

Analysis of the influence of the environment, stakeholder integration capability, absorptive capacity, and technological skills on organizational performance through corporate entrepreneurship

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Abstract This research seeks to analyze how factors such as the environment, stakeholder integration capability, absorptive capacity, and technological skills influence corporate entrepreneurship, and the repercussions of corporate entrepreneurship for the organization's results. The hypotheses are tested empirically using a sample of 160 European technology firms. A positive relationship is found between the factors of the environment and stakeholder integration capability, and corporate entrepreneurship. The uncertainty and complexity of the environment in which the organization operates and its relationship with stakeholders require the firm to be involved in constant updating, collaboration between parties, and innovation of processes, products, and system to maintain competitive advantage. Further, the capacity to absorb new knowledge and develop technological skills can generate new, advanced technological processes. These processes foster corporate entrepreneurship to detect opportunities on the market and transform them into additional advantage over competitors. Corporate entrepreneurship increases organizational performance, as it entrusts entrepreneurs with the task of utilizing potentially value-creating resources more effectively than competitors.

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Introduction

In the new economic scenario, characterized by high dynamism and complexity, firms should develop new responses so that they can survive and succeed (Bojica & Fuentes Fuentes, 2012). Corporate entrepreneurship is a necessary condition for the creation of wealth (Bojica & Fuentes Fuentes, 2012; Phan, Wright, Ucbasaran, & Tan, 2009; Zahra, Filatotchev, & Wright, 2009). Various researchers show that corporate entrepreneurship is driven by the prior existence of different strategic factors analyzed extensively in the literature, for example, organizational structure (Covin, Green, & Slevin, 2006), cultural diversity (Richard, Barnett, Dwyer, & Chadwick, 2004), and form of government (Covin et al., 2006). However, few studies analyze the following issues: first, how the environment and the stakeholder's role affects entrepreneurial initiatives; second, how absorptive capacity is strategic for exploiting new business opportunities; and third, how technological skills enable exploitation of different kinds of opportunities, thereby fostering corporate entrepreneurship and increasing organizational performance (Antoncic & Hisrich, 2001; Hayton, 2005; Lee, Lee, & Pennings, 2001; Martin-Rojas, Garcia-Morales, & Garcia-Sanchez, 2011). Various studies insist on the need to deepen knowledge of these areas (e.g., Alvarez & Barney, 2005; Alvarez, Ireland, & Reuer, 2006; Bojica and Fuentes, Bojica & Fuentes Fuentes, 2012). This study seeks to tackle these three questions, while also analyzing (fourth) whether organizations can reach higher levels of organizational performance by fostering greater entrepreneurial spirit through strategic consideration of the environment, stakeholder integration, development of technological skills, and promotion of sufficient absorptive capacity.

Entrepreneurial spirit is understood as a mechanism that permits renewal of established organizations, fostering innovation and increasing capability to compete in global markets (Kuratko & Audretsch, 2013; Martin-Rojas et al., 2011). Growing interest in the study of entrepreneurial spirit comes from the belief that this attitude can lead to improved organizational performance (Covin & Slevin, 1991). Entrepreneurial spirit is a key element for obtaining a competitive advantage and better financial results. It is a process through which the firm can detect an opportunity and act creatively to create value (Jones & Butler, 1992; Schollhammer, 1982). Business entrepreneurship requires not only identification of people who wish to be entrepreneurs but also detection of the most valuable business opportunities for the organization (Shane & Venkataraman, 2000). Identifying and choosing the right opportunities to create new or advanced business depends on specific factors, such as those analyzed in this research (environment, stakeholder integration capability, absorptive capacity, and technological skills), as these factors influence the manager's or businessperson's capability to detect such new opportunities.

In sectors like the technology sector, firms are characterized especially by entrepreneurial behavior and high innovation. Such characteristics drive development of entrepreneurial activities, permitting firms to respond more rapidly to changes in the environment, obtain new products, and respond to current demands on the market (Jimenez & Sanz, 2005; Martin-Rojas et al., 2011). Entrepreneurial capacity permits

organizations to anticipate and to act in the face of future desires and needs in the market, benefitting from competitive advantage and the economic profit that it can produce in the organization (Fuentes et al., Fuentes Fuentes, Bojica, & Ruiz, 2010; Lumpkin & Dess, 1996).

To achieve the goals proposed, we have organized the research as follows. Theoretical background section explains the theoretical background. Hypotheses section proposes a series of hypotheses. Methodology section presents the data and research methodology used in the empirical analysis. Results section presents the results obtained. Finally, in Discussion section we discuss the results, implications of the research, and limitations of the study, as well as future lines of research.

Theoretical background

The increasing speed of technological advances requires faster innovations and changes if the organization is to maintain its competitive advantage. According to the theory of resources and capabilities and of dynamic capabilities, only firms that develop dynamic capabilities will be able to generate a competitive advantage (Barney, 1991; Teece, Pisano, & Shuen, 1997). According to this theoretical framework, and considering the variables to be studied, the environment is an important initial factor influencing strategy, structure, and the process of initiating any entrepreneurial activity, since the environment includes macroeconomic and structural factors that affect entrepreneurs' activity. Managers face short decision-making periods and pressure for rapid response, lack of stable market resources, increasingly rapid product obsolescence, etc.—conditions that generally lead to lack of long-term resource control (Stevenson, Roberts, & Grousbeck, 1994).

Entrepreneurial spirit is influenced by the different interest groups involved (Sharma & Henriques, 2005; Vandekerckhove & Dentchev, 2005). Interest groups are defined as individuals or groups whose interests the firm considers in order to achieve its strategic goals (groups that can affect the firm's performance) and other interest groups affected by the firm (Freeman, 1984; Goodpaster, 1991; Rueda, 2005). Proper management of stakeholders thus includes strategies and ethics, balancing consideration for both kinds of stakeholders. This process is performed through stakeholder integration capability, in which the firm establishes collaborative relationships based on trust in a wide range of stakeholders, thereby facilitating innovation capacity, continuous learning, and development of innovative entrepreneurial initiatives (Hart & Sharma, 2004; Kuratko, Hornsby, & Goldsby, 2007; Kuratko & Audretsch, 2013).

Along with these factors, absorptive capacity is key in the entrepreneurial process, as it permits the firm to recognize and explore new opportunities through construction of new capabilities, to create value, and to maintain competitive advantage (Zahra et al., 2009). Throughout the entrepreneurial process, absorptive capacity is a strategic factor, whose role should prioritize enabling the firm to acquire, assimilate, and use new knowledge dynamically and continuously over time (Reuber & Fischer, 1993).

Finally, technological skills enable the firm to foster dynamic, integrative capability to reconfigure its internal competences and promote the organizational change needed to meet the demands of the environment. Technological skills provide capability to respond more rapidly to an opportunity, since they make resources available to the

entrepreneur in a better way, enabling him/her to obtain competitive advantage and to exploit resources, bringing the firm greater profitability (Perez Lopez & Alegre, 2012).

Hypotheses

This section analyzes the influence of factors, primarily external to the firm, that influence corporate entrepreneurship, such as the environment (H1a) and stakeholders (H1b). It then examines the influence of absorptive capacity (H2) and technological skills (H3) and, finally, the influence of corporate entrepreneurship on organizational performance.

The influence of environment and stakeholder integration capability on corporate entrepreneurship

The environment is an essential factor influencing strategy, structure, and the processes of entrepreneurial activities (Wandosell, 2003). The characteristics that define the environment affect the fit between the firm's strategic behavior and corporate entrepreneurship (Covin & Slevin, 1989; Zahra & Garvis, 2000). Numerous studies have therefore analyzed the environmental factors that affect corporate entrepreneurship (e.g., Kuratko, Hornsby, & Goldsby, 2004; Sathe, 2003; Stopford & Baden-Fuller, 1994). Stevenson and Jarillo (1990) review studies of the figure of the entrepreneur and conclude that the environment is relevant, even essential, for entrepreneurial action. It not only provides opportunities to take advantage of the market's lack of efficiency but, above all, offers more or less favorable situations for the entrepreneur. Corporate entrepreneurship seems to depend not only on genetic or psychological characteristics of the entrepreneur but also on circumstances external to the entrepreneur that make him/her react, and recognize and exploit opportunity (Martin-Rojas et al., 2011). Without an environment that fosters detection of opportunities, corporate entrepreneurship will not develop (Stevenson & Jarillo, 1990).

