Strategic knowledge management, innovation and performance

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A R T I C L E   I N F O

A B S T R A C T

Our aim is to shed light on the consequences of knowledge management (KM) strategies on firm's innovation and corporate performance. Organisations are not aware of the real implications that KM may have. Based on an empirical study consisted of 310 Spanish organisations and structural equations modelling, results show that both KM strategies (codification and personalisation) impacts on innovation and organisational performance directly and indirectly (through an increase on innovation capability). Also, findings demonstrate a different effect of KM strategies on diverse dimensions of organisational performance. Our conclusions may help academics and managers in designing KM strategic programs in order to achieve higher innovation, effectiveness, efficiency and profitability.

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1. Introduction

In the last decade, the importance of knowledge has been highlighted by both academics and practitioners (Wu & Lin, 2009). Nowadays, knowledge is the fundamental basis of competition (Zack, 1999; Grant, 1996) and, particularly tacit knowledge, can be a source of advantage because it is unique, imperfectly mobile, imperfectly imitable and non-substitutable. However, the mere act of processing knowledge itself does not guarantee strategic advantage (Zack, 2002); instead, knowledge has to be managed. In next years, firms that create new knowledge and apply it effectively and efficiently will be successful at creating competitive advantages. Skyrme (2001) defines knowledge management (KM) as 'the explicit and systematic management of vital knowledge – and its associated processes of creation, organisation, diffusion, use and exploitation'. KM principles have been studied and implemented in every organisational discipline and profession (Kebede, 2010). This diversity has contributed to the rapid advance of the field, but also to a lack of integration of ideas and terminology (Clarke & Turner, 2004). In this situation, there are several challenges to establishing KM as a separate discipline (Kebede, 2010).

From a practice perspective, firms are noticing the importance of managing knowledge if they want to remain competitive (Zack, 1999) and grow (Salojärvi, Furu, & Sveiby, 2005). Thus, many companies everywhere are beginning to actively manage their knowledge and intellectual capital (DeTienne, Dyer, Hoopes, & Harris, 2004): most large companies in the USA, and many in Europe, have some sort of KM initiative in place (Davenport & Völpel, 2001). Nevertheless, many KM systems have been unsuccessful, with Storey and Barnett (2000) reporting failure rates of over 80%, due to diverse reasons, such as an overfocus on IT, inappropriate KM strategies, or ignorance of KM consequences. Now that technologies implemented to enhance knowledge sharing have matured, researchers and practitioners are able to reflect on the factors of their success or failure (Hall & Goody, 2007). Besides, a divergence in the practioner's view on KM and the academic perspective is already evident (Clarke & Turner, 2004), and an increasing feeling of disappointment in managers due to their inability to foster organisational knowledge.

In spite of all advances in these perspectives, the result has been an incomprehensible and confusing body of knowledge and many managers do not still know which variables can improve KM programs success (Moffett, McAdam, & Parkinson, 2002). There is not a clear model about the variables which KM may have a significant impact on. Effects of KM programs on innovation and corporate performance have been scarcely analysed in literature (Choi, Poon, & Davis, 2008). Few studies empirically test the link between knowledge and performance (Tseng, 2008), thus existing a research gap on how and under which circumstances KM initiatives lead to better results. Besides, organisational knowledge plays an important role in innovation process. However, it is difficult to draw conclusions from the extant literature about the relationship between effective KM, innovation and performance since research examining this link is developing (Darroch, 2005).

Thus, the aim of present study is to contribute to the advance of KM research from a strategic point of view and shed light on whether KM can be translated into better organisational per-

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Table 1
Knowledge management strategies.

