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Article

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Human capital: the link between leadership and organizational learning

Human capital

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Abstract

Purpose – There is some research showing that leadership behaviors could be important antecedents to learning, but knowledge is scarce on the impact of which leadership styles support exploitative and explorative learning. The purpose of this paper is to hypothesize that transformational leadership – more concerned with innovation – will encourage generalist human capital (HC), while transactional leadership – more focused on the efficiency of existing operations – will promote specialist HC.

Design/methodology/approach – To test the hypotheses, the authors adopt a structural ambidexterity approach as the authors consider that organizations need units working on both types of learning.

Findings – The results show the versatile role of transformational leaders, who are able to promote both types of HC and, in turn, both types of organizational learning. The authors have also found that marketing departments are more willing to explore than production departments.

Originality/value – This study highlights the relevance of considering the department as a unit of analysis (structural ambidexterity approach), the significant role of transformational leaders in organizational learning and the mediating role of HC.

Keywords Leadership, Human capital, Exploration and exploitation learning

Paper type Research paper

1. Introduction

Innovation and learning are vital to an organization's capacity to create value in today's knowledge-based market. In a knowledge-based economy, the development of human capital (HC), and its transformation into organizational learning, is a challenge for leaders. HC is among the key organizational resources that are hard to imitate (Ndinguri *et al.*, 2012). Organizations rely on the knowledge and skills of their HC to boost their competitive advantage (Kelly *et al.*, 2011).

Human resources (HR)-related issues are central to any discussion about a firm's ability to learn, innovate and change (Wright *et al.*, 2001). HC reflects individuals' knowledge, skills and abilities (Yang and Lin, 2009); however, it is larger than the sum of this individual knowledge (Scaringella and Malaeb, 2014). HC is at the center of knowledge creation and competitive advantage (Carayannis *et al.*, 2007), and here leaders have considerable responsibility in the way they manage knowledge and generate new knowledge through people. A triangle of leadership, HC and organizational learning therefore emerges that calls for further in-depth investigation.

Recent research has shown that leadership behaviors could be important antecedents of learning (Chang, 2016; Chang *et al.*, 2012; Chang and Hughes, 2012; Smith and Tushman, 2005). However, this relationship remains unclear and the empirical evidence for its role is



inconsistent and incomplete (Prasad and Junni, 2016; Vera and Crossan, 2004). The mechanisms through which leadership impacts on learning have not been defined, and in this paper we suggest that HC could be an important mechanism in this relationship. Transactional or transformational leaders could stimulate different types of HC (specialist or generalist), which in turn lead to exploitative or explorative organizational learning, respectively.

Conceptual frameworks that describe organizational learning distinguish between exploration and exploitation organizational learning (March, 1991). Exploitation involves learning how to make incremental improvements in existing products, services or processes. Exploration entails finding innovative new products, services or processes. Such classifications can oversimplify complex processes, however. There is growing evidence that most organizations require both learning processes, because methods usually associated with exploitation can be used to reduce costs for expensive forms of exploration, and methods usually associated with exploration can help to improve the efficiency of established processes (Yukl, 2009).

There are two widely accepted approaches of organizational ambidexterity: structural and contextual ambidexterity. Recent studies regard contextual ambidexterity as a meta-level capacity that pursues exploration and exploitation simultaneously, encouraging individuals to divide their time between activities (Wang and Rafiq, 2014; Gibson and Birkinshaw, 2004). However, since exploration and exploitation require such different management styles, organizational structures and routines (Stettner and Lavie, 2011; Lawrence and Lorsch, 1967), we consider the structural ambidexterity approach to be better suited to explore these relationships. This approach is complicated by the difficulty of obtaining data and comparing departments in the same company, because structural separation considers that organizations undertake exploration and exploitation concurrently in different organizational units (Raisch *et al.*, 2009). Certain organizational units will have generalist HC that undertakes exploration while other units are more likely to have specialist HC to concentrate on exploitative activities. The way managers use their leadership to stimulate unit employees in their search for new knowledge and to upgrade their existing knowledge is thus vital to achieve organizational ambidexterity (Chang, 2016).

In light of the above, the aim of this study is to analyze the role of transactional and transformational leaders in generating organizational learning, as they are able to promote specific and generalist HC, respectively. Specifically, our contribution aims to bridge two important gaps in the literature: the role of HC in relation to leadership style and the resulting organizational learning, and the relevance of the department as a unit of analysis, adopting an ambidextrous approach and comparing firms' production and marketing departments.

To this end, this paper is structured as follows. The next three sections introduce the research framework and the hypotheses. The scope of the study, the measures and the results are presented in the methods section. Finally, the study conclusions are reported.

2. Leadership and human capital

Many researchers have advocated a paradigm shift from HR to HC in order to sustain firms' competitive advantage (McGregor *et al.*, 2004; Bontis and Fitz-Enz, 2002). Bontis (2001, p. 5) defined HC as "the combined knowledge, skill, innovativeness and ability of the company's individual employees to meet the task at hand." HR management practices, particularly staffing, training, performance appraisal and rewards, may be implemented to develop HC (Birasnav and Rangnekar, 2009; Snell and Dean, 1992). But HC is not only developed through HR management; other organizational processes should also be introduced. It is in this context that leadership emerges as a useful framework for explaining how HC is generated, since leadership style will provide the foundations on which to develop

employees' motivation, their relationships and their behavior patterns. HC must be understood as the most important resource in all types of organizations, but to reach its full potential it has to be effectively managed (Hitt and Ireland, 2002; Lesser and Prusak, 2001).

Elenkov *et al.* (2005) define leadership as “the process of forming a vision for the future, communicating it to subordinates, stimulating and motivating followers, and engaging in strategy-supportive exchanges with peers and subordinates.” Leadership has been identified as one of the most important factors affecting organizational innovation, especially in the way transformational leadership can empower subordinates and create an appropriate climate for innovation (Jung *et al.*, 2003), following the line of Bass (1985).

Bass's framework was developed within larger organizational contexts (Burns, 1978), and has been successfully applied to the study of top-level managers (Zhu *et al.*, 2005; Judge and Piccolo, 2004; Lowe *et al.*, 1996). We therefore focus on top-level transformational and transactional leaders to explore the relationship between leadership and HC (Zhu *et al.*, 2005; Avolio and Bass, 1991; Bass, 1985).