Due to their higher orientation towards risk and proactiveness, entrepreneurial firms focus efforts broadly on identifying the scarce opportunities that emerge in hostile environments and exploiting these opportunities before they are discovered by less entrepreneurial businesses (Casillas, Moreno, & Barbero, 2011; Covin & Slevin, 1989; Cui, Sun, Xiao, & Zhao, 2016; Miller & Friesen, 1983). Environmental dynamism and hostility, combined with a centralized organizational structure in which owners and management work together to promote proactive and innovative behavior (Kuratko & Audretsch, 2013; Salvato, 2004), may stimulate the ability to create new business designs and enable corporate entrepreneurship. Companies that wish to be sustainable must self-renew and regenerate to face dynamic, innovative, and proactive environments.

A hostile and dynamic environment affects organizational performance (Covin & Slevin, 1989), giving rise to the need to establish entrepreneurial strategies to improve the organization's results (Zahra, 1991). For Lumpkin and Dess (1996), firms that face rapid evolution of the competitive environment are more inclined to apply strategies characterized by corporate entrepreneurship. Competitive intensity is one of the most influential strategic factors affecting development of corporate entrepreneurship, since

it forces firms to create and exploit new alternatives to maintain their competitive advantage (Ireland, Covin, & Kuratko, 2009; Porter, 1980). The absence of a competitive environment, motivation by the organization, and the right policies and incentives to detect opportunities make it harder for corporate entrepreneurship to emerge (Wandosell, 2003).

The environment plays a special strategic role in the case of technology firms (Covin & Slevin, 1989). Because the technology sector changes continuously, firms should promote technological improvement, seek strategic markets, develop innovative business models, and exploit and evaluate the opportunity to compete in different areas that distinguish them from the competition. Driven by the environment in which firms in the technology sector operate, technological changes require these firms to innovate continually and promote entrepreneurial activities to remain competitive on the market (Ireland et al., 2009). Based on the foregoing, we propose the following hypothesis:

H1a: The environment is positively related to corporate entrepreneurship.

Stakeholders such as investors, employees, managers, customers, and ONGs influence implementation of entrepreneurial strategies and the organization's performance (Kuratko et al., 2007). Greater knowledge of stakeholders and stakeholders' integration into the business can provide opportunities to develop new products and services (Vandekerckhove & Dentchev, 2005). Inclusion of expert knowledge and stakeholders' views (Pollard et al., 2004) enables the company to provide innovative methodologies to solve environmental problems (Agostini et al., 2012). Thanks to stakeholder integration in the firm, the company may renew itself and be proactive, assuming high risks when company structure must change to adapt to changing needs. It is within this framework that the role of entrepreneur gains importance, in identifying the opportunities that greater knowledge provides and exploiting them through entrepreneurial activities (Martin-Rojas et al., 2011). Thus, proactive management of stakeholders can give rise to intangible and socially complex resources that increase the firm's ability to excel over its competitors in long-term value creation (Hillman & Keim, 2001; Rueda, 2005). Long-term relationships with stakeholders can have dynamic repercussions in the firm, permitting it to respond rapidly to the changing circumstances of the environment (Harrison & St. John, 1996). This whole process will be possible through the integration of stakeholders in the firm, which leads to creation of relational interactions beyond mere economic exchange between the parties to develop long-term relations of trust. Further, creation of relational interactions with stakeholders can generate competitive advantages that are difficult for competitors to copy (Rueda et al., Rueda Manzanares, Aragon Correa, & Sharma, 2008).

The organization is also exposed to the needs of its stakeholders. It should maintain good relationships with these various groups, as they are potential suppliers of new entrepreneurial behavior (Vandekerckhove & Dentchev, 2005). The organization should share its stakeholders' tacit knowledge and be able to identify their needs, develop new products, and improve its services (Wiklund & Shepherd, 2003). The most entrepreneurial organizations identify and exploit these opportunities first and best (Martin-Rojas et al., 2011). More reactive, less entrepreneurial firms are less likely to find and exploit them to reap their benefits (Bojica and Fuentes, Bojica & Fuentes Fuentes, 2012). Stakeholder integration can help to generate ideas, technologies, and

new perspectives for entrepreneurial activity. Supplier or customer integration, for example, can help to design new products and services, produce knowledge to develop continuous innovation and learning capacities, and generate competitive imagination (Hart & Sharma, 2004; Sharma & Vredenburg, 1998).

Vandekerckhove and Dentchev (2005) propose two ways for the entrepreneur to discover the opportunities presented by relationships with stakeholders. The first is direct integration of the stakeholders in the firm's strategy to explore new business possibilities. This idea might seem to contradict what is required for the firm's achievement or profitability, but this is not the case. Greater participation of such groups in the firm gives the entrepreneur a new perspective on stakeholders' activities and identifies new business opportunities (Hart & Sharma, 2004). As Sharma and Henriques (2005) argue, when firm and stakeholders interdepend for a great number of resources, the two parties are very likely to adopt a strategy of direct influence to satisfy both groups' goals (Frooman, 1999). For example, in the forestry industry, the most important customers (e.g., construction firms, furniture manufacturers) work with supply firms to implement norms and practices of more sustainable forestry certification and lumber exploitation.

Second, we propose that the entrepreneur be involved with stakeholders indirectly to obtain information for effective resolution of possible conflicts between them. The opportunities that arise from stakeholder round tables permit the entrepreneur to engage in a process of continuous and creative learning that enables him or her to capture the information and opportunities from these processes. In this way, the firm can fulfill stakeholders' expectations—the commitments and considerations of each stakeholder—and improve the firm's situation (Vandekerckhove & Dentchev, 2005). For example, environmental groups and ecological associations participate actively in the evaluation meetings of the Canadian government to renew or reject permits for exploitation of forests (Sharma & Henriques, 2005). The same occurs when they demand changes in contractual practices, establishing, for example, that one may only buy wood products from Canadian firms that adopt sustainable practices. This is a strategy of indirect influence (Sharma & Henriques, 2005).

Given this perspective and the variety of economic and social issues involved, development of entrepreneurial activities transcends the organization's boundaries and requires knowing the views of a wide range of stakeholders, both internal and external (Westley & Vredenburg, 1991). Integrating stakeholders into varied perspectives within the firm encourages adoption and creation of new business designs to face constantly changing priorities (Agostini et al., 2012). Consequently, the more developed knowledge flow the stakeholder integration capabilities allow, the better the company's organizational innovation will be.

Entrepreneurs are considering stakeholders' increasingly influential role, changing their way of thinking, and including these factors in the concept of corporate entrepreneurial capacity (McGrath & MacMillan, 2000). The new opportunities proposed often require a new definition of the firm's purpose in adapting to changes implied by development of products and services, taking stakeholders into account. Based on the foregoing, we propose the following hypothesis:

H2a. *Stakeholder integration capability is positively related to corporate entrepreneurship.*

The influence of absorptive capacity on corporate entrepreneurship

Absorptive capacity indicates the firm's capacity to identify, accumulate, process, and use the new knowledge acquired from external sources (Zahra et al., 2009). This capacity can significantly improve the firm's ability to recognize and explore new opportunities through construction of new capabilities and reduction of cognitive rigidity among the firm's top managers. The external knowledge transmitted and disseminated through the firm's absorptive capacity can improve the knowledge already available in the organization and lead managers to explore different entrepreneurial strategies that encourage the firm's growth (Cohen & Levinthal, 1990; Zahra et al., 2009). Firms should thus develop their absorptive capacity to recognize, evaluate, assimilate, and exploit new knowledge, as these activities are crucial for effective integration of varied knowledge and resources, as well as generation of entrepreneurial activities and competitive advantage (Sirmon, Hitt, & Ireland, 2007).

The greater the ability to use this knowledge, the greater the tendency to promote proactive behavior—to foster active search for new opportunities (rather than waiting for failure [Cohen & Levinthal, 1990]), new business creation, and renovation of the firm (Heavey & Simsek, 2013). Although SMEs have fewer such resources than larger firms, SMEs can also innovate to obtain entrepreneurial deals when partners share knowledge (Bouncken & Kraus, 2013; Garcia-Morales, Bolivar-Ramos, & Martin-Rojas, 2014). Knowledge, specifically absorptive capacity, is thus a strategic entrepreneurial factor (Barney, 1991; Barney, Wright, & Ketchen, 2001). For Oviatt and McDougall (2005), business opportunities depend on the intensity of knowledge the firm possesses. Identification, evaluation, and potential exploitation of opportunity are thus influenced by the organization's attitudes and networks, as well as the know-how available (Sommer & Haug, 2011). These activities enable innovation in firms.