Author	System-oriented	Human-oriented
Hansen et al. (1999)	**Codification**	**Personalisation**
March (1991)	Exploitation	Exploration
Bierly and Chakrabarti (1996)	Exploiters	Innovators, Explorers
Jordan and Jones (1997)	Explicit-oriented	Tacit-oriented
Zack (1999)	Conservative	Aggressive
Choi and Lee (2003)	Systems-oriented	Dynamic, human-oriented
Garavelli et al. (2004)	Market	Community
Martini and Pellegrini (2005)	Codification	Network-based; Traditional
Mom, Van Den Bosch, and Volberda (2007)	Exploitation	Exploration
Moitra and Kumar (2007)	–	Socialization
Wu and Lin (2009)	Copier, continuous improver	Skill acquirer, innovator

Table 2
Codification and personalisation KM strategies.

	Codification	Personalisation
Economic motivation	Knowledge reuse	New solutions and knowledge development
Knowledge managed	Explicit	Tacit
Focus	Person-to-documents	Person-to-person
Use of IT	Heavy IT investment: connecting people and reusable knowledge	Moderate IT investment: facilitating dialogue and tacit knowledge sharing
Main tools	Decision support systems	Mentoring Groups
	Document repositories	Video-conferencing
	Knowledge maps	Bellow pages
	Workflow	E-mail
	Best practices databases	Discussion forum
Human resources Management	E-learning	Mentoring
	Rewarding the use of and contribution to databases	Rewarding knowledge sharing with others
Advantages	Economies of scale Time savings	Knowledge cataloguing is easy
	No need of reinventing the wheel	Flexible and adaptable knowledge Improvements in task quality
	Quicker and wider access and distribution of knowledge	Improvements in clients image Management of uncodifiable knowledge
Disadvantages	High cost Codified knowledge loses richness	Unwillingness to share Inappropriate culture

Source: Adapted from Hansen et al. (1999), Alvesson and Karreman (2001), Hansen and Haas (2001), Flanagin (2002), and Inuzuka and Nakamori (2004).

formance, directly or indirectly through an increase on firm's innovation. Specifically, we propose and test a model that links two KM strategies (codification and personalisation) and their consequences on innovation and on financial and non-financial performance. Our conclusions, based on an empirical study consisted of 310 Spanish organisations and structural equations modelling, may help academics and managers in designing KM strategic programs in order to achieve higher effectiveness, efficiency and profitability.

The paper is structured in five sections. First, the concept of strategic KM is defined and main typologies are reviewed, whereas Hansen, Nohria, and Tierney's (1999) distinction (codification and personalisation) is detailed. Next, consequences of different strategic alternatives are included in the proposed model. Third, methodological issues are explained. Then, results from hypotheses testing are shown and discussed. Finally, conclusions, limitations and further research lines are presented.

2. Strategic KM

Strategic KM relates to the processes and infrastructures firms employ to acquire, create and share knowledge for formulating strategy and making strategic decisions (Zack, 2002), thus linking KM strategy to business strategy. A firm's knowledge strategy describes the overall approach an organisation intends to take to align its knowledge resources and capabilities to the intellectual requirements of its strategy, thus reducing the knowledge gap existing between what a company must know to perform its strategy and what it does know (Zack, 1999). A similar definition is provided by Bierly and Daly (2002, p. 277), who state that "the set of strategic choices addressing knowledge creation in an organisation comprise the firm's KM strategy, which provides the firm with guidelines for (. . .) creating competitive advantage". Both definitions take account of the convenience of explicitly managing knowledge with a clear knowledge strategy. However, the KM strategy is often adopted in an unconscious way (Garavelli, Gorgoglione, & Scozzi, 2004). Firms must take a global and consistent vision when managing its knowledge and selecting KM tools to be implemented. The whole organisation must share a common KM orientation because KM is central to their ability to grow and compete (Salojärvi et al., 2005).

A better understanding of the concept and implications of KM strategies can be achieved through a review of most important contributions (Table 1). An essential element is the balance firms should observe between exploration and exploitation (March, 1991), i.e. between the creation, discovery or acquiring of knowledge and its refinement, reuse or a focus on efficiency in knowledge

resource management. Bierly and Chakrabarti (1996) label firms according to the way they manage knowledge. They conclude that more aggressive knowledge strategies, featured by more innovative firms, cause higher financial performance. In a similar way, Zack (1999) proposed two orientations: conservative vs. aggressive. Concern for exploration is more frequent in the latter.