Transactional leadership refers to managers' contingent reward behavior (providing constructive feedback and valuing individual contributions), management by exception (clarifying what the follower has to do and taking remedial actions if needed) and laissez-faire behaviors. In contrast, transformational leadership style is characterized by charismatic influence (serving as a good work model), inspirational motivation, intellectual stimulation (being open to new ideas) and individual consideration behaviors, moving followers away from their self-interest by providing support, mentoring and coaching (Avolio and Bass, 1991; Bass, 1985).

HC refers to employees' knowledge, skills, capabilities, commitment, know-how and ideas, which add economic value to firms (Birasnav and Rangnekar, 2009; Sullivan, 1999; Ulrich *et al.*, 1999; Becker, 1962). Kang and Snell (2009) distinguish between specialists and generalists. Specialists have deep knowledge in a specific domain while generalists are more versatile and equipped with a variety of useful skills for different situations. Transactional leadership helps organizations to achieve their current objectives more efficiently through rewards linked to job performance, and by providing employees with the resources they need to do their work (Zhu *et al.*, 2005). Transactional leaders, who are more oriented to achieving efficiency, are more likely to foster specialized HC. This specialist HC is more interested in acquiring new knowledge in its own area than expanding knowledge beyond it (Brown and Duguid, 1991).

Conversely, generalists have more diverse mental models, knowledge distributed across different areas and a better disposition to discover and apply new knowledge (Taylor and Greve, 2006; Bunderson and Sutcliffe, 2002; Wright and Snell, 1998). All these characteristics facilitate innovation, which in turn interests transformational leaders (Elenkov *et al.*, 2005). Chang *et al.* (2011) conclude that hiring and training multi-skilled core customer-contact staff has significant benefits for innovation. Firms benefit more from innovation when employees have sufficient skills because workers have complementary capabilities and learning abilities (Trung *et al.*, 2014). Through intellectual stimulation, transformational leaders encourage their employees to be innovative and creative by promoting new approaches for solving problems without criticizing mistakes (Bass *et al.*, 2003). When leaders are supportive, creativity is more likely to occur; leaders' understanding of their employees is also crucial for stimulating creativity (Trung *et al.*, 2014). Transformational leaders identify employees' demands and needs, satisfy them and increase their levels of motivation (Akbari *et al.*, 2017). Ultimately, transformational leadership will result in high levels of cohesion, commitment, trust, motivation and performance in new organizational environments (Zhu *et al.*, 2005).

Based on the above arguments, we propose that transformational leadership – more oriented to innovation – will encourage generalist HC, while transactional leadership – centered

on efficiency of existing operations rather than acquisition of new capabilities (Shamir *et al.*, 1993) – will promote specialist HC. Transformational leaders can stimulate individual and team spirit among employees by coaching, encouraging and supporting them to tackle task-oriented problems in innovative ways (Birasnav *et al.*, 2011; Yukl, 2006). Moreover, each type of leader is likely to seek out those who are similar to themselves, forming teams with people who share their way of thinking or attitudes to risk-taking or experimentation. They may also develop their followers' knowledge and skills in their own style. The result of these leadership behaviors is that transformational leaders will more likely encourage generalist HC, and transactional leaders, specialist HC:

H1. Leadership is related to HC.

H1a. Transformational leadership is positively related to generalist HC.

H1b. Transactional leadership is positively related to specialist HC.

3. Leadership and organizational learning

Organizational learning has been suggested as a key process to maintain a sustainable competitive advantage (Kang and Snell, 2009). The actions of top managers can engender explorative and exploitative innovations (Chang and Hughes, 2012; Lubatkin *et al.*, 2006). But despite the growing interest in the topic, little is known about the role of CEO and top management teams in supporting organizational learning in their firms (Vera and Crossan, 2004). Some research studies have shown that leadership behaviors could be important antecedents of learning (Chang and Hughes, 2012; Smith and Tushman, 2005; Gibson and Birkinshaw, 2004; Tushman and O'Reilly, 1996). Nevertheless, leadership and organizational learning have largely remained disconnected fields of inquiry (Vera and Crossan, 2004), and knowledge about the impact of different leadership styles on supporting exploitative, explorative and ambidextrous learning is scarce. Moreover, most studies explore transformational leadership behavior, since such behavior contributes to creating HC, which in turn helps organizations achieve competitive advantage (Birasnav *et al.*, 2011), while the possibility that transactional leadership could also enhance efficiency is often ignored.

Although there is an implicit assumption that leaders are a guiding force behind organizational learning (Yukl, 2009; Lahteenmaki *et al.*, 2001), researchers have not defined the specific behaviors and mechanisms through which leaders impact on learning. We propose that depending on the type of learning an organization wants to promote, it should encourage different types of leadership. A leader should present the full range of leadership behaviors and the effectiveness of his or her leadership will be related to the relative frequency of each style (Sosik and Jung, 2010). Using only transactional or transformational leadership has been found to be ineffective in the long term (Chaimongkonrojna and Steane, 2015). Transformational leaders are often effective communicators; their idealized influence and inspirational motivation provides ideological explanations linking individuals' identities with the organizational identity. Transformational behaviors serve to engage individuals' self-concepts in the interest of the firm's mission (Jung *et al.*, 2003), and increase followers' intrinsic motivation to engage in exploratory learning. Leadership style plays an important role in promoting firm innovation, as leaders can take decisions to introduce new ideas into the organization, set goals and encourage behaviors to stimulate innovation among their subordinates (Dominguez Escrig *et al.*, 2016; Aragon-Correa *et al.*, 2007).

Through intellectual stimulation, transformational leaders encourage individuals to think unconventionally, examine problems from different angles and follow generative and exploratory thinking processes (Sosik *et al.*, 1997). By encouraging and displaying such behaviors, these leaders act as role models, and help spread these practices to lower levels of

management (Waldman and Yammarino, 1999). Transformational leaders are key actors in integrating processes to construct a learning organization. They are strategic players in creating a climate that stimulates the disciplines of organizational learning and their interaction (Densten, 2005; Slater and Naver, 1995; Senge, 1990). Leaders with transformational behaviors also champion innovation, recognize and identify with innovative ideas and drive enthusiasm for exploratory innovations across the organization (García-Morales *et al.*, 2008).

