



A Framework for Firm Performance Under the Influence of Knowledge Management and Dynamic Capabilities: Examining the Mediating Role of Sustainable Competitive Advantage

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Abstract

This study aimed to investigate the effect of knowledge management (KM) and dynamic capabilities (DCs) on the improvement of the performance of knowledge firms through the mediating role of sustainable competitive advantage (SCA). The study was applied in terms of purpose and descriptive-correlational in terms of nature. A number of knowledge firms in Tehran province were selected as the statistical sample. The optimal sample size was calculated to be 288 people using G-Power software version 3.1. Using a simple random sampling method and through an online survey (Response Rate of 64%), 186 questionnaires were collected. Data analysis was carried out using Smart PLS 3. The findings revealed that KM and DCs enhanced the performance of knowledge firms through strengthening SCA. The current study extends the literature on management by bridging the research gap. It is suggested that creating and applying KM and DCs simultaneously, through SCA, can provide the essential setting for the significant improvement of knowledge firms' performance and assist managers and policymakers understand how to improve the firm performance (FP) in dynamic environments. This paper is built on the assumptions of the resource-based view and the perspective of the firms' dynamic capabilities. The findings of the study help firm managers and practitioners to create and maintain a SCA and improve performance through a KM approach and DCs. In addition to theoretical contributions, this study provides a variety of practical advice for managers and policymakers to succeed in applying KM and DCs to achieve better performance.

Keywords: firm performance, knowledge management, dynamic capabilities, sustainable competitive advantage.

Introduction

Due to the fundamental and transformational changes in the business environment and the global movement toward a knowledge-based economy, firms today are facing a number of challenges to maintain their optimal performance in the long term (Hock-Doepgen et al., 2021). One of the salient features of this environment is the creation and growth of technology-based businesses in support of the economic development of countries. In this context, knowledge firms have been proposed as one of the main players in the development

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and dynamism of the economies of countries, and the positive results of their activities have attracted more attention from managers and policymakers in developing countries, including Iran (Ghafouri et al., 2020). Despite the importance of the field, studies in Iran have often been related to the analysis of literature and quoting the actions and experiences of other countries. According to statistics, more than 50% of Iranian knowledge firms practically cease to operate within a short period of time after their establishment. In other words, the process of technology commercialization in Iran has gradually decreased, and domestic knowledge firms are facing difficulties in the implementation of innovative measures to gain a competitive advantage and improve their performance (Ghafouri et al., 2020; Sadr & Ansari, 2015). Therefore, providing better performance seems to have become the most fundamental challenge for the managers of these firms, and they are trying to achieve superior performance by using forecasts and applying various strategies and tools (Dehghani Soltani & Mesbahi, 2020; Shahin et al., 2020). In this regard, the focus of strategic management is also organized around this issue, as researchers seek to answer the question of why some firms always outperform others (Dubey et al., 2013). Studies in this area show that knowledge firms are able to improve their performance by having a sustainable competitive advantage. Hence, achieving and maintaining a competitive advantage has become the ultimate goal of firm managers (Na et al., 2019), and the “holy grail” of strategic management research is focused on improving corporate performance in dynamic environments (Ferreira et al., 2019; Pang et al., 2019). On the other hand, almost all of the existing frameworks and strategic tools used to develop and deploy strategies have been adopted from a single basis, i.e., SCA. In fact, those firms that have a sustainable competitive advantage will improve their performance. Hence, achieving and maintaining competitive advantage (CA) to ensure the growth of a firm as the ultimate goal of strategic management is of great importance (Na et al., 2019). Recent studies in this field have sought to answer the question that if the resources, capabilities, and operational characteristics of firms correlate with a CA that creates sustainable performance. According to a resource-based view, firms must exploit their resources and capabilities to maintain their CA (Keat et al., 2018). Therefore, with the understanding that achieving a SCA in the dynamic and competitive nature of the current business environment is critical for knowledge firms, they need to effectively control their existing knowledge and turn it into a SCA. In recent years, KM has been considered a strategic resource and a key factor in achieving SCA. In a knowledge-based economy, firms focus on issues regarding knowledge assets more than traditional assets. However, in dynamic and competitive conditions, these firms face many challenges to maintain their knowledge base (Denford & Chan, 2011). With the rapid development of the knowledge-based economy in the markets, organizations confront with a complicated business environment. Consequently, management researchers have always been looking for better ways to improve FP and many have considered KM as a valuable organizational resource to address new challenges and as one of the key factors that leads to organizational success. Furthermore, studies have illustrated that KM is an important predictor for the performance of a firm. Nevertheless, today’s increasingly globalizing economy makes it an important endeavor to explore KM and its impact on FP in different cultural communities. Despite this, there are a limited number of studies in the literature that investigate the impact of KM performance in the international context (Yu et al., 2019). In addition, the transformations arising from the digitalization of the business world are rapidly eliminating traditional barriers to trade (Ibarra et al., 2018). In this context, resources are no longer monopolized and organizations are looking for alternative resources that are difficult to emulate (Honyenuga et al., 2019). Meanwhile, since the value generated by resources and capabilities tends to become obsolete, companies need to develop DCs. DCs are considered essential elements for the growth, survival, and competitiveness of companies (Keat et al.,

2018). DCs enable companies to turn the short-term CA into a SCA (Augier & Teece, 2008). Although the resource-based view argues for creating and maintaining a SCA, several knowledge issues and gaps exist in this approach that require further investigation. Besides, there is a need for a better understanding of the interactions among resources, capabilities, and SCA (Keat et al., 2018). Recent evolutionary approaches to DCs demonstrate that the mere consideration of superior resources is not sufficient to achieve high-level performance. This connotes that firms require DCs to make better use of their resources, providing them with the potential to improve organizational performance results. DCs activate the ability of the businesses to change resources, i.e., creation, integration, and liberalization of the resources along with environmental changes (Hernandez-Linares et al., 2018). In fact, the researchers' purpose in addressing this issue arises from the fact that knowledge firms face many problems such as the lack of a complete cycle of new product development, high failure rate, the short life cycle of their products, and low ability to sustain a competitive advantage over time. Addressing the problems of such companies with new approaches such as knowledge management and the development of dynamic capabilities can reduce the challenges and problems they face. Considering all these, the present study aimed to fill the gap of previous studies by examining the impact of KM and DCs on FP, by explaining the mediating role of SCA in knowledge firms.

