Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1, 41-59
2026
Publisher: Learning Gate
DOI: 10.55214/2576-8484.v10i1.11492

Knowledge management capabilities and organizational performance in a North African context: The mediating role of business model innovation

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Abstract: This study investigates the impact of knowledge management capabilities (KMC) on organizational performance, emphasizing the mediating role of business model innovation (BMI). Drawing on the perspective of KMC, the research conceptualizes knowledge infrastructure as comprising technology, structure, and culture, and knowledge process architecture as encompassing acquisition, conversion, application, and protection. Utilizing quantitative methods, this research gathered data through questionnaires from a sample of 391 managers working in banks and insurance companies in Tunisia, a North African country, and analyzed the data using Amos 10. The data were analyzed using Amos 10 with the maximum likelihood estimation method (LISREL). The results demonstrate that both knowledge management capabilities and business model innovation significantly enhance organizational performance, particularly through organizational structure, technology, knowledge conversion, application, and protection. Furthermore, the findings confirm that BMI mediates the relationship between knowledge management capabilities and organizational performance. The study extends an existing pool of knowledge regarding the large-scale influence of innovation on firm performance. It also provides valuable insights for financial institutions seeking to improve their performance by fostering innovation activities through effective utilization of BMI.

Keywords: *Banks and insurance, Business Model Innovation, Knowledge management capabilities, North African context. Organizational performance.*

1. Introduction

The contemporary business landscape is characterized by growing complexity, driven by continuous innovation and the rapid pace of digital transformation. Adapting to these ongoing changes cannot depend solely on training initiatives aimed at acquiring new tools; rather, it requires a sustained enhancement of organizational knowledge [1]. In this regard, enterprises must ensure access to effective innovations and continuously develop their knowledge base. Furthermore, identifying and efficiently managing the critical knowledge necessary for success has become essential for achieving strategic objectives in such a dynamic and competitive environment [2].

Knowledge Management (KM) has long been regarded as a key factor in enhancing organizational performance and ensuring long-term competitiveness [2-5]. Today, KM extends beyond internal company boundaries to encompass regional networks and collaborations among organizations.

Multiple stakeholders, encouraging innovation across various sectors [6, 7]. Recent studies have also broadened the scope of KM to include organizations of different sizes, external knowledge exchanges, and wider geographical contexts [8, 9].

Knowledge Management capabilities (KMC) have emerged as a fitting solution to address the challenges faced by businesses in a dynamic economic environment. In fact, proficient knowledge

History: Received: 8 October 2025; Revised: 25 November 2025; Accepted: 1 December 2025; Published: 1 January 2026
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management has evolved into the linchpin for maintaining a sustainable competitive edge and a valuable asset for achieving optimal performance. It empowers managers to evaluate the efficacy of strategic decisions they make [1]. In this sense, Iqbal et al. [10] argue that successful firms are those that constantly create new knowledge, disseminate it widely throughout the organization, and rapidly incorporate it into new technologies and products.

An organization must therefore succeed in identifying, assimilating, and using this knowledge and capabilities to stimulate its innovation activity, as KMC and innovation are highly significant topics of current interest, above all because they are interrelated and directly influence organizational performance [11, 12]. For this purpose, some companies have started to explore new strategies to gain a competitive advantage [13], and this is achieved through business reconfiguration by either innovating one or more components of their business model (BM) or the whole model [14]. This approach, known as Business Model Innovation (BMI), refers to "designed, novel, nontrivial changes to the key elements of a firm's business model and/or the architecture linking these elements" [15]. Given its demonstrated impact on firm performance [16-18], BMI has become an established topic in academic research [15, 19]. This growing body of research reflects both the rising interest in BMI and its relative underrepresentation within the innovation management field [20]. Therefore, integrating the BMI perspective more fully into innovation management literature could generate novel and valuable insights.

Building on previous research and the knowledge-based view (KBV), which emphasizes that different types of innovation draw on different knowledge sources [21, 22], we posit that the KMC required for BMI differs from that needed for product and process innovation. Moreover, we assume that the impact of specific KMC depends on the firm's strategic orientation. According to KBV, knowledge is the key strategic resource underpinning value creation, competitive advantage, and innovation [23]. Effective knowledge management and sharing enable firms to leverage their intellectual capital to innovate in revenue models, value architecture, and offerings, thereby driving business model innovation. Accordingly, this study examines how business model innovation and knowledge management jointly influence firm performance within the KBV framework.

In this sense, we aim to examine the knowledge capabilities with greater impacts on BMI and OP in Tunisian financial firms since the latter have undergone significant changes leading to new challenges and contributing to political, economic, and social instability, which has been heightened by the series of revolutions that have swept the Middle East and North Africa, most notably Tunisia, a North African country located on the Mediterranean coast.