Transformational leaders look for new ways of working, challenge fixed mindsets and are more likely to reject conventional norms (Conger and Kanungo, 1987). Leaders who coach, counsel, mentor and train their followers can improve their skills and motivation to seek out opportunities and try new methods to deal with problems (Schneier *et al.*, 1988). Leaders who are perceived to have idealized influence will more readily become involved in risk-taking activities and are therefore more influential, effective and willing to trust their employees (Bass and Riggio, 2006).

Transformational leaders allow greater autonomy, stimulate employees intellectually and encourage and give them the freedom to solve task-oriented problems in new and different ways (Burpitt, 2009; Birasnav and Rangnekar, 2009). Indeed, Lee (2008) found that transformational leadership has a positive impact on innovativeness. Risk-tolerant leadership tends to encourage large, risky commitment of resources, such as investing in new products and services with new technology (Chang and Hughes, 2012; Wiklund and Shepherd, 2005).

The managerial thinking underlying transformational leadership creates flexibility of strategy, and develops HC, turning it into an appropriate set of skills to respond to a dynamic environment (Sarlak *et al.*, 2012).

Drawing on the idea that exploration is based on search, risk-taking, experimentation and innovation (March, 1991), transformational leadership behaviors are expected to positively influence exploration learning:

H2a. Transformational leadership is positively related to explorative learning.

Transactional leaders, in turn, tend to focus on maintaining the status quo, and organizational members' interaction with these leaders is based on exchanges in which individuals are specifically rewarded and recognized for meeting targets. Leaders with transactional behaviors also monitor individual and team performance to anticipate errors and take corrective action when required (Howell and Avolio, 1993). In contrast to transformational leaders, transactional leaders prioritize the efficiency of existing operations over acquiring new capabilities (Burpitt, 2009; Shamir *et al.*, 1993). In stable conditions, the leader's energy and efforts may be invested in exploiting the organization's current strategy, capabilities and markets (Burpitt, 2009; Jansen, 2004).

A transactional leader operates within the existing system or culture, tends to avoid risks and focuses on time constraints, standards and efficiency (Bass, 1985). Because transactional leaders promise their followers tangible rewards for achieving goals, they may encourage them to solve problems with the simplest and most straightforward method rather than challenging them to explore other alternatives (Amabile, 1998). Such leaders do not actively set out to enhance followers' innovativeness (Lee, 2008; Jung, 2001).

Exploitation creates reliability by refining familiar routines that are closely aligned with a company's experiences and embedded in organizational cognitions (Gilbert, 2005), ensuring efficiency and reducing risk and potential for loss (Burpitt, 2009). Therefore, considering that exploitative learning results from activities focused on refinement, production, efficiency and execution (leading to increased efficiency and proficiency) (March, 1991), we can expect transactional leadership to be positively related to exploitative learning:

H2b. Transactional leadership is positively related to exploitative learning.

4. Human capital and organizational learning

While many other factors may affect firms' ability to learn, HC has been identified as a crucial foundation for organizational learning (Kelly *et al.*, 2011). Individuals who are more open to new experiences and risks have been shown to contribute more to developing radical ideas, and characteristics such as motivation, educational profile, professional background and skills can influence the generation and implementation of ideas that lead to both incremental and radical innovation (Intan-Soraya and Chew, 2010; Baer, 2007; Romijn and Albaladejo, 2002). In light of Kang and Snell's (2009) distinction between generalist and specialist HC and the knowledge they involve, it seems reasonable to assume that each of these HC types may be related to organizational learning. Having diverse knowledge of multiple domains or deep knowledge in a specific domain will influence future knowledge search behaviors, whereas a specialist focus may imply that individuals are less willing and able to exchange and combine new knowledge beyond their specialized area (Dougherty, 1992).

As mentioned above, exploration derives from a relatively broad and generalized search to extend the firm's knowledge domains into unfamiliar or new terrains and/or to establish new combinatory mechanisms. Because generalist HC tends to be less entrenched in a particular perspective and can potentially adapt to discover, understand, combine and apply new knowledge in the future (Taylor and Greve, 2006; Shane, 2000), it is more predisposed to exploratory learning (Kang and Snell, 2009).

In contrast, exploitation causes firms to remain in familiar areas and rely on existing solutions, rather than seeking out innovative, emerging and pioneering knowledge (Kang and Snell, 2009; March, 1991). Specialist HC tends to be more effective for acquiring and assimilating new, in-depth knowledge, and is likely to focus on exploitation. Because the deeper knowledge that individuals already possess is necessary to improve exploitation, specialists are best positioned for exploitation learning. These considerations predict that:

H3a. Generalist HC is positively related to explorative learning.

H3b. Specialist HC is positively related to exploitative learning.

5. Mediation effect of human capital on the relationship between leadership and learning

So far, we have proposed that transformational leaders promote generalists, and they, in turn, are able to build exploratory learning; by contrast, transactional leaders encourage specialists, who may contribute to developing exploitative learning. This suggests that a firm's HC may be seen as a link or nexus between leadership style and organizational learning. The skills, ideas, information or attitudes for building knowledge are held by individuals, and leaders must be capable of transforming that HC into organizational learning (Zhu *et al.*, 2005). We have argued above that different leadership styles foster different types of HC and, in turn, HC engages in different types of organizational learning. In other words, HC may play a mediating role between leadership style and organizational learning, as proposed in our final hypothesis:

H4. HC will mediate the relationship between leadership style and organizational learning.

H4a. Generalist HC will mediate the relationship between transformational leadership and explorative learning.

H4b. Specialist HC will mediate the relationship between transactional leadership and exploitative learning (Figure 1).