Absorptive capacity facilitates exploration activities that improve the firm's innovation capacity, driving value creation (Zahra et al., 2009). Firms with high levels of absorptive capacity have greater capacity to learn how to develop and use new knowledge in entrepreneurial activities (Leonard-Barton, 1992; Zahra & George, 2002). New knowledge changes established routines, permitting the firm to generate new capabilities and entrepreneurial opportunities (Bojica and Fuentes, Bojica & Fuentes Fuentes, 2012). To construct these capabilities, firms must mobilize significant resources, develop new systems for combining these resources, and deploy assets in very different ways to seek new sources of competitive advantage and explore innovative options. Greater knowledge can nourish the firm's ability to exploit existing resources, supporting entrepreneurial activities and initiatives to increase value creation (Sirmon et al., 2007).

The continuous search for and exploitation of new business opportunities also requires injection of resources and new knowledge, and use of multiple external sources (Zahra et al., 2009). If the firm does not develop absorptive capacity and demonstrates an attitude of inactivity toward technological advance, new products, etc., it may not recognize opportunities its environment offers and may lose competitiveness (Cohen & Levinthal, 1990). Firms that acquire and exploit knowledge from external sources tend to improve their sources for resources. This knowledge and the businessperson's ability to recognize opportunities and mobilize resources to bring new inventions to the market affect the organization's results (Bojica & Fuentes Fuentes, 2012; Qian & Acs, 2013). Absorptive capacity can indicate new uses for current resources to

fill resource gaps generated by the firm's behavior. In firms with a proactive strategic orientation, absorptive capacity improves ability to respond to a dynamic environment, providing the best conditions to translate entrepreneurial strategy into greater performance (Bojica and Fuentes, Bojica & Fuentes Fuentes, 2012). Superior absorptive capacity increases the firm's capability to recognize opportunities proactively instead of reactively (Thorpe, Holt, Macpherson, & Pittaway, 2005).

In conclusion, absorptive capacity permits exploitation and integration of external knowledge, increasing chances for better comprehension of the opportunity and thus better ability to respond to entrepreneurial activities (Zahra, Nielsen, & Bogner, 1999). These activities involve a process of acquisition, assimilation, and knowledge use, and the ability to mobilize external resources, attract customers, and identify entrepreneurial opportunities (Fuentes et al., Fuentes Fuentes et al., 2010; Granovetter, 1985). Based on the foregoing, we propose the following hypothesis:

H2. *Absorptive capacity is positively related to corporate entrepreneurship.*

The influence of technological skills on corporate entrepreneurship

The organization will have greater corporate entrepreneurship if it fosters technological skills (Kelley, 2011). Managers with technological skills are better able to detect opportunities in the environment. Through corporate entrepreneurship, they can develop products or deliver services that are more difficult for the competition to imitate or substitute (Perez and Alegre, Perez Lopez & Alegre, 2012), generating competitive advantage and obtaining greater profitability (Martin-Rojas et al., 2011). Fostering such technological skills in managers is a necessary condition for developing corporate entrepreneurship (Brio & Junquera, 2003). Entrepreneurs possess a series of remarkable skills (among them, technological skills) that permit them to innovate and respond to existing opportunities in dynamic and turbulent environments (Leonard-Barton, 1992). Technological skills foster creation of an organizational structure that supports entrepreneurial activities, increases preparation for entrepreneurship, and improves evaluation and decision making (Kelley, 2011). Organizational technological skills have been shown to be a key factor helping entrepreneurs to discover different technological opportunities obtained by 'achieving the impossible' and inventing their way out of difficulties (D'Este et al., D, Mahdi, Neely, & Rentocchini, 2012). The more dynamic and innovative (technological) skills the company has, the more successful its process of organizational innovation and the more it will foster a technologically proactive attitude (Martin-Rojas, Garcia-Morales, & Bolivar-Ramos, 2013).

The firm's success is thus based to a great extent having group of people with experience in technological skills who promote corporate entrepreneurship (Antoncic & Hisrich, 2001; Cooper, 1973; Omerzel & Antoncic, 2008). Most successful new technology-based ventures and corporate entrepreneurship (Antoncic & Prodan, 2008) are developed by a group of people (Cooper, 1973) whose experienced technological skills are pivotal in renovating the organization for excellent command of corporate entrepreneurship (Fontes, 2005; Martin-Rojas et al., 2013; Martin-Rojas, Fernandez-Perez, & Garcia-Sanchez, 2016; Omerzel & Antoncic, 2008).

Authors like Zahra and Garvis (2000) stress that US firms promote development of technological skills tied closely to corporate entrepreneurship. According to various studies, organizations in these circumstances, pressed to develop such technological skills among their personnel, should propose plans to work with educators, universities, etc. to recognize the challenges and opportunities of the current economy. They must make the necessary changes in training programs to develop the knowledge and technological skills that employees, managers, and business owners will need in the new economy (Boyles, 2012; Lemke, Coughlin, Thadani, & Martin-Rojas, 2003; Vockley, 2008; Wagner, 2008). Technological skills generate capability to think and reason logically, and more open vision to solve complex problems and recognize opportunities in today's dynamic environments (Boyles, 2012; DeTienne & Chandler, 2004; Hills & Shrader, 1998). Technological skills thus impact corporate entrepreneurship positively through new business creation, innovative processes, proactive personnel, and efficient renovation of the company.

Further, for managers to discover technological opportunities and perform entrepreneurial activities, they must already possess the strategic information that permits them to detect these opportunities. Technological skills are key in gathering crucial information to discover business opportunities (Shane & Venkataraman, 2000). Damanpour (1991) shows that technological skills in the organization's managers facilitate entrepreneurial and business activity. Technological skills encourage better exploitation of existing resources and opportunities, driving entrepreneurial activities that permit greater competitive advantage and profitability for the firm (Perez and Alegre, Perez Lopez & Alegre, 2012). Based on the foregoing, we propose the following hypothesis:

H3. *Technological skills are positively related to corporate entrepreneurship.*

The influence of corporate entrepreneurship on organizational performance

Corporate entrepreneurship is a strategic variable for the survival of organizations in highly competitive environments like the current one (Batjargal, 2007). It promotes achievement of competitive advantage (Antoncic & Prodan, 2008; Covin & Slevin, 1991; Zahra, 1991, 1993). In the current environment of hostility, world crisis, and shrinking business opportunities, firms should foster entrepreneurial corporate activities that permit managers to seek innovative solutions to reduce or manage sources of instability and hostility (Covin & Slevin, 1991; Martin-Rojas et al., 2011; Zahra, 1993). Organizations should identify and neutralize threats and weaknesses through entrepreneurial activities that permit them to obtain higher levels of growth and profitability (Antoncic & Hisrich, 2001; Batjargal, 2007). There is a positive relationship between corporate entrepreneurship and the organization's growth and profitability (Antoncic & Hisrich, 2001; Martin-Rojas et al., 2011).

In technology firms, entrepreneurial behavior promotes development of entrepreneurial opportunities, generating new products or services and fostering business alliances and strategic networks (Batjargal, 2007; Martin-Rojas et al., 2011). Various

studies (Antoncic & Hisrich, 2001; Audretsch, Bönte, & Keilbach, 2008; Martin-Rojas et al., 2011; Pearce, Fritz, & Davis, 2010; Zahra, 1991, 1993; Zahra & Covin, 1995) show a positive relationship between corporate entrepreneurial initiative and organizational performance. Audretsch et al. (2008) demonstrate that obtaining positive results in high-tech firms depends on the capacity of local, regional, or national authorities to support entrepreneurial initiatives. Similarly, various authors indicate that entrepreneurial innovation motivates technology firms to exploit competitive advantage from being a pioneer and obtaining better business results than competitors (Antoncic & Hisrich, 2001; Pearce et al., 2010; Zahra, 1991, 1993; Zahra & Covin, 1995). Proactive technology firms develop emerging opportunities that permit them to anticipate and act on future market desires and needs to obtain advantages from being the first to act among competitors (Fuentes et al., Fuentes Fuentes et al., 2010; Lumpkin & Dess, 1996). Mascarenhas (1992) shows that pioneering firms have a higher survival rate in foreign markets.