Hansen et al.'s (1999) typology of knowledge strategies distinguishes between personalisation and codification of knowledge. This classification is based on the distinction between tacit and explicit knowledge, and the distinct use of IT (Martini & Pellegrini, 2005). In the codification strategy knowledge is extracted from the person who developed it, made independent of that person, and reused for various purposes, while the personalisation strategy focuses on dialogue between individuals (Table 2).

This research focuses on the KM strategies typology by Hansen et al. (1999) because, first, their work is well-known and accepted in the field of KM, and has been used for other studies (464 times cited by November 2010, according to ISI Web of Science by Thomson Corporation). Second, it includes previous significant classifications (exploration vs. exploitation by March (1991) or human-orientation vs. system-orientation by Choi and Lee (2003)) and relates to the distinction between tacit and explicit knowledge (Davenport & Völpel, 2001). Third, the concepts of personalisation and codification of knowledge are easily understood by academics and practitioners.

Nevertheless, Hansen et al.'s (1999) classification has also been criticised due to its incompatibility of combining codification and

personalisation (*stuck in the middle*), stating that companies who try to excel at both strategies risk failing at both. The stuck in the middle situation is an example of the focused perspective in KM strategy (Choi & Lee, 2002, 2003). Some authors consider the "do not straddle" advice is overly simplistic and dangerous. Recently, professor Choi and colleagues have published the conclusions from a research on KM strategies complementarity. Their results prove that strategies oriented to explicit knowledge (systems or codification) or to tacit knowledge (human or personalisation) are non-complementary with respect to organisational performance, thus supporting Hansen et al.'s (1999) idea about the danger of being *stuck in the middle*. Our research is based on the classification by Hansen et al. (1999) and on the focused perspective proposed by those authors and empirically tested in Choi et al. (2008) regarding the non-complementary of codification and personalisation.

3. Consequences of strategic KM

We aim at analysing KM effects on corporate performance. Specifically, likely consequences of KM on innovation and firm's results (financial and non financial) are studied.

3.1. Effects of strategic KM on innovation

The innovative efforts include the search for, and the discovery, experimentation, and development of new technologies, new products and/or services, new production processes, and new organisational structures. Innovation is about implementing ideas (Borghini, 2005). Literature (Daft, 1982; Damanpour & Evan, 1984) describes innovation in terms of its nature, as an element, a new structure or administrative system, a policy, a new plan or program, a new production process, a product or service new to the company, which has been acquired or generated internally.

Innovation process highly depends on knowledge (Gloet & Terziovski, 2004), specially on tacit knowledge (Leonard & Sensiper, 1998). New and valuable knowledge is created and converted into products, services and processes (Choy, Yew, & Lin, 2006), by transforming general knowledge into specific knowledge. Works on knowledge creation by Nonaka consider knowledge as a main requisite for innovation and competitiveness (Nonaka, 1994). A KM system that expands the creativity envelope is thought to improve the innovation process through quicker access and movement of new knowledge (Majchrzak, Cooper, & Neece, 2004). Also, effective KM is a critical success factor when launching new products. In this sense, present paper supports that one of the factors influencing innovation capacity in organisations is knowledge and its management.

Organisational interest in KM is stimulated by the possibility of resultant benefits, such as increased creativity and innovation in products and services (Darroch, 2005; Moffett et al., 2002). In fact, knowledge contributes to producing creative thoughts and generating innovation (Borghini, 2005). That is why innovation is seen as the area of greatest payoff from KM (Majchrzak et al., 2004). Darroch (2005) provides empirical evidence to support the view that a firm with a capability in KM is also likely to be more innovative. Also, Massey, Montoya-Weiss, and O'Driscoll (2002) tell the story of a real company who implemented a KM strategy and achieved improvements on innovation process and performance, while Swan, Newell, and Robertson (1999) compare the impact on innovation of different KM programs implemented in two organisations.

