

# **HRM, organizational culture and entrepreneurial capabilities: The role of individual and collective knowledge processes**

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**HRM, organizational culture and  
entrepreneurial capabilities:  
The role of individual and collective  
knowledge processes**

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### **ABSTRACT**

The capacities for acquiring, integrating and exploiting new knowledge and capabilities exert significant influence on long run organizational performance and growth. In this study we develop and test a theoretical framework that links individual and collective human capital with these capabilities. Prior research suggests that the development and organization of human capital at an individual and collective level are influential upon knowledge flows. We hypothesize that HRM and organizational cultural characteristics that emphasize strong individualist values influence entrepreneurial knowledge acquisition, while those that emphasize collectivist values influence cooperative knowledge integration. HRM practices are hypothesized to directly influence knowledge processes, and also to mediate the influence of organizational culture on knowledge processes. We hypothesize that knowledge acquisition and integration processes are positively related to the exploitation of new knowledge through creation of new products and services. We test these hypotheses on data obtained from multiple respondents in a sample of 81 small and medium sized manufacturing firms. The study results provide support for these hypotheses and indicate that a form of behavioral ambidexterity is needed in order for human capital to promote knowledge-based entrepreneurial capabilities. Implications for theory and future research are discussed.

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Entrepreneurship within existing organizations involves continually seeking and exploiting new technological and/or market opportunities (e.g., Miller, 1983). In contrast to the Ricardian rents that have been a primary focus of explanations for the value created by strategic human resource management, entrepreneurial rents reward the capacity for identifying new opportunities, accurately judging their value under conditions of uncertainty, and exploiting them successfully (e.g., Chadwick & Dabu, 2009; Hitt et al., 2001). This paper focuses on how HRM practices relate to the knowledge-flows underlying entrepreneurial capabilities: the capacity to acquire, integrate and exploit new and existing knowledge (e.g., Kang, Morris & Snell, 2007). These knowledge flows promote the renewal and reconfiguration of substantive capabilities, aiding organizational adaptation by creating new sources of competitive advantage (e.g., Zahra, Sapienza & Davidsson, 2006).

While a significant body of strategic HRM research has focused on the creation of competitive advantage through the development of unique, value creating human capital stocks (e.g., Coff, 1997; Huselid, 1995; Lepak & Snell, 1999; 2002; Ployhart & Moliterno, 2011; Wright, Dunford & Snell, 2001), recent research has explored the ways in which HRM may influence the knowledge flows underlying strategic capabilities, including entrepreneurial knowledge acquisition and exploitation (e.g., Collins & Clark, 2003; Collins & Smith, 2006; Kang et al., 2007). Critical knowledge flows include identifying, acquiring and importing knowledge from outside the boundaries of the organization, as well as finding new opportunities for recombining knowledge that is already within the organization. The movement of knowledge across external and internal boundaries is essential for refreshing and recombining substantive strategic capabilities in order to avoid competency traps (Leonard-Barton, 1992; March, 1991; Zahra et al., 2006). The creation of entrepreneurial rents through exploitation of uncertain opportunities, cannot be explained solely by control of human capital stocks, but require the consideration of how these

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stocks are continually revised and updated through the assimilation of new resources, especially knowledge (Chadwick & Dabu, 2009).

A challenge for understanding the role of HRM is that knowledge flows differ in the types of behavior and organizational activities involved. These differences have already been identified from diverse disciplinary perspectives (e.g., March, 1991; Kang et al., 2007; Zahra & George, 2002). The concept of organizational ambidexterity distinguishes exploratory learning, involving wide search for in loosely related knowledge domains, from exploitative learning involving incremental refinement of existing knowledge (March, 1991). Kang et al (2007) distinguish two types of knowledge flow that are closely related to exploration and exploitation: entrepreneurial knowledge acquisition from external partners, and internal cooperative knowledge sharing within the boundaries of the organization. They argue that these two types of knowledge flow rest on distinct organizational processes, knowledge and behaviors, norms and inter and intra-organizational relationships. It is common for scholars to distinguish between processes of acquisition of external knowledge, and processes for integration of new knowledge (e.g., Burgelman, 1983; Kang et al., 2007; March, 1991; Zahra & George, 2002). An important question that needs to be addressed is how can HR practices simultaneously promote these diverse knowledge flows (Kang et al., 2007; Patel et al., forthcoming)?

Within the literature on organizational ambidexterity, it is often assumed that a focus on either exploration or exploitation limits resources available for the other (Lubatkin et al, 2006; March, 1991). Focusing on knowledge stocks, Patel et al (forthcoming) suggest that high performance work systems can build a workforce that is capable of both aligning to existing strategic objectives, while being sufficiently adaptable to adjust to new opportunities. We extend this line of inquiry, by examining how HRM practices can influence the knowledge flows in the form of the acquisition of new knowledge from external sources and the integration of that knowledge internally. This approach assumes the centrality of knowledge flows to the development of new substantive capabilities (Kang et al., 2007;

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Zahra et al., 2006). We build on prior work on ambidexterity, knowledge flows, and entrepreneurial capabilities to examine how HRM can support the dual processes of knowledge acquisition and integration.

An ongoing concern within HRM research is the extent to which theoretical frameworks and findings generalize to small and medium sized enterprises (SMEs) (e.g., Cardon & Stevens, 2005; Heneman, Tansky & Camp, 2002). SMEs are of particular interest because they account for around 99 percent of all firms in major economies around the world, and at least half of total employment. They also account for a significant proportion of new job creation and economic growth, although this contribution appears to be unevenly distributed, with a small percentage of high growth ‘gazelles’ accounting for a disproportionate share of growth. It is important to understand how SMEs overcome their resource constraints to build the entrepreneurial capabilities required for successful growth and long-term survival.

Knowledge-processes may be different within SMEs because they rely upon less formalized organization structures and management practices (e.g., Cardon and Stevens, 2005; Heneman et al., 2002). However, informal aspects of employment relationships are as influential on knowledge stocks and flows as the formal HR policies and procedures (e.g., Kang et al., 2007; Lepak & Snell, 1999, 2002). Therefore, SMEs represent an ideal context for an empirical examination of the association of HR practices and cultural values with knowledge-based capabilities.

## THEORY

Entrepreneurship is a process “by which individuals, either on their own or inside organizations, pursue opportunities without regard to the resources they currently control” (Stevenson & Jarrillo, 1990, p.23). Therefore, an entrepreneurial organization is one that is able to discover, evaluate and ultimately exploit opportunities (Shane & Venkataraman, 2000). Organizations characterized as entrepreneurial tend to be proactive,

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competitively aggressive, take risks, and be innovative, adept at finding and exploiting new technological opportunities, defining their own markets, and forging their own path (e.g., Lumpkin & Dess, 1996; Miller, 1983). To achieve this, entrepreneurial organizations rely on the continual acquisition of new knowledge, and the integration of new and existing knowledge and capabilities. These two knowledge flows represent essential foundations for generating entrepreneurial rents (Shane & Venkataraman, 2000; Stevenson & Jarillo, 1990; Zahra et al., 2006).

