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The impact of innovation orientation and knowledge management on business services performance moderated by technological readiness

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Abstract

Purpose – This work aims to determine how innovation orientation (IO), built from six dimensions (strategic, structural-process, human resources, technological, organizational culture and market) affects organizational performance (OP) with the inclusion of knowledge management (KM) as a mediator and technological readiness (TR) as a moderator in the model.

Design/methodology/approach – Questionnaires completed by business service companies were analyzed using multiple regression analysis (path analysis), including the mediating variable (KM) and moderating variable (TR). The construct was validated with positive outcomes.

Findings – Of the eight hypotheses, six were supported. The study results show that strategic, technological, organizational culture and market dimensions of IO positively influence KM. On the other hand, KM plays an important role as a mediator in supporting the relationship between the four dimensions of IO and performance. Moreover, TR, as a moderator, positively affects the relationship between KM and OP.

Originality/value – The study is the first to explore the relationship between six dimensions of IO and KM in business service sector. Furthermore, this study provides evidence that TR can be beneficial for companies with respect to effective KM, which leads to the better performance.

Keywords Innovation orientation, Knowledge management, Technological readiness, Organizational culture, Organizational performance, Business services

Paper type Research paper

Introduction

Enterprises are currently facing severe challenges such as complex management processes, shortened development time for new products, limited resources (including access to knowledge), and above all, the dynamic development of new technologies (Heirati and Siahtiri, 2019; den Hertog and Bilderbeek, 2019). As a result, the most important issue seems to be to introduce an innovation mindset in the company, which will integrate key areas of the company's operation and result in improved performance.

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Innovativeness is one of the conditions for a company to obtain a sustainable competitive advantage (Anning-Dorson, 2018). Therefore, the innovation orientation (IO) of a firm increases its opportunity for better performance. Achieving and managing IO is a process that requires the comprehensive involvement of all components of the company's activities and management processes (Siguaw *et al.*, 2006). Therefore, in assessing the impact of IO on company performance, it is necessary to assess the impact of all IO dimensions.

A review of the literature on IO allows us identify its six key dimensions: strategic, structural-process, human resources, technological, organizational culture and market (Borodako *et al.*, 2021). In reference to the approach suggested by Kreiser *et al.* (2013) and Lumpkin and Dess (1996), in this research a multidimensional analysis of IO impact on performance was applied to assess that influence more precisely.

The literature on the nature and management of innovation is very extensive (Awan, 2019; Bamel *et al.*, 2022; Huesig and Endres, 2019). It is less often found in the field of research on the impact of innovation on performance. Previous studies have focused on the influence of the overall category of innovation on company performance (Archibugi and Filippetti, 2018) and this is well documented in a systematic literature review on the relationship between innovation and performance in private companies provided by Bach *et al.* (2019). Alternatively, certain research took into account individual factors of innovation, like Kreiser *et al.* (2013) who found nonlinearity between each of the dimensions and company performance, or George and Marino (2011) who assessed the independent effects of various orientation dimensions on company performance. The unique effects of the dimensions in a particular industry were investigated by Hughes and Morgan (2007) and the influence of social performance was discussed by Awan *et al.* (2019).

Our multidimensional approach fills this research gap, hence it proves the impact of IO by indicating the contribution of individual dimensions on organizational performance (OP). It is an insightful contribution to innovation management literature and provides practical conclusions.

Knowledge is a strategic resource that influences the development and success of a company (Johannessen, 2019). The potential for knowledge copying on the market (imitation by competitors) means it is perceived as a crucial factor in creating a competitive advantage and innovation capabilities (Omerzel and Gulev, 2011). From this, we can conclude that companies striving to be successful on the market should rely on knowledge (as a strategic resource), and, at the same time, competently manage it as part of innovation management. Moreover, based on the knowledge-based view (KBV), it can be assumed that knowledge management (KM) is the mediating factor in the relationship between IO and OP. Previous studies typically included KM as the independent variable (Johannessen, 2019).

Another factor that should be taken into account in the assessment of IO's impact on OP is modern technologies. Technologies in particular can help a company achieve its business goals and create innovation as long as the company has all the appropriate resources to use them. The category of technology readiness (TR) describes company potential in this area (Parasuraman, 2000, p. 308). The lack of technological readiness (TR) may negatively influence both the effects of innovation activities (Denicolai *et al.*, 2021) and maximization of KM outcomes (Garrido-Moreno *et al.*, 2015). At the same time, TR can provide a company with better business results by stimulating the KM processes necessary to get, update and implement the latest technologies over the long term. Studies on the impact of TR on KM in companies and its impact on results are very poor (Dolmark *et al.*, 2019). And in times when technology dominates almost every sphere of life, it seems to be the missing link in understanding the impact of IO on KM.

Therefore, in this article, a conceptual model was constructed taking into account all the dimensions of IO and their impact on OP. KM as a mediator and TR as a moderator were included in the model, which, to the best of the authors' knowledge, has not previously been comprehensively considered. This makes a contribution to the scientific discussion on the impact of innovation on performance and the significance of knowledge in strategic and

innovation management. Additionally, the lack of large-scale empirical research results on IO from the perspective of KM in organizations represents a significant gap in the literature. Our study fills this gap. The model was verified on the base of empirical results for the business services industry. This is the practical contribution of the study: to assess the impact of the six dimensions on KM and the impact of KM and TR on company performance.

This study explores KM in the business services industry in three ways. First, we examined how IO influences KM (with a detailed examination of the dimensions of IO). Secondly, we determined the impact of KM on the performance of business service companies. And thirdly, this KM study was carried out to determine the importance of TR in stimulating the relationships between IO-KM and KM-OP.

