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Improving innovation performance through knowledge acquisition: the moderating role of employee retention and human resource management practices

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Abstract

Purpose – The paper aims to study the effects of knowledge acquisition on innovation performance and the moderating effects of human resource management (HRM), in terms of employee retention and HRM practices, on the abovementioned relationship.

Design/methodology/approach – A sample of 129 firms operating in a wide array of sectors has been used to gather data through a standardized questionnaire for testing the hypotheses through OLS regression models.

Findings – The results indicate that knowledge acquisition positively affects innovation performance and that HRM moderates the relationship between knowledge acquisition and innovation performance.

Originality/value – With the increasing proclivity toward engaging in open innovation, firms are likely to face some tensions and opportunities leading to a shift in the management of human resources. This starts from the assumption that the knowledge base of the firm resides in the people who work for the firm and that some HRM factors can influence innovation within firms. Despite this, there is a lack of research investigating the link between knowledge acquisition, HRM and innovation performance under the open innovation lens. This paper intends to fill this gap and nurture future research by assessing whether knowledge acquisition influences innovation performance and whether HRM moderates such a relationship.

Keywords – Innovation performance, knowledge acquisition, open innovation, HRM, employee retention.

1. Introduction

Early studies in the business management field suggest that knowledge is the most important resource for firms to compete and create unique advantages (Nonaka, 1994;

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Grant, 1996). So far, there has been an arduous debate on whether firms create knowledge internally or acquire it externally. Either way, firms have to create knowledge and leverage dispersed knowledge to increase competitiveness (Von Krogh 1998; Argote and Ingram, 2000; Alavi and Leidner, 2001), to respond to changes of the competitive and technological environment (Dezi, 1996a; Teece, 2007). Consequently, firms increasingly have to heighten their internal knowledge management capacity in order to manage inward and outward flows of knowledge – thereby, exploiting and exploring external opportunities (Lichtenthaler and Lichtenthaler, 2009). These trends are led by the increasing globalization and changes in the social, economic and technological environment, which calls for new, dynamic and participative approaches to innovation (Siggelkow, 2001; Bresciani et al., 2016).

According to the open innovation paradigm, firms can and should acquire dispersed knowledge from external actors to integrate with knowledge developed internally and possessed by firm employees (Chesbrough, 2003). Most importantly, people inside the organization are called to search for external knowledge and integrate it with the internal knowledge to improve processes and products (West and Bogers, 2014). Moreover, the innovation culture is spread among employees as a key intangible resource that moves action towards creativity and shared beliefs (Barney, 1986; Vrontis et al., 2016a). For these reasons, it is reasonable to infer that human resource management (HRM) – namely all the decisions made by the management of a firm that affect the relationship between the firm and its employees (Beer et al., 1984) – could affect the capacity of acquiring and managing knowledge properly. This could stimulate an "open" innovation culture within firms. In fact, studies within the HRM domain found that certain practices foster knowledge management and innovation processes (Ichniowski et al., 1997; Laursen and Foss, 2003; Michie and Sheehan, 2003; Darroch, 2005; du Chatenier et al., 2007, 2010). In addition to this, acquiring or sourcing external knowledge may provoke many internal tensions, requiring cultural and HRM efforts and practices. Despite this, there has been scarce interest in the intra-organizational aspects of open innovation so far (van de Vrande et al., 2010; Petroni et al., 2012; Vanhaverbeke et al., 2014; Bogers et al., 2017a, 2017b), and on internal factors and antecedents that help in the pursuit of knowledge acquisition and open innovation strategies (Van Beveren, 2002).

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Therefore, this paper aims to contribute to leading literature addressing the research gap aforementioned by shedding more light on the issue concerning the human aspect of open innovation. In particular, it investigates whether knowledge acquisition (one the main aspects of the open innovation paradigm) leads to higher levels of innovation performance through higher levels of HRM. Regarding HRM (– which represents a valuable contribution of this paper), the empirical analysis focuses on employee retention and HRM practices. First, from a resource-based view perspective, talents and knowledge workers are intangible resources that are essential to achieving competitive advantage; these workers are driven by commitment (Muffatto, 1998; Michie and Sheehan, 2003), which is a prerequisite for innovation culture. Second, evidence exists that HRM practices foster knowledge sharing and innovativeness (Lazzarotti et al., 2015), and, thus, we hypothesized that it also fosters the knowledge acquisition process.

To reach the goal of this paper, this research applied a quantitative methodology involving OLS regression analyses to test several hypotheses (developed under the open innovation and HRM lens) on a sample of Italian firms operating in a wide array of sectors. Findings indicated that knowledge acquisition has a positive and significant effect on innovation performance and, most importantly, employee retention and HRM practices moderate the above relationship.

The remainder of the paper is organized as follows: Section 2 proposes the theoretical backbone of the paper regarding open innovation and knowledge acquisition. Also, Section 2 develops hypotheses relating to the moderating effect of employee retention and HRM practices on the relationship between knowledge acquisition and innovation performance. Section 3 explains the methodology of this study while Section 4 presents the OLS regression test of the hypotheses and the related results. In conclusion, the last section presents a concluding discussion identifying managerial implications and issues for upcoming research.