Theoretical Framework of the Research

Theoretical Approach

To facilitate research in environmental strategies, various theories – including the resource-based view (RBV) – have been utilized (Do & Nguyen, 2020). The resource-based view, the most employed theoretical framework in management studies, focuses on internal factors and assists businesses to achieve SCA (Pereira & Bamel, 2021). However, researchers argue that the resources of CA include both internal resources and external resources (Mandal, 2015). Moreover, with regard to the business model innovation, studies suggest that the antecedents of the business model innovation for a firm can be either internal or external (Su et al., 2020). Although the configuration of resources can be changed through the resource-based view, the emphasis on change and learning originates from the evolutionary theory (Hernandez-Linares et al., 2021). Based on this theory, a number of researchers posit that the business model innovation is an answer to the external environment changes. They maintain that due to the unknown nature of the organization's external environment, firms, through the trial-and-test method, need to adjust their business models to the environment (Su et al., 2020). Nevertheless, it is worth mentioning that the business model innovation often requires financial resources and massive investments, which may result in unknown revenue streams and even adverse outcomes in the future (Rashnavadi et al., 2021). Furthermore, considering the increasingly dynamic business environment and its challenges, values generated by resources and capabilities are not permanent for firms and gradually become obsolete (Keat et al., 2018). Consequently, as the market changes, the resources and procedures need to be turned into new competencies. The attitude of change is developed through the realization of this concept (Girdwichai & Somjai, 2019). Based on this rationale, the dynamic capabilities theory (DCT) was suggested. It is now considered a key factor in the growth, survival, and competition of firms. The concept of DCs is developed based on the resource-based view, and contains the same premises; however, the DCs outlook focuses on the behavior and response in a particular situation (Keat et al., 2018). In the face of environmental uncertainties, firms can create opportunities by exploiting DCs (Mandal, 2015). Therefore,

DCs enable firms to turn the CA into a sustainable one in a short period of time (Keat et al., 2018). Firms, using DCs, perform more effectively through systematic creation and modification of how tasks are done. DCs are created over time and in accordance with the environmental changes and are developed by tangible and intangible resources and decision-making processes. In this framework, the CA of a firm is created by effective DCs, assisting it to outperform other firms and maintain its CA (Girdwichai & Somjai, 2019). Considering all these, the present study used the DCs theory as the dominant theoretical approach.

Knowledge Management (KM)

Knowledge is an abstraction or is related to a theoretical approach or practical understanding of a subject that has become an important aspect of economic life. Moreover, when included in human capital, it is a valuable resource for organizations and enables companies to improve their distinctive competencies (Keat et al., 2018; Sanchez et al., 2015). However, the mere presence of knowledge in a company cannot guarantee organizational success and SCA, unless it is effectively managed through a proper system. KM is a management tool with a set of principles that showcases methods and techniques through which knowledge is shared and used. This concept refers to an approach to the recognition of knowledge, expertise, and experience that creates new competencies (Iqbal et al., 2019). Although there is no consistent definition for KM and it is often regarded as managerial processes and organizational capability, it has recently been considered as a type of dynamic capability that enables a firm to exploit knowledge to increase competition (Bamel et al., 2021). KM is a process that takes place within the organization and helps find information and knowledge similar to creating knowledge and sharing it (Mehrez et al., 2021). KM emerged in 1986 in academia. Researchers have studied its various disciplines and have presented many different concepts, theories, and applications related to it (Santos et al., 2015). In the past few decades, extensive research has been conducted on this concept (Hock-Doepgen et al., 2021). Recent studies carried out in the field of KM have recognized this century as the age of knowledge and information and the period during which knowledge is considered as an important organizational asset. Knowledge can be translated into information, insight, ideas, skills, expertise, and experience (Iqbal et al., 2019). Although knowledge is considered the main source of sustainable advantage for firms, its management is still challenging (Santos et al., 2015). Knowledge management capabilities (KMC) are among the capabilities that enable organizations to absorb, share, and transfer knowledge in an efficient way. KMC helps organize, combine, and coordinate knowledge in an efficient and structured way and enhances the ability to use knowledge to decide and formulate a strategy (Bamel & Bamel, 2018). In other words, KM means recognizing and using a firm's collective knowledge to increase its competitiveness. Organizations capable of absorbing the knowledge embedded in their firms in an effective manner and deploying them in their business can have more SCA over competitors (Keat et al., 2018). Knowledge is an essential asset for firms, and the proper management and utilization of knowledge improves the performance of firms (Akram et al., 2018). KM is a tool that allows firms to focus on the productivity, flexibility, and creativity needed to increase their value and competitiveness (Sanchez et al., 2015). In addition, there is extensive literature that investigates the complex and multidimensional relationship between effective KM and innovation capabilities. Innovation is considered a major mechanism for more competition and survival (Adnan et al., 2018; Pereira et al., 2021). Evidence firmly demonstrates that there is a positive relationship between a firm's knowledge base and its innovation capabilities. However, to exert more influence on KM, firms need to facilitate and manage the entry and exit of knowledge in different areas. Hence, firms need effective KM

and innovation to achieve sustainable competitive performance. For a firm to be successful in long-term innovation and performance, a high level of KM is required (Hock-Doepgen et al., 2021; Pereira et al., 2021).

Dynamic Capabilities (DCs)

Today, due to the dynamics of the business environment, merely considering resources is not sufficient for excellent performance, and firms need DCs to make better use of their resources (Hernandez-Linares et al., 2018). Researchers have found that as a result of the dynamics of the business environment, the value created by resources and capabilities is becoming obsolete and the value derived from the resources and capabilities of any firm may not be permanent. This has led to the emergence of the concept of DCs as an important element for the growth, survival, and competitiveness of firms (Keat et al., 2018). The term “Dynamic Capabilities” was entered into management literature by Teece et al. (1997). A few years later, Teece (2007) developed the DCs approach based on the findings of a resource-based view, namely evolutionary economics, and behavior theory. DCs refers to firms’ specific capacity to shape, transform, reconfigure, and renew resources to respond to changing technologies and markets (Li & Liu, 2014). The concept of DCs is the resource-based approach that has similar assumptions. Contrary to the resource-based view, however, the DCs perspective emphasizes how companies behave and react in a particular situation. The term “dynamic” denotes the capacity to replace old competencies to maintain competition when changing the business environment, and the term “capability” refers to the capacity of firms to implement a particular activity reliably. Hence, in research related to strategic management, DCs are a fundamental part of the selection, development, and coordination of ordinary (non-dynamic) capabilities that generally are of a strategic nature (Keat et al., 2018). Meanwhile, the existence of a positive and direct relationship between DCs and company performance has been presented in previous conceptual studies (Hernandez-Linares et al., 2021).