### **Entrepreneurial Knowledge Acquisition**

The discovery of entrepreneurial opportunities is aided by the creation of new information channels between the organization and the environment (Shane & Venkataraman, 2000; Zahra et al., 2006; Zahra & George, 2002). Establishing networks of connections with customers, suppliers and beyond, and creating “information corridors” facilitates the acquisition of new information that contributes to opportunity identification (Ardichvili et al., 2003; Shane & Venkataraman, 2000; Wiklund & Shepherd, 2003). Extensive networks allow the organization access to more information and consequently enhance their ability to identify new opportunities. All else equal, organizations that have extensive networks identify more opportunities (e.g., Kelley, Peters & O’Connor, 2009; Wiklund & Shepherd, 2003).

Kang et al (2007) refer to the knowledge flows leading to the acquisition of new knowledge from external partners as an ‘entrepreneurial archetype’ which involves networks of weak ties between core organizational members and partners outside of organizational boundaries. Core organizational members possess unique and strategically valued human capital (Lepak & Snell, 1999; 2002). They are therefore influential in embodying and exchanging knowledge that is central to the strategic activities of the organization. In exchanges with external partners, core employees import new component knowledge that contributes to the development of knowledge stocks. Weak, non-redundant network connections are a source of novel information that not only supports the



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renewal of existing knowledge stocks but can also provide insights regarding new entrepreneurial opportunities (Kelley et al., 2009; Wiklund & Shepherd, 2003).

Kang et al (2007) note that for this entrepreneurial archetype to emerge, individuals must be free to form their own unique, non-redundant ties, and those relationships must be characterized by significant levels of dyadic trust. This suggests that three characteristics must be present. First, employees must be able to act independently, since dyadic trust between organizational members and external partners is dependent upon the autonomy of the organizational actors (Perrone, Zaheer & McEvily (2003). Second, because it is hard to specify ex-ante what types and sources of knowledge might be of value, core employees must be free to choose which external partners to seek out and build relationships with. Third, core employees must possess sufficient related knowledge in order to be able to absorb new knowledge about opportunities (Cohen & Levinthal, 1990; Kang et al., 2007; Zahra & George, 2002). This suggests that independent, autonomous and knowledgeable employees are key to the formation of the necessary relationships.

The corporate entrepreneurship literature identifies middle managers as an important part of the core group of employees (e.g., Floyd & Lane, 2000; Hornsby et al., 2002). Middle managers often create informal networks that are a source of innovative ideas from within and outside the firm (Burgelman, 1983; Kelley et al., 2009). Middle managers possess informational and network advantages resulting from their position in the organizational structure (Burgelman, 1983; Floyd & Lane, 2000; Hornsby et al., 2002). When they are motivated, and allowed sufficient autonomy, middle managers explore different knowledge domains, learn from them, and combine knowledge to define new opportunities (Burgelman, 1983; Hornsby et al., 2002). In sum, knowledge flows connecting external partners to internal core employees underlie opportunity identification, and are impacted by the motivation, ability and opportunity for core employees to engage in the identification and acquisition of new knowledge. However,

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while knowledge acquisition is necessary, it is not sufficient for the exploitation of new knowledge.

### **Cooperative Knowledge Integration**

Exploitation of new knowledge and opportunities requires that following the acquisition of new external knowledge, it is integrated with existing knowledge stocks, products, processes or strategies (Burgelman & Sayles, 1986; Cohen & Levinthal, 1990; Zahra & George, 2002). The integration of new knowledge moves it from the individual to organizational level (Burgelman & Sayles, 1986; Floyd & Wooldridge 1999). This process is likely to involve multiple individuals within the organization (Floyd & Lane, 2000; Kelley et al., 2009). It therefore requires collective action in contrast to the individual action required for importing new knowledge (Kang et al., 2007).

The involvement of others is necessary in order to acquire resources for developing and testing new knowledge for its value creation potential (Ardichvili et al., 2003). An opportunity has to be proven viable even before obtaining resources for its preliminary development (Burgelman, 1983). In order to receive a positive evaluation and gain further support, entrepreneurial ideas are championed throughout the organization (Floyd & Wooldridge, 1999; Howell & Higgins, 1990). Champions engage other organizational members in the development of new entrepreneurial ideas and seek legitimacy and sponsorship from the key resource holders and decision makers within the organization (Floyd & Wooldridge, 1999; Howell & Higgins, 1990). In this way, new knowledge is integrated into a firm's competences, renewing or extending them (Floyd & Wooldridge, 1999; Nahapiet & Ghoshal, 1998; Zahra & Nielsen, 2002).

Social interactions, as well as organizational routines, are particularly important in order to integrate knowledge that is more tacit in nature (Grant, 1996; Nahapiet & Ghoshal, 1998). Therefore, managerial processes and systems, organizational structures, culture and values, which may all influence the extent and nature of social interactions are relevant to the

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integration of new knowledge (e.g., Kang et al., 2007; Smith, Collins & Clark, 2005; Verona, 1999). Kang et al (2007) refer to this integration of knowledge as the 'cooperative archetype'. As such it depends upon strong ties within the organization and high degree of generalized trust among organizational members. The latter refers to trust in any others who are members of the same group or organization (Leanna & Van Buren, 1999; Nahapiet & Ghoshal, 1998). Generalized trust supports knowledge exchange but also serves to constrain action. Because strong ties and generalized trust are based in strong mutual obligations within the group, they can also inhibit the acceptance of new ideas and novel information from outside (Kang et al., 2007). As a result, the conditions that support knowledge integration are quite distinct from those that support knowledge acquisition. This leads to the question of whether and how it is possible to sustain both knowledge processes.

### **Organizational Culture and Entrepreneurial Knowledge Flows**

An organization's culture represents the coherent pattern of values and beliefs that have evolved as successful solutions to past challenges (e.g., Schein, 1990). Culture represents an important contextual factor that can foster discretionary knowledge-sharing behaviors (Burgelman, 1983; Morris et al., 1993; Zahra et al., 2004). A significant aspect of organizational culture is the way in which the organization relates to employees and employees to one another (e.g., Baron, Hannan & Burton, 1999; Schein, 1990). The values regarding relationships with employees that underlie organizational culture can exert a significant influence upon the types of HRM practices selected (Baron et al., 1999). For example, Baron and colleagues identified several alternative 'HR blueprints' or coherent sets of values, which were also reflected in specific HRM policies: whether employment relationships were long or short-term; whether mutual commitment and trust were created; and whether exchange was purely economic, or also involved a significant element of social exchange. The dominant values of an organization are expected to exert a direct and indirect influence on knowledge processes.

