customer Knowledge Management (CKM) in the private banking sector of Iran. In a competitive environment, CKM contributes to the increase in customer communication, product development, and organizational performance. Questionnaires were completed by 265 top managers in 35 Iranian private financial institutions, across the following departments: marketing, CRM, innovation, and customer service. By applying Structural Equation Modeling (SEM) via LISREL 8/7, this study explored the direct and indirect impacts of CKM on BP with the mediation of IC. The findings supported the hypothesized direct positive relationship between CKM and BP and its mediation by IC, which, in turn, was positively associated with BP. The mediated moderation effect of CKM through IC was significant at 0.2448, while the total effect of CKM was 0.3948. The goodness of fit of the model was satisfactory (RMSEA = 0.076, CFI = 0.98, GFI = 0.97), and the Sobel test confirmed the intermediary role of IC. Overall, these results imply that CKM plays a crucial role in enabling innovation and enhancing BP, providing guidance for banks on how to harness CKM systems for competitive advantage.

Keywords – Innovation Capability, Customer Knowledge Management, Business Performance, Absorptive Capability, Structural Equation Modeling, Private Banking Sector.

I. INTRODUCTION

Customer knowledge is a crucial intangible resource for every business as it allows them to recalibrate and generate value. Gebert et al. [1] emphasized the need of practitioners taking advantage of every chance to interact with consumers in order to enhance their customer knowledge database. In their 2006 study, Constantinides [2] predicted that marketing (i.e. market segmentation and mass marketing), in the 21st century, would shift towards a customer-based strategy. Thus, an organization may acquire a broad understanding of its clients and be in a better position to meet their needs. It is therefore necessary for a firm to develop and proactively maintain a Knowledge Management (KM) framework that includes the processes for acquiring, storing, and sharing the knowledge as contained in the database [3].

In the context of Migdadi [4], Absorptive Capability (AC) helps the companies to acquire the external information and manage it within the organization. AC is an important learning process for a firm as it shows the company's capacity to obtain, transform and utilize information from the environment [5]. Therefore, AC provides a way of sharing current information and learning and integrating it with new knowledge, which leads to the emergence of radical innovations [6]. Vera, Crossan, and Apaydin [7] describe AC is as a process and a capability that is developed through the use of a set of organizational processes and mechanisms. They also distinguish between potential and realized AC. Potential AC relates to the information-seeking capacities that a company has developed, though it may not apply these to generate novelties; actualized AC concerns the degree to which a company is capable of using the information to develop goods and services. Potential AC comprises the capacity to acquire and utilize external information, which is essential to a specific organization.

It facilitates quick detection of changes in industries by organizations to enable the timely application of essential attributes like production and technical skills [8].

The acquisition of external knowledge by organizations is expected to help increase novelty because radical innovations are derived from distant knowledge and capability transformation [9]. Moreover, since radical technical advancements can originate from sources different from an organization [10], it is crucial to be able to identify and understand external information in order to facilitate knowledge transfer. Moreover, organizations that have developed superior acquisition and assimilation capabilities are better placed in enhancing their knowledge updating capacity by identifying patterns of information in their external environment and incorporating them into their knowledge reservoirs. These chances, for instance, may enable companies to uphold and prolong superior performance by using strategic advantages such as being the first to enter a market and being responsive to consumers.

Thus, organizations have just begun to use Customer Knowledge Management (CKM) to include consumers in the activities of the businesses and make use of their knowledge and ideas [11]. CKM contributes to the resolution of many organizational challenges, including: 1) Facilitates the development of diverse KM procedures and platform between companies and their clients or customers. 2) It is an integral component of an ongoing strategic procedures, which empowers customers to transition from passive information sources and recipients of services or/and products to activate the sharing of knowledge partners. 3) It has the capacity to be a critical competitive instrument that may enhance the effectiveness of both customers and firms. 4) It enables the combination of KM and CRM (Customer Relationship Management) concepts, but advances beyond the two to the level of synergy, exchange, and co-production of value.

Customer Knowledge Management (CKM) primarily involves the integration of systems such as customer relationship management [12] that may provide many benefits, which can be primarily delineated as: 1) Building a customer profile which normally consists of the basic private and communications data of the consumers obtained from previous transactions which could be used in subsequent questions [13]. 2) Help in the creation of a customer profile model that would give additional details to the timing, location, color preference and buying power of the consumers. 3) Help organizations design and develop a range of marketing communications strategies for a particular category of customers (mass customization) or for a distinct consumer (one-to-one marketing). Instead use the market coverage strategy where the company sends its products to the entire market with the help of data warehousing in marketing and customer mining [14]. 4) CKM helps organizations enhance and enhance its performance by not only listening to the customer feedback but also by recognizing customers as critical resources and parties [15].