There are three motives behind the choice of this topic. Firstly, despite a substantial increase in the literature on KMC [24], researchers have called for more studies exploring the subtleties involved in the relationship between KMC and performance outcomes. Secondly, Tunisian financial companies, more specifically banks and insurance companies, are part of a challenging context, since these institutions must focus more on knowledge development to guarantee their sustainability and reputation. While most Tunisian banks and insurance companies have a good standing in the local market, they can no longer ignore the economic ("opening up" of the economy, privatization, establishment of free-trade zones, etc.) and social (unemployment, changing customer expectations, higher levels of education, etc.) changes in their environment, which are introducing new rules of competition and competitiveness; it is, therefore, essential to study the role of KMCs in improving performance through BMI's intervention role. Thirdly, this study is the first to examine the impact of BMI on OP in Tunisian banks and insurance companies. (d. Third, this research takes place in the unexplored context of financial Tunisian).

Lastly, due to the lack of a well-defined BMI construct, previous literature has found inconsistent empirical results regarding its effect on company performance [14, 18, 25]. Thus, even though the relationship between innovation and performance has been explored with mixed findings, a majority of studies have concluded that there is a significant and positive relationship between both. Accordingly, we also aim to explore the relationship between BMI and PO in Tunisian financial companies. All these

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
DOI: 10.55214/2576-8484.v10i1.11492

factors led us to formulate the main question of this article: How and to what extent do knowledge management capabilities influence organizational performance through Business Model Innovation (BMI)?

Our study contributes to research in three main ways. First, we contribute to the literature on BMI by providing a better understanding of how it affects OP in Tunisian banks and insurance companies. Theoretically, this also helps to clarify the role of KMCs OP [26-28]. Second, we enrich the literature linking KMC and BMI [16, 18, 29]. So far, KMC and OP have been mainly related to product and process innovation, and few studies have investigated the impact of these capabilities on BMI. Thus, our results provide new insights into how KMC may play a role in BM innovation. Third, we contribute to the literature on the specificities of BMI management for improving the performance of financial organizations [30, 31].

The rest of the paper is structured as follows. The next section discusses the theoretical foundations, develops the hypotheses, and presents the research model. The subsequent sections present the research methodology, data analysis, and results. Lastly, the paper concludes with a discussion of the research findings, the implications for theory and practice, the limitations of the paper, and suggests avenues for future research.

2. Literature Review

The knowledge-based view (KBV) has emerged as a dominant theoretical lens in strategic management, emphasizing the central role of knowledge as the most critical resource for firm success. It suggests that organizations can achieve a competitive advantage by leveraging the potential of their knowledge workers to drive desired outcomes [32, 33]. Knowledge, as a unique and strategic resource, lies at the heart of KBV, portraying the firm as a dynamic entity that evolves through the creation and utilization of knowledge [34]. Since knowledge enables firms to compete in dynamic environments, managers must foster a culture that values knowledge and promotes knowledge-sharing practices to support innovation and enhance organizational performance [32, 34, 35]. This study argues that a firm's performance depends on its ability to exploit both existing and new knowledge to create innovative products and processes. In this context, knowledge management plays a crucial role in identifying and applying knowledge to sustain and nurture innovation [24, 36].

Regarding the notion of KMC, previous research [2, 37, 38] has described two main types of KMC, namely infrastructural and dynamic capabilities. Knowledge infrastructure capabilities encompass three fundamental dimensions: organizational culture, organizational structure, and technology [4, 39-41]. These elements constitute a foundational platform that enhances the effectiveness and efficiency of knowledge processes.

Organizational culture, in particular, plays a decisive role in determining the success or failure of knowledge management initiatives. Interaction and collaboration among organizational members are crucial for the transfer of tacit knowledge and its transformation into explicit knowledge [39]. A culture that promotes trust, learning, and openness tends to facilitate knowledge sharing, while a silo-oriented or competitive culture may hinder it [42, 43]. Hence, culture can act either as a facilitator or as a barrier to tacit knowledge exchange within the organization. KM structure is intrinsically linked to organizational culture, as it defines the channels and actors involved in knowledge transfer and communication across the enterprise. The latter indicates how and with whom knowledge is transferred and communicated throughout the organization. The nature of the structure (formal or informal, collective or individualistic, hierarchical or flat, central or marginal) promotes individualistic behavior in which locations, divisions, and functions are rewarded for "hoarding" information that can inhibit effective knowledge management across the organization [39]. Technology enables data-driven systems through which organizational knowledge is captured, and business processes are mapped [44]. However, recent findings suggest that technology alone is not sufficient; its effectiveness depends on its integration with supportive cultural and structural conditions [45].

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The concept of dynamic capabilities was introduced to articulate the types of capabilities organizations require to manage change. According to Zheng et al. [46], the term dynamic capabilities refers to an organization's ability to "acquire, generate, and combine knowledge resources in order to detect, explore, and address changes in the environment." Building on earlier research, dynamic capabilities in knowledge management can be classified into four interrelated processes: knowledge acquisition (which includes the creation of new knowledge), knowledge conversion (which involves the filtering, assimilation, and transformation of newly captured knowledge), knowledge application (often described through the terms transfer, sharing, diffusion, dissemination, exchange, implementation, or integration), and knowledge protection (processes implemented to safeguard knowledge assets from improper use or theft) [39, 47, 48].