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Values of individualism support autonomy and provide social incentives that promote individual creativity. Such values are expected to encourage the development of trusting relationships with external partners (Kang et al., 2007; Perrone et al., 2003), which in turn are expected to support knowledge acquisition. In contrast, collectivistic values reinforce norms of cooperation, which are required for support and acceptance of new ideas (Kang et al., 2007). There is some evidence that organizational cultures that are balanced, or midway along the individualism/collectivism continuum exhibit the highest levels of corporate entrepreneurship (Zahra et al., 2004). However, if an organizational culture is mid-way along a continuum from individualism to collectivism, then it is neither strongly collectivistic nor strongly individualistic. This logical problem can be reconciled if individualism and collectivism are conceived as two independent dimensions. Robert and Wasti (2002) present evidence that individualism and collectivism reflect two independent dimensions of organizational cultures. If this is the case, then an organization can have low or high levels of both dimensions of organizational culture at the same time. This two dimensional approach, and the expected association with the two knowledge processes is shown in Figure 1.

Entrepreneurial knowledge acquisition involves deviation from the dominant organizational mind-set in order to see new opportunities and develop innovative, entrepreneurial ideas (Floyd & Wooldridge 1999). This process, involving the formation of productive, trusting exchange relationships involves the autonomous initiative of core employees, especially middle managers (Burgelman, 1983, Kang et al., 2007; Lumpkin & Dess, 1996; Morris et al., 1993; Zahra et al. 2004). Therefore, a cultural orientation emphasizing individualism will be supportive of the creation of cross-boundary knowledge flows that support the discovery of opportunities:

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**Figure 1: Association between cultural characteristics and knowledge flows**

Individualist Culture	High	Entrepreneurial Knowledge Acquisition	Knowledge Acquisition + Knowledge Integration
	Low	null	Knowledge Integration
		Low	High
		Collectivistic Culture	

*Hypothesis 1: An organizational culture that values individualism will support entrepreneurial knowledge acquisition.*

The knowledge integration process is characterized by close collaboration and cooperation in order to embed knowledge into new products, processes or services (e.g., Grant, 1996; Kang et al., 2007; Nahapiet & Ghoshal, 1998; Zahra & Nielsen, 2002). The creation of cooperative knowledge exchange is facilitated by generalized trust, which is supported by an organizational culture that values the interests of the collective over those of the individual (Morris et al., 1993; Wagner, 1995). Collectivist values reward behaviors that support the collective interest and sanction opportunistic behaviors that serve only self-interests. Therefore, a collectivist cultural orientation will sanction, reward and reinforce

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collaboration and knowledge integration by core employees (Zahra et al., 2004):

*Hypothesis 2: An organizational culture that values collectivism will support cooperative knowledge integration.*

### **Organizational Culture and HRM Systems**

Culture and HRM systems influence each other in a mutually reinforcing fashion (Den Hartog & Verburg, 2004). On the one hand, culture permeates organizational systems, structure and processes, including the HRM system (Schein, 1990). As shown by Baron et al (1999), the values that organizational founders bring to their new organization exerts a significant and enduring influence on the choices they make with respect to HRM practices. On the other hand, HRM systems influence and reinforce organizational culture (Kerr & Slocum, 1987). Although they are mutually reinforcing, it may be argued on the basis of the research by Baron et al (1999) that culture precedes HRM choices in causal ordering. This is because the founder's orientation towards decision-making, coordination, and employee relations influence the 'blueprints' that they develop for the formal organization (Baron et al., 1999). Therefore, the development of organizational culture precedes the development of a formal HRM system.

HRM practices such as selection processes, performance appraisal criteria, and rewards systems are significantly influenced by the extent to which an organizational culture emphasizes individualistic or collectivistic values (Gomez-Mejia & Welbourne, 1991; Ramamoorthy & Carroll, 1998; Robert & Wasti, 2002; Storey & Bacon, 1993). Whether intentionally or not, choices in terms of HRM policies reflect and reinforce distinct values. Selection procedures based on measuring the abilities of applicants to perform jobs and tasks reinforce individualist values (Ramamoorthy & Carroll, 1998; Robert & Wasti, 2002). In contrast, collectivist values are reinforced by selection techniques that address the fit between people and organizations (Gomez-Mejia & Welbourne, 1991; Kang et al., 2007). An individualist orientation is reinforced by performance appraisal and rewards based on

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individual performance. In contrast, collectivist values are reflected in performance appraisal and rewards that emphasize collective objectives and outcomes (Gomez-Mejia & Welbourne, 1991; Sekaran & Snodgrass, 1986). Criteria for career progression that emphasize merit reflect individualistic values, while criteria of seniority and loyalty reflect collectivistic values (Robert & Wasti, 2002). Training practices aiming at providing specialist skills to individuals seeks to improve the individual initiative and achievement, and therefore reflect individualist values. Training oriented at the group, such as formal socialization programs, cross and group training, reinforce group culture, commitment to norms, and collective achievement (Gomez-Mejia & Welbourne, 1991). In sum, individualist and collectivist orientation in organizations are associated with HRM policies regarding work structure, staffing, training, performance appraisal, and reward systems. This suggests the following hypotheses:

*Hypothesis 3: An organizational culture that values individualism will be positively related to HRM practices oriented to the individual.*

*Hypothesis 4: An organizational culture that values collectivism will be positively related to HRM practices oriented to group or organization.*

The reverse relationships are expected to be non-significant: individualist values will not be associated with collectivist HRM practices; collectivist values will not be associated with individualist practices.

### **HRM Practices and Knowledge Flows**

An HRM system oriented at fostering acquisition of knowledge from key external partners should provide the ability, motivation and opportunity to create such connections (Collins & Clark, 2003). Human capital stocks form the basis for identification of new knowledge, reflecting the reciprocal relationship between stocks and flows (Dierickx & Cool, 1989) and between substantive and dynamic capabilities (Zahra et al., 2006). This is consistent with organizational absorptive capacity, whereby stocks of related knowledge are a foundation for the acquisition of new knowledge and

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capabilities (e.g., Cohen & Levinthal, 1990; Zahra & George, 2002). The ability of managers to identify opportunities will be enhanced when HRM practices build specialist knowledge that overlaps with that of customers, suppliers and other counterparts with whom they interact (Kang et al., 2007). Training that focuses on building individual capacity for understanding and interpreting the environment is expected to enhance knowledge acquisition. Staffing practices that emphasize the levels of relevant knowledge possessed by candidates will also support knowledge acquisition. However, in the case of human capital stocks, what is important is not only what is known, but the willingness and opportunity to put this knowledge to use (Coff, 1997).