Greater commitment to innovation and innovative products or processes influences the firm's performance positively (Miller, 1983; Lumpkin & Dess, 1996). Corporate entrepreneurship can redefine the way the firm competes and redirects its operations toward new segments (Zahra, 1991). For example, firms like Chrysler (Vlasic, 1998), General Electric (Smart, 1996), and Mattel (Bannon, 1998) have created innovative products to address new market segments and enter foreign markets. This process has enabled them to renew their way of working and improve their profitability (Baden-Fuller & Stopford, 1994; Zahra & Garvis, 2000). Entrepreneurial activities not only generate products and processes that satisfy the customer's needs but also provide a significant opportunity for learning that permits firms to achieve the strongest market position (Zahra & Garvis, 2000).

The results of an entrepreneurial activity are not always easy to predict. They are influenced by a series of factors that help or hinder the effects of entrepreneurial strategy on the organization's performance (Bojica, Fuentes Fuentes, & Gomez Gras, 2011). Lumpkin and Dess (1996) stress the importance of studying factors that affect the relationship between corporate entrepreneurship and the business results (Bojica and Fuentes, Bojica & Fuentes Fuentes, 2012). Among others, we stress resources based on firms' knowledge (Wiklund & Shepherd, 2003), organizational structure (Covin et al., 2006), network capability (Walter, Auer, & Ritter, 2005), and cultural diversity (Richard et al., 2004). Further, entrepreneurial activity involves risks that the organization should assess. Assuming risks has a positive effect on organizational performance to a point, but beyond this point, increased risk assumption begins to affect the organization's results negatively (Begley & Boyd, 1987). The effect becomes negative if the risk assumed is greater than the demands of the environment, or if proper fit between investment and benefits expected is not achieved (Zahra, 1993). Zahra (1993) suggests that risky, renewing activities that respond to the demands of the environment in which the organization operates will be rewarded by improved competitiveness, performance, or both simultaneously. Based on the foregoing, we propose that:

H4. *Corporate entrepreneurship is positively related to organizational performance.*

Figure 1 represents the model proposed, based on the hypotheses formulated (Fig. 1).

Methodology

Sample and procedure

The study population was composed of technology organizations in the geographical area of the European Union. We chose high-tech firms due to the interest of a technological and entrepreneurship study on sectors with a high technological component. Technological firms are potential vehicles for transferring knowledge from the academic environment to the production sector and are strategic for the economy (Fontes, 2001). The sample (900 firms) was drawn from the Amadeus (2009) database, which provides comprehensive financial and business data, by assets, on around 19 million companies in 43 European countries. The database complements Datastream from Thomson Reuters. Drawing on our knowledge of key dimensions in this investigation, previous contacts with managers and scholars, and new interviews with managers and academics interested in these strategic variables, we developed a structured questionnaire to investigate how organizations face these issues. We then established a list of the organizations' CEOs, with the help of partial funding from the Spanish Ministry of Science and Research and the Local Council of Economy, Innovation and Science of Andalusia's Regional Government.

We used CEOs as key informants, since they receive information from a wide range of departments and are therefore a very valuable source for evaluating the different variables of the organization. CEOs also play a major role in informing and molding the variables under study by determining the types of behavior that are expected and supported (Bolívar et al., Bolívar Ramos, García Morales, & García, 2012). Although numerous actors may be involved in the management process, the CEO is ultimately responsible for plotting the organization's direction and plans, and guiding the actions carried out to achieve them (Westphal & Fredrickson, 2001). The same type of informant was chosen to keep the level of influence among the organizations constant and increase the validity of the variables' measurements.

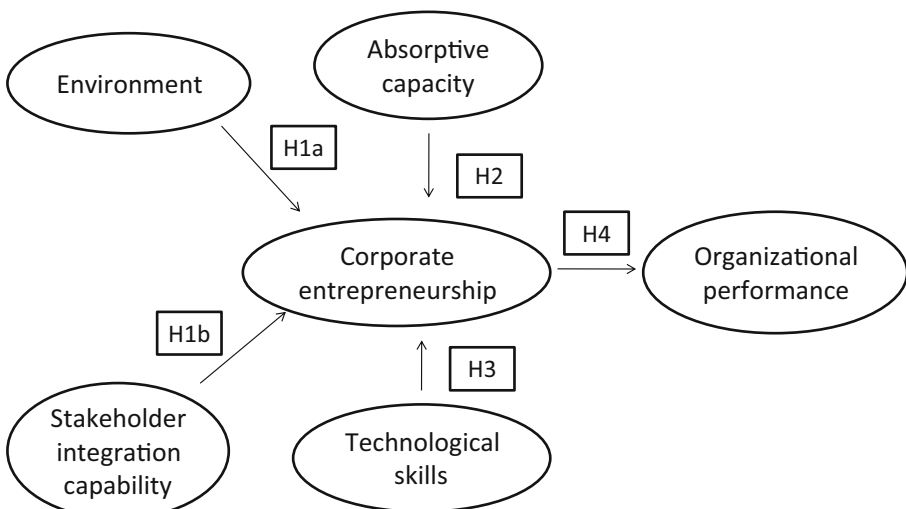


Fig. 1 Hypothesized model

We used stratified random sampling by country to divide the population into strata (based on the 10 EU countries analyzed: Austria, Belgium, Denmark, France, Germany, Italy, Poland, Spain, the Netherlands, and the United Kingdom). Within each stratum, a random sampling procedure was used. Through systematic sampling in each stratum, we obtained 16 firms for each target country in the study (160 firms). We contacted the CEOs and explained that the data obtained would be confidential and would be treated in aggregate form. We offered to send each CEO a comparative study specific to his/her firm on the variables analyzed. This approach enabled us to obtain an approximate response rate of 17.7%. The data were collected between May and September 2010.

Characteristics of responding businesses were compared to those of nonresponding businesses to reduce the possibility of non-response bias. The results for return on assets, return on equity, return on sales, and number of employees indicated no significant difference between respondents and nonrespondents (Armstrong & Overton, 1977). Since all measures were collected with the same survey instrument, the possibility of common method bias was tested using Harman's one-factor test (see Konrad & Linnehan, 1995). A principal components factor analysis of the questionnaire measurement items yielded various factors with eigenvalues greater than 1.0, accounting for 66% of the total variance. A substantial amount of method variance does not appear to be present, since several factors, not one, were identified and the first factor did not account for the majority of the variance (Podsakoff & Organ, 1986).

Measures

The use of constructs has played an important role in designing survey instruments in management research. In any research on behavioral elements, no device using a single metric unit can measure precisely, and researchers usually employ two or more measures to gauge a construct or scale. As developing new constructs or measurement scales is a complex task, wherever possible we use pre-tested constructs from past empirical studies to ensure their validity and reliability.

Environment Using scales established by Tan and Litschert (1994), we developed a Likert-type seven-point scale (1 “*completely disagree*”, 7 “*completely agree*”) of three items to measure the effect of environment. We developed a confirmatory factor analysis to validate our scales. The scale was one-dimensional and showed high reliability ($\alpha = .747$).

Stakeholder integration capability Using scales established by Buysse and Verbeke (2003), Henriques and Sadosky (1999), and Sharma and Henriques (2005), we developed a Likert-type seven-point scale (1 “*no attention*”, 7 “*maximum attention*”) of ten items to reflect stakeholders influences. A confirmatory factor analysis to validate our scales required eliminating Item 1 ($\chi^2_{27} = 82.84$; Normed Fit Index, NFI = .95; Non-Normed Fit Index, NNFI = .96; Goodness of Fit Index, GFI = .96; Comparative Fit Index, CFI = .90). The scale was one-dimensional and showed high reliability ($\alpha = .820$).

Absorptive capacity We used three items to measure knowledge acquisition, two items to measure knowledge assimilation, four items to measure knowledge transformation, and two items to measure knowledge exploitation (1 “*completely disagree*”, 7 “*completely agree*”). These items, developed by Jimenez et al. (Jimenez Barrionuevo, Garcia Morales, & Molina, 2011), were duly adapted to the present study. We calculated the arithmetic mean of the items (a high score indicated good level of knowledge acquisition, knowledge assimilation, knowledge transformation, and knowledge exploitation) and obtained a four-item scale for absorptive capacity. Confirmatory factor analysis to validate the scale ($\chi^2_2 = 4.46$, NFI = .96, NNFI = .94, GFI = .99, CFI = .98) showed that it was one-dimensional and had adequate validity and reliability ($\alpha = .720$).