Sustainable Competitive Advantage (SCA)

After the Japanese succeeded in penetrating world markets in the late 1970s, McKinsey & Company introduced the concept of CA. CA is defined as the advantage a particular firm has over competitors or a group of competitors in a specific market, strategic group, or industry (Keat et al., 2018; Norouzi et al., 2021). Porter (1985) identified two basic types of competitive strategies for firms to achieve a SCA based on environmental conditions, including cost leadership strategy and differentiation strategy. CA is a set of unique capabilities of an economic unit, enabling it to penetrate arbitrary markets and be superior to competitors (Camison & Lopez, 2011). In this regard, Kim et al. (2012) state that CA can be classified in various ways according to different indicators. In one of the most important classifications – which is based on longevity, reflectivity, and the ability of competitors to imitate and copy – CA falls into two categories, namely SCA and temporary (transient) CA. The longer the organization is able to use this CA in a way that it cannot be easily imitated by competitors, the more stable the CA is. This can be termed as SCA (Kim et al., 2012). In this context, having certain resources and special capabilities can lead to SCA. The value and scarcity of corporate resources lead to the creation of CA; similarly, the irreplaceability and inimitability of these resources lead to maintaining a CA. Businesses achieve SCA when they acquire a combination of attributes and outperform other competitors (Keat et al., 2018). Therefore, almost all of the strategic frameworks and tools employed to formulate and

implement the strategy have been derived from a single basis, namely SCA. On this premise, the ultimate goal of strategic management is to achieve SCA (Na et al., 2019).

Firm Performance (FP)

Managers consider excellent business performance an important factor in their business organizations. Measurement of business performance refers to the systematic process of effectively quantifying an action or concept (Loke et al., 2020). In the field of management, dependence or variability of the firm's performance has been one of the most studied variables to measure the success of an organization. The performance of a firm reflects the progress and development of that organization. Researchers define the performance of a firm by comparing expected results with actual results, examining deviations from plans, evaluating individual performance, and examining the progress made toward achieving the desired goals. They contend that the organization's goals must be taken into account when measuring its performance (Iqbal et al., 2019). To put it differently, the performance of a company, when does the right thing at the right time, can be summarized into cases where all the material and intellectual rights of this performance mean the results of the firm's operations that are in line with the goals of the organization (Intarapanich & Limpsurapong, 2019). Based on the definition, organizational performance is an indicator that measures how an organization or institution achieves its goals. Accordingly, the performance of a firm can also be examined from two aspects: the firm's financial performance (profitability, return on investment, and liquidity cash flow) and the firm's performance with regard to the market (sales growth, market share, market power, and market development) (Djaja & Arief, 2015). It can be noted that the performance of a firm is the total of the achievements that a business attains as an organization. Studies suggest different methods for evaluating the performance of a firm. The related literature indicates that perceived comparative performance is a good indicator for the superiority of a business (Lee et al., 2016).

Conceptual Framework and Hypothesis Development

Knowledge Management and Firm Performance

A firm's strategic orientation influences KM through formulating knowledge hypotheses, regulating the relationship between personal knowledge and organizational knowledge, creating social interactions, and creating and using new knowledge (De Long & Fahey, 2000). A large number of studies have been carried out to investigate the impact of KM on FP; however, only a few of them have found a significant and clear relationship between KM and FP. Some studies have reported a direct effect of KM on FP, while others have suggested a mediating relationship. The theoretical relationship between KM and organizational performance is achieved through the knowledge-based perspective of firms, which indicates that changes in the performance of organizations in a particular sector can be explained by their knowledge and their ability to create and develop knowledge (Usman et al., 2020). Many scholars hold that a firm's performance is dependent on its ability to process and implement knowledge. The relationship between KM and FP is significant, and firms that have high KMC have better performance. This is due to the fact that KM leads to high-quality decisions and contributes to a better performance of the firm (Yu et al., 2019). In other words, firms that constantly take advantage of KM in their businesses have higher success rates and better performance (Ahmad et al., 2019). Therefore, it is essential for firms to use KM to achieve better performance (Yu et al., 2019). In general, some studies substantiate a positive

relationship between KM and FP; furthermore, there are clear theoretical and empirical bases that demonstrate KM affects the firm's superior performance (Hesniati et al., 2019; Koohang et al., 2017; Siregar et al., 2020). Therefore, the first hypothesis of the present study is as follows:

Hypothesis 1: KM has a positive and significant effect on FP.

Knowledge Management and Sustainable Competitive Advantage

Nowadays, knowledge is considered an important source for creating and maintaining a CA (Fletcher-Brown et al., 2020). In an organization, there are different capabilities to exploit and integrate resources to achieve corporate goals. KM function is to strengthen a company's ability to use existing knowledge through continuous learning in order to create new knowledge (Tundung et al., 2017). In fact, KM not only adheres to the ability to gather knowledge but also supports knowledge and information to transform them into a SCA. Knowledge is the ultimate strategic resource for a company to create corporate value so as to achieve its goals. It is therefore reasonable that KM has become an important feature of SCA (Bhatt et al., 2005). Knowledge is a strategic resource, and if properly managed, can create a CA. KM deals with processes that enable companies to achieve a CA (Hesniati et al., 2019; Sanchez et al., 2015). A firm's Knowledge-based view indicates that it has socially complex knowledge that is hard to imitate, and so it results in a SCA. Knowledge is considered a vital resource, and the related studies highlight the importance of a firm's special knowledge in the realization of its strategy (Bamel et al., 2021). Similarly, studies in this area suggest that KM plays an important role for companies in achieving SCA (Hajimohammadi & Vafaei, 2019; Pradipto et al., 2019). Therefore, the second hypothesis of this study is proposed as follows:

Hypothesis 2: KM has a positive and significant effect on SCA.

Dynamic Capabilities and Firm Performance

DC is one of the most important factors influencing the performance of firms, and theoretical research reveals the existence of a direct relationship between DCs and FP (Hernandez-Linares et al., 2018; Zhao et al., 2019). According to David Collis (1994), DCs, which can be defined as higher-order/meta-capabilities, are important because they may help firms avoid the path dependencies imposed by their current low-order competencies. Therefore, a firm need to develop these capabilities to learn and redefine its resources in order to overcome the trap led by existing competencies and to create new sources of CA. Thus, DCs contribute to the company's superior performance by combining and renewing functional competencies that in turn affect performance (Protogerou et al., 2012). In this regard, a review of previous literature points to the relationship between DCs and FP (Correia et al., 2020; Ferreira et al., 2020; Protogerou et al., 2012). Hence, the third hypothesis of this study is proposed as follows:

Hypothesis 3: DCs have a positive and significant effect on FP.

Dynamic Capabilities and Sustainable Competitive Advantage

DCs play a determining role in firms' CA by providing the necessary conditions in the face of environmental change. Theoretically, three complementary theories have been widely used in the strategic management literature to explain the relationship between DCs and SCA and their developments. These include resource-based view, the evolutionary theory of the firm, and dynamic capability approach. Each of these theories and approaches contributes to the explanation of the way organizations adapt and develop capabilities to gain and sustain a

competitive advantage over their contemporaries (Chukwuemeka & Onuoha, 2018). To stay in the competition and be able to keep pace with or move beyond the needs of their customers, firms and organizations must have certain abilities and capabilities. These capabilities must be different from those of their competitors and should not be easily imitable by the competitors. Among these capabilities are DCs. Teece et al. (1997) discuss DCs based on a resource-based perspective. DCs, they say, are the company's ability to integrate, create, and reshape internal and external competencies to respond to rapidly changing environments. Teece (2007) has highlighted the role of DCs in achieving a company's CA, and these capabilities can play a common role in creating a CA because these capabilities may be rare, difficult to access, and irreplaceable, and their value can belong to the same organization. Moreover, numerous studies have examined the direct impact of DCs and CA on companies, and almost all of them have confirmed the impact of DCs on the sustainability of CA (Correia et al., 2020; Ferreira et al., 2020; Ogunkoya et al., 2014; Wu, 2010). Therefore, the fourth hypothesis of the present study is proposed as follows:

Hypothesis 4: DCs have a positive and significant effect on SCA.