We structure the rest of the paper by beginning with the IO concept (including its six dimensions), followed by KM, and TR. The next section contains a methodology and conceptual model. Then the results are presented and their relevance for theory and practice discussed. The work ends with a section devoted to limitations and future research paths.

Literature review

Innovation orientation – dimensional approach

Initial corporate orientations, whether market orientation (Narver and Slater, 1990) or entrepreneurial orientation (Baker and Sinkula, 2009), inspired the search for new types of enterprise orientation that could bring companies a greater competitive advantage. The theoretical point of reference is the KBV, which allows us to analyze the IO of a company based on knowledge (Siguaw *et al.*, 2006). Until now, examinations of the role of IO based on the KBV are scarce because few researchers have linked IO with knowledge (as a strategic company resource). Key conceptual considerations of IO based on the KBV (without empirical evidence) were presented in work by Siguaw *et al.* (2006). They defined IO as "*a multidimensional knowledge structure composed of learning philosophy, strategic direction, and trans functional beliefs (. . .)*" (Siguaw *et al.*, 2006, p. 560).

Conceptualization of the IO category has existed in the literature since the beginning of the 90s (Berthon *et al.*, 1999; Manu, 1992), but it was not until the 21st century that many important contributions (Chou and Yang, 2011; Siguaw *et al.*, 2006; Stock and Zacharias, 2011) were made. IO (like other types of orientation such as market and entrepreneurial) is studied by adopting several of its dimensions (Stock and Zacharias, 2011). The substantive and theoretical justification as well as location of six dimensions of IO in KBV were described by Borodako *et al.* (2021). The research approach of these six dimensions (strategic, human resources, organizational culture, structural and process, market, and technological) was adopted in this study, given the fact that it is original and accurate. A brief discussion of these dimensions against the background of the KBV and the derivation of hypotheses are presented in the next sections of the paper.

Strategic dimension

The development of innovation in companies requires the inclusion of a strategic approach (Cheng and Huizingh, 2014; Soomro *et al.*, 2020; Cheng and Huizingh, 2014; Gatignon and Xuereb, 2006). The implementation of strategic dimension (SD) is based on the conscious formulation of strategic directions for the company's development using knowledge as key resource. At the same time, strategic directions are formulated to lead to the behaviors expected by the company that will foster the company's development (Jean *et al.*, 2018). Pioneers of research on strategic orientation, Miles *et al.* (1978), emphasized that the inclusion of strategy in the development of a company relies on a specific manner by which companies adapt to changes in their environment. Thus, defined by Miles *et al.* (1978), habits include innovative activities based on generated or transferred knowledge. The role of strategy in the development of innovation is also to adapt the company to changing environmental

conditions by collecting, analyzing and usage of the information (Nonaka and Toyama, 2007; Schilling and Shankar, 2019). Strategy as a dimension of IO can be defined as discovering opportunities faced by the company and the abilities (Choy and Mula, 2008) that limit or stimulate knowledge acquisition and adaptation. It can therefore be concluded that researchers to date have perceived the SD as a key dimension.

H1. The SD positively influences KM.

Structural and process dimension

Companies providing business services should place great emphasis on shaping organizational processes aimed at creating innovations and new knowledge. This applies both to the organizational structure appropriate for innovation as well as properly designed innovation processes (Wolfe, 1994). It is worth emphasizing that often the solutions used by business service providers are unique and targeted at the needs of a specific customer. For this reason, the designed processes of creating services must use the possessed knowledge, but also create its new resources in the company.

Innovation processes and structural factors determine the level at which KM is used in an enterprise to generate new solutions. As indicated by Wang *et al.* (2010), processes related to learning in a company and KM affect the results of innovation in these companies. It is difficult to talk about organizational structure and the innovation process in the context of KM without addressing the design aspect – in particular, design thinking involving other stakeholders. In particular, we base this process on the involvement of external entities as consultants in specific fields, and above all, diverse groups of clients (Yu and Sangiorgi, 2018). The structural and process dimension (SPD) seems to be of great importance in defining the IO of business service providers precisely.

H2. The SPD positively influences KM.

Human resources dimension

Human resources play a crucial role in company performance (Easa and Orra, 2021). Santos-Rodrigues *et al.* (2010) claim that a firm's performance and innovativeness depend on the quality of its human resources and related investment.

Human resources dimension (HRD), which in our model is understood as employees and their ability to think and act in an innovative way, is an important element of IO. Achieving the best results is also determined by efficient human resources management (Fareed *et al.*, 2016). Managerial skills significantly impact the performance of a company with IO (Ode and Ayavoo, 2020).

In the light of KBV, human knowledge is an intangible resource that does not depreciate, and can generate increasing returns even when its shared (Curado and Bontis, 2006). The knowledge-based perspective of a firm suggests that employees knowledge and professional competences (Garengo *et al.*, 2021), as well as the ability to use them dynamically (Qadri *et al.*, 2021), are a key factor in IO that enable obtaining a sustainable competitive advantage (Teece, 2003). These conclusions allow us to formulate a hypothesis:

H3. HRD positively influence KM.

Technological dimension

According to the KBV, technological resources are a key source of company innovation and the development of basic competencies (Guo *et al.*, 2020). The feature that characterizes business services firms is knowledge (Pina and Tether, 2016), and a firm's technological capability is a major component of its knowledge base (Kocak *et al.*, 2017). Therefore, technologies can be considered crucial in a process of KM and determine a company's success

(Zhou and Li, 2010). The issue of the influence of technology on KM processes is widely recognized in the literature (Soto-Acosta *et al.*, 2018).