Thus, there exists a close link between the organisation's knowledge and its capacity to innovate and create (Borghini, 2005). Both codification and personalisation can enhance corporate innovation. Swan et al. (1999) state that it is largely exploration through

knowledge sharing that allows the development of innovation since it focuses on tacit knowledge, whereas Majchrzak et al. (2004) propose a positive impact of explicit knowledge reuse (which codification strategy is based on) for radical innovation. We posit the following:

H1. Codification KM strategy enhances innovation.

H2. Personalisation KM strategy enhances innovation.

3.2. Effects of strategic KM on organisational performance

Prior conceptual research state that KM can improve corporate performance and competitiveness (Civi, 2000; DeTienne & Jackson, 2001; Holsapple & Jones, 2004, 2005). KM programs are successful when corporate performance is improved. Therefore, it is essential to measure KM contribution to performance (Tseng, 2008), especially when there is at present no conclusive research on the relationship between KM strategy and firm performance (Yang, 2010).

Corporate performance is a multidimensional concept and considers firm's position regarding to competitors. A comprehensive view of corporate performance considers not only a financial perspective but also others which allow monitoring value creation. With this focus some methodologies have been developed, being the most popular the Balanced Scorecard (Kaplan & Norton, 1996). Some works recognize the impact of strategic KM on different dimensions of corporate performance (McKeen, Zack, & Singh, 2006). Nevertheless, most of them focus on hard financial outcomes (e.g. cost, profit, etc.) to evaluate KM (e.g. Vaccaro, Parente, & Veloso, 2010), while ignoring soft non-financial outcomes such as operating costs, shorten lead-time, and differentiate products (Sher & Lee, 2004); developing new services (Storey & Kahn, 2010); improving its ability to attract, train, develop, and retain employee (Thomas & Keithley, 2002); and improving coordination efforts (Wu & Lin, 2009).

KM systems performance should combine financial and non-financial measures (Tseng, 2008; Wu & Lin, 2009), since diverse dimensions of performance are affected by KM strategy. Existing literature in the field, however, does not provide a clear model about the real impact of KM on performance (Choi et al., 2008). We suggest that the impact of KM strategy on firm performance should be better studied by analysing different dimensions of corporate performance. Three dimensions will be used to value KM contribution to corporate performance: (1) financial performance, which encompasses market performance (profitability, growth and customer satisfaction); (2) process performance, which refers to quality and efficiency; and (3) internal performance, which relates to individual capabilities (employees' qualification, satisfaction and creativity).

A strategic attitude is necessary to achieve those competitive advantages and to improve performance (Bierly & Chakrabarti, 1996; Braganza, Edwards, & Lambe, 1999; DeTienne & Jackson, 2001; Jennex, Olfman, & Addo, 2003; Salojärvi et al., 2005). Nonetheless, the effect of each KM strategy (codification and personalisation) on performance may be different. By grounding on the Knowledge-based view of the firm (Grant, 1996), some studies (e.g. Storey & Kahn, 2010) suggest that personalisation strategy, focused on managing tacit knowledge, may be more valuable in enhancing competitiveness than codification strategy which is mainly concerned about explicit knowledge. Other works (e.g. Keskin, 2005) find, however, that the influence of explicit oriented KM strategy is higher than the tacit orientation on firm performance. Those contradicting results may be explained by the fact that prior research prove that both KM strategies may improve corporate performance differently. Managing codified knowledge saves time (Ofek & Sarvary, 2001; Haas & Hansen, 2007) and improves coordination
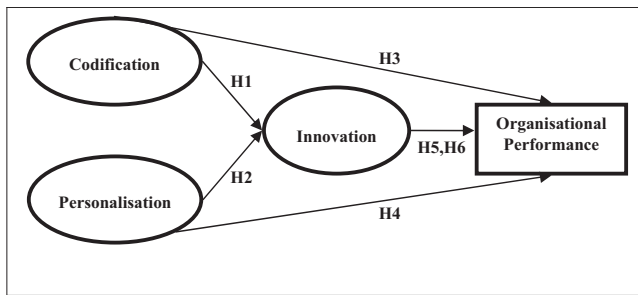
Fig. 1. Conceptual model.

efforts (Wu & Lin, 2009), while personalisation strategy improves quality (Ofek & Sarvary, 2001), signals competence to clients (Haas & Hansen, 2007), and improves ability to innovation (Wu & Lin, 2009). Based on these and other studies, it is hypothesized that KM strategies positively contribute to firm performance directly:

H3. Codification KM strategy has a direct effect on corporate performance.