2. Theoretical background and hypotheses

2.1 Knowledge acquisition and innovation performance

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The value creation for a firm depends on intangible and knowledge-based resources (Grant, 1996; Wiklund and Shepherd, 2003), which can be acquired externally or developed internally by employees and R&D departments (Scuotto et al., 2017a). However, an integrative perspective which considers both internal and external sources of knowledge is relatively new in management studies (Dezi, 1996b; Grant and Baden-Fuller, 2004; Chesbrough, 2006; Teece, 2007; Del Giudice and Maggioni, 2014; Scuotto et al., 2017b).

From a dynamic capabilities perspective, Teece (2007) claims that firms could combine internal and external knowledge in order to cope with the dynamic environment and to exploit technological and commercial opportunities. The open innovation theory describe this combination suggesting that *"...firms can and should use external as well as internal ideas, and internal and external paths to market, as they look to advance their technology"* (Chesbrough, 2004, p. 1). The inbound open innovation mechanism describes the acquisition of external knowledge or technologies through practices such as licensing-in or participating in communities, while the outbound open innovation mechanism explains the transferring of internal knowledge or technologies to external actors for economic or strategic purposes (Cheng and Shiu, 2015; Lichtenthaler, 2015).

Thus, the open innovation model suggests new forms of interactions and collaborations that foster innovativeness within firms (Bonfanti et al., 2015; Della Peruta et al., 2016). These forms of collaboration can be established as formal or informal (West and Lakhani, 2008; Baraldi et al., 2011), through pecuniary or non-pecuniary mechanisms (Dahlander and Gann, 2010), and can involve knowledge from market-based sources or science-based sources (Chen et al., 2016; Del Giudice et al., 2013). The openness degree of the innovation process is explained through the number of external sources of knowledge involved and the depth of each external relationship (Laursen and Salter, 2006).

Therefore, firms develop competitive advantages through knowledge exploitation and exploration both within and outside the firm's boundaries (Campanella et al., 2017; Vrontis et al., 2017). On one hand, internal departments and employees are pushed to find new solutions and develop new products to meet customers' needs (Vrontis et al., 2016b). On the other hand, internal departments and employees struggle to find

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knowledge that is externally provided by the customers through customer engagement techniques, from other market-based sources such as suppliers and distributors, but also from scientific partners such as universities (Fabrizio, 2007; Tardivo et al., 2017).

Several studies suggest that – although no firm can be considered totally open – some firms tend to establish more external relationships, while others concentrate their efforts with one or two intense ties (Laursen and Salter, 2006; Naqshbandi and Naqshbandi, 2016). Therefore, despite the fact that little attention has been given to the link between open innovation and strategy, the openness degree seems to be a strategic priority for innovating firms. These management decisions about openness are essential for achieving competitive advantage (Del Giudice and Maggioni, 2014).

With particular regard to knowledge acquisition (inbound open innovation), the breadth of external sources of knowledge is associated with positive innovation performance in literature. This helps firms develop new combinations of knowledge that are useful for being innovative (Katila and Ahuja, 2002; Leiponen and Helfat, 2011), enriching the pool of solutions available to solve innovation challenges endemic to the firm (Dahlander et al., 2016). Moreover, firms that pursue widely and extensively inbound open innovation are more likely to obtain more knowledge and technologies capabilities (Santoro et al., 2017b).

Therefore, we posit that:

Hypothesis 1: Knowledge acquisition is positively related to innovation performance

2.2 HRM and knowledge acquisition

Apart from the level of openness to innovation, employees cover an important role in recognizing and integrating sources of knowledge within the innovation process (West and Bogers, 2014) and manage knowledge strategically (López-Nicolás and Meroño-Cerdán, 2011). Despite this, there have been few attempts to describe the human and intra-organizational aspects of open innovation in literature. This is striking, given that acquiring or sourcing external knowledge may provoke many internal tensions requiring

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cultural and HRM efforts and practices (Vanhaverbeke et al., 2014). In fact, open approaches to innovation involve tensions, complex, and risky outcomes (de Araújo Burcharth et al., 2014; Del Giudice and Della Peruta, 2016). Previous studies tried to suggest knowledge management and organizational capacities essential in managing such a complexity (Cohen and Levinthal, 1990; Ahn et al., 2016; Ferraris et al., 2017b; Santoro et al., 2017a). Despite this, the issue has not been explained from a HRM perspective.

HRM controls all decisions made by the management of a firm which then affect the relationship between the firm and its employees (Beer et al., 1984). Literature usually distinguishes a number of relevant areas of policies and practices within the broad field of HRM. In particular, HRM controls (De Leede and Looise, 2005): a) the design of organizations and tasks; b) the staffing of the organization by managing the in-, through- and out-flow of personnel; c) the measurement of performance and the reward of employees; d) the channels for communication and participation in work and decision-making.