Sustainable Competitive Advantage and Firm Performance

SCA has attracted the attention of numerous strategic management scholars during this era, which has been called the age of turbulence due to its significant contribution to the financial and non-financial performance of firms. Achieving the CA is a concept that exists in the heart of strategic management literature (Barney, 1991; Ismail et al., 2010). Researchers posit that firms that have a SCA experience an improvement in their performance, and that the performance of companies will be better than before as the CA persists (Na et al., 2019). CA plays an important role in the performance of businesses (Correia et al., 2020). Achieving CA with a certain level of organizational performance is the main condition for the long-term success of organizations. A review of previous studies also shows that there is a significant relationship between CA and FP (Ferreira & Coelho, 2020; Ferreira et al., 2020; Kim et al., 2020). Therefore, the fifth hypothesis of this study is suggested as follows:

Hypothesis 5: SCA has a positive and significant effect on FP.

The Mediating Role of Sustainable Competitive Advantage

Firms enjoying a stronger and more effective CA have higher productivity. Empirical studies suggest that SCA contributes significantly to FP (Khan et al., 2019). On the other hand, the rapid development of new technologies and digital communications has increased the importance of KM as a vital resource for CA by organizations, through which those organizations are able to create and develop SCA (Hajimohammadi & Vafaei, 2019). Some researchers consider knowledge as a key factor for the success of firms in achieving CA in dynamic economic environments as well as improving performance (Fletcher-Brown et al., 2020). In addition, other researchers claim that DCs are critical to the competitiveness and success of firms (Hernandez-Linares et al., 2018). DCs are an essential element for the growth, survival, and competitiveness of companies, and firms with this feature are able to maintain their competitiveness in a variety of environmental conditions that can lead to better performance in the long term (Keat et al., 2018). In other words, DCs help improve a firm's competitiveness and performance by developing specific capabilities (Ferreira & Coelho, 2020). Therefore, the sixth and seventh hypotheses of the present study are presented as follows:

Hypothesis 6: SCA mediates the relationship between KM and FP.

Hypothesis 7: SCA mediates the relationship between DCs and FP.

According to the theoretical foundations and the identification of the main variables of the research and also based on the mentioned hypotheses, the proposed conceptual model of the research was designed and formulated as follows (Figure 1).

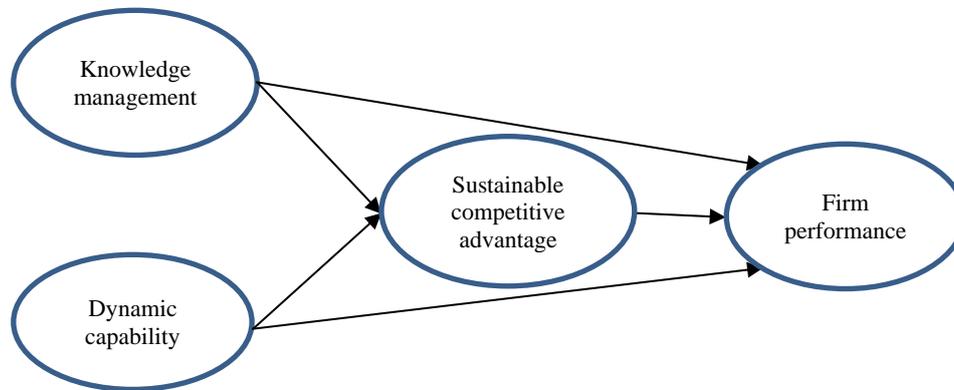


Figure 1. The Conceptual Model

Research Methodology

Method, Sample, and Data

The present study was applied research in terms of purpose and descriptive-survey in terms of data collection method. It set out to the variables in the statistical population and provided applied knowledge about the quality of the relationship and the effectiveness of four variables, including KM, DCs, SCA, and FP. The statistical population of the study regarded a number of Iranian knowledge firms. In the time of conducting this study, the researchers found – based on a list retrieved from the website of the Vice Presidency for Scientific and Technological Affairs (www.en.isti.it) – that there are a total of 5943 Iranian knowledge firms, out of which 3159 firms (53%) were located in Tehran province (Iran’s capital). Hence, the researchers selected the firms located in Tehran province as the statistical population for a number of reasons including time limitation, Covid-related restrictions, higher density, and a wider range of business activities of the knowledge firms in it. Furthermore, managers of knowledge firms were selected as the level of research analysis. The thumb rules provide an approximate estimate of the sample size; however, they do not take into account the effect size, confidence level, number of indicators, or other known factors that affect test strength (Hair et al., 2014). Therefore, in order to determine the sample size, the test-based method and G-Power software version 3.1 were used. According to Faul et al. (2009), the minimum statistical power expected for social and behavioral sciences in G-power software is 0.8. Thus, considering the error level of 5%, the effect size of 0.05, the minimum test power of 90%, and the three predictor variables in accordance with Figure (2), the optimal sample size was calculated to be 288 observations. To collect data and test the research model, a cross-sectional survey was used, during the period between 25 May and 22 June of 2021. The questionnaires were distributed online using a simple random sampling method. To this end, the researchers, with the help of a list of the firms, extracted the names of all members of the population. Following this, a number was assigned to each member. A number then was randomly selected as the starting point and the number of samples needed for the study was obtained using a random digit's table.

In order to reduce the probability of common method variance (CMV), the respondents’ confidentiality and anonymity were guaranteed. To this end, an online questionnaire was used such that that no particular specifications that would reveal the identity of the person or the firm were included. As a pre-test, 30 respondents from the statistical sample were asked to

complete the questionnaire to determine the possible ambiguities of the answers related to the items of the questionnaire. The pre-test results were quite satisfactory. After distribution of the questionnaires, the researchers received back 186 questionnaires. All respondents provided a complete answer. Therefore, the response rate of this study was 64%, which is an acceptable value (Fincham, 2008). Nevertheless, it is stated that to use SEM, the minimum sample size should be five times larger than the number of items (Lam et al., 2021). According to Hair et al. (2010), in order to use SEM for data analysis, the optimal sample size should be ten times as high as the tested indicators, which in our research (10.33) is in accordance with the requirements. To be more reliable, the KMO test was also conducted, obtaining a value of 0.942.