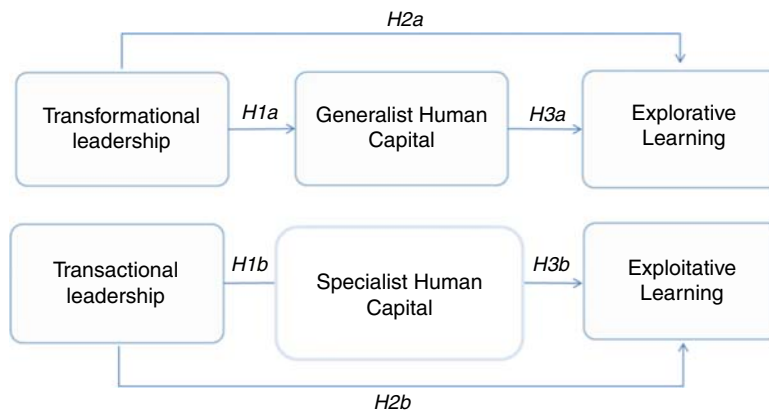


Figure 1.
Theoretical model

6. Method

6.1 Population and sample

Our population comprised Spanish manufacturing firms with more than 50 employees included in the SABI database. These firms were selected from the most innovative sectors in Spain in recent years (INE, 2005), namely, manufacture of machinery; manufacture of motor vehicles; manufacture of radios, TV and telecommunications equipment; and the chemical activities sectors. These five industries are all in manufacturing sectors and they all perform innovative activities, which could help to control for common factor markets and inter-industry variance (Burpitt and Valle, 2010). Several studies on organizational learning have considered manufacturing firms to test their hypotheses (e.g. Burpitt and Valle, 2010; Lee and Huang, 2012; Huang and Li, 2017). Our population included 530 Spanish manufacturing firms.

Structural ambidexterity refers to the organization's capacity to enable dualism, by creating some units specifically focused on alignment or continuity, and others centered solely on the rapidly changing demands of the environment (Jansen *et al.*, 2009; Duncan, 1976). Therefore, structural ambidexterity implies that organizational units engaged in exploration are physically separated from those involving exploitation (Tushman and O'Reilly, 1996). In line with the structural ambidexterity perspective adopted in this study, our unit of analysis is organizational departments. We selected HR, production and marketing units or departments, the managers of which were the respondents for the study. These managers have information about employees' characteristics and HRM practices in their departments, as well as information about the firm as a whole.

All the firms in the population were initially contacted by telephone. We then sent them three questionnaires covering issues of leadership style, HC and learning. The HR managers were asked to complete the questions about both the production and the marketing departments, and the production and marketing managers were asked about their own organizational units. A total of 107 firms returned the three questionnaires answered by the HR, production and marketing managers, yielding a 20.18 percent response rate. We also obtained only one questionnaire from 23 firms and two questionnaires from 11 firms, although this information was not used in this study.

We performed an ANOVA between respondent and non-respondent firms to identify potential non-response bias, considering industry membership, number of employees and revenue. The results revealed no significant differences between respondent and non-respondent firms.

The three questionnaires received from 107 firms, completed by the HR, production and marketing managers, were then analyzed to evaluate the degree of similarity between the

responses from the three manager types, by comparing their responses in pairs. Specifically, the responses from the HR managers were aggregated to the responses from the production managers, and to the responses from the marketing managers.

To this end, we calculated the interrater agreement index (rwg) to test correspondence between the different respondents in the same firm (Kozlowski and Hattrup, 1992), following the method proposed by James *et al.* (1993). This analysis yielded the following results in the production departments: rwg = 0.84 for transformational leadership, rwg = 0.76 for transactional leadership, rwg = 0.89 for specialist HC, rwg = 0.89 for generalist HC, rwg = 0.82 for exploration learning and rwg = 0.71 for exploitation learning. In the marketing departments we obtained rwg = 0.84 for transformational leadership, rwg = 0.95 for specialist HC, rwg = 0.91 for generalist HC, rwg = 0.82 for exploration learning and rwg = 0.73 for exploitation learning.

6.2 Measurements

The proposed hypotheses were tested using structural equation models, following the two-step process proposed by Anderson and Gerbing (1988). A confirmatory factor analysis (CFA) was performed to verify the reliability and validity of the scales and the composite reliability and discriminant validity analyses of the factors (Bagozzi and Phillips, 1982; Bagozzi *et al.*, 1991). Content validity was guaranteed by the literature review (Bollen, 1989). The CFA was performed using EQS software.

6.2.1 Dependent variables. Organizational learning was measured with scales adapted from Lubatkin *et al.* (2006) and Atuahene-Gima (2005). These authors identified two dimensions for organizational learning: exploitation and exploration learning. Lubatkin *et al.*'s (2006) scale includes 12 items, 6 items related to exploitation learning and 6 related to exploration learning. Atuahene-Gima (2005) measured exploitation and exploration learning using 8 and 9 items, respectively. We proposed a new scale to measure organizational learning linked to both the previous scales. Our scale includes the similar items from Lubatkin *et al.* (2006) and Atuahene-Gima (2005) as well as the different items proposed by these authors. Our final scale has a total of 17 items, 8 related to exploitation learning, and the other 9 to exploration learning.

A K-means cluster analysis and an ANOVA were performed to examine the ratio of production and marketing units devoted to exploitation and exploration learning in our sample. Results show that 91 (84.25 percent) production departments engaged in exploitation learning and 70 (64.82 percent) marketing departments carried out exploration learning. We can therefore conclude that production departments are exploitative organizational units, whereas marketing departments are explorative organizational units.

6.2.2 Independent and mediating variables. We adapted the scales from Subramaniam and Youndt (2005) and Kang and Snell (2009) to measure organizational HC. Subramaniam and Youndt (2005) measure HC with five items, as a dimension of intellectual capital. Four of these items are related to specialist HC and one is related to generalist HC. Kang and Snell (2009) distinguish and describe two different types of HC: specialist and generalist HC. Our proposed scaled included nine items, five related to specialist HC and four related to generalist HC.

The leadership styles considered in this study – transformational and transactional leadership – were adapted from the items proposed in previous research. Specifically, the 21-item scale from McKenzie *et al.* (2001) was used to measure transformational leadership style, and transactional leadership style was measured with Podsakoff *et al.*'s (1996) four-item scale.