According to an early view, the HRM priority should be the creation of a safe environment that aligns the organizational strategy and climate to the values of the employees via motivation, incentives and education. The organizational strategy would also be aligned to the empowerment of the human side of the enterprise that would foster organizational development and improve organizational culture (McGregor, 1960). Therefore, from an organizational perspective, this means that the management of people within the organization must be an essential element of the firm's ability to reach and realize its goals (Yahya and Goh, 2002; Salampasis et al., 2015).

To date, there has been an increasing interest in understanding the strategic role of HRM and the benefit for the firm and innovation performance. Accordingly, there is evidence of positive effects of recruitment and selection, training, human resources (HR) planning, rewards system and employee participation activities on higher productivity (Koch and McGrath, 1996; Lazear, 1996); market performance (Delaney and Huselid, 1996; Hartog and Verburg, 2004), overall performance (Pfeffer, 1998; Fey et al., 2000), and innovativeness (Hoque, 1999; Andries and Czarnitzki, 2014).

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Nevertheless, few studies investigated how HRM contributes to knowledge management and to acquiring and integrating external knowledge through inbound open innovation. Therefore, the link between knowledge acquisition and HRM remains unexplored in literature. However, some studies suggest that firm's innovation culture, its HRM and employees' characteristics influence the adoption of open innovation strategies and help in pursuing them effectively (Harison and Koski, 2010; Salampasis et al., 2015; Bogers et al., 2017).

A first important question in the management of HR for open innovation regards talents (Chesbrough, 2003). This means that firms strive to find, recruit and retain best talents and knowledge workers (Murray et al., 2016). This is hard to achieve; thus firms sometimes acquire knowledge possessed by talent involved in other firms.

Accordingly, global talent management is about systematically utilizing HRM activities to attract, develop, and retain individuals with high levels of human capital (e.g., competency, personality, motivation) consistent with the strategic directions of the firm in a dynamic, highly competitive, and global environment (Tarique and Schuler 2010). The hypothesis in this paper is that the ability for recognizing useful external knowledge resides in the employees' capabilities and talent (Lewis and Heckman, 2006), given that talent plays a key role in the relationships a firm has with its external stakeholders (Zhang et al., 2015). Therefore, employee retention is reasonably expected to be positively associated with commitment and trust with the firm, and it is also likely to foster knowledge specialization and fortification (Muffatto, 1998; Politis, 2003). In fact, short-term contracts and low level of commitment have been found counterproductive to the firm's innovativeness (Michie and Sheehan, 2003). Along with this, knowledge acquisition strategies potentially lead to higher levels of professional commitment of employees (Bogers et al., 2017). Commitment may create a positive social climate that encourages employees to act in line with the firm's objectives by being enablers of a positive social climate to stimulate innovation (Soto-Acosta et al., 2016; Popa et al., 2017).

It is thus reasonable to infer that, through a higher level of commitment and retention, employees are more willing to consider the open innovation strategy and approach of the firm, understanding the need to integrate the knowledge developed internally and

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externally. Moreover, with the retention of the employees, the knowledge base of the firm increases, and, since employee retention is important to acquire and integrate knowledge, the firm augments the likelihood of benefiting from knowledge acquisition. (Weber and Tarba, 2010). As a consequence, with a higher level of an internal knowledge base, firms develop a higher level of absorptive capacity useful to recognize, acquire, absorb and integrate external knowledge acquired (Cohen and Levinthal, 1990; Wang and Han, 2011).

Therefore, the paper posits that:

Hypothesis 2: The higher the employee retention, the higher the effects of knowledge acquisition on innovation performance

Linked to the above hypotheses, HRM practices, such as training and learning, proper recruitment and selection, have been found positively associated with knowledge creation and innovation in literature (Laursen and Foss, 2003; Michie and Sheehan, 2003; Chand, 2010). Moreover, with reward systems these benefits are even stronger because employees feel incentivized to work better (Ichniowski et al., 1997). Job satisfaction and commitment stimulate employees to be creative, involved in the values of the firm, and contribute to building an innovation culture (Zhou et al., 2005). In this way, firms build a higher level of trust, social capital and group identity (Agarwal et al., 2010).

In general, appropriate roles, structures, procedures and systems are also relevant in order to enable effective knowledge flows when innovation is carried out in collaboration (Petroni et al., 2012). Other scholars have highlighted the crucial role of human and organizational capital and related HRM practices in creating a context that favors knowledge management within the firm (Cabrera and Cabrera, 2005; Yang and Lin, 2009). Lazzarotti and others (2015) suggest that firms should carefully manage several HRM practices, such as selection and recruiting of personnel, training, development, and reward system in order to promote knowledge transfer and innovativeness.

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As stated in the previous paragraph, an open approach to innovation involves the engagement between two actors though formal or informal ties (West and Lakhani, 2008). This means that, at the organizational level, HRM practices such as team work are essential in managing inter-organizational innovation processes. In particular, these are essential for: a) the management of collaboration processes; b) the management of the whole innovation process; c) the creation of knowledge in a collaborative manner; d) the importance of boundary-spanning, novelty-generating, negotiating and learning competences for employees (du Chatenier et al., 2007, 2010).