The concept of organizational performance has changed since the 1990s. The focus has shifted from a short-term to a global approach. In this context, MAALEJ and AFFES [49] consider performance to be polysemous, and its definition depends on the scope of activity covered [50]. This evolution has led to the adoption of a global performance approach. Baret [51] defines global performance as the aggregation of economic, social, environmental, and societal performance. Therefore, OP is a multidimensional concept comprising internal and external, qualitative and quantitative, technical and human, physical and financial parameters. In other words, OP is a set of financial and non-financial indicators that can be used to determine whether a company's objectives have been successfully achieved [52]. Organizational performance is by no means a straightforward phenomenon, and we therefore admit it is a complex concept. This means that it is up to the researcher to adapt this broad concept to their research objectives [50, 53].

The concept of the Business Model (BM) dates back several decades [54]. BM is generally strategy-focused, taking into account PO or innovation potential [55, 56]. The evolution of BM literature has been broadly categorized into three areas of research [57, 58]. Firstly, BM is used as a basis for company classification [59]. Secondly, BM is considered an antecedent to heterogeneity in company performance; more precisely, BMs are regarded as an important factor contributing to company performance. Thirdly, the BM is viewed as a potential unit of innovation [20, 60]. It can move away from the idea that innovation is only possible if it is technological or applied to a product or a process. Consequently, it resides in transforming the business model and expressing how to do business with new methods [59]. Hence, more and more studies have focused on the innovation dimension of BM and examined BMI from different perspectives. Thus, we could say that BMI is an extension of BM.

To achieve this, companies began to seek new strategies to gain a competitive advantage. Thus, in response to these challenges, the new "BMI" approach emerged, demonstrating innovative corporate actions by simultaneously considering all internal and external factors [20, 61]. As a result, it is seen as a strategic tool that enables companies to overcome the difficulties they encounter along their lifecycle [62]. This is widely recognized as a crucial activity that managers need to perform to successfully cope with environmental change in an innovative way [63, 64]. However, it should be noted that, unlike product and service innovation, BMI involves different innovative activities of a company, such as processes, structure, delivery, and interaction, that are carried out to achieve a sustainable competitive advantage and higher performance.

3. Hypothesis Development

3.1. KMC and BMI

Infrastructural capabilities benefit from a pool of innovative knowledge assets that help the company to be aware of innovative opportunities [65]. These opportunities can arise from the R&D department in terms of new products and services, via innovative teams or other units dealing with value-creation and value-capture innovation. The organizational culture has a strong influence on a company's ability to innovate [2, 14, 20, 25] since the company's histories, symbols, rituals, and routines contribute to shaping an innovation culture in which the shared values and beliefs of innovation are transmitted across the organization... The organizational structure is also important, as it is regarded as a driver of

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ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
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dynamic knowledge capabilities since improving these capabilities will enhance the acquisition, generation, sharing, and combination of knowledge in the organization. Consequently, a flexible, non-hierarchical structure has a significant impact on innovation [2, 14, 39] and subsequently on BMI [25]. Previous studies have also shown that KMCs related to technology foster innovative ideas and promote a company's overall innovation [2, 14, 25].

Based on these arguments, we formulate the following hypothesis and sub-hypotheses:

$H_{1:}$ Infrastructural KMC has a positive effect on BMI
$H_{1.a:}$ Organizational culture has a positive effect on BMI
$H_{2.b:}$ Organizational structure has a positive effect on BMI
$H_{1.c:}$ Technology has a positive effect on BMI

Doz and Kosonen [66], along with Clauss et al. [14] and Hock-Doepgen et al. [25], identify KMC as key catalysts for BMI. Similarly, based on dynamic capabilities theory, Teece and Leih [67] argue that an organization's ability to gather new knowledge and apply it at the appropriate time is fundamental to driving BMI. Supporting this view, Teece and Leih [67] have indicated that the knowledge acquisition process enhances administrative and technical innovation, product/service innovation, product innovation, and new product performance. To effectively exploit acquired knowledge and capture innovation opportunities, firms must be able to convert and apply this acquired knowledge [21]. Accordingly, knowledge conversion plays a pivotal role in supporting a company's innovative capabilities and performance [25, 68]. This process stimulates the generation and development of BMI Clauss et al. [14] and Hock-Doepgen et al. [25]. Lee et al. [69] have provided empirical evidence that the knowledge translation process is significantly related to product and process innovation. This mechanism enhances a firm's knowledge-based organizational resources and strengthens its intellectual capital by facilitating the exchange of information, experiences, and practices among organizational members. Additionally, Sahoo et al. [70] highlight that knowledge application positively influences technical and administrative innovation. Through this process, organizations continuously adapt their operational and strategic dimensions of BMI [14] to solve problems and develop new technologies, products, revenue models, etc. [25]. Finally, knowledge protection represents a critical capability for sustaining innovative performance [71]. Safeguarding a firm's knowledge base contributes to its ability to introduce innovative products and services, thereby reinforcing its competitive advantage. Based on the above, we therefore introduce the second hypothesis and the following sub-hypotheses:

$H_{2:}$ Dynamic KMC has a positive effect on BMI
$H_{2.a:}$ The knowledge acquisition process has a positive effect on BMI
$H_{2.b:}$ The knowledge conversion process has a positive effect on BMI
$H_{2.c:}$ The knowledge application process has a positive effect on BMI
$H_{2.d:}$ The knowledge protection process has a positive effect on BMI