6.2.3 Control variables. The control variables used in this study were firm size and department size, environmental turbulence and activity sector. These variables were

included in all the analyses and equations. Firm size was measured as the natural logarithm of the number of employees in the firm. Department size (production or marketing department) was measured as the natural logarithm of the number of employees in the department. Environmental turbulence was measured with the environmental turbulence scale proposed by Jansen *et al.* (2006). Finally, we selected five different activity sectors ranked from sector 1 to sector 5. Sector 1 was chosen as a reference category and is not included in the analysis. The other categories were introduced as dummy variables, taking the value of 1 when the firms belong to the corresponding sector and 0 otherwise.

In this study all items were measured on a seven-point Likert scale (1 = totally disagree, 7 = totally agree). Some of the original scales used a five-point Likert scale.

The reliability and validity of the scales were verified by CFA using EQS. CFA is a statistical technique used to verify the factor structure of a set of observed variables, and allows researchers to test the hypothesis that there is a relationship between observed variables and their underlying latent constructs. Based on knowledge of the theory and/or empirical research, the researcher first postulates the relationship pattern and then tests the hypothesis statistically.

Tables I and II report the results of the CFA for production and marketing units, respectively, comprising leadership style, HC and organizational learning for each department.

Table I presents the results for the production departments. Two factors were obtained for transformational leadership ($t = 2.671$; $t = 2.319$) and one for transactional leadership ($t = 2.974$). Two factors capture employees' HC: specialist HC ($t = 2.436$) and generalist HC ($t = 2.031$). For organizational learning we found two significant factors, one for exploitative learning ($t = 3.393$) and one for explorative learning ($t = 4.419$). Table II shows the results for the marketing departments. Two factors were obtained for transformational leadership ($t = 1.980$; $t = 2.664$), but none were obtained for transactional leadership. Two factors capture employees' HC: specialist HC ($t = 2.561$) and generalist HC ($t = 2.770$). For organizational learning we found one significant factor for exploitative learning ($t = 2.736$) and one for explorative learning ($t = 4.132$). In all cases, t -values were higher than 1.96, confirming that all the factors are significant at 95 percent.

Tables I and II also include the goodness-of-fit-indices from the CFA. In both cases, all indicators are favorable. The two tables only report the significant indicators for each factor, and confirm the convergent validity in all cases, due to the high and statistically significant values of the standardized factor loadings (Bagozzi *et al.*, 1991; Hair *et al.*, 1999).

From Tables III and IV we can conclude that the scales are reliable and that convergent and discriminant validity are confirmed for both the production and the marketing departments. Discriminant validity was confirmed following the procedures proposed by Fornell and Larcker (1981). Tables III and IV show that the average variance extracted (the main diagonal in the two tables) is higher than the square of the correlations between factors in both cases.

We use structural equation modeling to test the research hypotheses, applying the methodology proposed by Anderson and Gerbing (1988). The correlations between the different factors and their significance were analyzed, as well as the composite reliability associated with each factor (Tables V and VI).

6.3 Results

6.3.1 Testing the hypotheses. The hypotheses proposed were tested using covariance structure models. We started with the theoretical model in which the leadership style has some effect on employees' HC, which in turn affects learning. This model assumes that HC plays a mediator role between leadership and learning.

Table I.
Confirmatory analysis
factor (standardized
solution): production
department

	Transformational leadership_1	Transformational leadership_2	Transactional leadership	Specialist human capital	Generalist human capital	Exploration learning	Exploitation learning	t-statistic
VIS_2: Paints an interest picture of the future of our group	0.874							6.084
VIS_3: Has a clear understanding of where we are going	0.815							2.957
VIS_4: Inspires other with his/her plans for the future	0.855							3.329
APY_1: Acts without considering my feelings		0.845						3.171
APY_2: Shows respect for my personal feelings		0.873						1.803
TRNS_2: Gives me special recognition when my work is very good			0.872					2.487
TRNS_3: Commends me when I do better than average work			0.809					4.857
TRNS_4: Complements me personally when I do understanding work			0.858					4.700
SPEC_1: Our employees are highly skilled in a very particular knowledge domain				0.817				4.973
SPEC_2: Our employees have knowledge that is deeper in a particular domain				0.778				3.859
SPEC_3: Our employees have a specific repertoire of capabilities				0.702				4.393
SPEC_4: Our employees can use their capabilities across specific situations				0.868				5.198
GEN_1: Our employees are experts in their particular jobs and functions					0.869			5.198
GEN_2: Our employees are multi-skilled in multiple knowledge domains					0.624			5.878
GEN_3: Our employees are able for varied interpretations of problems and situations					0.826			5.233

(continued)

	Transformational leadership_1	Transformational leadership_2	Transactional leadership	Specialist human capital	Generalist human capital	Exploration learning	Exploitation learning	t-statistic
GEN_4: Our employees have the potential to adapt in order to discover, comprehend, combine and apply new knowledge in the future					0.791			5.101
PLOMAT_3: Learns product development skills and processes entirely new to the industry						0.749		4.764
PLOMAT_5: Aggressively ventures into new market segments						0.811		5.266
PLOMAT_6: Acquires entirely new managerial and organizational skills that are important for innovation						0.749		5.258
PLOMAT_7: Looks for creative ways to satisfy its customer's needs						0.766		4.010
PLOMAT_8: Learns new skills in areas such as funding new technology, staffing R&D function, training and development of R&D and engineering personnel for the first time						0.819		4.629
PLOMAT_9: Upgrades current knowledge and skills for familiar products and technologies							0.777	4.898
PLOMAT_10: Upgrades current knowledge and skills for familiar products and technologies							0.825	3.976
PLOMAT_12: Invests in enhancing skills in exploiting mature technologies that improve productivity of current innovation operations							0.821	3.332
PLOMAT_14: Fine-tunes what it offers to keep its current customers satisfied							0.782	5.939

Notes: $n = 107$. Goodness-of-fit indices: Satorra-Bentler $\chi^2 = 303.9834$; $p = 0.03542$; BB-NFI = 0.814; BB-NNFI = 0.824; CFI = 0.867; RMSEA = 0.043; df = 775

Table I.