H3a. Codification KM strategy has a direct effect on financial performance.

H3b. Codification KM strategy has a direct effect on process performance.

H3c. Codification KM strategy has a direct effect on internal performance.

H4. Personalisation KM strategy has a direct effect on corporate performance.

H4a. Personalisation KM strategy has a direct effect on financial performance.

H4b. Personalisation KM strategy has a direct effect on process performance.

H4c. Personalisation KM strategy has a direct effect on internal performance.

Prior research state that KM can improve corporate performance and competitiveness indirectly through higher organisational ability to innovate (Braganza et al., 1999; Gloet & Terziovski, 2004; Massey et al., 2002; Yang, 2010) and higher organisational ability to creativity (Lee & Choi, 2003). Following Lee and Choi (2003), Vaccaro et al. (2010) and Yang (2010), we consider an intermediate variable between KM strategies (codification and personalisation) and performance, that is, innovation. Based on previous discussion, and considering that both academics and practitioners state that innovation capacity lead to competitiveness (Braganza et al., 1999), we posit the following:

H5. Codification KM strategy has an indirect effect on corporate performance through an increase on innovation capacity.

H6. Personalisation KM strategy has an indirect effect on corporate performance through an increase on innovation capacity.

Fig. 1 shows graphically the research model and summarised the hypothesis that will be tested in the present paper.

4. Methodology

The model shown in Fig. 1 is empirically tested through a survey among Spanish companies. The sample consists of 310 firms in the Region of Murcia (Spain). The sampling procedure is based on stratified random sampling, with proportionate stratification with

Table 3
Sample description.

Size	Sample (%)
10–49 employees	71.3
50–249 employees	24.5
>250 employees	4.2
Age (%)	
After 1992	33.9
1981–1991	33.5
Before 1981	32.6
Sector (%)	
Food and agriculture	35.7
Textile	12.0
Food trading	25.0
Services to companies	15.0
Other products distribution	12.3
Geographical distribution (%)	
One location	71.2
More than one location	28.8

respect to firm size and activity sector. Specifically, it aims at representing firms with at least 10 employees operating in specific sectors (textile, food and agriculture, food trading, trading, and services to companies). The study assumes an error of 4.9% for $p = q = 50$ and a confidence level of 95.5%. After having contacted 400 firms, 317 companies were interviewed and 310 valid responses were obtained from different industries (response rate nears 80%). Data were collected during the first semester of 2005.

A structured questionnaire consisting of close-ended questions was developed. Pretest for the instrument was examined by 5 practitioners (CEOs of five companies) and 5 academics in this area, including translation, wording and structure. Face-to-face surveys with the CEOs were conducted. CEOs were targeted as key informants because they must be the KM leaders (DeTienne et al., 2004), and the ones who are used to doing it in Spanish firms (Tena & Ongallo, 2004). Following other investigations (e.g. Tseng, 2008), informants were promised to obtain a summary of the results if they were interested in this study. Ninety percent of respondents requested the free-of-charge report with the main conclusions of the research, thus signalling the high interest of interviewed companies in KM and research. Table 3 shows characteristics of the sample. Studied companies are mainly SMEs. Organisations have been divided in 3 homogenous groups, based on the year of their foundation. Range limits for firm's age are determined by 1992 and 1981.