Research findings show that technologies serve as mechanisms to enhance communication and interaction between stakeholders (Al-Aama, 2014). Enabling direct, frequent and deep interactions between companies and their customers, digital innovations are at the center of the KM process and therefore they can better identify, analyze, understand and respond to consumer needs (Priem *et al.*, 2018).

The technology dimension (TD) of IO can be described as the extent of knowledge in the field of emerging technologies which companies acquiring and applying them in developing new and improving existing services. Often, this is linked to corporate activities that encourage openness to new ideas, creative thinking and proactive initiation of necessary actions (Zhou and Li, 2010). That is why the development of technology is also indicated as one of the most important factors in promoting innovative attitudes in companies, which consequently make technology one of the main dimension of their IO contributing to better performance (Guo *et al.*, 2020).

H4. TD positively influences KM.

Organizational culture dimension

In the discussion on the impact of IO on company performance, attention should also be paid to organizational culture, one of the most important dimensions of IO. According to Schein (1985), and we share this approach, organizational culture is a pattern of shared basic assumptions learned by a group because of its capacity to solve problems of external adaptation and internal integration that has worked well enough to be considered valid and worthy of teaching to new members as the correct way to perceive, think, and feel in relation to those problems.

Organizational culture has a direct impact on company performance (Aboramadan *et al.*, 2020). Kohtamäki *et al.* (2016) assert that organizational culture is an essential component of OP and a source of sustainable competitive advantage. Awan *et al.* (2018) referred to the cultural intelligence of a company as key for relationship development, reconfiguration of cultural knowledge and innovation performance. There are some aspects of organizational culture that particularly determine the effectiveness of management processes (including KM) such as: cooperation (Hanisch *et al.*, 2009), trust and openness (Lee and Choi, 2003), continuous learning, which also involves learning from mistakes (Hanisch *et al.*, 2009), communication (Oliver and Kandadi, 2006) and, as mentioned above, human resource management.

In the light of KBV, organizational learning resulting from the KM plays a significant role in the sustainability of the competitive advantage (Qadri *et al.*, 2021).

Organizational culture dimension (OCD) in a business service company with IO is characterized by strong support for new ideas from both internal and external sources, employee proactiveness and acceptance of risk-taking, which in turn leads to innovation of the services offered and a competitive advantage (Borodako *et al.*, 2021). The second but equally strong influence of Organizational culture (OC) comes from the impact it has on KM.

H5. The OCD positively influences KM.

Market dimension

From a market perspective, a firm is viewed as most efficient and effective when it creates the relevant behavior for developing superior value for clients which results in superior performance. In the light of KBV customers are the primary external source of knowledge acquisition by the company (Sulistyo and Ayuni, 2018). Among companies providing business services, the client's needs and requirements are among the most important strategic considerations in the process of KM. Companies providing business services tend to

adapt solutions to specific customer requirements. The development of business services companies and their role in the KM process for customer innovation is considered an important indicator of the increasingly distributed nature of the innovation process (Gallouj and Savona, 2010). These companies not only introduce innovations for their development but, thanks to KM, co-create innovations with clients (Lee and Miozzo, 2019). In our model market dimension (MD) is understood as strategic philosophy aimed at keeping the company close to the customer, recognizing his needs (current and future) and creating superior value on the basis of knowledge comes from the processes of co-creation of a new product. Thus, MD has a significant influence on the IO of these companies and a positive impact on performance.

H6. The MD positively influences KM.

Knowledge management as a mediator

KM is a prerequisite for company performance (Chawla *et al.*, 2021) and consists of many processes. DeLong (1997) indicates three factors influencing KM that are designed to ensure effective business performance, organizational culture, work processes and technological infrastructure, which reflect some of the IO dimensions. Moreover, Zhang *et al.* (2007) stress that firms must engage in systematic knowledge acquisition, dissemination and application processes to convert each orientation factor into performance.

From the perspective of performance, human knowledge in the firm should be broad on one hand, and deep on the other, enabling it to achieve company goals in an optimal way. Hence, diversified sources of knowledge are important. Nguyen *et al.* (2018) claim that cross-functional knowledge influences performance by creating collective knowledge-related resources that contribute to the firm's ability to attain and sustain superior performance. Tacit cross-functional knowledge-sharing across departments, which is typical for business service companies, can promote organizational learning and create organizational benefits in terms of cost reductions, service quality improvements and innovative service offerings (Hsu, 2008).

In the literature, we find studies focused on KM as a mediator. Lee *et al.* (2012) indicated in their research that knowledge mediates the impact of certain factors on company performance and supports creative organizational learning at the same time. These organizational factors included collaboration – represented in this study by the human resources dimension (HRD); trust and learning culture – reflected in this study by the OCD; information technology – as the TD; and decentralization – included in the SPD. Also, Lai *et al.* (2014) clearly indicated that KM plays the role of a mediator in the relationship between industry clustering (recognized as cluster resources and cluster relations) and corporate innovation performance. The literature review also provides other research results which confirm KM as a mediator between organizational attributes (such as leadership, product quality, social interactions) and organizational results, including innovation performance and dynamic capabilities (Huang and Liu, 2019; Singh and Rao, 2016). Thus, we formulated the following hypothesis:

H7. KM, as a mediator, positively influences OP.