Technological skills We used the scales designed by Ray, Muhanna, and Barnety (2005) and Byrd and Davidson (2003) to establish a Likert-type seven-point scale (1 “*completely disagree*”, 7 “*completely agree*”) of four items to reflect technological skills. Using a confirmatory factor analysis ($\chi^2_2 = 1.26$, NFI = .99, NNFI = .99, GFI = .99, CFI = .99), we validated our scales, verifying each scale’s one-dimensionality, high validity and reliability ($\alpha = .849$).

Corporate entrepreneurship We used Likert-type seven-point scales (1 “*completely disagree*”, 7 “*completely agree*”) of three items developed by Zahra (1993) to measure new business venturing, three items developed by Knight (1997) to measure proactivity, three items developed by Zahra (1993) to measure self-renewal, and four items developed by Zahra (1993) to measure organizational innovation. These items were duly adapted to the present study. We calculated the arithmetic mean of the items (a high score indicated good level of new business venturing, proactivity, self-renewal, and organizational innovation) and obtained a four-item scale of corporate entrepreneurship. Confirmatory factor analysis to validate the scale for corporate entrepreneurship ($\chi^2_2 = 4.30$, NFI = .98, NNFI = .97, GFI = .99, CFI = .99) showed that it was one-dimensional and had good validity and reliability ($\alpha = .792$).

Organizational performance After reviewing how performance is measured various strategic research studies, we used a Likert-type seven-point scale (1 “*Much worse than my competitors*,” 7 “*Much better than my competitors*”) of six items developed by Murray and Kotabe (1999) to ask about the organization’s performance as compared with that of its most direct competitors. The use of scales for evaluating performance relative to the main competitors is one of the most widely-employed practices in recent studies (Choi, Poon, & Davis, 2008; Douglas & Judge, 2001). Many researchers use managers’ subjective perceptions to measure beneficial outcomes for firms. Others prefer objective data, such as return on assets. Extensive literature has established high correlation and concurrent validity between objective and subjective data on performance, implying that both are valid when calculating a firm’s performance (Homburg, Krohmer, & Workman, 1999; Venkatraman and Ramanujan, Venkatraman & Ramanujam, 1986). We included questions involving both types of assessment in the interviews, but the CEOs were more open to offering their general views than to offering precise quantitative data. When possible, we calculated the correlation between objective and subjective data, and these were high and significant.

Confirmatory factor analysis to validate the scales ($\chi^2_9 = 24.60$, NFI = .94, NNFI = .94, GFI = .98, CFI = .96) showed that they were one-dimensional and had high reliability ($\alpha = .816$).

Control variables The research adds control variables for several other factors that may influence the estimation results. This study considers that firms may vary in industry or sector, size, and country or nationality. It thus includes industry type, as in other similar studies on entrepreneurial activities or opportunities for innovation (Covin & Slevin, 1991; Zahra, 1993, 1996). Measuring size is difficult, as multiple focuses may be adopted as operational (Gupta & Govindarajan, 2000): number of employees, sales volume, activity, or net assets (in millions of Euros). All of these options would measure size as an organizational factor (Damanpour, 1992). The items used initially were volume of annual sales and number of employees. As both items had a high significant correlation in our sample, we used number of employees in our models, since CEOs are more reluctant to give an accurate figure for sales. To avoid desirability bias due to the range of variance values throughout the sample, we measured size through a logarithmic transformation in the number of employees instead of gross data (Damanpour, 1992; Gupta & Govindarajan, 2000; Kimberly & Evanisko, 1981). Nationality was included as a nominal variable with ten categories based on the data for the GDP per capita in PPS published by the European Union in Eurostat. Table 1 presents the items.

Results

This section presents the research results. Table 2 shows the means and standard deviations, as well as the inter-factor correlation matrix for the study variables. There are significant and positive correlations among environment, stakeholder integration capability, absorptive capacity, technological skills, corporate entrepreneurship, and organizational performance. We also find a positive correlation among size and environment, stakeholder integration capability, corporate entrepreneurship, and organizational performance. The largest firms usually have greater variety in knowledge supply, as well as more funds and other means to develop training and education programs that help to produce more entrepreneurs (Pavitt, 1991). These firms are in a better position to venture into national and international markets, complex and hostile environments, and scenarios of collaboration and coordination with different stakeholders. They thus have the potential to obtain higher levels of corporate entrepreneurship and organizational performance (Ireland et al., 2009; Zahra & Garvis, 2000). Small organizations have simpler organizational structures that also promote use of available knowledge, absorptive capacity, and new technological skills (Real, Leal, & Roldan, 2006). Further, there is a positive correlation between country and organizational performance, since organizations perform better if their countries invest more in research and development. Brouthers (2002) shows that organizations achieve better financial performance if they take into account the institutional and cultural context of the country in which they invest. For example, nations that

Table 1 Measures used in the research

Variables	Item		
Environment	Ent1	Indicate the degree to which you agree or disagree with the following statements about firm's environment in the past three years: The environmental factors that affect this business (technology, customer preferences, suppliers, competitors, regulation, etc.) are very numerous.	
	Ent2	Environmental factors have strongly impacted the operation of this business.	
	Ent3	The environmental factors that affect this business have changed significantly.	
	Stakeholder Integration Capability	Stake1	Indicate the attention your firm has paid to the groups listed in the past three years: Shareholders/Owners
		Stake2	Employees
		Stake3	Customers
		Stake4	Suppliers
		Stake5	Financial Institutions
		Stake6	National (and regional) Governments
		Stake7	Media
Absorptive Capacity	Stake8	Competitors	
	Stake9	Citizens/Communities	
	Stake10	NGOs	
	Absca1 (Knowledge Acquisition)	Think of an organization that has had frequent contact with your organization over the past three years, or with which you would like to have had contact in order to obtain or exchange new information or useful knowledge to perform the business of the organization. Indicate the degree to which you agree or disagree with the following statements: Close personal interaction between the two organizations. The relationship between the two organizations is characterized by mutual trust.	
	Absca2 (Knowledge Assimilation)	The relationship between the two organizations is characterized by a high level of reciprocity. The organizational cultures of the two organizations are compatible. The operating and management styles of the two organizations are compatible.	

Table 1 (continued)

Variables	Item
Absca3 (Knowledge Transformation)	<p>Interdepartmental meetings are organized to discuss the development and tendencies of the organization.</p> <p>The important data are transmitted regularly to all units.</p> <p>When something important occurs, all units are informed within a short time.</p> <p>The organization has the capabilities or abilities necessary to ensure that knowledge flows within the organization and is shared among the different units.</p> <p>The division of functions and responsibilities regarding use of information and knowledge obtained from outside the organization is clear.</p> <p>The organization has the capabilities and abilities needed to exploit the information and knowledge obtained from outside the organization:</p>
Absca4 (Knowledge Exploitation)	<p>The skills of the people in the technology department/unit are very superior to:</p> <p>Skill1 Closest competitors in hardware and operating systems performance.</p> <p>Skill2 Closest competitors in business applications software performance.</p> <p>Skill3 Closest competitors in communications services efficiency.</p> <p>Skill4 Closest competitors in the generation of programming languages.</p>
Technological Skills	<p>In the last three years:</p> <p>Entre1 (New Business Venturing)</p>
Corporate Entrepreneurship	<p>The organization has broadened the business lines in current industries.</p> <p>The organization has pursued new businesses in new industries related to current business.</p> <p>The organization has entered new businesses by offering new lines and products/services.</p> <p>In general, the top managers at this firm have a strong inclination toward high risk projects (with chances of very high returns).</p> <p>In general, the top managers at this firm believe that, owing to the nature of the environment, bold wide-ranging acts are necessary to achieve the firm's objectives</p> <p>When confronted with decision-making situations involving uncertainty, our organization typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.</p>
Entre2 (Proactivity)	

Table 1 (continued)

Variables	Item
Entre3 (Self-Renewal)	<p>The organization has coordinated activities among units to enhance organizational innovation. The organization has adopted flexible organizational structures to increase innovation. The organization has trained and encouraged the employees to be creative and innovative. The organization has significantly increased: The spending on new product/service development activities.</p>
Entre4 (Organizational Innovation)	<p>The number of products/services added by the organization and already existing in the market. The number of new products/services introduced for first time in the market by the organization. The emphasis on R&D, technological leadership, and innovations.</p>
Organizational Performance	Relative to your main competitors, what is your firm’s performance in the last three years in the following areas?:
Operf1	Organizational performance measured by return on assets (economic profitability or ROA)
Operf2	Organizational performance measured by return on equity (financial profitability or ROE)
Operf3	Organizational performance measured by return on sales (percentage of profits over billing volume)
Operf4	Recovery of investments
Operf5	Organization’s market share in its main products and markets
Operf6	Growth of sales in its main products and markets
Sector	Sector
Size	Total number of employees in the organization
Country	Sales volume (millions of Euros)
	Nationality