3.2. BMI and Organizational Performance

In today's era of globalization, companies operate in a competitive market and are subject to constant change. Accordingly, they begin to search for a unique strategy and innovative tactics to survive these changes. Businesses are therefore moving from product/service innovation to BMI [72], as the latter provides a high level of profitability compared to the traditional model [73]. It enables the company to improve ROE (Return on Equity) and makes a significant contribution to overall financial performance [74]. BMI has become an important factor in improving performance [18, 75]. New businesses can fail in a fast-moving market due to poor performance. BMI then operates as a key driver for gaining competitiveness and superior performance [76, 77]. Based on this, we propose hypothesis H3:

$H_{3:}$ BMI has a positive effect on OP

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
DOI: 10.55214/2576-8484.v10i1.11492

3.3. Knowledge Management Capabilities and Organizational Performance

The relationship between KM and OP is widely acknowledged in the literature. According to the knowledge-based view, knowledge plays a pivotal role as a strategic resource for enhancing organizational effectiveness [13, 78]. This understanding underscores the significance of effective KM practices in achieving optimal organizational outcomes.

Several authors, Clauss et al. [14] and Nakou and Simen [79], have shown the positive impact of these infrastructural capabilities on OP. According to Theriou et al. [80], "an effective knowledge management culture consists of rules and practices that promote information and knowledge transfer between staff and at different administrative levels, resulting in superior performance. In other words, an organizational culture that is positive in terms of productivity and participation, based on an effective network of interpersonal relations, improves work performance [79, 81]. In addition, a flatter, simpler, and more flexible structure chains together more generative processes, more sharing, and more knowledge transmission [82]. Similarly, the right structure facilitates communication between individuals and company departments on the one hand, and the free flow of ideas among employees on the other, as it increases the degree of employee empowerment, participation in decision-making, creativity, and organizational success [2]. Regarding the technological dimension, Nakou and Simen [79] assert that organizations with advanced technology have higher organizational performance than their competitors. Technology is always linked to organizational performance, and theoretical reflections have shown that it is a catalyst for performance [83-85]. Thus, we make the following hypotheses:

H_4 Infrastructural KMC has a positive effect on OP.
$H_{4.a}$ Organizational culture has a positive effect on OP.
$H_{4.b}$ Organizational structure has a positive effect on OP.
$H_{4.c}$ Technology has a positive effect on OP.

Dynamic KMC holds significance, as they are instrumental in fostering a positive organizational environment, improving work conditions, and boosting productivity through their processes and practices [40]. To put it another way, "organizational performance refers to the dynamic ability of organizations to meet the needs of their stakeholders and their own survival needs" [2]. In this sense, Mehralian et al. [86] pointed out that "knowledge acquisition is the organization's ability to identify, organize, and obtain knowledge from external resources and is essential to its operational success." This implies that the accumulation of acquired knowledge can enhance employees' skills and expertise, leading to improved production and customer satisfaction, ultimately resulting in enhanced overall performance [87]. Additionally, the knowledge conversion process plays a pivotal role: when knowledge is effectively transformed, members of the company are likely to continue broadening their perspectives and refining their ideas [68]. Consequently, effective knowledge conversion is believed to drive the creation of a sustainable competitive advantage as knowledge becomes seamlessly integrated into organizational processes, MOBOLADE and IBOJO [88]. Law and Ngai [89] discovered that the process of applying knowledge results in enhancements to a company's business products, services, and offerings, leading to improved operational performance. Additionally, sharing and applying knowledge through expert interaction, communication, and coordination can elevate a company's productivity and help it sustain a competitive edge [13]. For knowledge to serve as a source of competitive advantage, it must possess the attributes of being both scarce and unique [23]. Without the security-oriented process of knowledge protection, knowledge could lose its important qualities. Protection is therefore vital since knowledge is used to generate or preserve a competitive advantage [90]. Previous research has highlighted the importance of knowledge protection mechanisms such as patents, trademarks, trade secrets, and non-disclosure agreements in preventing knowledge leakage and safeguarding organizational interests [91, 92]. In this sense, Mills and Smith [93] demonstrated a positive relationship between knowledge protection and OP.

Following these arguments, we propose the following hypotheses:

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
DOI: 10.55214/2576-8484.v10i1.11492

H_{5}: Dynamic KMC has a positive effect on organizational performance.
$H_{5.a}$: The knowledge acquisition process has a positive effect on OP.
$H_{5.b}$: The knowledge conversion process has a positive effect on OP.
$H_{5.c}$: The knowledge application process has a positive effect on OP.
$H_{5.d}$: The knowledge protection process has a positive effect on OP.

3.4. The Mediation Role of BMI

Previous research has suggested that a KM system that includes infrastructure and processes is essential to ensure effective KM, leading to innovation and organizational performance [94]. Similarly, companies that implement comprehensive KM strategies can not only deliver more innovative services to demanding customers but also achieve their goals [95] and can also play an important role in economic development and societal transformation [96].