Literature also recognizes that greater degrees of openness imply increasing organizational and managerial complexity (Bader and Enkel, 2014), and certain HRM practices can help in managing such complexity. From a social capital perspective, HRM systems may foster social relations among employees by improving their opportunity, motivation, and ability to access and mobilize; that, in turn, may extend to collaborative ties externally (Adler and Kwon, 2002), which would be useful to acquiring knowledge.

For these reasons, the paper hypothesizes that:

Hypothesis 3: The higher the use of HRM practices, the higher the effects of knowledge acquisition on innovation performance

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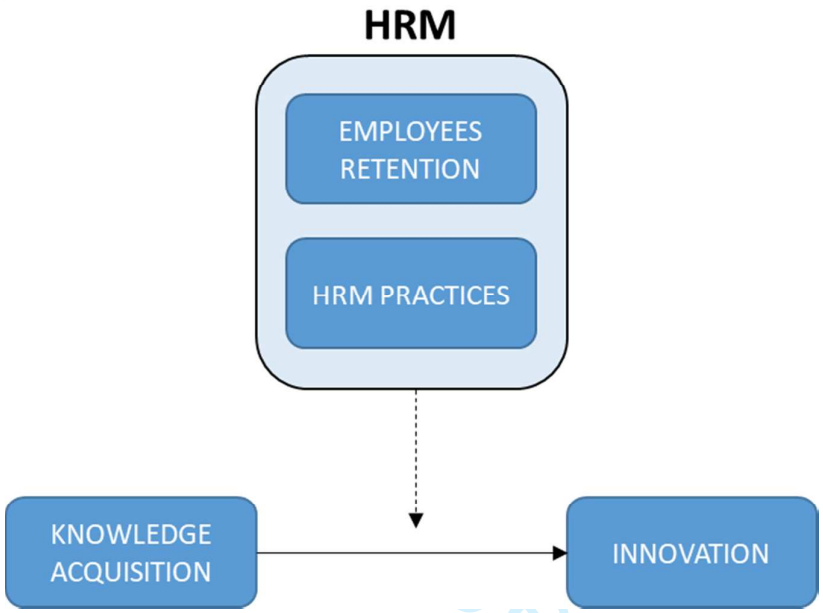


Figure 1: the conceptual model

3. Methodology

3.1 Research sample and design

The paper aims to study the effects knowledge acquisition on innovation performance and the moderating effect of human resource management (HRM), in terms of HRM practices and employee retention, on the abovementioned relationship. To do so, the research employed a quantitative methodology involving a sample of Italian firms operating in different sectors. In detail, firms within the sample belong to a wide array

of manufacturing and service industries such as ICT, food and beverage, textile, automotive (Fig. 2).

The research is based on a survey methodology, which is useful to enhance the generalization of results (Dooley, 2001). As a first step, a conceptual model for developing hypotheses was proposed in the previous section. Then, the quantitative study aimed at testing the hypotheses developed. To reach this goal, a total of 1200 firms of different sizes with at least 20 employees were randomly selected from the Italian database *AIDA – Bureau van Dijk*. This criterion has been established because with fewer employees, the HRM can be less frequent or unnecessary. Second, an email with an invitation to participate in the survey, along with a letter containing an explanation of the study's purpose was sent to all the firms. In total 192 firms expressed interest in entering the study. Third, a questionnaire, composed of several questions (open and closed), was sent to these firms; this was answered and returned by 129 firms.

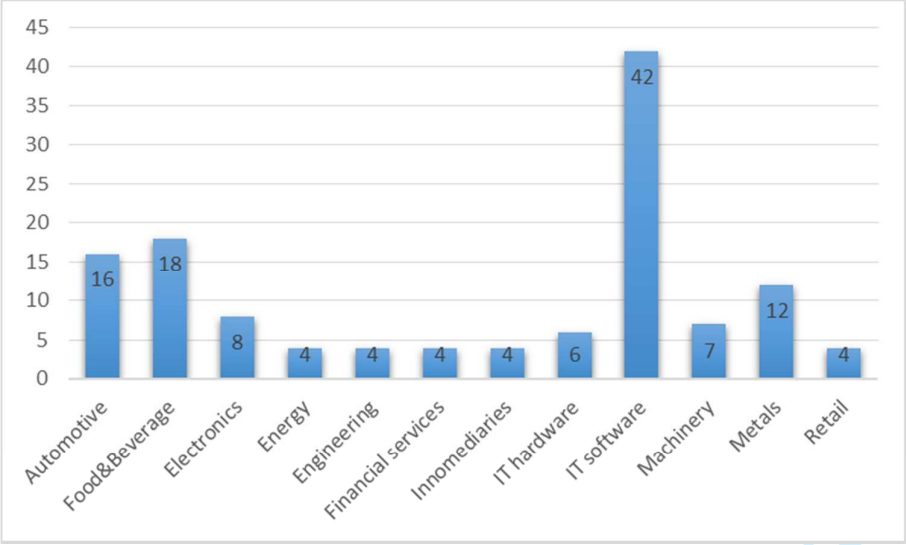


Figure 2: Sectors

The questionnaire was developed according to the previously discussed literature and sent with a brief introduction explaining the scope of the research. It was divided in two parts, with both open and closed questions. The first part investigated general information about the firm, such as industry, number of employees, age, and innovative,

financial and economic performance. The second part investigated specific approaches to innovation, knowledge acquisition, HRM practices and employee retention.