Technological readiness as a moderator

TR is most often defined as a "propensity to embrace and use new technologies for accomplishing goals" (Parasuraman, 2000, p. 308). It includes internal (i.e., technological infrastructure used by employees) and external (availability of the most advanced technology on the market) aspects. This issue is very widely discussed in the literature (Blut and Wang, 2020; Ramírez-Correa *et al.*, 2020), especially in the field of marketing, and is often approached from the perspective of a moderator of the relationships studied, e.g. the scope of use of given

services (Marcus *et al.*, 2019) or the impact of information system quality on performance (Kuo, 2013). TR is understood as a measurement to determine whether technologies can help a company achieve its business goals, create innovation and achieve better performance. Contrary to the technology dimension, understood as the scope of knowledge about technologies possessed by the company and one of the dimensions of IO (understood as the structure of knowledge), TR presents the actual model of the company and is related to higher adoption rates of technology.

Moreover, empirical research largely supports a positive association between TR and business performance. In the context of IO study, essential research was carried out by Adams *et al.* (2019), who showed that both customer orientation and TR are positively correlated with successful innovation. They also demonstrated the moderately positive impact of marketing management in increasing successful innovation for all orientations but most significantly for companies with a high degree of TR. Their research results also indicate that the highest impact on the relationship between IO dimensions and performance is observed among technology-driven companies. That is why we propose:

H8. TR, as a moderator, positively affects the relationship between KM and OP.

Research model

The starting point for this study was the work of Borodako *et al.* (2021) using the latest and most up-to-date approach to measuring IO available in the literature. In line with reported needs for a multidimensional approach to IO research (Lumpkin and Dess, 1996), this tool is based on six dimensions: strategic, human resources, organizational culture, structural and process, market and technological. On the basis of management and innovation literature, the authors derived their hypothesized variables, moderator and mediator, to establish the conceptual research model (Figure 1). Grounded in the KBV theory, the model was developed to test the IO dimensions on a firm's performance with KM as a mediator and TR as a moderator on this relationship.

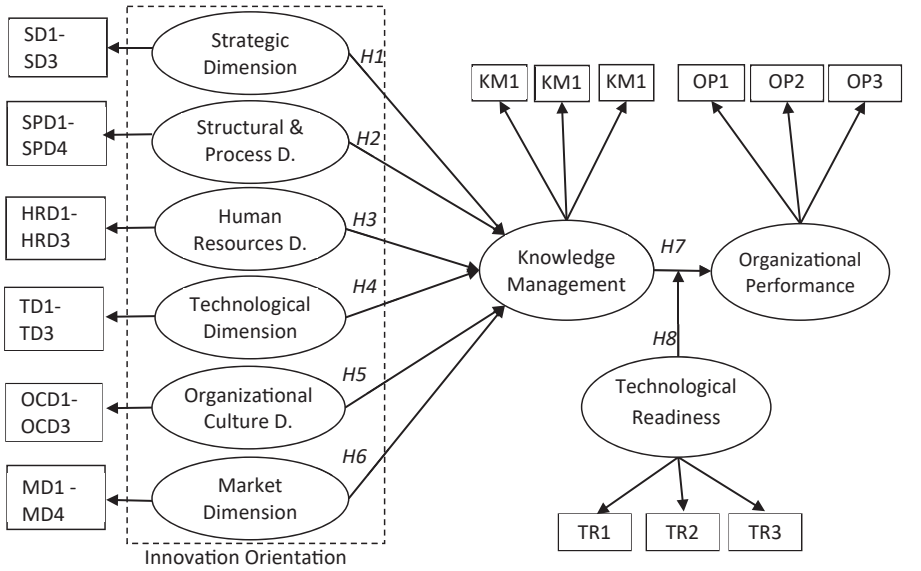

Figure 1.
Conceptual
research model

Methodology

Data and variables

The questionnaire was evaluated by subject matter experts worldwide during a consultation phase (as Flores *et al.*, 2012). We received feedback from 36 scholars who supported us in modifying the construction of the survey. The aim of the consultation phase was primarily to reduce the number of statements included in each IO dimension. Each dimension initially included five statements, but these were reduced to four per dimension following expert evaluation. The same changes were made for other questions included in the questionnaire, which shortened the time needed for its completion.

The research sample of respondents was obtained from a national database reflecting the official court register of economic activity in Poland. The database of companies was limited to entities belonging to the group of business service providers. From the dataset of 91,236, we generated the final database of 89,944 unique records to which to send invitations. The number of received questionnaires was 3,135, which represents a 3.81% response rate. The sample description is presented in Table 1. The main challenge was to convince business service providers to complete the survey. Despite assurances about the confidentiality and anonymity of the conducted research, company representatives were not willing to participate. While collecting the data, the authors sent reminder messages asking for the survey to be returned or completed. Despite several requests and reminders, attempts to make contact and frequent telephone requests for completion, a significantly higher rate of return was not achieved. This is a typical problem in survey research when respondents are elusive or refuse to take part (nonresponse error). Moreover, the vast majority of the surveyed companies are micro and small enterprises (over 90% – see Table 1) and the literature notes that larger enterprises are more willing to participate in research and disclose information about their activities (Kansal *et al.*, 2014). The surveyed companies were engaged in the following services: accounting and tax services, engineering and architectural services, information technology (IT) services, legal services, business event services, management and public relations services, technical research and analysis, market research services, advertising services and employment related services.

In addition to the predominance of micro and small enterprises, nearly 75% of the respondents were from companies with several years of experience (over 5 years). The most numerous were companies providing accounting and tax services, engineering and architectural services, and IT services (nearly 65% of the surveyed companies).

Organizational performance – dependent variable. To design the research in accordance with scientific standards, the authors used three different indicators of business performance.