Table 2 Means, standard deviations, and correlations

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Sector	1.731	0.733	1.000								
2. Size	3.697	1.634	-0.026	1.000							
3. Country	5.528	2.894	-0.122	0.019	1.000						
4. Environment	4.968	1.274	0.050	0.166*	0.048	1.000					
5. Stakeholder Integration Cap.	4.536	1.189	0.087	0.203**	-0.024	0.222*	1.000				
6. Absorptive Capacity	5.016	1.135	0.002	0.144	-0.133	0.347***	0.188*	1.000			
7. Technological Skills	4.807	1.394	0.045	0.120	-0.022	0.308***	0.214***	0.190***	1.000		
8. Corporate Entrepreneurship	4.738	1.151	0.039	0.172*	-0.007	0.396***	0.283***	0.319***	0.539***	1.000	
9. Organizational Performance	4.727	1.142	-0.013	0.193*	0.200*	0.236**	0.230***	0.329***	0.279***	0.387***	1.000

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed). $n = 160$

Table 3 Validity, reliability, and internal consistency

Variable	Item	Validity, reliability, and internal consistency		
		λ^*	R ²	A. M.
Environment	ENT1	0.92***(21.57)	0.84	$\alpha = 0.747$ C.R. = 0.836 S.V. = 0.632
	ENT2	0.71***(11.38)	0.50	
	ENT3	0.74***(12.81)	0.54	
Stakeholder Integration Capability	STAKE2	0.76***(21.70)	0.57	$\alpha = 0.820$ C.R. = 0.934 S.V. = 0.615
	STAKE3	0.76***(18.53)	0.57	
	STAKE4	0.71***(13.34)	0.50	
	STAKE5	0.80***(20.94)	0.64	
	STAKE6	0.80***(22.25)	0.64	
	STAKE7	0.76***(13.79)	0.57	
	STAKE8	0.84***(28.29)	0.70	
	STAKE9	0.83***(24.81)	0.68	
	STAKE10	0.81***(16.28)	0.65	
	Absorptive Capacity	ABSCA1	0.76***(8.04)	
ABSCA2		0.74***(7.67)	0.54	
ABSCA3		0.71***(11.20)	0.50	
ABSCA4		0.76***(12.34)	0.57	
Technological Skills	SKILL1	0.72***(11.34)	0.51	$\alpha = 0.849$ C.R. = 0.867 S.V. = 0.622
	SKILL2	0.81***(14.56)	0.65	
	SKILL3	0.85***(16.84)	0.72	
	SKILL4	0.77***(13.32)	0.59	
Corporate Entrepreneurship	ENTRE1	0.82***(19.10)	0.67	$\alpha = 0.792$ C.R. = 0.856 S.V. = 0.599
	ENTRE2	0.72***(12.35)	0.51	
	ENTRE3	0.73***(11.08)	0.53	
	ENTRE4	0.82***(18.93)	0.67	
Organizational Performance	OPERF1	0.73***(11.53)	0.53	$\alpha = 0.816$ C.R. = 0.907 S.V. = 0.621
	OPERF2	0.72***(11.71)	0.51	
	OPERF3	0.80***(17.99)	0.64	
	OPERF4	0.91***(29.66)	0.82	
	OPERF5	0.71***(9.40)	0.50	
	OPERF6	0.84***(14.62)	0.70	

λ^* = Standardized Structural Coefficient; R² = Reliability; α = Alpha Cronbach; C. R. = Compound Reliability; S. V. = Shared Variance; f. p. = fixed parameter; A. M. = Adjustment Measurement; * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed)

emphasize institutional support and more entrepreneurial values and behavior encourage entrepreneurial capability and achieve greater organizational performance (Zahra & Garvis, 2000). Countries that stress more conservative values—that neither invest in research and development nor develop policies to support companies—have more limited organizational performance (Kannan-Narasimhan & Glazer, 2005).

The quality of the scales used is acceptable, since the constructs display satisfactory levels of reliability as indicated by composite reliabilities ranging from 0.93 to 0.83 and shared variance coefficients ranging from 0.63 to 0.55 (Table 3). Convergent validity, the extent to which maximally different attempts to measure the same concept agree, can be judged by looking at both the significance of the factor loadings and the shared variance. The amount of variance shared or captured by a construct should be greater than the amount of measurement error (shared variance >0.50). All of the multi-item constructs meet this criterion, each loading (λ) being significantly related to its underlying factor (t-values greater than 7.67) in support of convergent validity. Likewise, a series of chi-square difference tests on the factor correlations showed that discriminant validity—the degree to which a construct differs from others—is achieved among all constructs (Anderson & Gerbing, 1988). Discriminant validity was established between each pair of latent variables by constraining the estimated correlation parameter between them to 1.0 and then performing a chi-square difference test on the values obtained for the constrained and unconstrained models (see Anderson & Gerbing, 1988). The resulting significant differences in chi-square indicate that the constructs are not perfectly correlated and that discriminant validity is achieved.

Second, Hypotheses 1a, 1b, 2, and 3 were tested using the hierarchical regression method (Cohen & Cohen, 1983). We checked for multicollinearity and determined that the analyses meet the requirements for measures of the tolerance value and variance inflation factor (Hair, Anderson, Tatham, & Black, 2010). In the first step, the dependent variable of interest (corporate entrepreneurship) was regressed on the control variables (Model 1). Next (Model 2), the variables of environment and stakeholder integration capability were introduced. Subsequently (Model 3), the variable of absorptive capacity was added. Finally (Model 4), we added technological skills (Table 4).

Hypotheses 1a, 1b, 2, and 3 suggest that the environment, stakeholder integration capability, absorption capacity, and technological skills are positively related to corporate entrepreneurship. Model 2 shows that environment ($\beta = 0.358, p < .001$) and stakeholders ($\beta = 0.225, p < .001$) had a significant positive relationship with corporate entrepreneurship and together accounted for 17.9% of the variance in corporate entrepreneurship. These data support Hypotheses 1a and 1b. A hostile, uncertain environment and stakeholder integration lead the organization to establish entrepreneurial strategies to improve organizational results (Zahra, 1991). Further, rapid evolution of the competitive environment, as well as scenarios of collaboration and coordination of the different interests, encourages opportunities for business development or innovation in products, processes, or structural systems, and thus entrepreneurial initiative (Ireland et al., 2009).

Hypothesis 2 suggests that absorptive capacity is positively related to corporate entrepreneurship. Model 3 shows that absorptive capacity ($\beta = 0.169; p < .05$) had a significant positive relationship to corporate entrepreneurship and accounted for 1.9% of its variance. Thus, the data support Hypothesis 2. Absorptive capacity permits exploitation and integration of external knowledge, which increases the probability of understanding the opportunity better and responding with entrepreneurial activities (Zahra et al., 1999). Absorptive capacity permits greater knowledge, promoting firms' capacity to exploit their existing resources and support entrepreneurial activities and initiatives to increase value creation (Sirmon et al., 2007).

Table 4 Regression analysis

Independent Variables	Dependent Variable			
	Model 1	Model 2	Model 3	Model 4
Constant	4.175*** (11.165)	2.008*** (4.032)	1.451** (2.618)	0.745 (1.460)
Sector	0.043 (0.541)	0.001 (0.010)	0.008 (0.111)	0.001 (0.020)
Size	0.173* (2.196)	0.067 (0.908)	0.057 (0.775)	0.042 (0.636)
Country	-0.003 (-0.041)	-0.020 (-0.271)	0.006 (0.084)	0.015 (0.230)
Environment		0.358*** (4.917)	0.302*** (3.962)	0.193** (2.726)
Stakeholder Integration Capability		0.225*** (3.066)	.202** (2.761)	.135* (2.024)
Absorptive Capacity			.169* (2.182)	.143* (2.060)
Technological Skills				.418*** (6.166)
R ²	0.031	0.217	0.241	0.393
Adjusted R ²	0.013	0.192	0.211	0.365
Change in adjusted R ²		0.179***	0.019*	0.154***
F	1.989	8.539	8.083	14.036
Std. Error	1.144	1.035	1.022	0.917

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed); t-students are shown in parentheses below the variables

Hypothesis 3 indicates a positive relationship between technological skills and corporate entrepreneurship. As shown in Model 4, technological skills ($\beta = 0.418$; $p < .001$) had a significant, positive relationship to corporate entrepreneurship and accounted for 15.4% of the variance in corporate entrepreneurship. Thus, the data support Hypothesis 3. Technological skills foster creation of an organizational structure that supports entrepreneurial activities, increases training for entrepreneurship, and improves evaluation and decision making (Kelley, 2011).