The single questions were separated in order to reduce the risk of rationalizing the answers of the respondents. Moreover, dependent and independent variables were placed in different positions within the questionnaire to limit potential common method variance.

We also assessed potential non-response bias by looking for differences between early and late respondents (Kanuk and Berenson, 1975). To do so, the order of responses to the survey was recorded and it was revealed to be non-significantly correlated with both firm age and firm size; this suggested that concern regarding non response bias is minimal (Hawes and Crittenden, 1984). We also found no substantial differences in either firm age or firm size across industries. Data were processed through an OLS regression model, following previous studies (Lichtenthaler, 2009; Parida et al., 2012).

3.2 Variables

With regard to innovation as a performance measure, it processes the ability of a firm of developing new products or services (Laursen and Salter, 2006). In particular, it is taken from previous studies in innovation management, and is calculated by using the percentage of sales from new or significantly improved products and services on total sales of the firm (Laursen and Salter, 2006; Brunswicker and Vanhaverbeke, 2015; Chen et al., 2016).

The independent variable is *knowledge acquisition*. To measure it, we employed the concept of search breadth, developed by Laursen and Salter (2006), by asking subjects to indicate how many external sources of knowledge are exploited to innovate on a total of 16 sources. As a result, a score of 0 indicates a closed innovation approach, while a score of 16 indicates a totally open approach to knowledge acquisition. The list of the external sources of knowledge is provided in table 1.

Table 1: External knowledge sources

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Type	Knowledge sources
Market	Suppliers of equipment, materials, components, software
Market	Clients or customers
Market	Competitors
Market	Consultants
Market	Commercial laboratories/R&D enterprises
Institutional	Universities or other higher education institutes
Institutional	Government research organizations
Institutional	Other public sector
Institutional	Private research institutes
Other	Professional conferences, meetings
Other	Trade associations
Other	Technical/trade press, computer databases
Other	Fairs, exhibitions
Specialized	Technical standards
Specialized	Health and safety standards and regulations
Specialized	Environmental standards and regulations

Source: adapted from Laursen and Salter (2006, p.139)

The moderating variables, employee retention and HRM practices, were developed using multi-item scales, according to relevant literature, to ensure their validity. Table 2 shows the specific questions and items for each variable. In particular, we asked the respondent to evaluate several statements with a seven-point Likert scale.

Table 2: Variables and items

Variables	***Questions***	***Related literature***
Employees' retention	The importance of retaining employees in the top management	Ranft and Lord, 2000
	The importance of retaining employees in the middle management	Ranft and Lord, 2000
	The importance of retaining employees in manufacturing and operations	Ranft and Lord, 2000
	The importance of retaining employees in R&D	Ranft and Lord, 2000
	The importance of retaining employees in finance, legal and other staff	Ranft and Lord, 2000
HRM practices	The importance of performance related rewards	Chand, 2010
	The importance of flexible work	Chand, 2010
	The importance of training and learning	Chand, 2010
	The importance of recruitment and selection	Chand, 2010

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Finally, we assessed internal consistency of each variable measured through multi-item (*Cronbach's alpha employees' retention=0.764; Cronbach's alpha HRM practices=0.841*), which showed good results. Therefore, the average values of the items could be used to develop the main variable.

Finally, several control variables were included in the models. First, the size of the firm can affect the digital resources possessed and knowledge creation processes (Dewar and Dutton, 1986). The number of employees represents the firm size. Second, the age of the firm, namely the number of years since founding, is included in the models (Huergo and Jaumandreu, 2004). Third, we controlled for R&D intensity, calculated as the share of investments in R&D to total revenues for the year, given that it could affect knowledge creation and innovation within firms (Cohen and Levinthal, 1990; Bresciani et al., 2015; Santoro et al., 2016).

4. Procedures and Results

Descriptive statistics show that firms of the sample on average are small and medium enterprises (the average number of employees is 98.90) even though some larger firms are included in the sample, spend 10.038 per cent of total sales in R&D, and they are rather innovative (32.78% of the revenues comes from new products and services).