Migdadi [94] has examined the mediating effect of innovation capabilities in the relationship between the KM process and OP. The findings of this study are consistent with the conclusions of Ozdemir and Abdukhoshimov [97], who have found that innovation has a positive effect on the relationship between the KM process and OP. Foss and Saebi [15] analyzed 150 scientific articles on BMI published between 2000 and 2015. They have identified important avenues for future research and shown how innovation theory and other literature streams can help fill many gaps in the BMI literature. Based on their literature review and identification of gaps in BMI research, they have argued that BMI can play an antecedent, moderating, and mediating role. On this basis, we propose the following hypotheses:

H_{6}: BMI plays a mediating role in the relationship between infrastructural KMC and OP
H_{7}: BMI plays a mediating role in the relationship between dynamic KMC and OP.

To sum up, Figure 1 illustrates the research framework

4. Research Methodologies

4.1. Sampling

Our analysis of the problem and subsequent conceptualization naturally led us to choose quantitative methods, using questionnaires with managers. This approach will enable us to identify the capabilities that have a greater impact on BMI and OP. The population of interest for our empirical research is the people responsible for decision-making in banks and insurance companies in Tunisia. This selection of respondents is drawn from studies conducted by Idrees et al. [98], Jandawapee et al. [99], Kaewnaknaew et al. [52], and Limsangpetch et al. [12]. These researchers have worked with decision-makers in SMEs since these individuals have more adequate knowledge of KM processes to take part in the study, and are more likely to provide an overview of their companies' level of performance. For more information, refer to Table 1 for Demographic Information and Data Collection. The sample comprises 391 managers, and the institutions consulted are mainly located in the Greater Tunis area (most answers were provided at the head office level). Our survey was conducted in French, utilizing specialists (two university French teachers and two university English teachers) to carry out the back-translation method (from English to French and from French to English) in two ways. We opted for face-to-face data collection by administering questionnaires at banks' and insurance companies' head offices, and we emailed questionnaires to respondents who were difficult to reach. The data collection period started in January 2023 and continued until April 2023.

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Table 1.
Demographic Analysis.

Participants	Description	Percentage
Gender	Male	59%
	Female	41%
	Total	100%
Age	25 to 35	32%
	36 to 45	55%
	Above 46	13%
	Total	100%
Financial organizations	Banks	53.5%
	Insurance	46.5%
	Total	100%
Hierarchy	Executive managers	52. 2%
	Branch managers	12.3%
	Department managers	20.7%
	Central managers	7.8%
	General managers	6%
	Total	100%

4.2. Measurement

To measure KMC, we used the two-stage hierarchical measurement model of Gold et al. [39]. This model has been reused by Liebowitz and Megbolugbe [100], Smith [101], and Jasimuddin and Naqshbandi [102]. The three first-order constructs that measure infrastructural KMC are organizational culture (7 items), organizational structure (7 items), and technology (6 items). The four second-order constructs measuring dynamic KMC are knowledge acquisition capabilities (9 items), knowledge conversion capabilities (5 items), knowledge application capabilities (6 items), and knowledge protection capabilities (4 items). This construct of dynamic KMC was reused by Hock-Doepgen et al. [25].

The BMI measurement scale is drawn from the work of Anwar [30], Anwar and Ali Shah [103], and Al-Nimer et al. [104]. This scale included questions to determine whether the company focused on existing or new activities in each of the eight components of the business model. These authors used the five-point Likert scale because, according to the literature review, a five-point scale increases response rates and response quality, making it easier for respondents to complete the questionnaire.

To measure OP, we have relied on previous studies by Danso et al. [105], Guo et al. [106], Anwar and Ali Shah [103], and Ngouni Noupele and Mayéglé [107]. We have listed three areas relating to financial performance (e.g., return on assets, return on equity, and return on investment) and five relating to non-financial performance (customer satisfaction, employee satisfaction, product and service quality, new product/service development, and overall company performance) in the questionnaire. Respondents are asked to rate their company's performance on the given options, from 1 = extremely poor to 5 = extremely improved.

5. Hypothesis Test

We have chosen Analysis of Covariance Structure (ASC) as our methodological tool and AMOS as the processing software. The ASC method uses a system of structural equations based on the covariance matrix estimation. It allows us to assess how well the model fits the data, based on its distributional properties. This approach, therefore, aims to establish the quality of a predefined model based on the data.

Table 2 shows that we obtain good fit indices. Specifically, the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values exceeded the acceptance threshold. Additionally, the Normed Fit Index (PNFI) increased from 0.763 to 0.866. It is worth noting that the standardized Chi-square (χ^2) of the model is less than 2, and the Root Mean Square Error of Approximation (RMSEA) is below 0.10.

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Furthermore, the Parsimony Comparative Fit Index (PCFI) is close to 1 [108-112]. These improved fit indices indicate a good structural model for our variables (Table 2). The following diagram (Figure 2) presents the factorial contributions between the various variables in the model.