In this paper, the impact of CKM on Business Performance (BP) and innovation in the private bank of Iran has been discussed. As competition rises, the implementation of CKM has become important in enhancing innovation and achieving higher business performance. We also discuss how CKM impacts business performance and examine the mediating objectives of Innovation Capacity (IC**)**. This study has successfully collected data from senior managers of several banks and offers insights into how CKM can be used to further innovation and sustain competitiveness in the dynamic and growing environment of the banking sector. The remaining sections of this paper have been organized as follows: Section II reviews related works on CKM, BP and IC. This section describes their similarities and distinctions. Section III presents the research models and hypotheses surrounding CKM, BP and IC. Section IV describes the data and methods used to compose the research This section describes the measurement model, structural model, and model fit as well as indices. Section V presents a detailed discussion of the findings regarding the measurement model, structural model, and effect assessment. Lastly, Section VI concludes the research, and proposes future research directions.

II. LITERATURE REVIEW

According to Kothari et al. [16], explicit knowledge refers to the understanding that can be readily articulated. The phrase "tacit knowledge" [17] refers to information that is challenging to express and so difficult to transfer. This phrase was later replaced by "implicit knowledge". Kakihara and Sørensen [18] have developed a comprehensive epistemic autopoietic knowledge management paradigm called SECI KM. In contrast, ontological knowledge management approaches see knowledge as an opaque entity. Its connections with a built world of discourse establish the qualities of knowledge. Ontological knowledge management models often use two basic modeling dimensions: an agent dimension and a process dimension (group vs. individual).

According to Maier and Remus [19], process-oriented KM methods place emphasis on the attributes of knowledge across its entire lifespan. Madhavan and Grover [20] examine environmental factors and connections that impact the process of creating knowledge, distribution, refinement, and use. Agent-oriented KM models emphasize the attributes of knowledge as it is exchanged between persons. These characteristics are examined to determine if they accelerate or impede the transmission of information in social networks. Representative agent-oriented knowledge management approaches include Toledo et al. [21]. The majority of knowledge management models developed in the past ten years include features from both perspectives. Arpírez et al. [22] included an agent ontology component in 1994 and aims to completely integrate both perspectives in his notion of "ba" [23]. The process-based knowledge management models proposed by Maier and Remus [24] specifically emphasize explicated knowledge processing. Nevertheless, a completely optimal model has not yet been developed [25].

According to Glazer [26], the knowledge of customers is widely acknowledged as a fundamental strategic asset for the future success of any business. Therefore, CKM might be considered an essential area of KM. Furthermore, it establishes a powerful connection between CRM and KM. CKM is a management branch that utilizes KM platforms and processes to facilitate the transfer of customer knowledge between and within the company and its clients. It also involves using customer knowledge to enhance customer relationships and ultimately enhance CRM procedures, including relationship profitability,

customer retention, and customer service. In the context of CKM, KM is the provider of services that provides the necessary processes and tools for knowledge exchange. On the other hand, CRM assumes the role of the service buyer, responsible for identifying the required knowledge and generating and using it in customer engagement. In order to fully use KM and deliver on the promise of higher understanding for competitive advantage and firm performance, CKM need adequate organizational competency.

By incorporating the concepts of Yeniyurt, Cavusgil, and Hult [27] on understanding the market, Campbell [28] on understanding clients, and Bueren et al. [29] on managing the clients, we define CKM as the efficiency in integrating knowledge and customer information into the firm's operations and processes. Eidizadeh, Salehzadeh, and Esfahani [30] described the role of innovation as a methodology to achieve a competitive edge for the company. This is often accomplished when companies own or actively cultivate their technical capacities. According to Dutta, Narasimhan, and Rajiv [31], the two well-established ideologies of innovative capabilities, namely innovation as a result and innovation as a process, are also applicable. In consideration to innovation as a process, innovation capability is often conceptualized as the capacity to generate inventive results.