Table 3: Descriptive statistics

	N	*Min*	*Max*	*Mean*	*Standard dev.*
R&D	129	0.000	0.480	0.10038	.126512
Size	129	20.00	1,728.00	98.90	252.502
Age	129	5.00	95.00	25.61	24.117
Innovation	129	0.00	1.00	0.3278	.24133
KA	129	3.00	16.00	8.70	3.046
HRM	129	2.50	7.00	5.2558	1.27033
ER	129	1.00	7.00	4.9674	1.46368

Note: HRM=HRM practices; ER=employee retention; KA=knowledge acquisition

Table 4: Correlation matrix

	R&D	**logsize**	**logage**	**Innovation**	**KA**	**HRM**	**ER**
R&D	1	.012	.178	-.046	.317**	.014	.281**

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Logsize	.012	1	.418**	.012	.144	-.135	.071
Logage	.178	.418**	1	-.438**	.422**	-.160	.173
Innovation	-.046	.012	-.438**	1	.343**	.047	.104
KA	.317**	.144	.422**	.343**	1	.066	.061
HRM	.014	-.135	-.160	.047	.066	1	.139
ER	.281**	.071	.173	.104	.061	.139	1

Note: HRM=HRM practices; ER=employee retention; KA=knowledge acquisition

The hypotheses have been tested using OLS regression analysis and the results are presented in Table 4. Model 1 has an R^2 of 0.279 (the adjusted R^2 is 0.248) and an F-value of 8.989 (P<.001). Model 2 has an R^2 of 0.322 (the adjusted R^2 is 0.287) and an F-value of 9.108 (P<.001). Model 3 has an R^2 of 0.311 (the adjusted R^2 is 0.275) and an F-value of 8.667 (P<.001).

Table 5: Results of regressions

Variables	*Model 1*	*Model 2*	*Model 3*
R&D	-0.041 (-0.493)	-0.162 (-1.626)	-0.112 (-1.242)
logsize	0.229 (2.625)*	0.218 (2.550)*	0.193 (2.219)*
logage	-0.569 (-6.346)***	-0.433 (-4.362)***	-0.442 (-4.300)***
HRM			0.619 (2.604)*
ER		0.264 (0.927)*	
KA	0.218 (2.582)*	0.241 (0.851)*	0.660 (1.829)*
*KA*HRM*			0.853 (2.982)**
*KA*ER*		0.345 (1.026)**	
R	0.528	0.568	0.558
R^2	0.279	0.322	0.311
Adjusted R^2	0.248	0.287	0.275
F-value	8.989***	9.108***	8.667***

Notes: *p<0.05; **p<0.01; ***p<0.001
T-values in parentheses.
Note: KA=knowledge acquisition; HRM=HRM practices; ER=employee retention.

In detail, Model 1 tests the effect of knowledge acquisition on innovation performance, which is positive and significant, confirming Hp. 1. Model 2 tests the moderating effect of employee retention on the relationship between knowledge acquisition and innovation performance, which is positive and significant (B=0.345; T=1.026; p<0.01), confirming Hp. 2. Model 3 tests the moderating effect of HRM practices on the relationship between knowledge acquisition and innovation performance, which is positive and significant (B=0.853; T=2.982; p<0.01), confirming Hp. 3. Another

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remarkable result indicates that the moderating effect of HRM practices is stronger than the one of employee retention.

The models also indicate that size and age have a significant effect as control variables. In detail, size affects innovation positively, as shown in Models 1, 2 and 3, while age affects innovation negatively. Finally, R&D intensity does not have a significant effect on innovation performance.

5. Discussion and conclusions

The paper aims to study the effects of knowledge acquisition on innovation performance and the moderating effect of human resource management (HRM) – in terms of HRM practices and employee retention – on the abovementioned relationship. Developing a conceptual model based on knowledge acquisition and HRM literature, three hypotheses have been developed and tested through OLS regression analysis on a sample of 129 firms.

In particular, a baseline hypothesis was first proposed about the positive effect of knowledge acquisition on innovation performance. Then, it was hypothesized that employee retention and HRM practices moderate the relationship between knowledge acquisition and innovation performance. Results strongly supported the three hypotheses proposed. From one side, HRM practices develop a trustful and powerful organizational climate and flexibility, which can influence the flexibility – namely, how employees feel free to innovate and share ideas and visions. Moreover, through HRM practices a firm improves the level of commitment and understanding of the firm's mission and values (Goleman, 2000). In this way, employees are more willing to include external knowledge and avoid the Not-Invented-Here Syndrome (Gupta and Singhal, 1993).

From the other side, our findings suggest that employee retention improves the effect of knowledge acquisition on innovation performance. One possible explanation is that employee retention increases commitment and trust among employees, fostering

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knowledge specialization and fortification (Muffatto, 1998; Michie and Sheehan, 2003), and innovation culture (Soto-Acosta et al., 2016; Popa et al., 2017). Moreover, according to the absorptive capacity theory, with the retention of the employees, the knowledge base of the firm increases, and, therefore, the firm augments the likelihood of benefiting from knowledge acquisition (Cohen and Levinthal, 1990). As a consequence, with higher levels of an internal knowledge base, firms develop higher levels of absorptive capacity which is useful to recognize, acquire, absorb and integrate external knowledge provided through knowledge acquisition (Ferreras-Méndez et al., 2015; Ferreras-Méndez et al., 2016; Ferraris et al., 2017a).