Size	(%)	Type of services	(%)
Up to 9 employees	76.53	Accounting and tax services	22.80
10–49	15.93	Engineering and architectural services	21.54
50–249	5.20	IT services	19.54
Over 249	2.33	Legal services	10.07
Age of firm	**(%)**	**Type of services**	**(%)**
		Business event services	7.00%
Up to 2 yrs.	9.40	Management and Public Relations services	5.87%
2–5 yrs.	19.93	Technical research and analysis	4.87%
6–10 yrs.	23.07	Market research services	3.34%
11–20 yrs.	25.20	Advertising services	2.87%
Over 20 yrs.	22.40	Employment related services	2.14

Table 1.
Sample description

The first one focused on sales growth to provide a general picture of the company's condition and prospects for further development. The second referred to close relations with the client and his/her satisfaction with the purchased services. The last variable used to measure performance in business services was successful service launch, which demonstrates the professionalism and innovativeness of the company. The variables applied in this study were judgmental measures that have been commonly adapted in strategic orientation research (Gao *et al.*, 2007; Zhou and Park, 2020).

Independent variables. The independent variables implemented in this study are the dimensions of IO, KM and TR described at length in the previous section. All dimensions were based on four items (statements), while KM and TR were based on three, all rated on a 5-point Likert scale (1 – strongly disagree . . . 5 – strongly agree). This type of measurement scale is commonly adopted in strategic and IO research (Avci *et al.*, 2011).

We measured the variables used in the model based on a literature review (Borodako *et al.*, 2021; Olson and Slater, 2005; Stock and Zacharias, 2011; Talke *et al.*, 2011) adapted to the study context.

Methods

Path analysis is a type of multiple regression analysis that is used in the social sciences to investigate the relationship between multiple variables (Stage *et al.*, 2004). Most often, this analytical approach is chosen when the researcher wants to identify cause-and-effect relationships between the variables. However, it should be taken into account that correlation does not always mean a causal relationship. The purpose of path analysis is to estimate the size and significance of the parameters that relate to relationships between variables – quite often represented by the path diagram. The arrows in such a diagram indicate the theoretical causal relationships described in the literature. Path analysis takes into account the presence of moderating and mediating variables, which makes it a popular analytical tool. In this study, path analysis was used to build a model with the dependent variable "performance" (OP), a set of independent variables ("strategic dimension" (SD), "structural and process dimension" (SPD), "human resources dimension" (HRD), "technological dimension" (TD), "organizational culture dimension" (OCD) and "market dimension" (MD), the moderating variable "technological readiness" (TR) and the mediating variable "knowledge management" (KM). We used Statistica and R packages lavaan, semTools and conMET for conducting the analysis (Jorgensen *et al.*, 2021; Rosseel, 2012; de Schutter, 2021).

Analysis and results

Common method bias

In this study, data comes from a single source (questionnaires). Therefore, there may be a common method bias (CMB) and associated data disturbance. We understand that CMB is considered a serious problem with self-examination (Podsakoff and Organ, 1986) and can affect the relationship between the measured variables (Conway and Lance, 2010). Harman's single factor test was used to check the CMB. A test value of 0.335 means that the total variance explained by a single factor was less than 33.5%. This result is lower than 50% and allows us to state that data is not associated with CMB (Dupuis *et al.*, 2017).

Reliability, validity and descriptive statistics

As defined by Ginty (2013, p. 487), construct validity is "the extent to which the measurements used, often questionnaires, actually test the hypothesis or theory they are measuring". Two types of construct validity – convergent validity and discriminant validity – were assessed as

part of the analyses. The approaches were based on Cronbach's alpha, composite reliability, average variance extracted (AVE) and cross-loading values (Henseler *et al.*, 2015).

In the first step of the analysis, confirmatory factor analysis was used to investigate construct validity based on the final fully completed and correct 1,500 records used for further study (from all received surveys). Values of Root Mean Square Error of Approximation (RMSEA) = 0.063, χ^2 (df) = 1892.676 (271) p = 0.000, Comparative fit index (CFI) = 0.944, Tucker–Lewis index (TLI) = 0.932 indicate acceptable fit. Table 2 shows Cronbach's alpha and McDonald's Omega Coefficient (Ω) results. The former range from 0.756 to 0.932, while the latter exceed the threshold value of 0.7. This is a satisfactory result, which proves the good reliability of the measurement model. The last column of the table contains AVE values. Since they are all higher than the cut-off value of 0.5 (with OP slightly below with 0.496), it means that convergent validity is acceptable (Fornell and Larcker, 1981; Hair *et al.*, 1998).

The HTMT (heterotrait-monotrait ratio of correlations) values are presented in Table 3. None value exceeds the threshold value of 0.85, which means that discriminant validity is not violated (Henseler *et al.*, 2015).

To establish discriminant validity, cross-loadings were also assessed with varimax rotation (Table 4). The factor loadings for observed variables are highest for almost all the constructs with which they are associated. This confirms the previous conclusion that the measurement model has good discriminant validity.