The F-tests on all changes in adjusted R-squared values are significant, indicating that successive factors added to the regression models significantly improve prediction of corporate entrepreneurship. In Models 2, 3, and 4, sector, size, and country are not significant variables affecting corporate entrepreneurship.

Finally, Hypothesis 4 was tested using the hierarchical regression method, with similar tests for multicollinearity and compliance with requirements for tolerance values and variance inflation factors. In the first step (Model 1), the dependent variable of interest (organizational performance) was regressed on the control variables. Finally (Model 2), the independent variable (corporate entrepreneurship) was introduced (Table 5). Hypothesis 4 suggests that corporate entrepreneurship is positively related to organizational performance. As shown in Model 2 of Table 5, corporate entrepreneurship ($\beta = 0.366$, $p < .001$) was positively and significantly related to organizational performance and accounted

Table 5 Regression analysis

Independent Variables	Dependent Variable	
	Model 1	Model 2
Constant	3.740*** (10.326)	2.224*** (4.922)
Sector	0.017 (0.218)	0.001 (0.016)
Size	0.192* (2.492)	0.128 (1.767)
Country	0.201** (2.594)	0.202** (2.805)
Corporate Entrepreneurship		0.366*** (5.034)
R ²	0.077	0.207
Adjusted R ²	0.059	0.186
Change in adjusted R ²		0.127***
F	4.337	10.097
Std. Error	1.108	1.030

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed); t-students are shown in parentheses below the variables

for 12.7% of the variance in organizational performance. These data support Hypothesis 4. The F-test on change in adjusted R-squared values is significant, indicating that adding corporate entrepreneurship to the regression model significantly improved prediction of organizational performance. Greater commitment to corporate entrepreneurship (e.g., innovation, proactivity, creation of new products or processes, etc.) influences the firm's performance positively (Miller, 1983; Lumpkin & Dess, 1996). Analysis shows country to be a significant variable relative to organizational performance. Organizations achieve greater financial performance if they take into account the institutional and cultural context of the country in which they invest (Brouthers, 2002). Sector and size produced no significant differences in organizational performance.

We also analyzed whether some exogenous constructs and antecedents of corporate entrepreneurship directly affect organizational performance and assessed the indirect and total effects of these antecedents on organizational performance. The full model was assessed through a path analysis. Table 5 shows the direct, indirect, and total effects of the model. All hypotheses are supported in the path analysis. Further, absorptive capacity had a direct effect on firm performance (0.25, $p < .01$), as the literature indicates (e.g., Zahra et al., Zahra & James, 2008). Technological skills also influence organizational performance indirectly (0.09, $p < .001$) through corporate entrepreneurship (.42 \times .22; see Bollen [1989] for calculation rules), supporting prior research (Cohen & Levinthal, 1990; Fosfuri & Tribo, 2008; Gallego, Rubalcaba, & Suarez, 2013; Garcia-Morales et al., 2014; Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011; Rangus & Slavec, 2017; Tsai, 2001; Zahra et al., Zahra & James, 2008). Of the control variables, only country has a direct effect on organizational performance (0.24, $p < .01$) Table 6.

Table 6 Path analysis (direct, indirect, and total effects)

Effect from	To	Direct effects	<i>t</i>	Indirect effects	<i>t</i>	Total effects	<i>t</i>
Environment	→ Corporate Entrepreneurship	0.19**	2.66			0.19**	2.66
Environment	→ Organizational Performance	-0.01	-0.02	0.04	1.78	0.03	0.53
Stakeholder Integration Cap.	→ Corporate Entrepreneurship	0.14*	2.03			0.14*	2.03
Stakeholder Integration Cap.	→ Organizational Performance	0.09	1.23	0.03	1.56	0.12	1.63
Absorptive Capacity	→ Corporate Entrepreneurship	0.14*	2.05			0.14*	2.05
Absorptive Capacity	→ Organizational Performance	0.25**	3.13	0.03	1.58	0.28***	3.51
Technological Skills	→ Corporate Entrepreneurship	0.42***	5.71			0.42***	5.71
Technological Skills	→ Organizational Performance	0.09	1.05	0.09*	2.25	0.18*	2.41
Corporate Entrepreneurship	→ Organizational Performance	0.22**	2.45			0.22**	2.45
Sector	→ Corporate Entrepreneurship	0.01	0.02			0.01	0.02
Sector	→ Organizational Performance	-0.01	-0.03	0.02	0.02	0.01	-0.03
Size	→ Corporate Entrepreneurship	0.04	0.64			0.04	0.64
Size	→ Organizational Performance	0.09	1.26	0.01	0.62	0.10	1.37
Country	→ Corporate entrepreneurship	0.01	0.24			0.01	0.24
Country	→ Organizational Performance	0.24***	3.36	0.01	0.23	0.25***	3.35

Standardized Structural Coefficients; † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

In today's turbulent world, where technological companies compete hard to obtain good position or better performance (Langerak, Hultink, & Robben, 2004), exploration, exploitation and dissemination of knowledge capabilities (absorptive capacities) can help to achieve competitive advantage that differentiates these companies from others and enhances growth in sales, profitability, and market share (Langerak et al., 2004; Martin-Rojas et al., 2013, 2016).

We confirm that entrepreneurial ability—coupled with technological skills and ability to learn and assimilate new knowledge, and supported by stakeholders in the firm—helps firms to achieve more ambitious goals in high-technology environments. We have analyzed how the environment, stakeholder integration capacity, absorptive capacity, and technical skills influence development of entrepreneurial activities and their repercussions for the organization's performance.

Firms currently face dynamic environments that increase the need to be involved in entrepreneurial activities, enabling them to face continuous changes in their environment through innovative strategies (Miles & Snow, 1978; Rueda, 2005; Sharma, 2000). Today's environment promotes the need to foster continuous innovation and organizational learning to generate entrepreneurial dynamic capabilities (Sharma & Vredenburg, 1998).

The competitive benefits of capability to integrate stakeholders include better corporate reputation and translate into favorable economic agreements and increased legitimacy. These advantages help to ease potential conflicts between parties when they perform daily operations and development plans (Sharma & Vredenburg, 1998). Further, anticipating stakeholders' demands can be a source of differentiation and competitive advantage (Spar and La Muse, Spar & La Mure, 2003).

Consequently, there is a positive relationship between stakeholder integration capacity and corporate entrepreneurship. Use of information from third parties can facilitate how entrepreneurs manage discovery of new opportunities (Kuratko et al., 2007) to increase organizational performance.

Finally, we consider the need to develop the technological skills and knowledge of all personnel in the firm. To foster absorptive capacity, this development should be a complex, long-term process carried out in conjunction with a corporate business strategy based on knowledge and innovation (Zahra & Covin, 1995). Greater absorptive capacity increases the organization's autonomy through adoption of more flexible organizational structures. These structures, in turn, motivate members to achieve knowledge flows, increasing participation of the most creative employees and thus corporate entrepreneurship (Antoncic & Hisrich, 2001).

Corporate entrepreneurship contributes very significantly to the firm's development and economic growth. Creation and establishment of new firms contribute to generating innovation, renewing the fabric of production, and creating new work positions through dissemination and exploitation of knowledge (Acs & Plummer, 2005).

Statistical study suggest that absorptive capacity is directly related to organizational performance. Firms that consistently invest in assimilating and exploiting new external knowledge are more likely to capitalize on changing environmental conditions by generating innovative products to meet the needs of emerging markets (Kostopoulos et al., 2011; Rangus & Slavec, 2017). Through these actions, they gain critical competences that

contribute to the firm's competitiveness (Rangus & Slavec, 2017; Tsai, 2001). Absorptive capacity successfully allows firms to identify and utilize external knowledge inflows (Escribano, Fosfuri, & Tribo, 2009). Expressing willingness to interact with their external environment in innovative ways, firms with absorptive capacity access complementary external knowledge to enhance higher company performance.

Technological organizations with higher levels of absorptive capacity are more likely to gain first-mover advantage in exploiting new technologies, as absorptive capacity facilitates identification and exploitation of specific technological knowledge (Cohen & Levinthal, 1990).