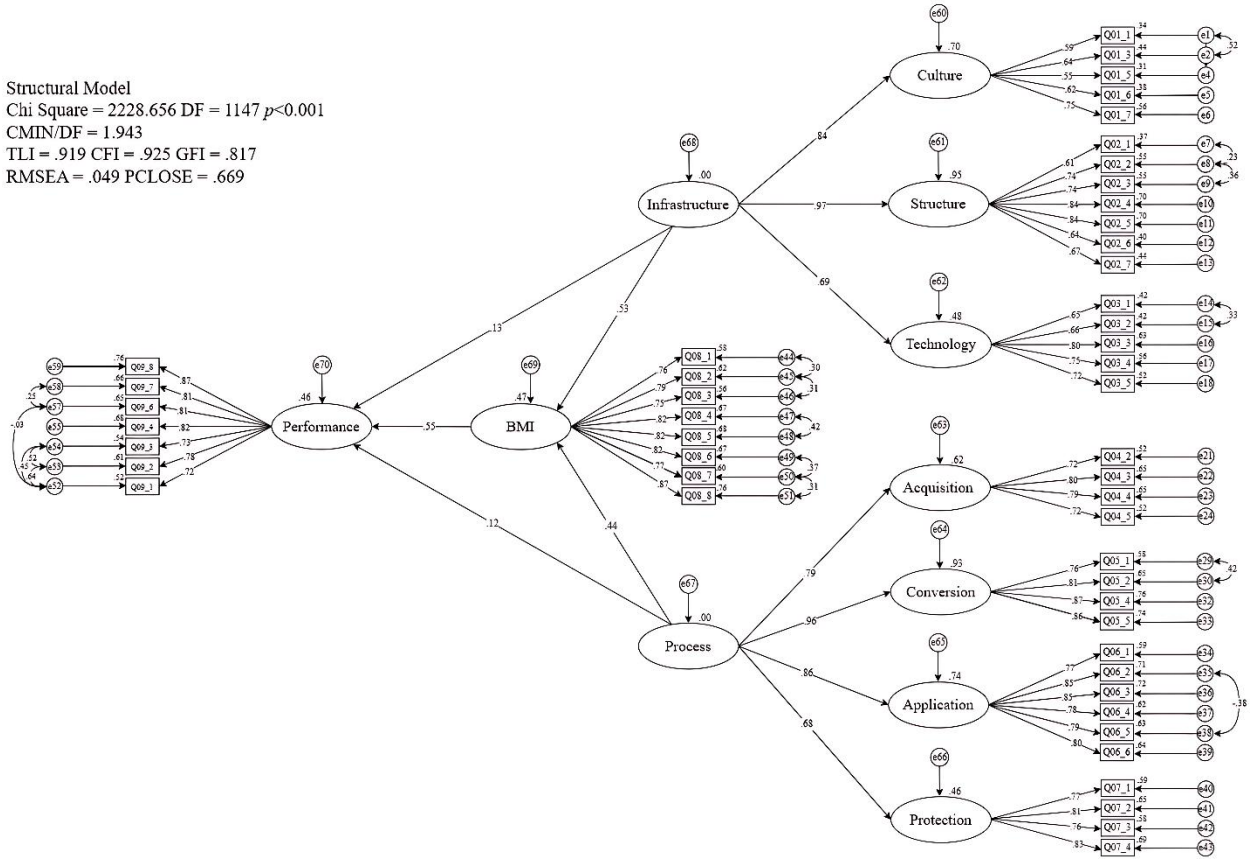

Figure 2.
Structural research model.

Table 2.
Search structure model indices.

	Absolute indices					Incremental indices			Parsimony indices	
	χ2	**GFI**	**AGFI**	**RMSEA**	**χ2 /ddl**	**NIF**	**CFI**	**TLI**	**PNFI**	**PCFI**
Value obtained	2,228,656	0.817	0.797	0.049	1.943	0.857	0.925	0.919	0.802	0.866

Table 3 reveals that all direct effects have a statistical T value greater than the threshold of 2 and are significant at a P error of 5% [113]. Thus, the results confirm the hypotheses (H1, H2, H3, H4, and H5). Table 3 also presents the path coefficients of the causal links between exogenous and endogenous latent variables. The infrastructural and dynamic capabilities of KM have a positive effect on OP (T= 2.227 and T= 2.279). For these causal links, a closer examination shows that these knowledge management capabilities are more strongly explained via BMI (T= 7.789 and T= 7.773). Lastly, the OP variable is positively affected by BMI, with a T value of 7.430.

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Table 3.
Direct links of the research model.

Hypotheses	Links	Estimation	S.E.	C.R.	P< 0.05	Significant at the 0.05 threshold
H1	Infrastructure capabilities Business Model Innovation	0.953	0.122	7 .789	0.000	Significant
H2	Dynamic Capabilities Business Model Innovation	0.573	0.074	7.773	0.000	Significant
H3	Business Model Innovation Organizational performance	0.462	0.062	7.430	0.000	Significant
H4	Infrastructure capabilities Organizational performance	0.193	0.091	2.127	0.033	Significant
H5	Dynamic capabilities, Organizational performance	0.137	0.060	2.279	0.023	Significant

The indirect effects (Table 4) have revealed the following results. Firstly, organizational culture does not affect BMI (T= 1.379 < 2 and P= 0.168 > 0.05), so hypothesis H1.1 is rejected. Organizational structure and technology have positive effects on BMI, with a higher Student's T for organizational structure at 7.381. Therefore, hypotheses H1.2 and H1.3 are confirmed. Knowledge acquisition does not affect BMI (T= 1.770 < 2 and P= 0.77 > 0.05), leading to the rejection of hypothesis H2.1. Conversely, knowledge conversion, knowledge application, and knowledge protection have positive effects on BMI, confirming hypotheses H2.2, H2.3, and H2.4. Next, organizational culture does not affect OP (T= 0.8 < 2 and P= 0.936 > 0.05), so hypothesis H4.1 is rejected. Organizational structure and technology have positive effects on OP, with hypotheses H4.2 and H4.3 confirmed. Finally, knowledge acquisition, knowledge conversion, knowledge application, and knowledge protection have positive effects on OP, with a higher Student's T for knowledge conversion at 7.016, confirming hypotheses H5.1, H5.2, H5.3, and H5.4.