Hypotheses testing – results

Based on the literature review, the authors consider KM as the mediator variable between IO and OP. The results indicate that KM plays an important role in supporting the relationship

Construct	Items	Cronbach's alpha	Mcdonald's omega coefficient (Ω)	Average variance extracted (AVE)
Strategic dimension (SD)	3	0.843	0.836	0.638
Structural and process dimension (SPD)	4	0.889	0.891	0.675
Human resources dimension (HRD)	3	0.839	0.820	0.621
Technological dimension (TD)	3	0.855	0.851	0.659
Organizational culture dimension (OCD)	3	0.825	0.839	0.630
Market dimension (MD)	4	0.932	0.935	0.780
Organizational performance (OP)	3	0.756	0.733	0.496
Knowledge management (KM)	3	0.844	0.848	0.647

Table 2. Results of confirmatory factor analysis

	SD	SPD	HRD	TD	OCD	MD	OP	KM
SD	1.000							
SPD	0.831	1.000						
HRD	0.595	0.731	1.000					
TD	0.738	0.782	0.695	1.000				
OCD	0.720	0.797	0.780	0.797	1.000			
MD	0.672	0.745	0.597	0.725	0.758	1.000		
OP	0.668	0.659	0.582	0.690	0.725	0.751	1.000	
KM	0.636	0.678	0.589	0.686	0.773	0.772	0.717	1.000

Note(s): SD – Strategic dimension, SPD – Structural and process dimension, HRD – Human resources dimension, TD – Technological dimension, OCD – Organizational culture dimension, MD – Market dimension, TR – Technological readiness and KM – Knowledge management, OP – Organizational performance

Table 3. Results of HTMT

Items	SD	SPD	HRD	TD	OCD	MD	OP	KM
SD-1	*0.768*	0.235	0.098	0.196	0.124	0.178	0.073	0.218
SD-2	*0.819*	0.161	0.096	0.093	0.197	0.172	0.180	0.141
SD-3	*0.594*	0.311	0.209	0.336	0.150	0.233	0.204	0.087
SPD-1	0.347	*0.630*	0.267	0.325	0.023	0.307	0.081	0.114
SPD-2	0.357	*0.621*	0.258	0.358	0.074	0.283	0.095	0.152
SPD-3	0.211	*0.741*	0.145	0.179	0.218	0.243	0.149	0.210
SPD-4	0.156	*0.662*	0.171	0.060	0.420	0.161	0.163	0.184
HRD-1	0.120	0.126	*0.821*	0.184	0.131	0.152	0.112	0.130
HRD-2	0.087	0.171	*0.850*	0.149	0.164	0.112	0.097	0.096
HRD-3	0.175	0.296	*0.548*	0.181	0.408	0.212	0.078	0.225
TD-1	0.250	0.267	0.180	*0.615*	0.213	0.248	0.124	0.289
TD-2	0.161	0.186	0.192	*0.748*	0.194	0.216	0.158	0.178
TD-3	0.156	0.136	0.182	*0.752*	0.207	0.215	0.135	0.127
OCD-1	0.223	0.198	0.197	0.218	*0.547*	0.280	0.136	0.342
OCD-2	0.169	0.239	0.290	0.197	*0.656*	0.254	0.156	0.258
OCD-3	0.154	0.129	0.160	0.251	*0.729*	0.188	0.145	0.109
MD-1	0.176	0.242	0.128	0.127	0.223	*0.659*	0.166	0.305
MD-2	0.196	0.192	0.176	0.230	0.181	*0.781*	0.175	0.185
MD-3	0.148	0.186	0.128	0.189	0.157	*0.804*	0.143	0.276
MD-4	0.177	0.186	0.124	0.226	0.178	*0.781*	0.190	0.248
OP-1	0.150	0.142	0.251	0.278	0.146	0.408	*0.538*	0.111
OP-2	0.113	0.109	0.102	0.153	0.105	0.101	*0.863*	0.094
OP-3	0.166	0.108	0.045	0.044	0.147	0.264	*0.653*	0.339
KM1	0.130	0.101	0.071	0.235	0.144	0.223	0.129	*0.788*
KM-2	0.161	0.160	0.135	0.237	0.124	0.293	0.201	*0.717*
KM-3	0.156	0.200	0.206	0.014	0.214	0.271	0.144	*0.692*

Note(s): Applied rotation method is varimax; SD – Strategic dimension, SPD – Structural and process dimension, HRD – Human resources dimension, TD – Technological dimension, OCD – Organizational culture dimension, MD – Market dimension, TR – Technological readiness and KM – Knowledge management, OP – Organizational performance

Table 4.
Results of cross-loadings

between dimensions of IO and OP, which is confirmed by regression coefficients (values). In six dimensions included in the construct, four had significance. Only two components of this construct (SP and HR dimensions) were not statistically significant. The relationship between the mediator variable of KM and company performance is significant and strong (0.812). This allows us to confirm the hypothesis H_1 and H_4-H_7, and reject H_2 and H_3. As far as the relations between IO dimensions and KM are concerned, the strongest relationships are between: the MD (0.414) and KM, and the OC dimension (0.395) and KM (Table 5). Values of RMSEA = 0.066, χ^2 (df) = 2093.342 (277) p = 0.000, CFI = 0.937, TLI = 0.926, Normed Fit Index (NFI) = 0.928, Goodness of Fit (GFI) = 0.963 indicate acceptable fit. As discussed in the literature review, we considered TR as a moderator. Due to space limitations, the TR moderation effect on the relationship between IO dimensions and KM was postponed. To test the moderation effect for KM-OP relationship, the significance of the difference between the coefficients was assessed using a Z-test (Clogg *et al.*, 1995). We found that KM-OP ($Z = -1.176$, p = 0.000) moderation effects was significant and demonstrated a strong impact on this relationship, which confirms H_8. The same is true for the relation between KM and OP (which confirms H_7).