According to Forsman [32], Innovation Capacity (IC) is seen as a one-dimensional aspect including the measures that may be executed to increase SMEs (small and medium-sized enterprises) performance. The widely accepted definition is the one provided by Koc and Ceylan [33]. Koc [34] define innovation capability on the present capability to transfer ideas and information into novel systems, procedures, and products, with the aim of benefiting the organization and its shareholders. In a similar vein, Wonglimpiyarat [35] argues that innovation capacity is constituted by the willingness to experiment with new concepts, to seek out original approaches to accomplish tasks, and to exhibit originality in operational methods. Furthermore, Abou-Zeid and Cheng [36] assert that innovation capacity particularly emphasizes the effective application of knowledge and concepts derived from several sources.

Moustaghfir and Schiuma [37] characterizes innovation aptitude as the capacity to generate novel outcomes, but lists other aspects that together lead to a greater degree of IC. These factors include leadership, corporate culture, strategic use of external knowledge, effective competency management, and employee creativity. Various studies distinguish many types of competencies that constitute the overall innovation capacity [38, 39, 40, 41, 42, 43]. These include, for instance, proficiency in learning, entrepreneurship, marketing, networking, and resource exploitation. Within the context of small businesses, there are also individual publications, which categorize the functionalities of innovation as either detecting, grasping, and altering capabilities, or assimilation, acquisition, deployment, and transformation capabilities.

In this study, we aim to fill the gap related to the lack of prior studies that focus on investigating the link between CKM, business performance, and innovation capability in the context of Iran's private banking sector. Although previous research discusses the relevance of CKM for competitiveness and innovation, there is a void in the literature that measures the implications of CKM on the BP and the controlling functionality of IC. Therefore, by concentrating on this relatively uncharted environment, our research helps to fill this void, providing insights into how CKM can be used to enhance innovation and business outcomes.

III. RESEARCH FRAMEWORK AND HYPOTHESES

Customer Knowledge Management (CKM) allows companies to ascertain the knowledge possessed by their customers hence issuing suitable responses and a dedicated platform for information exchange among consumers, as well as between businesses and customers. CKM allows companies to ascertain the knowledge possessed by their customers. Thus, through CKM, it is possible to gain a vast pool of creative ideas that are appropriate for improving performance and stimulating innovation. In this regard, our study reviews the relationship between CKM, innovation capabilities, and company success through the conceptual model presented in [44].

CKM and BP

The concept of Customer Knowledge Management (CKM), proposed by Sedighi, Mokfi, and Golrizgashti [45], suggests that market opportunities are created by the customers' knowledge. Therefore, the knowledge acquired from consumers is deemed to be more relevant than the CKM estimate. The idea put forward by Tseng [46] was supported by Yoon [47] who pointed out that the knowledge gained from the interaction with customers may be employed to improve customer relations and design new products. New product development is a dimension within the context of Organizational Performance (OP). In their study of Old Mutual, the biggest insurance business in South Africa, Alvekrans et al. [48] proposed that patient awareness is crucial for a company operation. The research revealed that Old Mutual Company is using client insights to create novel medical insurance solutions.

The creation of the new product by Old Mutual Company is underpinned by their expertise and the specific needs expressed by their clients [49]. Their research conducted over the last six years on over twenty-four corporations in the pharmaceutical and insurance sector shown that effective management of customer information enhances the ability of organizations to effectively identify market prospect. Another research conducted by Chuang and Lin [50] offers further evidence to support the assertion that customer knowledge may enhance organizational performance. A comprehensive case study by Hammami and Triki [51] examined the dimensions of CKM at Siemens and Electronic firms. The research revealed that client knowledge has resulted in product development and innovation, which were identified as the performance outcomes of the organization. Consequently, he revealed that CKM had beneficial impacts on OP. To provide a technical elucidation of the link, this research emphasizes the following hypothesis:

H1. CKM has a positive and direct effect on the BP

Previous studies have indicated that CKM may boost BP indirectly by creating a greater capacity for creativity. Effective KM plays a crucial role in fostering innovative activities. Existing research have emphasized the effect of KM on innovativeness. Customers are regarded as the holders of crucial information and the agents that greatly contribute to improved innovation. Phongthiya et al. [52] argued that companies now prioritize C&D (connecting and developing) functions over R&D (research and development) activities. This C&D evaluation indicates that concepts generated by consumers are more innovative and valuable compared to ideas generated by internal shareholders like as employees, directors, and executives. These concepts significantly enhance a company's capacity for innovation [53] revealed a direct and favorable impact of CKM on the innovative potential of 210 Spanish SMEs. Drawing on prior debates and acknowledging the consensus among scholars and practitioners that excellence in innovation capacity results in better performance and competitiveness [54], we make the following proposition:

H1a. CKM has a positive and indirect effect on the BP via increased IC

CKM and IC

Consumer information is increasingly identified as a fundamental factor in the innovation process [55]. This knowledge directly influences the generation of new concepts and indirectly impacts the effectiveness of innovation [56]. Academics have argued that implicit knowledge plays a vital role in a company's capacity to innovate, and that innovation skills are essential for achieving a better level of innovation performance [57]. Freel [58] theoretically propose that the capacity for innovation arises from both internal factors, such as the skillset of the labor, and external factors, such as networking. López-Claros and Mata [59] defines innovation speed and quality as indicators of innovation capacity. Innovation capacity is the synthesis of the operational protocols for developing new services or products, focusing on both quality and timing.

Organizations have recognized the need of accelerating operations to achieve competitive rivalry [60]. The growing recognition of the need to accelerate operations is rooted in the notion that a rapid inventor might gain a competitive edge by being the first to enter the market [61]. In [62], innovation speed is often described as the duration between the initial development and the ultimate commercialization of novel goods or services. Therefore, innovation speed is the acceleration of various occurrences from the initial idea to the ultimate products over product creation process [63]. Danneels [64] has argued that the rapidity of innovation enables firms to experiment with many novel technology and product characteristics, leading to successful inventions. De Oliveira et al. [65] have also asserted that the pace of innovation contributes to the operational and financial performance outcomes of organizations. Although the empirical links between Innovation Capacity (IC) and CKM have been established, none have specifically reviewed the direct effect of CKM on the capability of innovation. So as to address this deficiency, we presented the following hypothesis:

H2. CKM has a positive and direct effect on the IC

BP and IC

Research has consistently shown that innovation aptitude is a crucial and intangible resource for companies to generate value and achieve sustained Competitive Advantage (CA), ultimately resulting in better performance. Aghamirian, Dorri, and Aghamirian [66] conducted interviews with 210 consultants employed by insurance firms. The research findings indicate that having information from, for, and about consumers has a beneficial impact on client acquisition in e-commerce. Customer-centric knowledge management enables firms to provide high-quality goods and services to consumers. E-commerce facilitates the establishment of knowledge partnerships between manufacturers and consumers. The use of e-commerce for customer knowledge management enables a firm to attain sustained CA since e-commerce facilitates the storage of comprehensive client information.

Consequently, organizations have the ability to develop goods and services that align with the specific requirements of customers, thereby enhancing client loyalty. Research conducted by Mahawrah, Shehabat, and Shanab [67] has shown that in the food industry, CKM has a beneficial impact on CA. This is because knowledge serves as the primary catalyst for CA and stimulates innovations to enhance goods, leading to higher profitability and growth of market share. Extant research has firmly proven a substantial and positive correlation between innovation capabilities and corporate success. Notably, Gök and Peker [68]; Visnjic, Wiengarten, and Neely [69]; and Phan [70] have contended that innovativeness has a beneficial impact on the effectiveness of businesses. Building upon this foundation, we put out our final hypothesis:

H3. The IC has a positive and a direct effect on BP

IV. DATA AND METHODS

In this section, the detailed procedure of data collection is explained and the methodological framework used to support the empirical analysis of the proposed business performance and innovation capability model and the theoretical framework of Customer Knowledge Management (CKM) is outlined. We employed a quantitative survey technique and assessed the structural model by using post-estimation tests. The subsequent sections give a detailed description on the procedures involved in sample selection, measurement and the mathematical equations employed in the validation of the model.

Sample

The sample of this research is 35 private banks that are active in Guilan province in Iran and included Sarmaye Bank, Shahr Bank, Ghavamin Bank, Eghtesade Novin Bank, Sina Bank, Parsian Bank, Ansar Bank, and Pasargad Bank, and Iran-Zamin Bank. Using private financial institutions for this analysis has two clear benefits. First, due to high competition in the private banking industry, customer relations act as a key input, and hence the use of CKM systems to enable the interaction between the banks under consideration and their customers. CKM systems allows the banks to harness ideas from outside, and this

translates to faster incubation and deployment of innovative services giving the banks competitive advantage. Second, the banking system of Iran is private; there are a lot of banks in the country and customers have a wide variety of choices.