In order to enhance individual motivation to establish the relationships necessary to acquire new knowledge, an HRM system should induce individuals to seek new contacts, and build the necessary social capital (Leana & Van Buren, 1998). Collins and Clark (2003) provide evidence of the influence of specific HRM practices including training, performance management and rewards for building social networks. Performance appraisal and reward practices based on individual performance will be suitable to this aim. Rewards for the contributions of individuals such as incentive pay, merit-based promotion, and output-based rewards are expected to encourage the acquisition and sharing of knowledge of new opportunities (Gomez-Mejia & Balkin, 1989). This suggests the following hypothesis:

*Hypothesis 5: HRM practices oriented to the individual capabilities, behaviors and achievements will be positively associated with entrepreneurial knowledge acquisition.*

Knowledge integration capabilities require close collaborative relationships that facilitate the communication and assimilation of knowledge (Grant, 1996; Kang et al., 2007; Nahapiet & Ghoshal, 1996; Zahra & Nielsen, 2002). Therefore, HRM practices should also provide the ability, motivation and opportunity to build such relationships. In terms of opportunity, the



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HRM system should allow and encourage people to interact closely and build strong ties within organizational boundaries. Work design that allows close relationships to form, and facilitate connections across formal lines of authority help to build this kind of value creating social capital (Verona, 1999; Youndt & Snell, 2004). Work design characterized by high interdependence, team-based organization, job rotation across functions and frequent formal and informal meeting all facilitate strong cooperative networks (Collinson, 2001; Kang et al., 2007; Verona, 1999). These practices increase proximity and support repeated interaction, creating opportunities to establish contacts and exchange ideas.

The HRM system also influences the abilities needed for collaborative and trusting work relationships. In order to collaborate effectively, individuals must possess knowledge that helps them see beyond their own area of expertise (e.g., Grant, 1996). Architectural knowledge, relating to how entire processes, products and services fit together helps promote this breadth of understanding (Kang et al., 2007). Staffing and training practices create the abilities required to support knowledge integration. Staffing oriented towards hiring people with well-developed interpersonal skills and the ability to work in teams, facilitates the development of strong, work-oriented relationships (Youndt & Snell, 2004). The creation of a workforce with overlapping competences and the use of job rotation facilitate knowledge integration (Collinson, 2001). Knowledge integration is also enhanced by an internal staffing strategy and, when hiring from outside, an emphasis on organizational fit (Kang et al., 2007). Training can enhance knowledge integration in a number of ways. Formal socialization programs, mentoring, and cross training provide employees with a broader view, by exposing them to organizational knowledge, culture and values (Kang et al., 2007). Group-process training improves the skills required for productive collaborative relationships, while on-the-job training and mentoring programs help develop both job-related knowledge and strong ties across the organization, favoring knowledge integration in new products, processes, or services (Verona, 1999; Collinson, 2001).

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Team-based incentives are particularly suitable to motivate knowledge integration in presence of interdependent tasks (Gomez-Mejia & Balkin, 1989). Collectively focused performance metrics promote cooperative behaviors through shared goals and values (Kang et al., 2007). Performance feedback from customers, peers, team members and subordinates facilitates knowledge sharing and goal alignment (Youndt & Snell, 2004). In sum, knowledge integration capabilities are enhanced by HRM practices that include interdependent work organization, internal staffing, group-based performance management and rewards, and training that encourages and values knowledge sharing and close collaboration. This leads to the following hypothesis:

*Hypothesis 6: HRM practices oriented towards the collective will be positively associated with knowledge integration.*

These individually and collectively oriented HRM practices are hypothesized to influence the knowledge acquisition and knowledge integration processes respectively. However, these HRM practices are themselves influenced by organizational culture values (Baron et al., 1999; Schein, 1990). Therefore, HRM practices represent a mediating mechanism through which cultural values influence knowledge acquisition and knowledge integration:

*Hypothesis 7: Individual oriented HRM practices will mediate the relationship between cultural values of individualism and entrepreneurial knowledge acquisition.*

*Hypothesis 8: Collective oriented HRM practices will mediate the relationship between cultural values of collectivism and cooperative knowledge integration.*

### **Opportunity Exploitation**

In order to create value, new knowledge and capabilities must also be exploited. Opportunity exploitation is reflected in the persistent creation and

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commercialization of new goods, systems, processes, knowledge and organizational forms (Yli-Renko et al., 2001; Zahra & George, 2002). The ability to exploit knowledge derives from the ability to acquire and integrate new knowledge belonging to several areas of technology into a firm's operations (e.g, Yli-Renko et al. 2001; Zahra et al., 1999). In order to create value from new opportunities, first new opportunities must be identified and brought within the boundary of the organization (Cohen & Levinthal, 1990; Zahra & George, 2002). Next, new knowledge must be assimilated and integrated if its potential for value creation is to be realized (Verona, 1999; Zahra & George, 2002). Therefore, an important validation of the significance of entrepreneurial knowledge acquisition and cooperative knowledge integration is the extent to which these are positively associated with knowledge exploitation:

*Hypothesis 9a: Knowledge acquisition is positively associated with knowledge exploitation.*

*Hypothesis 9b: Knowledge integration is positively associated with knowledge exploitation.*

In the next section we describe an empirical study designed to test all of our hypotheses.

## **METHODS**

### **Research Process and Sample**

We focus on a single industry in order to reduce the effects of extraneous variance. This is particularly important in the study of organizational knowledge processes, which may differ systematically across sectors. We selected the industrial machinery industry, an important sector for the Italian economy, which represented 6 percent of Italian GDP with a turnover of 23.4 billion euros in 2006. Within this sector, Italy is the second largest producer in the European Union, which in turn accounts for 30 percent of global production. The majority of firms in this sector are SMEs.

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The ability to innovate and be entrepreneurial is key to the competitive success of Italian companies making them particularly suited for the purposes of our study.

The sampling frame was all firms that belonged to the sector “machinery and equipment” listed in the European AIDA database, which contains all public and private firms registered as commercial enterprises in Italy. Because we do not expect to find formalized HRM practices in smaller firms, we only included the 731 firms that had more than 100 employees. Among these, about one third had more than 250 employees, while two thirds of firms in the sample have between 100 and 250 employees. Data collection included both primary surveys and secondary data sources.

In order to avoid possible biases caused by using a single respondent, we directly contacted multiple representatives of every firm, inviting them to participate in the online survey. We surveyed HR managers or their equivalent for information about HRM practices. We surveyed middle managers regarding organizational culture and capabilities. By aggregating responses from multiple middle managers in each organization we further mitigate threats associated with common method effects. Following Dillman (2007) we used multiple modes of contact, first by telephone to obtain email addresses, and then using both email and follow-up telephone calls. The final usable sample included 231 completed surveys, from 83 organizations. We obtained three respondents or more from 57 firms, two respondents from 14 firms, and a single respondent for 12 firms. The overall response rate calculated at the organization level is 11 percent.

### **Measures**

#### ***Dependent variables***

*Entrepreneurial knowledge acquisition.* In order to assess this process, we adapted the scale reported in Smith et al. (2005) using only those items that measure the access of employees to other people’s knowledge. Examples of items in the scale include “Employees are restricted from

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talking to people outside the company about their current projects” (reverse coded) and “Employees here feel free to contact anyone outside the organization to discuss new ideas or developments.” Middle managers responded to these items on a five-point agree-disagree format.

*Cooperative knowledge integration.* We measure integration with the scale used by Zahra and Nielsen (2002). This instrument measures the involvement of people in the development of new technologies, the extent of internal exchange of information, and the ability of an organization to coordinate different units. Middle managers responded using a five-point agree-disagree format. The individual responses of the managers were aggregated to create a firm level variable.