Discussion

Previous research in KM and innovation has usually concerned only one sector and examined selected performance determinants. Moreover, research to date has focused more on the

	Coefficient	SE	Entire sample z-value	*p*
SD → KM	0.109	0.041	2.298	0.022
SPD → KM	−0.065	0.040	−1.231	0.218
HRD → KM	−0.040	0.038	−0.892	0.372
TD → KM	0.130	0.036	2.941	0.003
OCD → KM	0.395	0.047	7.227	0.000
MD → KM	0.414	0.031	12.003	0.000

Moderators	Entire sample				High level of TR			Low level of TR			
	Coefficient	SE	z-value	*p*	Coefficient	SE	z-value	*p*	Coefficient	SE	z-value	*p*
KM → OP	0.812	0.033	23.887	0.000	0.656	0.085	10.762	0.000	0.766	0.039	13.779	0.000

Note(s): SD – Strategic dimension, SPD – Structural and process dimension, HRD – Human resources dimension, TD – Technological dimension, OCD – Organizational culture dimension, MD – Market dimension, TR – Technological readiness and KM – Knowledge management, OP – Organizational performance

Table 5.
Multiple regression results

production sector rather than services. For example, Mardani *et al.* (2018) examined Iranian companies in the power sector and showed that KM impacts innovation and OP directly, and indirectly through an increase in innovation capability. We have broadened the research field by taking into account all dimensions of IO in the sector of business services. Our research proposes a new perspective by investigating the impact of IO in business services firms on business performance. Implementing an IO paradigm based on six dimensions – strategy, organizational culture, human resources, structure and process, market, and technology – sets out a framework for achieving innovation and supports OP through KM.

Hypothesis H1: *The SD positively influences KM* was supported. This confirms views formulated as part of the theoretical approach (Miles *et al.*, 1978). It also extends to results obtained by other researchers such as Forcadell and Guadamillas (2002), who proved that the strategic orientation of a firm has a significant impact on successful KM implementation. Pursuant to the KBV, KM has a strategic nature, and the results confirm that using the KBV to underpin our model was justified.

Our results lead us to reject H2: *The SPD positively influences KM*, which marks a departure from the findings obtained by Lee *et al.* (2012), where the structural factor was significant. In the case of research by Taghizadeh *et al.* (2020), the structural factor with $\beta = 0.365$ ($p < 0.01$) plays an important role in influencing KM capability. By contrast, in our research, this dimension was found to be statistically insignificant. The results were somewhat surprising since one would expect these processes to be important. In fact, in the 90s, the authors of some studies pointed out that structures can impede knowledge flow (Dougherty, 1992). Nowadays, the approach taken by Eisenhardt and Santos (2000), which posits that organizations and groups of organizations become complex adaptive systems and are therefore organized into loosely linked systems of unique knowledge specialists. Despite this, they are collectively more innovative, adaptive and ultimately successful on dynamic markets. This may partly explain the lack of influence of the SPD.

Our results also don't support the hypothesis H3: *Human resources positively influence KM*. Our research is in contradiction with the results obtained in the study by Lee *et al.* (2012), where measurements such as collaboration (covered here as part of the HRD) were mediated by KM to improve OP. Our results don't support the outcomes of other researchers either. Fareed *et al.* (2016) investigated the impact of human resource professionals in accelerating ideas and innovation toward achieving a sustainable competitive advantage among companies in the telecom sector and Fu *et al.* (2017) established the linkage mechanisms through which high-performance work systems influence the performance of accounting companies. The results of Messersmith and Guthrie (2010) indicate that utilization of high performance work systems is positively associated with sales growth and innovation in emerging companies in the high-tech sector. Our results also contradict those from a study by Taghizadeh *et al.* (2020), which indicated that human resources (HR) incentive, training and development had a positive effect on the KM capability of Malaysian Small and medium-sized enterprises (SMEs). One possible explanation is that HR is a key element in KM and that slight differences in the study focus can lead to contradictory results. The differences in this dimension may generate new research questions for further studies.

Hypothesis H4: *The TD positively influences KM* was supported. This result was expected on the basis of both the reference to the KBV (because technology can enable KM in all four processes: knowledge creation, capture, distribution and sharing) and the results of other studies (Al-Aama, 2014; Guo *et al.*, 2020). Although Arias-Pérez *et al.* (2021) claimed that strategic orientation (toward digitalization) had an impact on the technology dimension, our study provides evidence that this impact is in fact reversed, with the TD affecting the knowledge which is embedded in the strategic orientation of the firm.

Our study also supported H5: *The OCD positively influences KM*. The relationship between organizational culture and KM, which is the second strongest among all dimensions, proves

the importance of fostering a culture of openness to new ideas from both internal and external sources and managing employee proactivity. This conclusion is undeniable due to the strong relationship (the highest among all dimensions) between MD and KM. Our findings reveal a similarity between internal and external knowledge transfer processes. Our findings complement the research carried out by Kohtamäki *et al.* (2016), Lee *et al.* (2012) and Martín-de Castro *et al.* (2013), where measurements such as (learning and innovation) culture (covered here within the OCD) were mediated by KM to improve OP. Our results confirm that the KBV is a good theoretical framework (Chang and Lin, 2015). The role of organizational culture is significant because KM comprises knowledge creation and transformation, and refers to the individual level (Cong and Pandya, 2003) (H2).

Hypothesis H6: *The MD positively influences KM* was supported. The results illustrating the relationship between the MD and KM confirm the importance of using external knowledge sources and the absorptive capacity of the company (Chitsazan *et al.*, 2017). It also suggests that a portfolio of externally oriented connections leads to more innovation. Nowadays, researchers confirm this relationship, while also taking into account the influence of Big Data and open innovation processes (Papa *et al.*, 2020).