The competition among the bank to capture the customers is high and that makes the innovation capability as a key driver to success; therefore, this setting is appropriate to experiment the correlation between CKM, IC, and BP. The survey targeted 350 executives from different banks where the participants came from various departments including marketing, CRM, innovation, customer service and complaint handling. These managers were chosen because of their indirect and direct relationship with clients as well as their comprehension of the internal environment of the bank and the external ecosystem within which the bank operates. Thus, of 297 completed questionnaires distributed, 265 were considered usable for the analysis. The emphasis in designing the questionnaire was made on the description of the bank's CKM systems, innovation activities, and business outcomes.

Measurement Model and Data Analysis

The research method applied chiefly in this study is Structural Equation Modeling (SEM) [71] with the aid of the LISREL 8/7 software. The initial point of the analysis entails checking on the model's convergent and internal validity. The Convergent validity is then checked using AVE (Average Variance Extracted) [72] while the Inner consistency reliability is checked through Cronbach's alpha. AVE is calculated by the use of the following equation. (1).

$$AVE = \frac{\sum_{i=1}^{n} \lambda_i^2}{\sum_{i=1}^{n} \lambda_i^2 + \sum_{i=1}^{n} \theta_i} \quad (1)$$

where λ_i is the factor load of the i^{th} indicator and θ_i is the measurement error of the same indicator. Using the designated 0.50 threshold for convergent validity, the calculated AVE values for CKM, IC, and BP are 0.650, 0.655, and 0.632, correspondingly, which corroborates the validity of the above conclusion. To check the internal reliability of each construct, Cronbach's alpha is computed using the following equation (2):

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{i=1}^{n} \lambda_i^2}{\sigma_T^2}\right) \quad (2)$$

where k refers to the quantity of items within the construct, σ_i^2 is the variance of every item and $\sigma_T^2$is the total variance of the construct. For CKM, innovation capability, and business performance Cronbach alpha value was found 0.872, 0.792 and 0.818 respectively which show that there is satisfactory internal reliability as all the values are greater than the cut off value of 0.70.

Structural Model Formulation

The next phase involves the formulation of the structural framework for the purpose of testing the correlation between the latent parameters. The structural equations reflect the proposed pathways from CKM to business performance and innovation capability. The structural model is specified using Eq. (3) and (4).

$$BP = \gamma_{11} CKM + \beta_{12} IC + \zeta_1 \quad (3)$$
$$IC = \gamma_{21} CKM + \zeta_2) \quad (4)$$

In these equations, CKM for customer knowledge management and BP for business performance, and IC for innovation capability. The coefficients γ_{11} and γ_{21} represent the direct impacts of CKM on the performance of business and capacity of innovation respectively while β_{12} represents the impact of IC on BP. These terms ζ_1 and ζ_2 are the equations residuals, which is considered to follow a normal distribution with constant variance and mean equal to 0. The model is estimated employing the technique of Maximum Likelihood Estimation (MLE) [73] in the equation. This is Eq. (5), which attempts to optimize the likelihood function.

$$L(\theta) = \prod_{i=1}^{n} \frac{1}{\sqrt{2\pi\sigma^2}} exp\left(-\frac{(y_i - X_i\beta)^2}{2\sigma^2}\right) \quad (5)$$

where $\theta = (\beta, \sigma^2)$ are the model parameters, y_i for the observed values and X_i is the set of the explanatory variables. The likelihood function is then maximated iteratively to estimate the path coefficients γ_{11}, γ_{21}, and β_{12}. These coefficients' estimates are $\gamma_{11} = 0.15$, $\gamma_{21} = 0.34$, and $\beta_{12} = 0.72$, and all of these coefficients are significant at the conventional levels of significance.

Model Fit and Indices

The model fit is assessed based on the goodness-of-fit index, integrating the RMSEA (Root Mean Square Error Of Approximation) [74], the CFI (Comparative Fit Index) [75], the AGFI (Adjusted Goodness-Of-Fit Index) [76], the GFI (Goodness-Of-Fit Index) [77], and the chi-square test statistic [78]. The RMSEA is calculated using Eq. (6).