*New product development.* To measure this outcome, we employed a measure similar to that used by others in this literature (Spender, 1996; Yli-Renko et al., 2001; Zahra & George 2002; Zahra et al., 1998). We asked respondents: “How many products did your company develop as a result of the relations it has with its key internal and external stakeholders? (Customers, suppliers, banks, service providers, people within the organization)”. Middle managers responded to this question using a continuous response format.

### ***Independent variables***

*Organizational individualism/collectivism.* We employ Robert and Wasti’s (2002) six-item index measuring organizational individualism and a seven-item index measuring organizational collectivism, each with a five-point agree-disagree response format. An example item for individualism is “Competition between employees is accepted.” An example item for collectivist values is “Regardless of hierarchical level, employees take each other’s views into consideration.” The respondents for the cultural values measures were the middle managers.

*HRM practices.* To avoid the threat of common method bias, the respondents to our questions about HR practices were the HR Director or

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other person responsible for administering HR. As there are many ways of measuring HRM practices, and our focus was on individual versus collective orientation in these practices, we drew our measures from diverse sources (Ramamoorthy & Carrol, 1998; Gomez-Meija & Welbourne 1991; Sekaran & Snodgrass, 1986). We created two different sets of HRM practices, each containing seven items related to work structure, selection, training, appraisal and incentives. The set of practices expected to reflect individualist values emphasize individual initiative by providing autonomy, individual-based appraisal and rewards, and specialist training. The set of practices that reinforce a collectivist culture emphasizes collective achievement and provide interdependent work structure, group-based appraisal and rewards and training programs that underlie the value of common norms and values. The scales used a five-point agree-disagree response format. The items are reported in the appendix.

### ***Control Variables***

We include two variables as controls due to their possible influence on the processes and outcomes of interest. Firm age, measured in years is included because this may influence the level of knowledge stocks an organization possesses, and therefore their ability to identify and integrate new opportunities (Zahra & George, 2002). We control for firm size in terms of assets (transformed by the natural log) because it may also influence the resources available for exploring for new opportunities as well as the ability to integrate new knowledge. These data were obtained from the AIDA database.

### **Analysis**

To assess the properties of the measures we conducted an exploratory factor analysis using a principal axis factor extraction technique and varimax rotation, along with the scree plot, conceptual fit and interpretability as our criteria for factor retention. Exploratory rather than confirmatory analysis was necessary due to the modest sample size. We then tested hypotheses using regression and path analyses. Hierarchical multivariate regression is used to test the mediation hypotheses, while a path analysis

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is presented to simultaneously assess the hypothesized relationships. Before creating a single indicator for each variable by summing the scale scores, we calculated the inter-rater agreement for each item using the rwg index (James, Demaree & Wolf, 1993) to ensure that it was appropriate to aggregate the data from multiple respondents to the organizational level.

## RESULTS

Means, standard deviations and correlations among the variables are summarized in table 1. Overall, the results of the factor analysis were consistent with our expectations with nearly all of the items for each scale loading significantly (i.e., loading  $>.50$ ) on its respective factor. The only exceptions were two items from the individual oriented HRM scale, one item from the collective oriented HRM scale, and one item from the knowledge acquisition scale, which failed to load significantly on their respective factors and were dropped from subsequent analysis. In each case we estimated the scale reliabilities using Cronbach's coefficient alpha: Individualist culture,  $\alpha=.86$ ; collectivist culture,  $\alpha=.85$ ; individual oriented HRM,  $\alpha=.88$ ; collective oriented HRM,  $\alpha=.84$ ; entrepreneurial knowledge acquisition,  $\alpha=.76$ ; and cooperative knowledge integration,  $\alpha=.91$ . All scales therefore demonstrated high internal consistency. The average rwg index for individualist culture was 0.92, that of collectivist culture was 0.87, for knowledge acquisition average rwg was 0.98 and for knowledge integration 0.93. These are all higher than the suggested cut-off point of 0.7. For opportunity exploitation the rwg is 0.68, which is slightly below the recommended cutoff. These estimates all support the validity of aggregating our data across multiple respondents.

The correlations shown in table 1 provide evidence that the pattern of relationships is entirely consistent with our hypotheses. That is, the individualist culture and individual oriented HRM are significantly correlated with one another and with knowledge acquisition but not with knowledge integration, while collectivist culture and HRM are significantly correlated with one another and knowledge integration but not knowledge acquisition.

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Table 1 Means standard deviations and correlations among study variables

Variables	Mean	s.d.	1	2	3	4	5	6	7	8
1. Individualist HRM	0.03	1.03								
2. Collectivist HRM Practices	-0.03	0.89	0.15							
3. Individualist culture	-0.05	0.77	0.78***	0.12						
4. Collectivist culture	-0.11	0.73	0.16	0.71**	0.17					
5. Knowledge acquisition	0.20	0.67	0.69**	0.08	0.79**	0.20				
6. Knowledge integration	-0.04	0.72	0.21	0.70**	0.18	0.84**	0.16			
7. Opportunity exploitation	-0.30	1.27	0.41**	0.43**	0.30**	0.36**	0.32**	0.44**		
8. Age	30.01	15.62	0.09	0.04	-0.04	0.10	0.05	0.06	0.24*	
9. Log Assets	10.78	1.11	0.13	-0.12	0.05	0.02	0.06	0.03	0.09	-0.06

Note: \*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$



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**Table 2 Regression of Entrepreneurial Knowledge Acquisition on HR Practices and Culture**

	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Log Assets	.044	.079	-.039	.56	-.033	.045
Age	.001	.005	-.002	.004	.002	.003
Individual Oriented HRM			.483***	.058	.142*	.075
Collective Oriented HRM			-.013	.066	-.121	.075
Individualist Culture					.544**	.095
Collectivist Culture					.187*	.094
$R^2$	.006		.544		.656	
F	.173		17.585***		23.163***	
$\Delta R^2$	.006		.538		.061	
F Change	.173		34.806***		6.502***	

Note: \*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

Table 2 summarizes the results of the regression of entrepreneurial knowledge acquisition on the HRM practices and culture variables. In the first step we enter the control variables. In the second step, we introduce the individual oriented HRM and collective oriented HRM variables. The overall model is significant ( $R^2 = .544$ ;  $p < .001$ ) and adds significant variation explained in the dependent variable ( $\Delta R^2 = .538$ ;  $p < .001$ ). Consistent with hypothesis 5, the coefficient for individual oriented HRM is significant ( $B = .483$ ;  $p < .001$ ), while the coefficient for collective oriented HRM is non-significant ( $B = -.013$ ; n.s.). In step 3 we add the measures for individualist culture and collectivist culture. This model is significant overall ( $R^2 = .656$ ;  $p < .01$ ) and the inclusion of the two culture measures explains significant additional variation in knowledge acquisition beyond the HR variables ( $\Delta R^2 = .061$ ;  $p < .01$ ). Taken together, these results provide robust support for hypothesis 1 (individualist culture is positively associated with entrepreneurial knowledge acquisition) and for hypothesis 5 (individual oriented HRM is positively associated with entrepreneurial knowledge acquisition).