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ISSN: 2576-8484
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Table 4.
Indirect links of the research model

Hypotheses	Links	Estimation	S.E.	C.R.	P< 0.05	Significant at the 0.05 threshold
H1.a	Organizational culture Business Model Innovation	0.091	0.066	1.379	0.168	Rejected
H1.b	Organizational structure Business Model Innovation	0.584	0.079	7.381	0.000	Significant
H1.c	Technology Business Model Innovation	0.113	0.053	2.134	0.033	Significant
H2.a	Knowledge Acquisition Business Model Innovation	0.081	0.046	1.770	0.077	Rejected
H2.b	Knowledge Conversion Business Model Innovation	0.192	0.044	4.371	0.000	Significant
H2.c	Knowledge Application Business Model Innovation	0.103	0.043	2.375	0.018	Significant
H2.d	Knowledge Protection Business Model Innovation	0.081	0.035	2.306	0.021	Significant
H4.a	Organizational culture Organizational performance	0.004	0.053	0.080	0.936	Rejected
H4.b	Organizational structure Organizational performance	0.245	0.062	3.926	0.000	Significant
H4.c	Technology Organizational Performance	0.114	0.044	2.621	0.009	Significant
H5.a	Knowledge acquisition , Organizational performance	0.119	0.038	3.117	0.002	Significant
H5.b	Knowledge conversion , Organizational performance	0.280	0.040	7.016	0.000	Significant
H5.c	Knowledge application: Organizational performance	0.137	0.036	3.788	0.000	Significant
H5.d	Knowledge protection, Organizational performance	0.081	0.035	2.306	0.021	Significant

Finally, to verify the mediating role assumed by BMI, we must check the results of the specific indirect effects. The results of the specific indirect effects from AMOS software are presented in Table 5.

Table 5.
Mediation effect.

Hypotheses	Links	Estimation	S.E.	C.R.	P< 0.05	Significant at the 0.05 threshold
H6	Infrastructure capabilities Business Model Innovation Organizational performance	0.288	--	--	0.000	Significant
H7	Dynamic capabilities , Business Model Innovation , Organizational performance	0.240	--	--	0.000	Significant

Indeed, the estimation and correlation significance (P-value) indices have improved through BMI mediation (Table 5). The impact of infrastructural KMC on OP is significant, with an estimate of 0.193 and P= 0.033. Mediation has improved this result, with a new estimate of 0.288 and P= 0.000. The impact of dynamic KMC on OP is significant, with an estimate of 0.137 and P= 0.023. Mediation has improved this result, with a new estimate of 0.240 and P= 0.000. Hypotheses H6 and H7 are therefore confirmed.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
DOI: 10.55214/2576-8484.v10i1.11492

6. Discussion

The intention of this research is to examine the effect of KMC based on two categories: knowledge infrastructure and knowledge process, on OP, with the mediating role of BMI. The results revealed that organizational structure and technology both positively influence BMI, whereas organizational culture has no significant effect. These results are not consistent with those demonstrated by Hock-Doepgen et al. [25], who state that organizational structure and technology do not affect BMI, and that organizational culture is a necessary condition for BMI. Similarly, Chen et al. [114], Ilyas et al. [115], and Spieth et al. [20] argue that organizational culture plays a major role in BMI development. Our findings suggest that developing a culture of innovation often conflicts with an intentionally conservative vision. Bank and insurance managers prefer to remain focused on their core activities, so employees are not encouraged to explore and experiment. On the other hand, they have affirmed the flexibility of their companies by facilitating and encouraging the discovery of new perspectives through technology.

In addition, our results indicated a significant link between dynamic KMC and BMI. We have found that knowledge conversion, application, and protection capabilities have a positive effect on BMI. In contrast, we obtained a negative impact of knowledge acquisition capabilities and BMI. This impact is reflected by the fact that banks and insurance companies have no knowledge acquisition process and do not use the information they have on current projects to improve future projects. This negative impact is in line with the findings of Idrees et al. [98] and is not with Zott et al. [58]. These researchers believe that the knowledge acquisition process identifies new BM opportunities that introduce new activities, connect partners in innovative ways, and change the governance of activities along the supply chain. This means that, for the latter, the ability to acquire new knowledge is essential for BMI. This link between knowledge acquisition and BMI was first proven by Zahra and George [116] and recently, by Von Delft et al. [117], Hock-Doepgen et al. [25], and Miroshnychenko et al. [118]. Their findings suggest that the acquisition process allows companies to be constantly aware of changes in the business environment. It increases global alertness to potential threats and enables companies to constantly reassess the competitive state of their business model. The continuous acquisition of new knowledge is therefore essential for identifying innovative opportunities and guiding the company's strategic positioning.