These research findings drive us to develop several implications to theory. First, our research contributes to theory indicating that the HRM aspect of open innovation, with particular regard to knowledge acquisition. This is important for firms, given that knowledge is the most important resource for innovation within firms, and innovation is driven by the knowledge possessed by the firm's employees. In this regard, acquiring or sourcing external knowledge may provoke many internal tensions requiring cultural and HRM efforts and practices. Despite this, there has been scarce interest in the intra-organizational aspects of open innovation so far (Vanhaverbeke et al., 2010; Petroni et al., 2012; Vanhaverbeke et al., 2014; Bogers et al., 2017). Therefore, the paper suggests that some HRM activities have to be established before structuring knowledge acquisition activities.

Second, by drawing on HRM literature, our research proposed several elements important in the knowledge management possessed by firms. Accordingly, the moderating effect of employee retention and HRM practices on the relationship between knowledge acquisition and innovation performance have been tested. In particular, HRM practices such as performance-related rewards, flexible work, training and learning and recruitment and selection, are important to foster knowledge acquisition and, in turn, innovation performance. Therefore, with certain HRM activities, firms are more able to develop innovative products and services as suggested by literature (Hoque, 1999; Andries and Czarnitzki, 2014). In turn, employee retention is important in sustaining knowledge acquisition and innovation (Michie and Sheehan, 2003). One possible explanation recognises the relevance of knowledge useful to innovate

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possessed by employees who cultivate internal capabilities useful to exploit external knowledge and opportunities.

Our study also has practical implications. First, the management of the firms should adopt a HRM strategic view when approaching knowledge acquisition. This underlines the importance of employee and human aspects in managing internal and external sources of knowledge as antecedents of innovation. In particular, HR managers must promote initiatives to stimulate a collaborative approach to innovation, along with specific practices that can be useful to improve innovation. In the specific case of our paper, rewards based on performance, flexibility in workday training and learning activities, and recruitment and selection are seen as important elements to foster knowledge acquisition and innovation. At a firm level, seeking external knowledge extensively and from heterogeneous sources leads to many opportunities but also leads to a higher level of complexity. Firms can manage the allocation of attention between internal and external search sources by cultivating a portfolio of different initiatives linked to HRM. This is even more evident in dynamic and turbulent sectors, which call for flexibility, external ideas and technologies and, therefore, a higher focus on HRM.

The results of our work should be considered in light of several limitations. First of all, data were gathered from top managers of the firms involved in the research and, therefore, they can be influenced from subjectivity. A second limitation is related to the context of analysis (Italy), which may suffer from specific and systemic conditions affecting the HRM practices within the firms – especially if we are neglecting the persistence of a family ownership. Thirdly, we cannot forget the limitations due to the specificity of the empirical analysis through OLS that surely affect the reliability of the data. Future studies can address the human aspect of open innovation for analysing the perspective of the employees' involvement in the management of knowledge and in collaborative activities. Finally, our research focused on firms from a specific country and operating in heterogeneous sectors; therefore, results in different geographical and cultural contexts can be different. In addition, future studies could address the issue proposed in this paper in specific sectors.

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RESPONSES TO REVIEWERS' FEEDBACKS Journal of Knowledge Management

PAPER TITLE: Improving innovation performance through knowledge acquisition: The moderating role of employee retention and human resource management practices

Acknowledge to the Editors.

We want to thank you the Editor for your integral approval and motivation. Also, thanks for the insightful comments and appreciations. We are grateful for your suggestions and efforts in order to proceed with this submission for your special issue.
Since this peer-review, we do hope the paper is now in adherence with your requests and compliant with the international standards of this special issue on your journal.
We are looking forward to hearing news from you. Thank you once again.

Acknowledge to the Reviewers.

We would like to thank the reviewers for careful and thorough reading of this manuscript and for the thoughtful comments and constructive suggestions, which, surely, will help us to improve the quality of this manuscript.
We appreciate the time and efforts by the editor and referees in reviewing this manuscript. We have addressed all issues indicated in the review report and believed that the revised version could meet the journal publication requirements.
Thank you once again: Our response follows (the reviewer's comments are in ***italics)***.