Table 3 summarizes the results of the regression of cooperative knowledge integration on the culture and HRM variables. In the first step we enter the

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control variables. In the second step, we introduce the individual and collective oriented HRM variables. The overall model is significant ( $R^2 = .597$ ;  $p < .001$ ;  $\Delta R^2 = .593$ ;  $p < .001$ ). In support of hypothesis 6, the coefficient for collective oriented HRM is significant ( $B = .578$ ;  $p < .001$ ), while the coefficient for individual oriented HRM is non-significant. In step 3 we added the measures for individualist culture and collectivist culture. This model is significant overall ( $R^2 = .833$ ;  $p < .001$ ) and the inclusion of the culture measures explains significant additional variation in knowledge integration beyond the HR variables ( $\Delta R^2 = .236$ ;  $p < .001$ ). These results provide support for hypothesis 2 (collectivist culture is positively associated with knowledge integration).

**Table 3 Regression of Knowledge Integration on HR Practices and Culture**

	Model 1		Model 2		Model 3	
	<u>B</u>	<u>SE</u>	<u>B</u>	<u>SE</u>	<u>B</u>	<u>SE</u>
Log Assets	-.008	.081	.063	.054	.014	.033
Age	.003	.005	.001	.003	.000	.002
Individual Oriented HRM			.027	.056	.036	.060
Collective Oriented HRM			.578***	.063	.191***	.060
Individualist Culture					-.025	.075
Collectivist Culture					.673***	.075
$R^2$	.004		.597		.833	
F	.117		21.848***		47.528***	
$\Delta R^2$	.004		.593		.236	
F Change	.117		43.415***		40.453***	

Note: \*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

Hypotheses 3 and 4 predict a positive relationship between individualist culture and individual oriented HR practices, and collectivist culture and collective oriented HR practices respectively. We test this in two additional regression models, summarized in tables 4 and 5. The results are supportive of hypotheses 3 and 4: individualist culture is significantly

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associated with individual oriented HRM ( $B = .623$ ,  $p < .001$ ;  $R^2 = .631$ ;  $p < .001$ ); collectivist culture is significantly associated with collective oriented HRM ( $B = .577$ ,  $p < .001$ ;  $R^2 = .529$ ;  $p < .001$ ).

**Table 4: Regression of Individualist HR practices on Culture of Individualism**

	Model 1		Model 2	
	<u>B</u>	<u>SE</u>	<u>B</u>	<u>SE</u>
Log Assets	.069	.095	-.036	.060
Age	-.004	.006	-.008	.004
Individual Oriented HRM			.623***	.062
$R^2$		.015		.631
F		.453		34.210***
$\Delta R^2$		.015		.616
F Change		.453		100.252***

Note: \*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

**Table 5: Regression of Collectivist HR practices on Culture of Collectivism**

	Model 1		Model 2	
	<u>B</u>	<u>SE</u>	<u>B</u>	<u>SE</u>
Log Assets	.014	.085	.074	.060
Age	.002	.006	.001	.004
Collective oriented HRM			.577***	.062
$R^2$		.003		.529
F		.104		22.419***
$\Delta R^2$		.003		.525
F Change		.104		66.826***

Note: \*\*\* =  $p < .001$ ; \*\* =  $p < .01$ ; \* =  $p < .05$

We hypothesized that HR practices mediate the relationship between the culture variables and the entrepreneurial processes. Three criteria are needed to satisfy the mediation hypotheses (Baron & Kenny, 1986). First, there must be a relationship between the dependent variable and the independent variable. In table 2, the direct relationship between knowledge identification and individualist culture is significant in model 3 ( $B$

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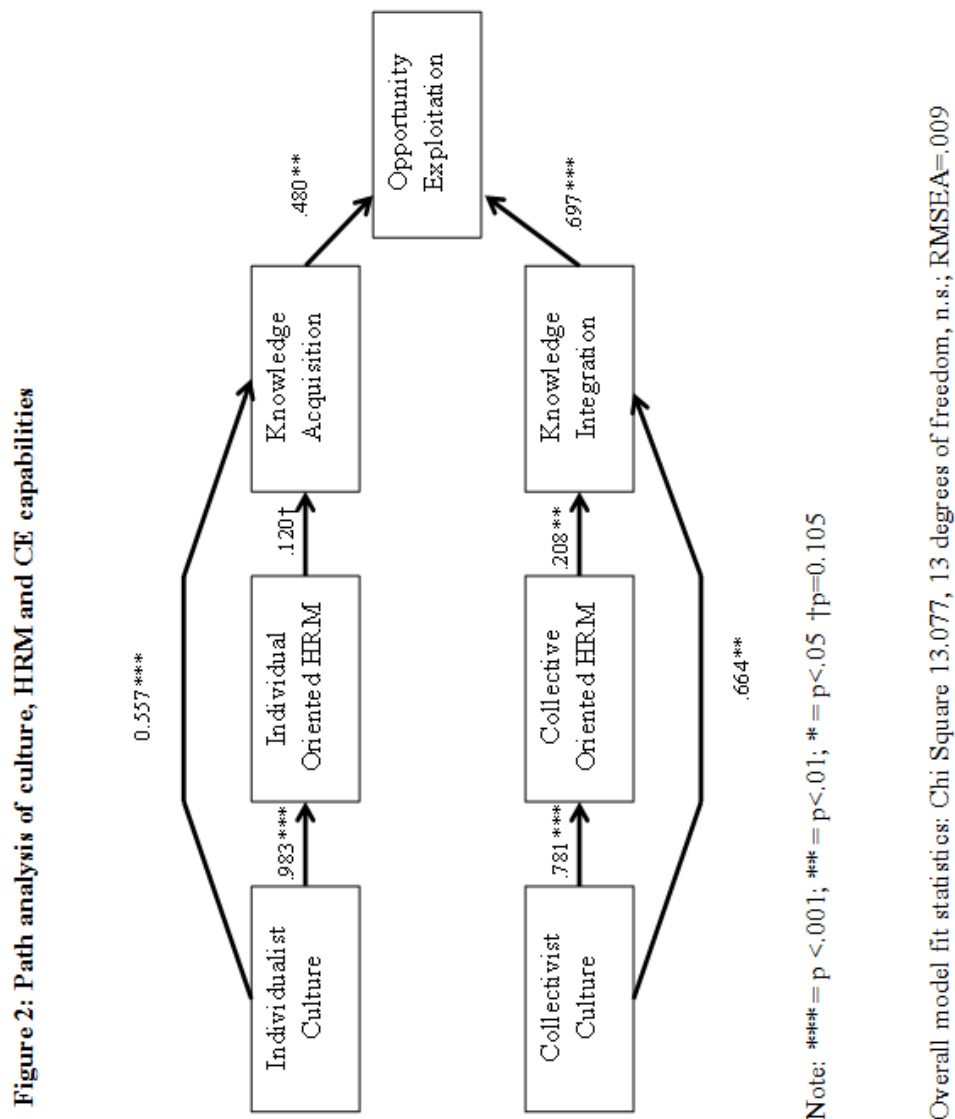
= .544,  $p < .01$ ). Similarly in table 3, the direct relationship between knowledge integration and collectivist culture is significant in model 3 ( $B = .673$ ,  $p < .001$ ). Second, there must be a significant relationship between the independent variable and the mediator variable. This is shown in tables 4 and 5, as discussed above. The third criterion is that the mediator variable must be significantly associated with the dependent variable after controlling for the effect of the independent variable. We see from table 2 model 3 that individual oriented HRM remains significantly associated with knowledge acquisition ( $B = .142$ ,  $p < .05$ ), even after individualist culture ( $B = .544$ ,  $p < .01$ ) is included in the regression model. Table 3 model 3 shows that collective oriented HRM remains significantly associated with knowledge integration ( $B = .191$ ,  $p < .001$ ), even after collectivist culture ( $B = .673$ ,  $p < .001$ ) is included in the regression model. The Sobel test indicates that there is a significant mediating effect for both individual oriented HR practices (4.975,  $p < .001$ ) and for collective oriented HRM (6.460,  $p < .001$ ). In sum, the results support hypotheses 7 and 8: individualism and collectivism dimensions of organizational culture are mediated by HRM practices in their influence on knowledge acquisition and knowledge integration respectively.