Table II.
Confirmatory analysis
factor (standardized
solution): marketing
department

	Transformational leadership_1	Transformational leadership_2	Specialist human capital	Generalist human capital	Exploration learning	Exploitation learning	t-statistic
VIS_1: Is always seeking new opportunities for the unit/ department	0.804						5.577
VIS_2: Paints an interest picture of the future of our group	0.834						2.902
VIS_3: Has a clear understanding where we are going	0.861						4.121
VIS_4: Inspires other with his/her plans for the future	0.863						4.365
APY_1: Acts without considering my feelings		0.874					2.265
APY_2: Shows respect for my personal feelings		0.861					2.964
SPEC_1: Our employees are highly skilled in a very particular knowledge domain			0.856				2.673
SPEC_3: Our employees have a specific repertoire of capabilities			0.781				2.487
SPEC_4: Our employees can use their capabilities across specific situations			0.725				4.386
GEN_1: Our employees are experts in their particular jobs and functions				0.852			2.050
GEN_3: Our employees are able for varied interpretations of problems and situations				0.751			3.324
GEN_4: Our employees have the potential adaptability to discover, comprehend, combine and apply new knowledge in the future				0.866			5.704
PLORAT_3: Learned product development skills and processes entirely new to the industry					0.807		4.412
PLORAT_4: Creates products or services that are innovative to the firm					0.759		4.163
PLORAT_8: Learned new skills in areas such as funding new technology, staffing R&D function, training and development of R&D and engineering personnel for the first time					0.637		5.536
PLOTT_14: Fine-tunes what it offers to keep its current customers satisfied						0.742	4.734
PLOTT_16: Continuously improves the quality and reliability of its products and services						0.727	3.918
PLOTT_17: Fine-tunes what it offers to keep its current customers satisfied						0.868	3.324

Notes: $n = 107$. Goodness-of-fit indices: Satorra-Bentler $\chi^2 = 96.1727$; $p = 0.028316$; BB-NFI = 0.872; BB-NNFI = 0.932; CFI = 0.949; RMSEA = 0.027; df = 704

	Transformational leadership_1	Transformational leadership_2	Transactional leadership	Specialist HC	Generalist HC	Exploration learning	Exploitation learning	Composite reliability
Transformational leadership_1	0.7092							0.885
Transformational leadership_2	0.2116	0.6347						0.849
Transactional leadership	0.1755	0.1697	0.7170					0.883
Specialist human capital	0.0906	0.0973	0.0829	0.6297				0.871
Generalist human capital	0.0882	0.0942	0.0812	0.1011	0.7399			0.862
Exploration learning	0.0670	0.0655	0.0585	0.0590	0.0615	0.6074		0.885
Exploitation learning	0.0900	0.0888	0.0772	0.0745	0.0750	0.0992	0.6424	0.877

Notes: $n = 107$. The values on the diagonal are the average variance extracted for each factor

Table III.
Discriminant validity
for the production
department

Table IV.
Discriminant validity
for the marketing
department

	Transformational leadership_1	Transformational leadership_2	Specialist HC	Generalist HC	Exploration learning	Exploitation learning	Composite reliability
Transformational leadership_1	0.757						0.906
Transformational leadership_2	0.550	0.636					0.858
Specialist HC	0.428	0.434	0.622				0.831
Generalist HC	0.438	0.446	0.429	0.702			0.863
Exploration learning	0.242	0.263	0.264	0.273	0.544		0.780
Exploitation learning	0.361	0.374	0.295	0.299	0.257	0.615	0.827

Notes: $n = 107$. The values on the diagonal are the average variance extracted for each factor

	Transformational leadership_1	Transformational leadership_2	Transactional leadership	Specialist HC	Generalist HC	Exploration learning	Exploitation learning	Mean	SD
Transformational leadership_1	0.885							5.925	0.744
Transformational leadership_2	0.46	0.849						5.633	0.817
Transactional leadership	0.419	0.412	0.883					5.352	0.931
Specialist HC	0.301	0.312	0.288	0.871				5.667	0.887
Generalist HC	0.297	0.307	0.285	0.318	0.862			5.349	1.048
Exploration learning	0.259	0.256	0.242	0.243	0.248	0.885		5.289	1.418
Exploitation learning	0.3	0.298	0.278	0.273	0.274	0.315	0.877	4.251	1.685

Notes: $n = 107$. The values on the diagonal are the composite reliability of each factor

Table V.
Means, standard deviations and correlations between factors and composite reliability for the production department

Table VI.
Means, standard deviations and correlations between factors and composite reliability for the marketing department

	Transformational leadership_1	Transformational leadership_2	Specialist HC	Generalist HC	Exploration learning	Exploitation learning	Mean	SD
Transformational leadership_1	0.906						5.926	0.744
Transformational leadership_2	0.55	0.858					5.633	0.817
Specialist HC	0.428	0.434	0.831				5.609	0.889
Generalist HC	0.438	0.446	0.429	0.863			5.560	0.937
Exploration learning	0.242	0.263	0.264	0.273	0.780		5.401	1.294
Exploitation learning	0.361	0.374	0.295	0.299	0.257	0.827	4.763	1.633

Notes: $n = 107$. The values on the diagonal are the composite reliability of each factor

The results for the relationships between HC and leadership show that in the production departments (Equation (1) in Table VII) both transactional and transformational leadership styles are positively and directly related to specialist HC. In turn, transformational leadership in the marketing departments is positively associated with generalist HC (Equation (1) in Table VIII). *H.1.1* and *H.1.2* are therefore supported. These results are presented in Figures 2 and 3.

In addition, our results show that transformational leadership is directly and positively associated with exploitation learning in both the production departments (Equation (2) in Table VII), and the marketing departments (Equation (2) in Table VIII). *H2a* is therefore supported, although *H2b* is not.

Our findings also show that specialist HC is positively associated with exploitation learning (Equation (2) in Table VII) and generalist HC is positively related to exploration learning (Equation (2) in Table VIII). *H3a* and *H3b* are therefore supported.

At last, in order to verify the existence of mediator effects of HC on the relationships between leadership and organizational learning, we examine Equation (2) in Tables VII and VIII. These results initially support the mediating effect of HC in the relationships between leadership style and learning. Table VII shows that in the production departments, the relationship between transformational leadership and exploitation learning is mediated by specialist HC. In the marketing departments (Table VIII) generalist HC mediates the relationship between transformational leadership and exploration learning. *H4* is therefore supported.