$$RMSEA = \sqrt{\frac{\chi^2 - df}{df(N-1)}}) \quad (6)$$

where X^2 is the Chi-Square test, df is the DoF (Degree of Freedom) and N is the sample size. Therefore, RMSEA value in our study is 0.07601, which is within the range of acceptable values (less than 0.08) therefore demonstrating a good fitness. Furthermore, the CFI = 0.981, GFI = 0.9701, and AGFI = 0.9101, all of which are above the cut-off of 0.90, to suggest satisfactory model fit. Another component of this research that is important is the moderating impacts of IC in the connection between CKM and BP. The indirect influence of CKM on the BP through IC is estimated in Eq. (7); that is γ_{21} and β_{12}.

$$\gamma_{21} \cdot \beta_{12} = 0.34 \times 0.72 = 0.2448 \tag{7}$$

Total impact of CKM on the BP is the combination of direct impact and indirect impact and represented by the following Eq. (8).

$$\gamma_{11} + (\gamma_{21} \cdot \beta_{12}) = 0.15 + 0.2448 = 0.3948 \tag{8}$$

This suggests that CKM has a large impact on BP and IC is one of the major mechanisms through which this influence occurs. The mediation effect can be further quantified using the Sobel test statistic, calculated as shown in Eq. (9).

$$z = \frac{\alpha \cdot b}{\sqrt{b^2 \cdot SE(a)^2 + a^2 \cdot SE(b)^2}} \tag{9}$$

where $\alpha = \gamma_{21}$, $b = \beta_{12}$ and $SE(a)$ and $SE(b)$ represent the standard error estimates of the path coefficients. Since the indirect effect is quite large, the Sobel test supports the fact that innovative capability is a worthwhile mediator of the correlation between CKM and BP.

V. RESULTS AND DISCUSSION

Measurement Model

First, the internal and convergent validity of this model were tested in order to evaluate its performance. Convergent validity is the dimension whereby identified items measure a single concept and are consistent with each other. Convergent validity was established by applying AVE (Average Variance Extracted) test with the threshold of 0.5. All constructs in our model fell within the range of 0.632 to 0.655 and were graded at a 0.50 threshold. Cronbach's alpha (α)) was employed to evaluate the internal validity, with a recommended threshold of 0.7. All contracts meet the appropriate internal dependability criteria, as shown in **Table 1**, with a cut-off value of 0.70. Prior to conducting hypothesis testing, we assessed the adequacy of the measurement framework using LISREL 7/8. Fit indices, including RMSEA, Parsimony Normal Fit Index (PNFI), Parsimony Goodness of Fit Index (PGFI), CFI, AGFI, Non-Normal Fit Index (NNFI), Normal Fit Index (NFI), GFI, and chi-square were employed. As demonstrated in **Table 2**, the fit indices achieved acceptable values, indicating that the model effectively explained the study hypotheses.

Table 1. Cronbach's Alpha and AVE Report

Constructs	Items	AVE	Cronbach's alpha	Findings
CKM	15	0.65	0.87	Both reliability and validity are acknowledged
IC	10	0.66	0.79	Both reliability and validity are acknowledged
BP	10	0.63	0.82	Both reliability and validity are acknowledged

Table 2. CFA Fit Indices

Fit Index	RMSEA	GFI	χ^2/df	CFI	AGFI	NNFI	NFI	PGFI	PNFI
Score	0.08	0.98	2.93	0.99	0.92	0.97	0.98	0.77	0.84
Proposed cut-off value	<0.09	≥0.91	>3	≥0.91	≥0.90	≥0.91	≥0.90	≥0.90	≥0.90

Table 3. Standard Coefficients

Hypothesis	Path	Estimation	p	Annotations
1	CKM → BP	0.150*	2.22	Maintained
2	CKM → IC	0.341**	4.40	Maintained
3	IC → BP	0.721**	9.01	Maintained

Structural Model

The findings of the hypothesis are shown in **Table 3**, while **Fig 1** visualizes the model that was evaluated using LISREL 7/8. The model in **Fig 1** was evaluated by taking into account latent variables. **Table 3** indicates that the research model satisfied the overall fit criteria (RMSEA = 0.076; GFI = 0.97; x^2/df = 2.931; AGFI = 0.910; NFI = 0.970; CFI = 0.981; NNFI = 0.960; PNFI = 0.831; and PGFI = 0.760). **Fig 1** confirms that all assumptions were supported. We provide individual descriptions of the specifics of each theory. First, we analyzed the impact of CKM on corporate performance. The data presented in **Table 2** indicates that the impact of CKM on company performance is 0.15 ($p < 0.01$), therefore providing support for *H1*. In their 2008 study, Taghizadeh, Rahman, and Hossain [79] demonstrated that customer capital had a beneficial implication on BP. In addition, Zand et al. [80] documented the beneficial influence of CKM on BP. They described that employing CKM, companies may understand the specificities of markets and adapt the right strategies for these markets, which would enable companies to perform better in the market.