The variables of this research are measured using multi-item scales tested in previous studies (see Appendix). Items for KM strategies are based on Choi and Lee (2002, 2003). Innovation scale is based on Lee and Choi (2003). Finally, performance measures are based on Quinn and Rohrbaugh (1983), Hoque and James (2000), and Choi and Lee (2002, 2003). Regarding the reliability of the measures, we conducted a confirmatory factor analysis (CFA) for each one of the constructs using LISREL 8.7 (Jöreskog & Sörbom, 1996). Measurement model shows high reliability and validity of the scales (Table 4). Cronbach's alpha is above .70, level recommended by literature (Hair, Anderson, Tatham, & Black, 2001). Scale composite reliability indexes are higher than .70, as recommended by other studies, and average variance extracted is above .50, minimum value proposed by Fornell and Larcker (1981). As may be observed from Table 4, measurement model shows appropriate indexes of goodness-fit: a non-significant χ^2, GFI, CFI and IFI above .90, RMSEA below .08, and RMR between .05 and .06.

CFA (Table 4) confirms, first, that two KM strategies exist: codification (items KMS1, KMS2, KMS3 and KMS4 in Appendix) and personalisation (items KMS5, KMS6, KMS7 and KMS8). Second, as learnt from exploratory factor analysis, CFA also confirms the existence of 3 dimensions in the performance variable: financial,

Table 4
Confirmatory factor analysis (CFA).

	Mean	SD	Items	Alpha Cronbach	Eigen-value	Lowest *t*-value	SCR[a]	AVE[b]
Codification	3.3887	.921	4	.819	2.599	11.82	.824	.543
Personalisation	3.7694	.797	4	.789	2.474	11.13	.801	.505
Innovation	3.2984	.914	2	.810	1.681	11.88	.821	.699
Financial performance	3.4839	.812	3	.736	1.968	10.45	.749	.502
Process performance	4.1043	.652	4	.677	1.842	10.08	.692	.501
Internal performance	3.6022	.669	3	.745	1.995	10.97	.761	.519

$\chi^2(137) = 337.05$
GFI = .90, CFI = .91, IFI = .91, RMSEA = .067, RMR = .057.

[a] Scale composite reliability.
[b] Average variance extracted.

process and internal performance. The idea that corporate performance has a multidimensional nature consisting on financial and non-financial measures is consistent with prior research. Specifically, our financial dimension in performance (items FP1, FP2 and FP3 in Appendix) is similar to financial perspective proposed in the Balanced Score Card (BSC) by Kaplan and Norton (1996), as well as the model of effectiveness based on rational goal by Quinn and Rohrbaugh (1983). Process dimension in our measure of performance (items FP4, FP5, FP6 and FP7) combines customer and internal perspectives of the BSC and the internal process model by Quinn and Rohrbaugh (1983). Finally, our internal dimension of performance (items FP8, FP9 and FP10) is similar to learning and growth perspective by Kaplan and Norton (1996) and the human relations model of effectiveness of 1983. Moreover, the 3 dimensions of performance found here (financial, process and internal) are also alike different components of diverse Intellectual Capital models. Thus, our valid, reliable scale for measuring performance can also contribute to academics and research on corporate performance.

Next, the structural model presented in Fig. 1 is tested using Lisrel 8.7 (Jöreskog & Sörbom, 1996). Using structural equation modelling, all the paths can be estimated at once. In Fig. 2 results from structural model estimation are presented and in Table 5 indirect and total effects of the different paths are detailed.

5. Results and discussion

Results show that both KM strategies (codification and personalisation) impacts on innovation and organisational performance, thus supporting H1–H4. Besides, KM strategies indirectly (through an increase on innovation capability) impact on performance (support for H5 and H6), thus reinforcing the total effect of KM strategies on performance. So, from findings one may draw the conclusion that KM is an important mechanism for companies to be more innovative, efficient and effective.

* p<.10; ** p<.05; ***p<.01

$\chi^2(143) = 341.49$
CFI= .91 IFI=.91 GFI=.90 RMSEA=.066 RMR=.057

Fig. 2. Structural model.