To test hypothesis 9, and to provide additional evidence for the positive benefits of the two forms of knowledge flows in our framework, we conducted a path analysis with opportunity exploitation as the dependent variable. The results of this analysis are summarized in Figure 2.

The results for the model overall all indicate a good fit of our model to the data (Chi Square 13.077, 13 degrees of freedom, n.s.; RMSEA=.009). As summarized in figure 2, with the exception of the association between individual oriented HRM and knowledge acquisition ( $B = .120$ ,  $p < .10$ ) all of the hypothesized coefficients are significant at or below the  $p < .01$  level, confirming the results already described from the regression analyses. In addition, the path model provides a test of hypothesis 9 (knowledge acquisition and knowledge integration are positively related to opportunity exploitation). The paths for both variables are positive and significant

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(knowledge acquisition,  $B = .480$ ,  $p < .01$ ; knowledge integration  $B = .697$ ,  $p < .001$ ). Taken together the results from the path analysis and the hierarchical regression models are supportive of our hypotheses.



**DISCUSSION**

In this study we examine the role of organizational culture and HRM in supporting entrepreneurial knowledge acquisition and cooperative knowledge integration. These two knowledge processes have been identified in prior research as significant in the development of capabilities

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that create entrepreneurial rents (e.g., Hitt et al., 2001; Kang et al., 2007; Zahra & George, 2002). Our empirical study provides support for each of our hypotheses, which when taken together, depict a system of connections between an organization's culture and HRM practices, and the ability to acquire and integrate new knowledge, ultimately resulting in the creation of new products or services.

In developing our theoretical model, we have described and measured the two major forms of knowledge flow underlying entrepreneurial capabilities in organizations: entrepreneurial knowledge acquisition and knowledge integration. While there are other ways to describe the entrepreneurial capabilities in firms (e.g., Zahra et al., 2006), a strength of this framework is that it is consistent with two concepts that form the core of contemporary research in knowledge-based competitive advantage: organizational ambidexterity (e.g., Gibson & Birkinshaw, 2004; March, 1991; Raisch & Birkinshaw, 2008; Simsek, 2009) and absorptive capacity (e.g., Cohen & Levinthal, 1990; Zahra & George, 2002). The evidence provided here is suggestive of ways to resolve the problem of building contextual ambidexterity (Lubatkin et al., 2006. Simsek, 2009). In contrast to the recent contribution by Patel and colleagues (forthcoming) we have identified how HRM creates contextual ambidexterity in a form which that addresses knowledge flows rather than knowledge stocks. The evidence reported here, for the combined influence of organizational culture and HR practices along two distinct behavioral dimensions, provides empirical support to the propositions offered by Kang et al (2009) of the dual process through which HRM is expected to influence these knowledge flows.

The emerging body of research that connects HRM to organizational learning, innovation and entrepreneurial capabilities has emphasized the importance of the development of human and social capital and the promotion of the autonomous and discretionary contributions of key employees (e.g., Collins & Clark, 2003; Collins & Smith, 2006; Hornsby et al., 2002; Kang et al., 2007; Kuratko et al., 2005). This research provides further support for the importance of human and social capital within and

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beyond the boundaries of the organization to organizational learning and innovation (e.g., Collins & Clark, 2003; Kang et al., 2007). Furthermore, it supports the view that employees and managers require a significant degree of autonomy to act, so that they may respond appropriately to opportunities and changing circumstances (e.g., Hornsby et al., 2002; Kuratko et al., 2005). Other research has identified positive employee-organization relationships as important antecedents for entrepreneurial learning to take place (e.g., Collins & Smith, 2006). While this research has enhanced our understanding, prior empirical studies have not differentiated the behavioral demands of internal and external knowledge flows as suggested by Kang et al (2007). The evidence presented here confirms that HRM can simultaneously promote two quite diverse sets of values and behaviors, and thereby respond to the disparate behavioral demands of these critical knowledge processes.

The concepts of organizational ambidexterity and absorptive capacity imply that culture and HRM may be required to support diverse and sometimes contradictory capabilities. Research on organizational ambidexterity indicates that multiple forms of learning exist and need to be sustained for organizational survival. In their reframing of the absorptive capacity construct, Zahra and George (2002) note that the identification and acquisition of knowledge is conceptually and empirically distinct from knowledge assimilation and exploitation. Similarly, we have noted that the ability to identify opportunities requires a distinct set of behaviors to those that support knowledge integration.

Our empirical study provides support for this explanation of how culture and HRM create conditions of contextual ambidexterity (Gibson & Birkinshaw, 2004; Lubatkin et al., 2006; Raisch & Birkinshaw, 2008; Simsek, 2009). By simultaneously promoting autonomous individual activity and collaborative collective behaviors, cultural values and the HRM practices that reinforce them create the ability, motivation, and opportunity for the desired behaviors to occur. This research therefore suggests that rather than a one-dimensional view, a more complex and nuanced view of

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the characteristics of culture and HRM required for building entrepreneurial capabilities is appropriate.

The results of our study are also suggestive of the role of culture and HRM in the creation of absorptive capacity (Zahra & George, 2002). To date, most researchers have focused on the role of resources and especially R&D investments and have largely ignored the role of human assets and other tangible resources such as culture. This study suggests that future research in the domains of both organizational ambidexterity and absorptive capacity could benefit from the inclusion of culture and HRM as variables of interest. However, our results also suggest the need to account for the inherent ambidexterity implicit within absorptive capacity, whereby knowledge identification and acquisition require distinct organizational qualities from knowledge integration and exploitation (Zahra & George, 2002; Zahra & Nielsen, 2002).