Furthermore, Lupton, Buckland, and Moon [81] also examined the moderating effect of consumer involvement on operational efficiency in an indirect manner. Customer engagement, in a broader perspective, can be defined as the various interactions of the customers with an organization or brand. From the definitions of customer engagement provided by Vivek, Beatty, and Morgan [82] it can be identified that this term reflects the physical, cognitive and emotional activities through which consumers interact with the organization and which motivate them for an efficient and engaged participation. Brodie et al. [83] have established that consumer engagement covers all behaviors that relate to the corporate brand, such as visits to the brand community and brand community activities. Beneke et al. [84] explained it as being the motivation behind certain activities where a customer not only has the intention to buy a product but also engages in other activities including posting online reviews and recommendations that are brand-oriented or brand-directed.

Consumer engagement, as viewed by Behnam, Sato, and Baker [85], is a psychological process that results in client loyalty. Therefore, Verhoef [86] embarked on research to review the effect of customer interaction on customer loyalty. Therefore, it can be argued that the level of consumer involvement is a very strong forecaster of the loyalty of customers. A study conducted by Solem [87] revealed a direct correlation between customer loyalty and participation in the context of social media. Within the consumer engagement framework devised by Núñez-Barriopedro et al. [88], customer happiness and emotions were identified as factors that preceded customer involvement. The moderating functionality of customer involvement in the associations between brand image and brand loyalty was empirically shown by Gazi et al. [89]. Nisar and Whitehead [90] demonstrated that improving customer loyalty might be accomplished by enhancing customer interaction.

Our research indicates that CKM has a favorable and substantial impact on operational effectiveness. Hence, the use of CKM might provide novel competitive advantage for companies, ultimately resulting in enhanced performance. Concerning hypothesis *H2*, we investigated the impact of CKM on the IC. We show that the impact of CKM on creativity capacity is 0.34 ($p < 0.051$). Thus, the hypothesis *H2* was confirmed. Research results corroborate the assertion made by Fidel, Schlesinger, and Emilo [91]; and Yusr et al. [92] that CKM enhances the capacity for innovation. Incorporating consumer information into the first stages of innovation necessitates certain client profiles and approaches, and involves distinct risks corresponding to each step [93]. The concept that companies might enhance their ability to innovate by engaging users and consumers in the process of acquisition of information has gained significant prominence in the field of innovation research. Particularly, companies that want to use user and customer information in the context of innovation must have an organizational structure that is suitable to facilitate it.

Furthermore, Santoro et al. [94] contended that CKM generates novel concepts for enterprise; so, it is particularly crucial for innovation. Empirical studies [95, 96, 97, 98, 99] have shown that a significant firsthand encounter may evoke novel concepts and "unconventional" viewpoints that articulate an imaginative consumer. Though employees are capable of generating new ideas, they frequently lack the motivation to translate those ideas into practical execution. This is mostly due to the many obstacles they face at that stage [100]. Binyamin and Carmeli [101] indicate that creative work behavior flourishes only when the process of generating ideas is directly connected to their ultimate execution. Hence, organizations are currently prioritizing the development of structures and processes that facilitate employees in achieving a harmonious alignment between their personal values and the values of the organization. This alignment enables them to demonstrate innovative work behavior [102, 103]. In [104], Malhotra assert that their dynamic model governing the generation of knowledge is based on the crucial premise that human knowledge is generated and elaborated via social correlation between explicit knowledge and tacit knowledge

Considering prior research [105, 106, 107] and the current results, it can be inferred that CKM has a favorable and substantial impact on corporate performance. Therefore, organizations should prioritize CKM to acquire more original and practical ideas to improve their innovation skills. Lau and Lo [108] have posited distinct capacities as significant factors influencing a firm's innovation performance. Hellström [109] explicitly identified that innovation is a dynamic process involving interconnected sub-systems associated to technology. Kramer et al. [110] regarded R&D activities as the primary intangible investment for fostering innovation. Bhatnagar and Gopalaswamy [111] proposed that consumer competence and technical competence are crucial factors in determining product innovation. Zahra, Matherne, and Carleton [112] highlighted the significance of operational resources, commercial resources, and internationalization in influencing innovation. An in-depth and thorough investigation of the correlation between the factors that affect innovativeness and innovative performance of a firm still needs further research. Consequently, firms have challenges in implementing measures to enhance their technical innovation competitiveness and overall company success [113, 114]. We investigated the impact of IC on the BP. The statistical analysis in **Table 2** reveals that the effect of IC on BP is 0.720 and is statistically significant ($p < 0.050$). Thus, the hypothesis *H3* was confirmed and the innovative capacity had a favorable and substantial impact on BP.