7. Conclusions

The aim of this study was to investigate the role of HC in the link between leadership and organizational learning. We proposed that different leadership styles promote specialist or generalist HC, which in turn, lead to different organizational learning (exploitative or explorative learning, respectively). To test the hypotheses, we adopted a structural

	Equation (1) dependent variable: specialist HC	Equation (2) dependent variable: exploitation learning
<i>Control variables</i>		
Environmental turbulence	ns	ns
Firm size	2.471**	ns
Production department size	ns	0.204***
Chemical industry	ns	ns
Manufacture of radios, TV and telecommunications equipment	ns	0.239***
Manufacture of machinery	ns	ns
Manufacture of motor vehicles	ns	ns
<i>Independent variables</i>		
Transactional leadership	0.252*	ns
Transformational leadership	0.310*	0.246***
Specialist HC	–	0.360***
Generalist HC	–	ns
	Goodness-of-fit indices: Satorra-Bentler $\chi^2 = 239.1619$; $p = 0.02423$; BB-NFI = 0.817; BB-NNFI = 0.821; CFI = 0.883; RMSEA = 0.044; df = 198	Goodness-of-fit indices: Satorra-Bentler $\chi^2 = 220.1105$; $p = 0.03547$; BB-NFI = 0.834; BB-NNFI = 0.843; CFI = 0.897; RMSEA = 0.043; df = 184

Notes: $n = 107$. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table VII.
Results for the
production
department

	Equation (1) dependent variable: generalist HC	Equation (2) dependent variable: exploration learning
<i>Control variables</i>		
Environmental turbulence	0.497***	ns
Firm size (F9)	ns	ns
Marketing department size	ns	ns
Manufacture of radios, TV and telecommunications equipment	0.192**	ns
Chemical industry	ns	ns
Manufacture of machinery	0.115**	ns
Manufacture of motor vehicles	ns	ns
<i>Independent variables</i>		
Transformational leadership	0.359***	0.689***
Transactional leadership	ns	ns
Specialist HC	-	0.357***
Generalist HC	-	ns
Goodness-of-fit indices: Satorra-Bentler $\chi^2 = 166.7858$; $p = 0.06081$; BB-NFI = 0.811; BB-NNFI = 0.866; CFI = 0.894; RMSEA = 0.042; df = 140		Goodness-of-fit indices: Satorra-Bentler $\chi^2 = 184.6767$; $p = 0.07988$; BB-NFI = 0.814; BB-NNFI = 0.887; CFI = 0.909; RMSEA = 0.039; df = 159

Table VIII.
Results for the marketing department
Notes: $n = 107$. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Figure 2.
Results for the marketing department

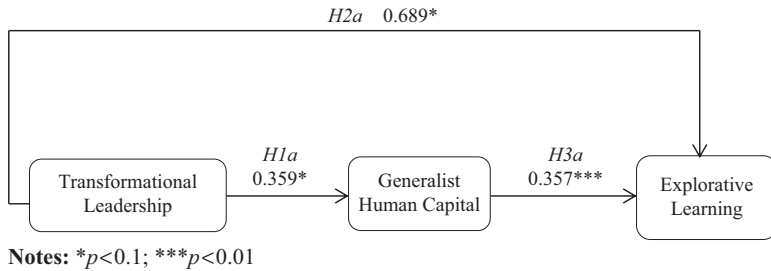
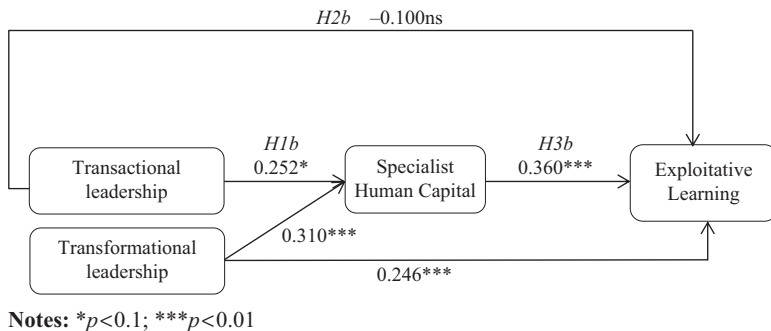


Figure 3.
Results for the production department



ambidexterity approach as we consider that organizations need units working on both types of learning.

We found that transactional leaders promote specialist HC, and transformational leaders encourage generalist HC, as we proposed. However, the former relationship was only found in the production departments, and the latter, in the marketing departments. Contrary to our expectations, transformational leadership is also related to specialist HC in the production departments. Regarding the kind of organizational learning that leaders encourage, we confirmed that transformational leaders stimulate exploration learning (marketing departments), but in contrast to our hypothesis, these leaders are also able to promote exploitation learning (production departments). On the other hand, transactional leaders do not appear to be directly linked with either type of learning; their only influence on learning is through HC. Specifically, they support specialist HC, which in turn leads to exploitative learning. In sum, we confirm that HC acts as a mediation variable between leadership and type of organizational learning. However, it is important to note that the link between specialists and exploitation learning only arises in the production departments, and the positive effect of generalist HC on exploration learning only appears in the marketing departments.

Based on the above results, we now elaborate on the three main contributions of the research: the relevance of considering the department as a unit of analysis (structural ambidexterity approach), the significant role of transformational leaders in organizational learning and the mediating role of HC. First, the department emerges as a key factor in understanding what kind of learning is generated, so our results are consistent with the structural approach. All organizations learn by exploring or exploiting knowledge, perhaps at different intensities, but both types of learning can be found in each organization (Vera and Crossan, 2004). Our results show that production departments are more inclined toward exploitation while marketing departments typically follow exploration learning. It is therefore interesting to highlight the preference of production units for efficiency, whereas marketing departments tend to prefer innovation. Even when a transformational leader is found in a production department, he or she is able to promote specialist HC to obtain exploitative learning. Our interpretation is that the unit prevails over leadership type in explaining which kind of knowledge is developed. A unit's innovation culture could therefore play a key role in understanding the influence of leaders, who may adapt to the existing culture. Previous research has highlighted the importance of leaders in generating an innovative culture (Sattayaraksa and Boon-itt, 2016), but only a transversal design reveals the association between the two variables. This confirms that contextual variables should be taken into account in order to further our understanding of the role leaders play in generating organizational learning.