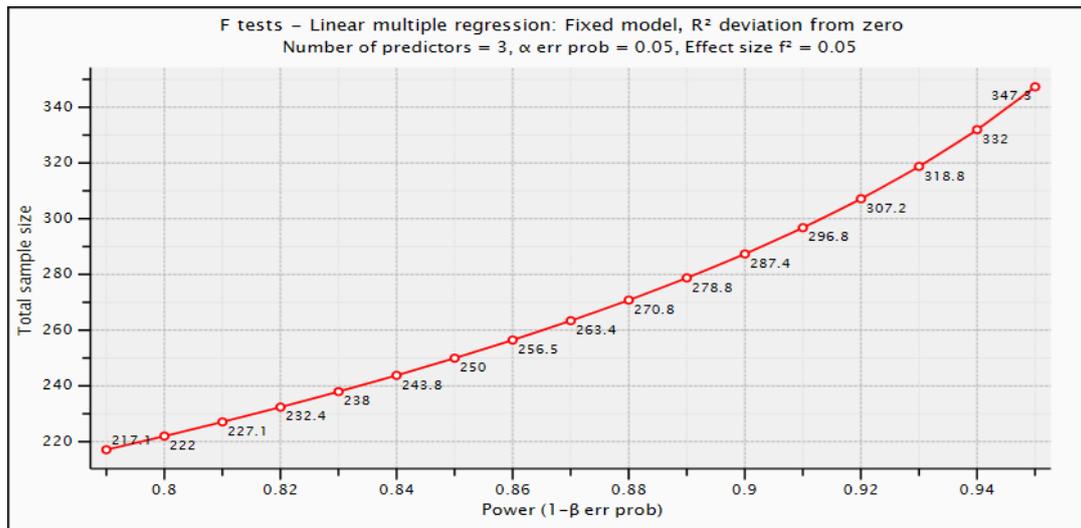


Figure 2. Recommended Sample Size Based on a Priori Power Analysis (Faul et al., 2009)

Table 1 shows the characteristics of the representatives of the firms participating in the survey. In order to obtain an appropriate overview of the research findings, gender, age, education, and managerial experience of firm representatives were inquired about according to their field of technology.

Table 1. Demographic Characteristics (n = 186)

Items	Description	Sample	Percentage (%)
Line of work	Biotechnology, agriculture, and food industry	11	5.9
	Pharmacology	20	10.8
	Chemical industry	23	12.4
	Advanced machinery companies	32	17.2
	Medical equipment	7	3.8
	Electricity and electronic, telecommunications, and automated systems	36	19.4
	Information technology (IT)	40	21.5
Gender	Commercialization services	17	9.1
	Male	148	79.6
Age	Female	38	20.4
	Less than 30	43	23.1
	30–40	89	47.8
Manager’s education	41–50	48	25.8
	51 and over	6	3.2
	BA	49	26.4
	MA	83	44.6
Manager’s experience	PhD	54	29
	Little experience: < 5 years	71	38.2
	Sufficient experience: 5 – 10 years	87	46.8
	Wide experience: >10 years	28	15

Measurement

To measure the four latent constructs in the conceptual model, all scales were completely adapted from the literature and a questionnaire with 18 items was prepared. DCs and KM were each measured using four items. The proposed questionnaire was used to measure DCs (Monteiro et al., 2019). KM was measured using a proposed questionnaire (Lam et al., 2021). SCA and FP were each measured by a 5-item questionnaire. The proposed questionnaire was used to measure SCA (Akram et al., 2018) and the questionnaire used by (Clauss et al., 2019) was utilized to measure FP. All constructs in the model were measured using 5-point Likert scales (from strongly disagree to strongly agree).

Findings

Measurement Model

The measurement model studies and evaluates the relationship between structures and their measurement indices. In this study, the reflective model was utilized for this purpose.

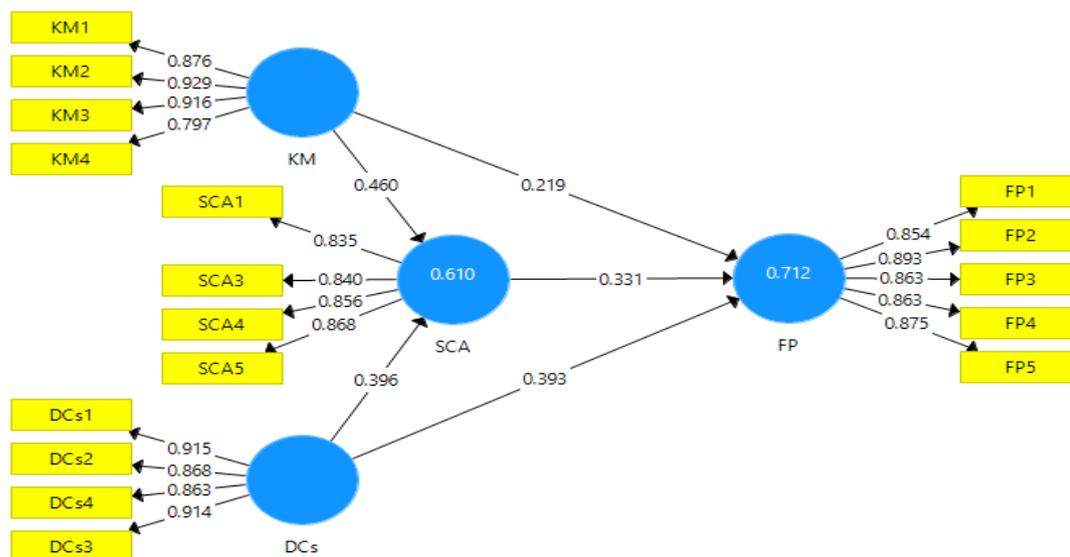


Figure 3. Confirmatory Factor Analysis

First, the outer loadings were examined. The minimum value acceptable for this test is 0.7. The researchers then evaluated the reliability of the external model. To this end, three tests of Cronbach's alpha (C.A), composite reliability (CR), and Rho_A were used. The minimum acceptable value for these three tests is 0.7. Convergent validity was also assessed through average variance extracted (AVE) test. The appropriate value for this test is at least 0.5 (Hair et al., 2019; Sarstedt et al., 2017). The factor load of SCA2 question was 0.614. Therefore, it was removed from the model. According to Table 2, the external loads along with all three reliability tests were greater than 0.7. Meanwhile, AVE values for all variables were greater than 0.5. Hence, the convergent validity of the external model was confirmed.