Effect Assessment

This research not only confirms the more direct influence of CKM on company success but also investigates the operational approach of this function via innovative capability. Consequently, after the examination of the direct impacts of independent factors on the dependent variable, our research therefore proceeded to compute the indirect impacts of CKM on BP by considering the IC. The results of indirect/direct impacts and overall impacts are shown. The direct impacts indicate that the impact of CKM on innovation capacity is greater than that on business performance ($0.34 > 0.15$ in magnitude). Furthermore, the capacity to innovate has a greater impact on corporate success than the CKM indicator ($0.721 > 0.150$). The indirect impact supports the notion that IC acts as an intermediary between company performance and CKM. Moreover, CKM has a substantial indirect impact on corporate success by influencing innovation capacity ($0.646 >> 0.15$). Thus, *H1a* was confirmed. Based on our findings, it can be deduced that including innovation capacity as a mediation variable between the

performance of the firm and CKM (0.795 > 0.65 > 0.150) may enhance the effectiveness of CKM in influencing company performance.

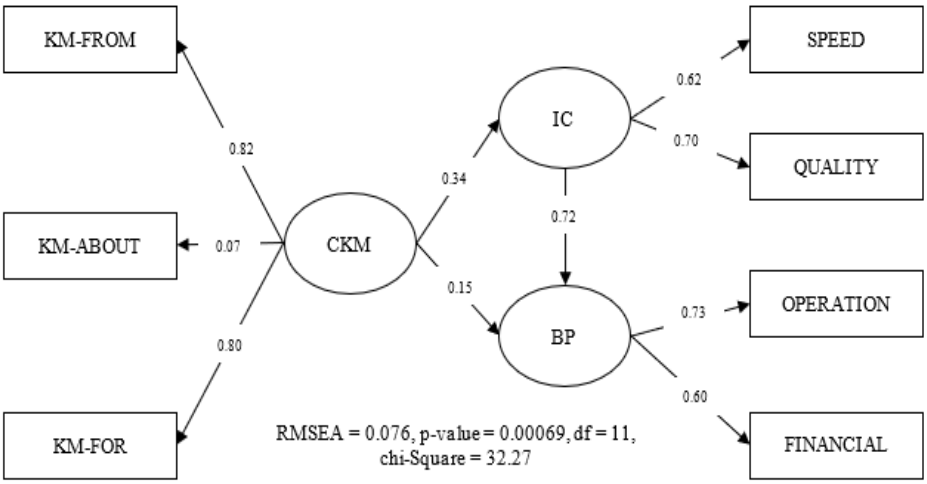

Fig 1. Study Model

VI. CONCLUSION AND FUTURE SCOPE

The findings of this research demonstrate that CKM has a positive influence on BP via Innovation Capability (IC) in Iran's private banking. Thus, the results support our hypothesis that CKM has a direct and positive impact on BP and that IC is a key mediator of this effect. The indirect impact of CKM on BP through the moderating variable IC therefore supports the significance of CKM in the promotion of innovation and survival of the business in the highly competitive banking sector. We propose that by optimally utilizing CKM systems, it is possible to enhance the performance of banks and foster innovation. Further research could be done on other sectors or other geographical areas to test the external validity of the above results. Exploring other potential mediators or moderators of the CKM-business performance link, including organizational culture or technology, may have offered more insight into the underlying processes. Moreover, the temporal nature of longitudinal research may provide further understanding of these dynamics and the extended effects of CKM on innovation and performance. Future research can also try to incorporate more qualitative methods to expand the knowledge of how CKM practices are actually being adopted and what impact they may have on innovation and organizational success.

CRediT Author Statement

The author reviewed the results and approved the final version of the manuscript.

Data Availability

No data was used to support this study.

Conflicts of Interests

The author(s) declare(s) that they have no conflicts of interest.

Funding

No funding was received for conducting this research.

Competing Interests

There are no competing interests

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ISSN: 3104-4115