Prior research into the influence of HRM and intangible resources on corporate entrepreneurship has largely relied upon idiosyncratic conceptual frameworks. Much literature has focused upon the concept of entrepreneurial orientation, a more general construct that refers to an organizational orientation towards innovation, risk taking and proactiveness (e.g., Miller, 1983; Lumpkin & Dess, 1996). While that approach has been fruitful for identifying important antecedents to corporate entrepreneurship (e.g., Hornsby et al., 2002; Kuratko et al., 2005) it also leaves several gaps in our understanding. Risk taking, innovation and proactiveness are themselves each complex organizational level behaviors. Understanding how HRM systems can influence these outcomes at the organizational level of analysis requires addressing the underlying individual behaviors needed to support them. The framework developed in this paper focuses instead upon the knowledge flows underlying corporate entrepreneurship. By addressing and measuring these knowledge flows, it is possible to separate antecedent factors, such as culture and HRM, from outcomes such as innovation. When trying to explain a complex phenomenon such as corporate entrepreneurship it is advantageous to avoid tautology that



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results from conceptions of a supportive organizational 'orientation' (Wiklund & Shepherd, 2003; Rauch et al., 2009). By defining the underlying knowledge processes, it is possible to strengthen our hold on this slippery concept, and to better understand its predictors and its outcomes (Zahra et al., 2006).

We have adopted a new direction with respect to the nature of organizational culture, and provide evidence that the support a two-dimensional conceptualization of individualism and collectivism (Robert & Wasti, 2002). Prior work has concluded that the two opposing forces of individualism and collectivism should be in balance in order to optimize the creative force of the autonomous individual with the integrative power of a collaborative community (Morris et al, 1994; Zahra et al, 2004). This raises a troubling logical problem: if a culture is neither strongly individualist or strongly collectivist, then what kind of power does such a culture hold for shaping ability, motivation and opportunity? A way out of this conundrum is offered by the revised view of individualism and collectivism as two distinct dimensions, which are allowed to vary independently (Robert & Wasti, 2002). When a culture can have both positive levels of individualism and collectivism, then it is possible to achieve a different type of balance in which the two create a positive force that acts on the development of ability, motivation and opportunity for action in a way that promotes needed behaviors. Our results support the two-dimensional structure proposed by Robert and Wasti, and demonstrate that these dimensions of organizational culture are a credible source of contextual ambidexterity (Gibson & Birkinshaw, 2004; Simsek, 2009).

Scholars of strategic HRM have been critical of the fact that research tends to focus only on large firms and has generally ignored SMEs (e.g., Cardon & Stevens, 2005; Heneman, Tansky & Camp, 2000). This omission is particularly serious given the significance of this class of organization for employment and economic growth around the world (e.g., Cardon & Stevens, 2005). The results presented here lend support to the call for more research into how HRM influences the performance of SMEs, and

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suggest some dimensions of the HRM system that might be profitably examined. Here too, we have departed from the more common approach to categorizing HRM systems in terms of high performance, or commitment oriented practices, instead focusing on practices expected to have more specific relevance to the capabilities of interest to entrepreneurial firms. Our results are encouraging of this orientation, and offer an alternative schema for organizing HRM practices.

Our results extend the strategic HRM literature by considering how HRM influences the strategic capabilities of firms rather than financial performance or efficiency measures (Wright et al., 2001). Although market and financial performance measures are important indicators, by themselves they do not shed much light on whether competitive advantages are sustainable, or how they are built or maintained. Arguments that HRM provides performance advantages by reducing costs (e.g., employee turnover) and enhancing efficiency (e.g., labor productivity) and effectiveness (e.g., employee commitment) have all found considerable support (e.g., Combs et al., 2006; Becker & Huselid, 1998; Huselid, 1995). The results of this study are supportive of the perspective that HRM can also influence entrepreneurial rent generation through its effect on knowledge flows as well as stocks (Chadwick & Dabu, 2009; Kang et al., 2007).

This study is not without limitations, which need to be clearly acknowledged. First, the moderate sample size has not allowed us to use the most sophisticated statistical modeling methods available. In particular, it would be preferable to have employed a full structural equation modeling approach, which would also allow simultaneous assessment of measurement and structural models. However, our sample size is sufficient in terms of statistical power (Cohen & Cohen, 1983) and the fact that our data include multiple responses for most companies is a compensating feature of our research. A second limitation relates to the internal validity of our research design. Although we have proposed that culture influences HRM, we must also acknowledge that this relationship is likely to be

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reciprocal (Deal & Kennedy, 1982; Den Hartog & Verburg, 2004). The present study takes a cross sectional approach and therefore is not able to test this causal relationship. A further possible limitation arises from the question of whether the results presented here could generalize beyond Italian SMEs. We believe that the theoretical model developed here should be applicable across national contexts, however future research should explore whether these results are moderated in some way by national culture or institutional context.

Future research should consider the role of other aspects of organizational culture beyond individualism and collectivism. This is an area in which there have been very limited explorations, which is surprising given the indications that culture is a powerful driver of organizational behavior (Deal & Kennedy, 1982; Den Hartog & Verburg, 2004). This and prior studies have demonstrated that culture is a significant driver of the kinds of discretionary contributions that support CE (Hornsby, et al., 1999; Zahra et al., 2004). A further important direction for research is to consider the relationships studied here in a longitudinal research design, so that the role of distal (culture) and proximal causes (HRM practices) can be studied over time as knowledge-based capabilities develop.

This study deepens our knowledge of the processes by which culture and HRM influence the capacity of organizations for entrepreneurship. All kinds of organizations, not only large and established, but also younger and smaller firms benefit from entrepreneurial capabilities (e.g., Wiklund & Shepherd, 2003; Rauch et al., 2009). This study suggests that higher levels of entrepreneurship are attainable in part through the creation of ambidextrous contexts, driven by organizational cultures and HRM systems.

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### APPENDIX

#### Measures of Human Resource Management practices

***Individual oriented HRM practices (based on Sekaran & Snodgrass, 1986; Gomez-Mejia & Welbourne 1991; Ramamoorthy & Carrol, 1998 Robert & Wasti, 2002)***

1. In this organization we use ability tests for selection
2. In this organization we have performance appraisal systems based on individual performance
3. In this organization we have individual MBO
4. In this organization we have rewards based on individual performance
5. In this organization we have merit-based promotions
6. In this organization we have a flexible work structure providing autonomy
7. In this organization we have individual training

***Collective oriented HRM practices (based on Sekaran & Snodgrass, 1986; Gomez-Mejia & Welbourne 1991; Ramamoorthy & Carrol, 1998; Robert & Wasti, 2002)***

1. In this organization we have selection based on person-organization fit
2. In this organization we have performance appraisal based on group performance
3. In this organization we have group MBO
4. In this organization we have rewards based on group performance
5. In this organization we have promotions based on seniority
6. In this organization we have interdependent work structures (e.g. teamwork)
7. In this organization we have group training.

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