Table 2. Reliability and Convergent Validity for the Measurement Model (n= 186)

Item	Loading ≥ 0.7	C.A ≥ 0.7	Rho_A ≥ 0.7	CR ≥ 0.7	AVE ≥ 0.5
Knowledge management (KM)		0.904	0.928	0.933	0.776
KM1. Our company creates new knowledge for application across functional boundaries.	0.876				
KM2. Our company creates operations systems for application across functional boundaries.	0.929				
KM3. Our company has a standardized reward system for sharing knowledge.	0.916				
KM4. Our company engages in processes of integrating different sources of knowledge across functional boundaries.	0.797				
Dynamic capabilities (DCs)		0.913	0.920	0.939	0.793
DCs1. Resource integration capability	0.915				
DCs2. Resource reconfiguration capability	0.868				
DCs3. Learning capability	0.914				
DCs4. Ability to respond to the rapidly changing environment	0.863				
Sustainable competitive advantage (SCA)		0.872	0.875	0.912	0.722
SCA1. Our revenue with new products/services is much better than that of our competitors.	0.835				
SCA2. Our operation cost, during production and/or service delivery, is inferior to that of our competitors.	Dropped				
SCA3. The profitability of new products/services is much better than that of our competitors.	0.840				
SCA4. Our new products/services incorporate knowledge and concepts of environmental sustainability.	0.856				
SCA5. Our new products/services are produced and offered respecting the entrepreneurial social responsibility precepts.	0.868				
Firm performance (FP)		0.920	0.921	0.940	0.757
FP. Relative to our competitors, our financial performance was much better.	0.854				
FP2. Relative to our competitors, the market share of our organization was much better.	0.893				
FP3. Relative to our competitors, the sales growth of our organization was much better.	0.863				
FP4. Relative to our competitors, the product development of our organization was much better.	0.863				
FP5. Relative to our competitors, the development of our organization was much better.	0.875				

Note: Cronbach's alpha (C.A), composite reliability (CR), average variance extracted (AVE)

Discriminant validity was assessed using Fornell-Lacker and Heterotrait-Monotrait Ratio (HTMT) tests. In Fornell-Lacker criterion, the square root of a construct's AVE must be greater than the association of any other construct (Hair et al., 2017). Similarly, In HTMT, the appropriate value must be lower than 0.9. If the HTMT value is higher than the threshold, it can be concluded that the model lacks discriminant validity (Hair et al., 2019). The results of these two tests indicate that the discriminant validity of the measurement model is established (Table 3).

Table 3. Discriminant Validity

	Fornell-Larcker criterion				HTMT			
	KM	DCs	SCA	FP	KM	DCs	SCA	FP
Knowledge management (KM)	0.881				1			
Dynamic capabilities (DCs)	0.661	0.809			0.710	1		
Sustainable competitive advantage (SCA)	0.722	0.701	0.850		0.785	0.771	1	
Firm performance (FP)	0.718	0.769	0.764	0.870	0.769	0.832	0.848	1

The index that is used to measure the quality of the external model is called the cross-validated communality index of the structure. This index, as a predictive relative measure, answers the key question that the items of each variable measure their variable quality with three values of 0.02, 0.15, and 0.35, i.e., small, medium, and large (Sarstedt et al., 2017). This index was abbreviated as CV COM in this study. The results presented in Table 4 indicate that the CV COM values for each variable are considerably higher than 0.35 and the external model has a very strong quality for each variable. Therefore, it can be argued that the questions had high predictive power in measuring their variables.

Table 4. Cross-Validated Communality

Latent variables	CV COM
Knowledge management	0.582
Dynamic capabilities	0.601
Sustainable competitive advantage	0.503
Firm performance	0.596

Structural Model

Ensuring the optimal quality of the measurement model, the researchers evaluated the structural model. The potential for potential collinearity issues among the constructs was initially determined using VIF values according to Sarstedt et al. (2017). Values above 5 indicate alignment between predictive structures. The researchers then focused on the predictive capabilities of the structural model. For this purpose, the coefficient of determination (R^2), cross-validated redundancy index, and path coefficients were used. The effect size was also employed to evaluate the effect of each exogenous variable on endogenous variables. In addition, like the measurement model, the quality of the structural model was cross-validated with a cross-validated redundancy index (Q^2). According to Table 5, the VIF values were less than five, indicating that no collinearity existed. R^2 values were also significant. KM and DCs explained 61% of the variance of SCA. KM, DCs, and SCA also explained more than 71% of the firm's performance variance. The effect size was also significant. Q^2 values were more than 0.35, which showed that the quality of the structural model prediction was strong.

Table 5. Summary of Research Results

Latent variables	VIF-value				R^2	f^2		Q^2
	KM	DCs	SCA	FP		SCA	FP	
Knowledge management (KM)	-	-	1.776	2.320	-	0.306	0.072	-
Dynamic capabilities (DCs)	-	-	1.776	2.179	-	0.227	0.246	-
Sustainable competitive advantage (SCA)	-	-	-	2.565	0.610	-	0.149	0.408
Firm performance (FP)	-	-	-	-	0.712	-	-	0.501

In order to test the hypotheses, path coefficients and relevant significant values were evaluated. A bootstrapping method was used to calculate significant values for all paths (Chin, 2010).

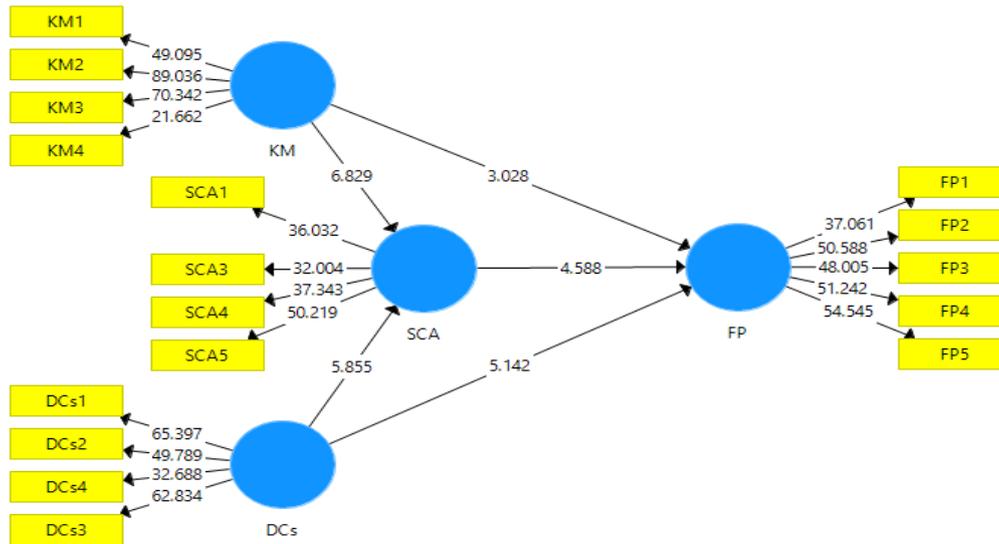


Figure 4. Results of the Direct Hypotheses Testing

Significant values of t-statistic for the two-way test of significance of the hypotheses were equal to 1.65 (sig =0.1), 1.96 (sig =0.05), and 2.58 (sig =0.01). Table 6 shows the results of testing the hypotheses. The first five hypotheses of the research were confirmed at the 99% confidence level.