With All the best,
Sincerely,
the Authors

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Point-to-point Report Authors' Response to Comments:

	REVIEWER 1 **General Comment:** *Dear Authors, Thank you for your resubmission. There are two main concerns I want to focalize your attention for.* *The first is related to the research methodology. Please verify that all your considerations and statements on the relationship between KA and Innovation performance are supported empirically. The other one is related to the editing and layout. Before your final revision you have to present a professional proof for this paper in order to draw and qualify the research compared with the standard of international research.* *Good Luck!*	**AUTHORS RESPONSES** Thank you so much for your kind appreciation as well as your overall appreciations. We had tried all our best in order to fulfill to your comments and follow your important suggestions as well.
1	*- I'm confirming my intention and my support to this submission.* *I appreciated the revision and extension of the subject matter of this submission, by qualifying*	Thank you very much for the comments made. We appreciated your suggestions on this regards. We revised the paper in all sections according the scope of the special issue and the development of this research with your recommendations.

	this research as qualitative and original as well. Also, I note a revision of the practical development and the conceptualization through a mediating variable which emphasizes the employees retention and the human side of knowledge management practices.	
2	*- I confirm the relevance of The theoretical background that proposes a good outstanding and an overall important scholarship. I see the efforts of the authors in boosting the international citations in this regard as well.*	Many thanks for your appreciation. According your suggestions We had been able to enlarge and specifify theoretical context of our analysis emphasizing the research gap compared with the prior literature and the main theoretical framework of our assumptions. We have included in this revised version other relevant citations in order to stand a clear posititoning based on theorerical assumptions of innovation performance and HRM relationship by proposing other relevant work compared with the main topic of this paper by fixing the mediating variable as knwoledge acquisition and HRM practices. We do hope we have fulfilled your requests.
3	*- Methodology is clear, well structured and with a complete assessment of items and hypotheses. Also, I appreciate the modifications and new setting of variables ac well.*	Thank you for your genlty appointment. We're glad of your thougths.
4	*Results: Results are clear presented and adequately related to the methodology, the research gap and the implications as well.*	Thank you very much. We appreciate a lot your appreciation.
5	*- Implications for research, practice and/or society: Implications and conclusions have been extended more deeply and in a correct manner, especially with limitations and future lines as well.*	Thank you for the comments made. We appreciate it very much. Thank you once again for your patient attention.

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6	*- Quality of Communication: Quality of communication is good and respects the standards of this important journal. Anyhow, this rest the main concern of this submission. The authors should be verify and comply with a professional proof reading the paper in order to reduce technical and language errors and align the editing to the standards of JKM*	Thank you for the comments made. We appreciate it very much. We know the standards of this journal for the editing and layout thus we provide a Second revision R2 with a professional proofreading and editing carried out from a professsional service agency. In this regard, this version appears as the correct proofreaded revision. Thank you for the recommendation made and we wish to hearing from you positevely.
	REVIEWER 2	**AUTHORS RESPONSES**
1	**General Comment:** *Thank you for the improvements on the manuscript.* *Some other considerations:* *- when you affirm that " In fact, studies within the HRM domain found that certain practices foster knowledge management and innovation processes " it my be very interesting to know what these studies highlighted. This increases the position of the paper and the state of the art of the literature (what we know on this topic)* *- the baseline hypothesis about the relationship between KA and innovation perfomances should be included* *- I think that H2 should be "the higher the importance or the use of HRM....."* *- reformulate carefully the paragraph on control*	Thank you for the accuracy, time and help in order to support positevely our submission under the peer-reviewing process. We really appreciated your suggestions in order to eliminate some little concerns for this revision and we are really thanksful for your deep evaluation which drive us along the entire review process. All upgrade and revisions according to your request are highlighthed in yellow already befor the final proof version. In particular: 1) we revise the statement according to your suggestions. 2) Enlarge and strenghten the baseline hypothesis on relationshio between KA and Innovation performance too. 3) Rewrite the hyphotesis H2 according your insights. 4) I revise and rewrite the regression table 5) We explain the moderating effect of employees retention.

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	variables (double check it with the regression table) *- if you say that "Another remarkable result indicates that the moderating effect of HRM practices is stronger than the one of employees' retention." you need to try at least to give an explanation to this. Why?* *- implications can be better elaborated, augmenting the relevance of the paper in the literature.*	
2	*Originality: Does the paper contain new and significant information adequate to justify publication?: yes*	Thank you so much. We appreciate your prior suggestions and comments Thanks to your guidance we was been able to better state the arguments and theoretical and practical development.
3	*Relationship to Literature: many of the references suggested has not been included. Moreover, you should also add a new and relevant reference on the topic:* *The "human side" of open innovation: The role of employee diversity in firm-level openness* *M Bogers, NJ Foss, J Lyngsie* *Research Policy*	Thank you for the comments. We appreciate it very much. The Theorerical background has been revised and extendend by including the suggested reference in order to better explain the human side of OI.
4	*Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed*	Thank you for your genlty appointment. We're glad of your thougths.

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	appropriate?: ok	
5	*Results: regression table can be better organized*	Thank you for your genlty appointment. We're glad of your thougths.
6	*Implications for research, practice and/or society: some improvements can lead the paper to higher quality*	Thank you for your genlty appointment. We're glad of your thougths.
7	*Quality of Communication: proofreading is needed.*	Thank you for the comments made. We appreciate it very much. We know the standards of this journal for the editing and layout thus we provide a Second revision R2 with a professional proofreading and editing carried out from a professsional service agency. In this regard, this version appears as the final proofreaded revision. Again, Thank you for the recommendations made, for time and we wish to hearing from you positevely.

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