Our results support H7: *KM, as a mediator, positively influences OP*. Empirical evidence is provided about the mediating impact of KM on performance, developing previous research in the field of KM where that link has been proposed quite often, but with scarce empirical support (López-Nicolás and Meroño-Cerdán, 2011). These results are complementary to the findings of Madhoushi *et al.* (2011), who prove that KM acts as a mediator between strategic (entrepreneurial) orientation and innovation performance. Our results are consistent with those obtained by (Chawla *et al.*, 2021), although the latter authors extend the research field and confirm that the effects of KM capacity on performance are mediated by strategic human resource management, administrative innovation and technical innovation. Our research, in contrast to Li *et al.* (2019), focuses on the impact of IO (six dimensions) on performance (where KM is a moderator), while Li *et al.* (2019) examined the impact of KM (the breadth of knowledge search) on innovation performance with IO as a moderator. In both studies, KM influenced the performance of companies.

Hypothesis H8: TR, *as a moderator, positively affects the relationship between KM and OP* was supported, which proves the moderating role of TR in increasing the impact of KM on OP in business services and is in line with findings by other researchers (Adams *et al.*, 2019; Garrido-Moreno *et al.*, 2015). According to the study by Garrido-Moreno *et al.* (2015), TR has a positive impact on KM processes, leading to better OP. In this way, the TR of the organization can be a significant factor in future studies on KM, as confirmed by the abovementioned research.

Conclusions

Implications for theory

This study makes a few major contributions to the existing literature. Our analysis is one of few research projects based on KBV theory in IO, which operationalizes its dimensions. In accordance with the postulates of the multidimensional approach in IO research (Lumpkin and Dess, 1996), this study extends existing concepts and tests an IO model based on six dimensions (Borodako *et al.*, 2021).

Our results clearly show that strategic, technological, organizational culture, and market dimensions have an impact on KM, confirming the validity of a broad approach to IO research (Stock and Zacharias, 2011).

Moreover, considering that business services are knowledge-based (Muller and Doloreux, 2009) and that the IO construct is based on knowledge (Siguaw *et al.*, 2006) in the mainstream KBV (Grant, 1996), we examine and prove the mediating role of KM in achieving OP by these firms.

The next way in which this study contributes to the literature is proving the moderating role of TR in strengthening the influence of KM on OP. Contrary to similar studies in this regard (Adams *et al.*, 2019), our results support the moderating effect of TR, especially with respect to the MD. The research has also shown that managers of business services firms with a low TR level in particular are more aware of the importance of technology for the innovation of market-oriented activities.

Implications for practice

The findings provide guidance to managers in business services firms on how to achieve superior performance. Managers should not only focus on the professional knowledge provided to the client, but look more broadly and focus on KM in terms of their own activities. Business services firms are usually micro and small companies with teams of just a few up to a dozen people. Innovation for such companies requires a focus on four proposed dimensions. In terms of the SD, managers should look for opportunities to enter new markets and be brave in adapting new solutions for their companies, even those that are already available on the market. The strategic perspective, implemented in business services, can increase the competitiveness of companies if managers combine it with KM processes – particularly the acquisition, development and efficient implementation of knowledge from the environment in the organization. A proactive attitude combined with a dynamic analysis of market data can make an organization resistant to many negative factors and ensure business stability. Managers should also be constantly open to new technological solutions (TD). The nature and size of business services show managers that KM is particularly important in terms of the OCD (managers should promote knowledge transfer processes between employees and between teams) and MD (managing the dissemination of knowledge to the client and within the company, including the co-creation of the offer by consumers). In these activities, particular emphasis should be placed on the latest technologies and equipping companies with appropriate hardware and software. These are valuable implications for managers because, as the research results have shown, TR for their companies positively influences knowledge levels and leads to better company performance. Moreover, our results confirm the accuracy of the multidimensional approach (Lumpkin and Dess, 1996), as it provides better insight into the role of individual dimensions. It creates the basis for managers to make more effective decisions in the process of achieving and sustaining innovativeness.

The results of the analysis of business services provide decision-makers in public policies with confirmation about what is crucial for these companies and what areas of their activities can be supported. Decision-makers could support these companies in the development and commercialization of new technologies. Moreover, networking (building cooperation networks) by technological and nontechnological business service companies may be one task of public policies based on the use of professional business clusters in the region. Regional innovation systems should also pay attention to shaping proactivity within the strategic approach of business service providers.

Limitations and future research

It is important to identify several study limitations that could be addressed in future research. First, our study uses a measure of performance based on a subjective assessment by respondents that included three indicators of business performance: sales growth, client satisfaction and successful service launch. As we mentioned, this methodology is commonly adapted in strategic orientation research but in the future, the secondary data of the surveyed companies would be worth considering. As for data, our research is based on survey data, which limits the possibility of in-depth analysis of the KM process in companies, which is closely related to the human factor, especially in the field of dissemination of tacit knowledge and its

sharing across departments. Future research should be supplemented with qualitative research methods which may provide additional information about the nature of knowledge in business services firms: methods of its transfer, its sources and mutual influence on other dimensions of activity, by giving a clearer picture of KM, IO and their impact on company performance.

What is more, our research presents a construct of IO based on six dimensions, some of which (e.g. organizational culture, human resources) are strongly related to national culture, mentality, etc. which strongly determine the patterns of decisions made. Therefore, in the future, it might be necessary to conduct these studies in the business services sectors of other countries.

Finally, by using similar data but from other contexts, new studies could expand our work here by seeking to understand whether the trends noted here regarding either the construct of IO or the mediating role of KM and moderating role of TR are generalizable to other sectors and contexts.

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