Although strategic KM enhances innovation (H1 and H2), there is hardly difference regarding the impact of each KM strategy. This finding does not support the statement by Hansen et al. (1999), or Alvesson and Karreman (2001), about the fact that personalisation strategy is motivated by new solutions and innovations, while codification strategy is based on the economics of existent knowledge reuse. Also, Leonard and Sensiper (1998) argue that social interaction, as an example of personalisation strategy, is especially critical for innovation processes and Wu and Lin (2009) have recently reported that improved ability to innovation was best performed on the personalisation approach and improved coordination efforts on the codification. Instead, our analyses indicate that both personalisation and codification approaches positively impact on corporate innovation. This means that organisations may focus on both IT and capabilities of human resources in order to enhance innovation and (every dimension of) performance. This finding is consistent with Vaccaro et al. (2010) and similar to the one by Inuzuka and Nakamori (2004) who do not find performance differences depending on KM strategy (codification or personalisation), but they do find that performance/cost ratio is much higher for personalisation than codification. Our results can also be compared to Gloet and Terziovski's (2004). Their research shows that KM contributes

Table 5
Indirect, direct and total effects.

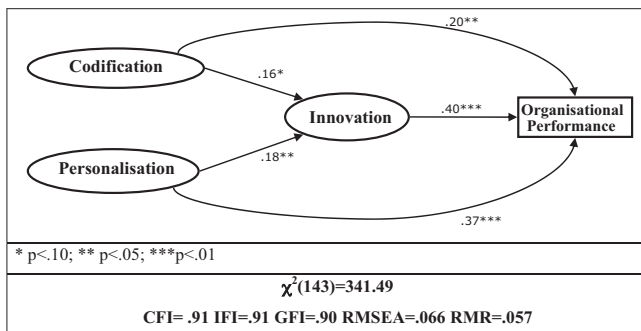|	
Indirect effects	
Codification → performance	.06[*]
Personalisation → performance	.07[***]
Innovation → financial performance	.30[***]
Innovation → process performance	.26[***]
Innovation → internal performance	.21[***]
Direct effects	
Codification → innovation	.16[*]
Personalisation → innovation	.18[**]
Codification → performance	.20[**]
Personalisation → performance	.37[***]
Innovation → performance	.40[***]
Total effects	
Codification → performance	.27[***]
Codification → financial performance	.15[***]
Codification → process performance	.13[***]
Codification → internal performance	.10[***]
Personalisation → performance	.44[***]
Personalisation → financial performance	.25[***]
Personalisation → process performance	.21[***]
Personalisation → internal performance	.17[***]
Innovation → financial performance	.30[***]
Innovation → process performance	.26[***]
Innovation → internal Performance	.21[***]
Performance → financial performance	.56[***]
Performance → process performance	.48[***]
Performance → internal performance	.38[***]

[*] $p < .10$.
[**] $p < .05$.
[***] $p < .01$.

to innovation performance when a simultaneous approach of "soft HRM practices" (personalisation strategy) and "hard IT practices" (codification strategy) is implemented.

A deeper analysis of results highlights that KM strategies have a distinct impact on different performance dimensions (H3a–c and H4a–c). Specifically, it can be observed that both codification and personalisation may have a higher effect on financial performance, followed by process performance and internal performance. Managers can use this finding as an argument to negotiate with and convince to stakeholders about the goodness of implementing KM projects. Similarly, McKeen et al. (2006) have also found that KM practices (without considering codification and personalisation distinction) positively influence customer intimacy, product leadership and operational excellence, thus improving financial performance. Regarding financial performance, Vaccaro et al. (2010) report a positive impact of KM on financial performance directly and indirectly through an increase on innovation outcomes, while Zack, McKeen, and Singh, 2009) find no direct effect of KM on financial performance. Our findings show that strategic KM may have an effect on financial performance higher than on other dimensions of performance. Although literature suggests that efforts supported by ICT are easier to implement and/or better managed, than initiatives that require human intervention and/or human component to succeed (Kruger & Johnson, 2010), our results indicate that KM strategies focused on either technologies or people are effective and efficient in improving corporate performance.