Conclusions

Conclusions of the research

In today's rapidly changing environment, munificence of the environment makes it more necessary for firms to acquire resources to develop entrepreneurial capabilities (Rueda, 2005). Resources available through government policies, incentives, rapid growth markets, qualified labor, valuing creativity, innovation, etc. can provide firms with opportunities to innovate and invest in the products, processes, and necessary changes in organizational structure to generate a proactive strategy (Gomez et al., Gomez Haro, Aragon Correa, & Cordon, 2011). Managers must exploit these resources through integration of stakeholders in the company, absorption of internal and external knowledge, and development of technological skills, because proactive strategy enables renovation of the company by promoting entrepreneurial initiatives (Martin-Rojas et al., 2016).

Entrepreneurial initiatives are strategic in the creation of organizational wealth, growth and profitability (Martin-Rojas et al., 2011). Most entrepreneurs develop activities to create new business or new units or firms, product and/or service innovation, strategic self-renewal processes, risk assumption and proactivity, etc. (Antoncic & Hisrich, 2004; Kuratko & Audretsch, 2013).

Firms with high levels of entrepreneurship are more likely to achieve better business results than firms with lower levels. Corporate entrepreneurship can thus impact three significant elements of performance—wealth creation or new funds; growth of the business, whether by increase in sales, number of employees or market share; and profitability of capital and assets relative to the competition (Antoncic & Hisrich, 2004). Traditional entrepreneurial management should change to adopt models based on knowledge and entrepreneurial policies with different requirements for control and reward systems etc., as such models will permit managers to motivate employees and detect opportunity and possibilities for success (Stevenson & Jarillo, 1990).

Contribution to the literature

The paper's main contributions to the literature are:

1. Analyzing how environment and stakeholders, jointly and directly, influence corporate entrepreneurship throughout the company.

2. Underscoring how absorptive capacity and technological skills encourage development of internal processes to obtain tacit knowledge from internal and external sources that may be extremely difficult to imitate, thereby enabling sustainable performance.
3. Observing the simultaneous direct and indirect relationship of absorptive capacity to organizational performance.
4. Advancing knowledge of the impact of corporate entrepreneurship on organizational performance through strategic variables such as environment, stakeholders' interests, internal absorptive capacity, and skills in intensively technology-based firms.

We have identified factors that facilitate resource exploitation to provide a more dynamic understanding of how competitive advantage is attained. Specifically, we show that this advantage comes from making entrepreneur and manager responsible for creating and sustaining a competitive advantage (Bolívar et al., Bolívar Ramos et al., 2012).

Implications

The innovative character of entrepreneurial initiatives permits firms to generate new ideas and perform R&D activities to develop new products or processes (Kuratko & Audretsch, 2013; Lumpkin & Dess, 1996). With these innovations, the firm can maintain not only its current competitive advantages but also constant adaptation to the environment. The firm can thus face the threats confronting it by exploiting new opportunities and their influence on its performance.

Adopting this point of view implies a deliberate change in thinking for the entrepreneur, one that fosters collaboration and involvement of third parties. A network system could be useful in achieving this perspective, as networks involve a process of repeated analysis, continuous learning, and capturing of changes. Such a process would provide the entrepreneur with a source of important additional information from which to derive greater knowledge of customers, suppliers, shareholders, etc. and detect new business opportunities (Vandekerckhove & Dentchev, 2005).

Further, educational and training plans within the organization are required to increase and develop technological skills and knowledge of managers and employees. Such plans help to maximize these groups' understanding of the need to have a good knowledge base, ability to achieve it, prior learning, and experience, since these permit the organization to improve evaluation of an opportunity, make the right decisions, and respond to new expectations for business and improvement (Kelley, 2011).

Nevertheless, we must bear in mind that use of available knowledge and capacity to absorb new technological skills or generate new, advanced technological knowledge will help to locate the technology firm entrepreneur in a more favorable position to detect opportunities, and thus to obtain additional competitive advantage (Martin-Rojas et al., 2011; Real et al., 2006).

As strategists entrusted with the task of utilizing potentially value-creating resources more effectively or innovatively than their competitors, entrepreneurs and managers may facilitate transformation of technological resources into competitive advantage (Martin-Rojas et al., 2013).

A proactive attitude also helps firms adopt technologically advanced postures and exploit the new opportunities that emerge continually in environments immersed in intense technological change (Bolivar et al., Bolivar Ramos et al., 2012; Garcia et al., Garcia Morales, Ruiz Moreno, & Llorens Montes, 2007).

Finally, absorptive capacity not only improves the company's existing knowledge base and encourages new knowledge creation activities that influence entrepreneurial success (Bojica and Fuentes, Bojica & Fuentes Fuentes, 2012). It also encourages firms to renew their products or key technologies for more efficient management of their employees to stimulate creativity (Gallego et al., 2013). All of these variables encourage innovative organizational performance in the company, as knowledge can be instrumental in facilitating a firm's innovation activities (Tsai, 2001) and enabling better performance. Absorptive capacity is not a goal in itself but can generate important organizational outcomes when it is developed (Fosfuri & Tribo, 2008).

Limitations and future research

This investigation has several limitations that suggest further possibilities for empirical research. A first limitation involves the cross-sectional nature of the research. Cross-sectional research into a series of dynamic concepts (e.g., corporate entrepreneurship, technological skills) can analyze only a specific situation in time of the organizations studied, not their overall conduct over time. Our approach reduces the magnitude of this problem, since dynamic characteristics and causal affirmations can be made if the relationships are based on theoretical rationales. We therefore began with a theoretical effort to identify and confirm the formal existence of the cause-effect relationships. Nonetheless, future research should focus on longitudinal study to examine these variables with greater precision and study their determinants, processes, and results systematically, as this approach will permit us to analyze the evolution of variables and draw more reliable conclusions about their activity.

We also took steps to guard against another potential limitation of cross-sectional research—common method bias. Podsakoff, MacKenzie, Lee, and Podsakoff (2003) provide guidance to reduce common-source bias, stressing two key points: 1) ensure anonymity in survey administration; and 2) improve items used to measure constructs. We followed both recommendations. By communicating study goals clearly and assuring respondents of survey anonymity, we met one of Podsakoff et al.'s (2003) key recommendations: well-tested, well-validated scales reduce item ambiguity. In measuring the study constructs, we relied on previously tested scales. Finally, we randomized the order of presentation of the survey items across the subjects. This combination of steps minimizes common method bias (Pandey, Wright, & Moynihan, 2008). Further, we tested for common method bias using Harman's one-factor test and other methods. The results indicate that it does not appear to be present (Konrad & Linnehan, 1995; Podsakoff & Organ, 1986).

Third, the absence of objective measures is a limitation. Anonymity is important to increase the value of these subjective measures and reduce social desirability bias of responses on sensitive topics (Konrad & Linnehan, 1995). The low risk of social desirability bias in the study was indicated by several managers who commented that it made no sense at all for their companies to go beyond regulatory compliance. Moreover, other research indicated that external validation of these variables from

the archival data of a subset of respondents increased confidence in self-reports and reduced the risk of common method variance (Konrad & Linnehan, 1995; Podsakoff & Organ, 1986). Thus, to confirm the validity of the information provided by the CEO in our research, we obtained additional information from organization members of various selected firms. The results were contrasted with those obtained in the main research survey by means of various tests to confirm that there were no significant differences between the research variables. Further, when possible, we calculated the correlation between objective and subjective data for some variables (e.g., organizational performance), and these were high and significant. Various studies also show that using CEOs as respondents to questions of corporate entrepreneurship can provide valid measures (Bolivar et al., Bojica & Fuentes Fuentes, 2012; Martin-Rojas et al., 2011).

Fourth, our model analyzes how corporate entrepreneurship influences factors such as environment, stakeholder integration capability, absorptive capacity, and technological skills, and their repercussions for the organization's results. Other variables could be analyzed. However, it should be noted that the strategic variables we chose explain a significant amount of variance in corporate entrepreneurship and organizational performance. More attention to the influence of other variables on corporate entrepreneurship is needed. Future studies should analyze a larger sample and firms from other sectors (this research concentrated on the technology sector). They might also explicitly integrate the influence of external factors. Development of a collaborative scheme between academics and practitioners would generate an organizational strategy for the technology sector. The direct and indirect relationships between the antecedents of corporate entrepreneurship and organizational performance must also be analyzed in greater depth.

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