Another important finding highlights the significant relationship between knowledge management and firm performance, suggesting that effective management and utilization of organizational knowledge contribute substantially to achieving superior performance outcomes. Knowledge emerges as the most strategically valuable resource for a company, particularly in a dynamic and competitive business environment. Recognizing the impact of KM, encompassing both infrastructural and dynamic capabilities, on innovation can secure a competitive advantage for the business [119]. Consequently, various studies, Abbas et al. [120], Abbas et al. [121], and Meher et al. [122] have substantiated the correlation between KMC and company performance. Few studies, however, identify the mediating effect of organizational innovation between these capabilities and firm performance.

To improve OP, BMI implementation has also proved crucial in previous research [20, 123]. Among the examples of BMI's impact on corporate performance and improving competitive advantage, we can mention Dell (in the IT industry), Wal-Mart (retail), Uber (transportation), and Southwest (airline industry), which all developed their innovative BMs and subsequently achieved better OP [124]. On the other hand, other brands have failed to improve their performance even with BMI, such as IKEA's Boklok for prefabricated homes and TenneT's BM electricity supply security [125]. This means that if BMI is not managed properly, it may not produce the desired effect. Thus, BMI can be regarded as a double-edged sword, in that it can have very positive and negative consequences, and companies can experience substantial performance improvements or go out of business. As a result, knowing how and when to innovate a BMI is a serious challenge for business leaders [124].

Lastly, the findings of this study also revealed that BMI positively and significantly mediates the relationship between KMC and OP. Specifically, the results highlight that, for banks and insurance

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
DOI: 10.55214/2576-8484.v10i1.11492

companies, certain KMCs are critical enablers of BMI. These capabilities include the ability to effectively acquire both internal and external knowledge, transform and integrate this knowledge to make it actionable, and ultimately apply it to the development of new products and services. This suggests that firms in the financial sector can enhance their performance by leveraging KMC to drive BMI, thereby fostering innovation and value creation.

7. Conclusion

In this article, we aim to examine the mediating effect of BMI on the relationship between KMC and OP and to identify the most relevant KMC to address the specific issues of banking and insurance, given that few studies exist in this sector in Tunisia. Indeed, on the theoretical level, we have found that most KMCs were originally developed and empirically tested in the context of Western and Asian countries such as the USA, Australia, Canada, Taiwan, Hong Kong, and Korea. Therefore, this study provides a theoretical contribution to the impact of KMCs on OP in a developing North African country. A further contribution relates to the lack of empirical evidence in the literature on KMC and BMI, particularly in the context of developing countries.

This study has filled this gap by showing that structural and technological infrastructural capabilities are BMI catalysts. In addition, these infrastructural capabilities directly affect organizational performance. Their impacts are entirely mediated by BMI, and secondly, knowledge conversion, application, and protection processes directly affect BMI as well as OP.

In managerial terms, the KM approach in Tunisian companies is still in its infancy, despite the considerable efforts made to implement KM through the intensive development of learning and training initiatives within these large companies. To improve the performance of Tunisian financial businesses and to develop their KMC managers successfully, they need to mobilize the various knowledge resources of their employees by instilling a culture of externalizing and sharing knowledge, introducing new BMs based on the acquisition, conversion, application, and protection of knowledge capital, and fostering a collaborative atmosphere. Managers should also encourage their staff to be innovative through exploring and experimenting, improving knowledge acquisition, and encouraging employees to analyze mistakes to enrich their knowledge, generate new knowledge, and foster a flexible, flat organizational structure. Indeed, successful management implies having managerial skills and a managerial culture oriented toward the company's ongoing development. To cope with the harsh conditions of globalization, banks and insurance companies must keep up to date in terms of knowledge, know-how, and knowledge management. Adopting a KM system is, therefore, an absolute necessity for these companies and must be implemented immediately.

Our work has some limitations. The first is our sample. It was extremely difficult to reach the people responsible for decision-making in banks and insurance companies since they were mostly senior civil servants who were permanently busy and difficult to contact. Similarly, it should be noted that the empirical study concentrated on the financial sector, more specifically, banks and insurance companies. However, it would have been interesting to look at other financial institutions, such as leasing and factoring companies. The second limitation concerns the conceptual model: we did not include moderating variables to strengthen the links between the variables studied. The third limitation is the focus on banks and insurance companies. We wonder whether the results would be the same if we applied this same study to another sector of activity.

These limitations pave the way for further extensions and avenues of research. It would be advisable for future studies to focus more specifically on measuring managerial inefficiencies and vulnerabilities in skills and knowledge, which lead to dysfunction, loss of added value, and hidden costs that are poorly reflected in the financial system. This work could therefore provide a theoretical and empirical basis for future work. Given the recency of the subject, its hyper-contextualization, and the richness of the field, it would be appropriate to carry out further investigations by promoting this research project among management researchers and professionals in the field.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
DOI: 10.55214/2576-8484.v10i1.11492

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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ISSN: 2576-8484
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Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 1: 41-59, 2026
DOI: 10.55214/2576-8484.v10i1.11492