The indirect effect of KM strategy on firm performance through an increase on innovation capacity (H5 and H6) is also supported. This finding is consistent with recent literature. Vaccaro et al. (2010) who find an indirect contribution of KM to financial performance through improvements of new product performance and findings from Yang (2010) predict that the relationship between KM strategy and strategic performance will be positive when process innovation is high. Finally, a positive impact of innovation on performance (financial, process and internal) has been found. In fact, it is well established in the literature and evidenced in practice that an organisation's ability to innovate leads to competitiveness (Braganza et al., 1999).

6. Conclusions

This paper allows one to draw conclusions relevant to academics and practitioners. Our research finds and explains strategic KM improves organisational performance and innovation. Empirical evidence is provided about the consequences of codification and personalisation strategies on innovation and performance, developing previous researches in the field of KM where the link has been proposed quite often, but with scarce empirical support. Now, academics and companies are aware of the implications that KM and its strategy may have. Thus, one of the main conclusions of our research is that KM has been found as a significant mechanism to enhance innovation and corporate performance. Besides, both codification and personalisation strategies have a positive impact on financial results. Managers can use these findings as an argument to negotiate with and convince to stakeholders about the goodness of implementing KM projects.

Our research can contribute to practitioners, since it provides organisations with new insights and findings which managers can translate into their own companies. By now, firms implemented KM initiatives suspecting the importance and utility of doing so, ignoring what KM really is useful and helpful for, and without understanding the consequences KM programs could have (Moffett et al., 2002). Now, enterprises can learn about the positive impact of KM and KM strategy on innovation and performance. Specifically,

companies know that with a clear KM strategy they can be more innovative, achieve better financial results, improve processes and develop human resources' capabilities. And, in turn, those benefits foster the link innovation-performance.

As any other research, ours suffers from some limitations. First, the sample was obtained from the Region of Murcia (Spain). In this sense, findings may be extrapolated to other Spanish areas and other countries, since economic and technological development in Murcia and Spain is similar to other OECD Member countries. However, in future research, a sampling frame that combines firms from different countries could be used in order to provide a more international perspective to the subject. Also, it may be interesting to analyse companies in different periods of time in order to observe their advances in KM and the existence of a KM implementation lifecycle. Initially, different levels of formalisation and KM strategy are expected over time. Third, organisational learning (OL) is acknowledged as a key issue on strategic management. However, a detailed analysis of OL exceeds the purpose of our research. Fourth, in the questionnaire subjective measures for performance were included. In the future we will try to consider also objective measures for performance, such as ROA or ROI, and intermediate outcomes of strategic KM, such as learning outcomes (DeTienne et al., 2004) or knowledge performance in terms of knowledge creation, accumulation, sharing, utilisation, and internalisation (Tseng, 2008).

Acknowledgements

Appendix. Measurement (7-point scales where 1 = strongly disagree and 7 = strongly agree)

KM strategy (KMS)
KMS1   Knowledge (know-how, technical skill, or problem solving methods) is well codified in your company.
KMS2   Knowledge can be acquired easily through formal documents and manuals in your company.
KMS3   Results of projects and meetings should be documented in your company.
KMS4   Knowledge is shared through codified forms like manuals or documents in your company.
KMS5   My knowledge can be easily acquired from experts and co-workers in your company.
KMS6   It is easy to get face-to-face advises from experts in your company.
KMS7   Informal dialogues and meetings are used for knowledge sharing in your company.
KMS8   Knowledge is acquired by one-to-one mentoring in your company.

Innovation (INN)
INN1   The number of new or improved products and services launched to the market is superior to the average in your industry.
INN2   The number of new or improved processes is superior to the average in your industry.

Firm performance (FP)
Compared with key competitors, your company . . .

FP1 is growing faster.
FP2 is more profitable.

FP3 achieves higher customer satisfaction.

FP4 provides higher quality products.

FP5 is more efficient in using resources.

FP6 has internal processes oriented to quality.

FP7 delivers orders quicklier.

FP8 has more satisfied employees.

FP9 has more qualified employees.

FP10 has more creative and innovative employees.

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