Table 6. PLS-SEM Path Coefficients: Direct Effect Results (n= 186)

Hypothesis	Path	Path coefficient	T-statistic	P-value	Result
H1	KM → FP	0.219	3.028	0.003	Confirmed
H2	KM → SCA	0.460	6.829	0.000	Confirmed
H3	DCs → FP	0.393	5.142	0.000	Confirmed
H4	DCs → SCA	0.396	5.855	0.000	Confirmed
H5	SCA → FP	0.331	4.588	0.000	Confirmed

Note: Knowledge management (KM), Dynamic capabilities (DCs), Sustainable competitive advantage (SCA), Firm performance (FP)

The GOF index was used to assess the overall model fit. The value of this index is between 0 and 1 (Tenenhaus et al., 2004). Wetzels et al. (2009) considered three values of 0.1, 0.25, and 0.36 as weak, medium, and strong values, respectively. Henseler et al. (2014) introduced SRMR as a suitable criterion for PLS-SEM that can be used to avoid model misspecification. They considered the ideal value for this index to be less than 0.08. According to Table 7, the GOF value showed that the overall fit of the model is very strong. The values were less than 0.08. The results of these two tests revealed that the structure of the research model is appropriate.

Table 7. Goodness-of-Fit Measures

GOF	SRMR
$GOF = \sqrt{AVE \times R^2}$	Estimated model= 0.060
$GOF = \sqrt{3.016 \times 1.322}$ = 0.706	Saturated model= 0.060

Mediated Effects

In this study, researchers faced two mediating pathways. The proposed method was employed for mediator analysis (Hair et al., 2017). First, the direct effect of two independent variables, namely KM and DCs, on the dependent variable FP was investigated (Figure 5). As shown in

Figure 6, the effect of KM on FP was significant at the 99% confidence level ($P < 0.01$). Similarly, the effect of DCs on FP was significant at the 99% confidence level ($P < 0.01$). The indirect path effects were then investigated and confirmed at the 99% confidence level (Figures 3 and 4). Therefore, the sixth and seventh hypotheses were confirmed. Finally, the results of $VAF = (a \times b) / (a \times b + c)$ and comparison with interval ($0.2 < VAF < 0.8$; partial mediator and $0.8 < VAF$; full mediator) showed that mediation of SCA in the relationship between KM and FP as well as in the relationship between DCs and FP was partial and passed part of the effect of the two independent variables to the dependent variable. The final results of the mediating variable analysis are presented in Table 8.

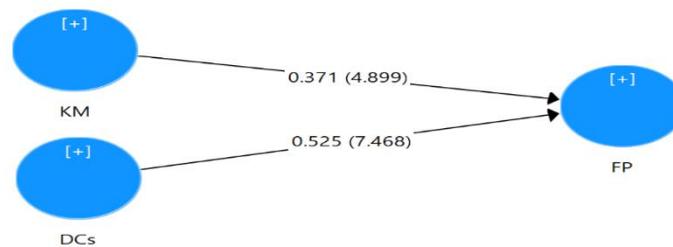


Figure 6. Total Effects of KM and DCs on FP

Table 8. PLS-SEM Path Coefficients: Indirect Effect Results (n= 186)

Hypothesis	Path	Path coefficients	VAF	Result
H6		a = 0.460 b = 0.331 c = 0.371	0.291	Partial mediation
H7		a = 0.396 b = 0.331 c = 0.525	0.200	Partial mediation

Note: Knowledge management (KM), Dynamic capabilities (DCs), Sustainable competitive advantage (SCA), Firm performance (FP)

Importance-Performance Map Analysis of Path Modeling Results

In order to evaluate the importance and performance of each predictor variable in explaining the behavior of the target variable, the importance-performance map analysis (IPMA) module was conducted (Akram et al., 2018). The purpose of the importance-performance map is to identify the role-playing structures that are of relatively high importance to the target structure. Importance-performance map analysis enables the researcher to improve the results of the PLS-SEM structural model, which is related to the importance of each underlying structure, according to the corresponding performance of the score of each latent variable on a scale of 0 to 100. The results of the importance-performance chart provide important insights into the prioritization of managerial actions. The horizontal axis of the importance-performance map indicates the importance and the vertical axis indicates the performance of the variables. Structures that are of high importance but at the same time have low performance, are given priority in management actions. In this framework, according to Table 9, the total effects (including direct and indirect effects) of the three predictor variables on the target variable of FP were measured. The results showed that KM has the highest priority for management actions. If managers of knowledge firms increase the unit performance of DCs

by one unit, the performance of the target variable, i.e., FP, will increase by 0.524. KM and SCA are the next priorities, respectively.

The importance and performance pertinent to each of the antecedents of the target construct or the performance of the firm are shown graphically in Figure 7.

Table 9. Importance-Performance Data

Predictor variables	Symbol	Importance (total effects)	Performance/ index (LV performance)
Knowledge management	KM	0.371	67.847
Dynamic capabilities	DCs	0.524	68.472
Sustainable competitive advantage	SCA	0.331	69.259
Mean		0.408	68.526