The second contribution concerns the role of transformational leaders in organizational learning, as we have shown that they are able to promote both types of HC and, in turn, both types of organizational learning. Transformational leaders are consequently more versatile than transactional leaders, who are only able to stimulate specialist HC, and indirectly, exploitative learning. Our results suggest an issue that requires further research: whether transformational leaders are able to get the best out of employees, by making specialists exploit and generalists explore, or whether they only act according to the type of HC available. In the first case, we could say that transformational leaders are ambidextrous themselves, because they can act in different ways to generate the most appropriate HC for the type of organizational learning the organization wants. Such leaders would be able to take full advantage of their employees' knowledge, by making specialists exploit and generalists explore, which could be the best result for the organization because specialists can contribute with efficiency and generalists with innovation.

The second interpretation is that the transformational leaders in the study were simply adapting to the type of knowledge available in their departments. In any case, what our results reveal is that only transformational leaders are found behind generalist HC and

explorative learning. Hence, they appear to be a necessary condition for generating the most appropriate environment to stimulate employees' attitudes and capabilities and achieve explorative learning.

The third and final contribution of the paper is the mediating role of HC in organizational learning, which extends our understanding of the mechanisms through which leadership impacts on learning. HC emerges as the link between leadership and organizational learning, and as such is a prerequisite for both exploitative and explorative learning.

From a practical point of view, it seems that the versatility of transformational leaders makes them more suitable in the current changeable environment, as they can contribute to the flexibility of the firm. These results can show practitioners that transformational leaders are able to promote both types of HC and also exploitation and exploration learning in different organizational units. Although firms must actively build a climate of empowerment through appropriate HR practices to promote employee behavioral outcomes regardless of leadership behavior, the importance of leadership also appears to be clear (Chang, 2016). Moreover, recent research shows that transactional leadership behavior may be less effective in pursuing organizational innovation in a dynamic environment (Prasad and Junni, 2016).

Our study therefore suggests that transformational leaders are best suited to address ambidexterity. HR departments could usefully invest in developing this kind of leader, or bring in leaders with a transformational style through the selection process. This would ensure that the firm's leaders will act according to its needs, exploiting actual knowledge or exploring new knowledge. In any case, leaders should be aware of their special role in generating knowledge, and how they should contribute to developing the HC the organization requires.

This study has some limitations. First, HR practices are not included in this model; introducing such practices would provide a better understanding of the relationships between leadership, HC and organizational learning. Second, approaches other than the structural perspective could also be taken into account (Chang and Hughes, 2012). Third, individual learning is a necessary but insufficient condition for organizational learning (Youndt and Snell, 2004; Argyris and Schön, 1978). Future research could include social and organizational capital to extend understanding of the effect intellectual capital has on organizational learning. Other unsolved questions concern the usefulness and role of transactional leaders in organizational learning. Our results confirm the preference for transformational leaders, which is in line with other studies on the effectiveness of this leadership style in emergent change processes (van der Voet, 2014) and knowledge sharing at group and individual levels (Li *et al.*, 2014). Future research should also study other industries, with different intensities of innovation activities.

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Appendix. Scales

Organizational learning (Lubatkin *et al.*, 2006; Atuahene-Gima, 2005)

Exploratory learning: our employees [...]:

- (1) look for novel technological ideas by thinking "outside the box";
- (2) based their success on their ability to explore new technologies;
- (3) create products or services that are innovative to the firm;
- (4) look for creative ways to satisfy customers' needs;
- (5) aggressively venture into new market segments;
- (6) actively target new customer groups;
- (7) strengthen innovation skills in areas where they had no prior experience;
- (8) learn product development skills and processes entirely new to the industry; and
- (9) acquire manufacturing technologies and skills entirely new to the firm.

Exploitation learning: our employees [...]:

- (1) commit to improve quality and lower cost;
- (2) continuously improve the reliability of the firm's products and services;
- (3) increase the levels of automation in the firm's operations;
- (4) constantly survey existing customers' satisfaction;
- (5) fine-tune what they offer to keep current customers satisfied;
- (6) penetrate more deeply into the firm's existing customer base;
- (7) upgrade current knowledge and skills for familiar products and technologies; and
- (8) invest in enhancing skills in exploiting mature technologies that improve productivity of current innovation operations.

Human capital (Subramaniam and Youndt, 2005; Kang and Snell, 2009)

Specialist human capital:

- our employees are highly skilled in a very particular knowledge domain;
- our employees have knowledge that is deeper in a particular domain;
- our employees have a specific repertoire of capabilities;
- our employees can use their capabilities across specific situations; and
- our employees are experts in their particular jobs and functions.

Generalist human capital:

- our employees are experts in their particular job;
- our employees are multi-skilled in multiple knowledge domains;

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- our employees can make varied interpretations of problems and situations; and
 - our employees can potentially adapt to discover, comprehend, combine and apply new knowledge in the future.

Leadership (McKenzie *et al.*, 2001; Podsakoff *et al.*, 1996)

Transformational leadership:

- is always seeking new opportunities for the unit/department;
- paints an interesting picture of the future of our group;
- has a clear understanding of where we are going;
- inspires other with his/her plans for the future;
- is able to get others committed to his/her dream of the future;
- fosters collaboration among work groups;
- encourages employees to be “team players”;
- gets the group to work together for the same goal;
- develops a team attitude and spirit among his/her employees;
- acts without considering my feelings;
- shows respect for my personal feelings;
- behaves in a manner that is thoughtful of my personal needs;
- treats me without considering my personal feeling;
- shows us that he/she expects a lot of from us;
- insists on only the best performance;
- will no settle for second best;
- leads by “doing” rather than simply “telling”;
- provides a good model to follow;
- leads by example;
- has provided me with new ways of looking at things which used to be a puzzle for me; and
- has ideas that have forced me to rethink some of my own ideas I have never questioned before.

Transactional leadership:

- always gives me a positive feedback when I perform well;
- gives me special recognition when my work is very good;
- commends me when I do better than average work; and
- personally complements me when I do understanding work.

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