Note: Total effects are standardized values

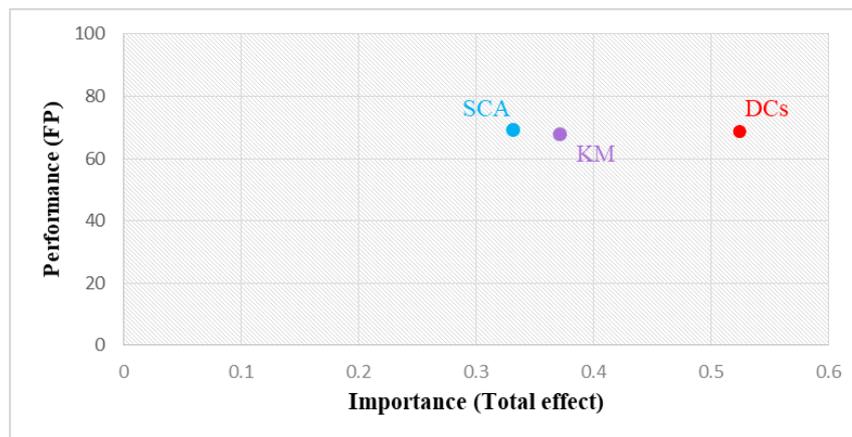


Figure 7. Importance-Performance Map

Discussion

The majority of the studies on knowledge firms have been conducted in economically developed countries. Undertaking a similar line of research in developing economies including Iran can significantly contribute to the literature. This study is the first of its kind that examines the effect of DCs and KM on organizational outcome (i.e., SCA and FP) in Iran. Meanwhile, the study investigates the mediating role of SCA in the relationship of DCs and KM with FP. To examine the research model, hypotheses were tested based on the previous literature. Through testing the research hypotheses, it was found that KM variable with a path coefficient of 0.219 and t-statistic value of 3.028 has a positive and significant effect on FP, which is consistent with the findings of Hesniati et al. (2019), Koohang et al. (2017), and Siregar et al. (2020). In addition, the SCA with a path coefficient of 0.460 and t-statistic value of 6.829 is affected positively and significantly by KM. This result is also in line with those of other studies (e.g., Ferreira et al., 2020; Hajimohammadi & Vafaei, 2019; Pradipto et al., 2019). Furthermore, the results obtained from examining the third and fourth hypotheses revealed that the DCs variable has a positive and significant effect on both FP and SCA. In particular, DCs with a path coefficient of 0.393 and t-statistic value of 5.142 affect the FP. This result is consistent with previous studies (e.g., Ferreira et al., 2020; Hernandez-Linares et al., 2018; Zhao et al., 2019). SCA with a path coefficient of 0.396 and t-statistic value of 5.855 is influenced positively and significantly by dynamic DCs. This is in line with the results of several studies (e.g., Correia et al., 2020; Ferreira et al., 2020; Ogunkoya et al., 2014; Wu, 2010). The fifth hypothesis test demonstrated that SCA with a path coefficient of 0.331 and t-statistic value of 4.588 has a significant positive and significant effect on the FP. This result is consistent with the findings of Ferreira & Coelho (2020), Ferreira et al.

(2020), and Kim et al. (2020). The test of the sixth and seventh hypotheses suggested that the SCA mediates the relationship between KM and DCs with FP at the 99% confidence interval. In general, it was found that there is a direct impact of DCs and KM on FP. Moreover, by integrating RBV and KBV insights, this study corroborated the findings of the previous research studies that argued that DCs, together with KM, lead to achieving SCA. The obtained results also illustrated that it is possible to get a clearer picture of the roadmap to obtain SCA through linking core competencies between the KM and the organization's resources.

Conclusion

Since there is a dire need for a rapid response to competition, technological changes, and customer preferences, firms face numerous challenges to developing new organizational skills. Therefore, firms must be able to take advantage of the knowledge management process and dynamic capabilities to create better conditions in the face of the limitations of the new business environment and the pressures of change and to improve their performance. Experimental findings of this research provide useful implications for academics and practitioners. This study proposes a comprehensive framework combining DCs and KM to explain SCA and FP. In this context, SCA is proposed as a mediator in the relationship between DCs and KM with the outcomes (i.e., Firm Performance). Sustainability is a major concern for both academics and policymakers. In the recent years, DCs and KMs have emerged as the main source of sustainability in contemporary organizations. Based on resources and knowledge view, this study extends the literature by exploring SCA records from the perspective of an emerging economy. Following a quantitative research method, we collected data from managers of knowledge firms. The results obtained from variance-based structural equation modeling confirmed DCs and KM as the major predictors of SCA and FP. In addition, the results of the analysis supported the SCA mediating role in the relationship between DCs and FP and also between DCs and FP.

Theoretical and Practical Implications

The business environment, particularly knowledge firms, has become increasingly complex due to intense competition, globalization, crises, and the development of technology. Businesses need to have various strategies and policies to deal with environmental uncertainty and change. To do so, adopting a KM approach and DCs can help them conform to these conditions. Therefore, conducting research in this area is of significant importance, and the findings can assist businesses in many areas as a useful strategy. Active firms can have a better performance in their environment in analyzing and identifying external opportunities and threats. Thus, they can seize the opportunity and simultaneously protect themselves from environmental threats. The results of this study also provide important implications for managers and organizational policymakers. DCs and KM play a pivotal role in SCA and FP. Managers of knowledge firms must engage in initiatives such as training and development to develop their strategies to build a strong competitive position. In recent decades, firms have preferred to adopt new approaches in their competitive business realms. The dynamic changes observed in organizational work environments have changed the strategic goals of a large number of firms. Further changes are related to organizational resources and the knowledge-based economy, which have improved FP. Moreover, firms are under pressure to increase their market share in a turbulent and competitive environment. Therefore, firms have to increase their KM to explore market opportunities and develop performance. To achieve optimal performance, firms must make use of their intellectual assets to devise strategies to sustain CA. Investing in various knowledge

management processes can help firms achieve SCA. Our results indicate that SCA mediates the relationship between KM and DCs and, as a result, FP. This result highlights the importance of organizational knowledge management. Therefore, organizational managers should invest in the development of employee knowledge management.

Furthermore, the present study contributes to the research on DCs. The research findings are important not only for the future operationalization of DCs but also important for conducting more extensive research on knowledge firms. In the face of intense competition from changing business environments, a growing number of knowledge firms are forced to compete with strong competitors, changing customer demand, and rapid technological advances. Therefore, for knowledge firms with limited resources, it is more important to focus on investing in the arenas that give the most return on their investment. In general, the results of the present study strengthen previous research and demonstrate that resources must be used properly to lead to sustainable competitive advantage and superior performance. Since knowledge firms face increasing competition, having above-average performance is not sufficient for long-term success and survival. Hence, achieving sustainable competitive advantage in the dynamic and competitive nature of the business environment is vital for businesses. In this regard, firms must effectively manage the knowledge that lies within their firm and turn it into their SCA. Consequently, firms need to develop DCs that are believed to be an essential element for their growth, survival, and competitiveness. These DCs for knowledge firms include the capability to integrate resources, the capability to reconfigure resources, the capability to learn, and the capability to respond to a rapidly changing environment. Overall, firms need to enrich their knowledge base; introduce new management methods, processes, and structures; and ultimately discover their unique capability to compete with their competitors in a variety of environments that can lead to better performance in the long run.

Limitations and Future Research

The present research has certain limitations that should be borne in mind when interpreting the results. The data of the research are cross-sectional in nature. Although cross-sectional designs are common in the strategic literature, they limit our ability to infer causality from findings. Future studies can use a longitudinal design, in particular, to determine whether the effects of DCs and KM change over time. Moreover, given that the methodology employed in this research is quantitative, a case study approach can be an asset for researchers to gain a better understanding of the DCs and KM in knowledge firms. The experimental context of the present study includes knowledge firms located in Tehran province (the capital of Iran) that were experiencing economic problems at the time of the survey. Therefore, caution should be exercised in generalizing these findings to incomparable populations. In addition, although an attempt was made to select a diverse sample, respondents may not be representative of all organizations. Consequently, the results may be different for those firms that do not fall into this category in any way. Another limitation of the study is the relatively small sample size. Future research may test the proposed model with larger and more diverse samples to further extend the validity of the results. Since the impact of the results can depend on factors such as the size and age of the organization as well as the specific environmental conditions of each business, it is recommended that researchers in future studies examine the moderating role of the perceived environmental dynamics. Future research may also extend the current framework by incorporating RBV in firms. RBV argues that in addition to knowledge management resources, a number of other factors including organizational structure and culture play an important role in SCA and performance. Hence, future research may investigate the role of these factors in the relationship between DCs and FP as well as between KM and SCA.

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