

*Tema: Empreendedorismo Corporativo*

## WHAT IMPACTS THE PERFORMANCE OF TECHNOLOGICAL ORGANIZATIONS? AN ENTREPRENERIAL PERSPECTIVE

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**Abstract:** This article proposes the construction of a theoretical review from corporate entrepreneurship (CE), institutional entrepreneurship (IE) and organizational performance (OP) viewpoints. To identify and discuss the relation between indicators of CE and OP and indicators of IE and OP, this study presents the dimensions and definitions of each indicator, and their relationships with OP. The literature shows two different relationships between CE with OP and IE with OP. OP is presented with indicators including return on assets, profitability and sales growth. The relationships between all indicators are presented with a theoretical framework that was tested using 72 information technology organizations. The results made possible to define two patterns or behavioral rules to explain OP.

**Keywords:** Organizational Performance. Corporate Entrepreneurship. Institutional Entrepreneurship.

### 1 Introduction

Information technology (IT) organizations possess the cultural ability to adapt to the research and development sector. These organizations need to build a portfolio of products to maintain their competitiveness and gain competitive advantages (Huang Wu, Dyerson, & Chen, 2012; Martinez-Noya, Garcia-Channel, & Guillen, 2012). Thus, in order to enhance competitiveness, the stronger their need to rely on local resources, the less likely companies are to enter emerging economies, meaning that the level of development of an emerging economy's market-supporting institutions directly influences multi-national enterprises' (MNEs') entry strategies (Meyer Estrin, Bhaumik, & Peng, 2009).

Due to the characteristics of these kinds of organizations, this research was conducted using 72 IT companies in Brazil—which is an emerging economy and an important cluster of IT

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firms. The sample was selected according to snowball sampling, whereby each interviewee recommended another to be interviewed. This procedure was followed in order to identify accessible born global IT companies, since it is difficult to find these companies in Brazil. To verify the framework's effectiveness, we used an innovative analysis: multiple correspondences, decision tree and dendogram. These analyses are simple and easy to use with reference to proving hypotheses.

Organizations that include entrepreneurial processes in their activities are more likely to improve their organizational performance (OP), providing profitability and sales growth (Antoncic & Hisrich, 2001; Antony & Bhattacharyya, 2010; Covin & Slevin, 1991; Martz, 2013; Zahra, 1993b). Some studies have investigated the relationship OP has with corporate entrepreneurship (CE) and institutional entrepreneurship (IE), and proven that the relationship improves the level of OP. However, this study investigates the relationship between the variables that compose the theories of CE with OP and IE with OP. Some extant studies have investigated only the influence of CE on OP (Kuratko & Audretsch, 2013; Lumpkin & Dess, 1996; Zahra, 1991), and others have investigated IE's effects on OP (Gómez-Haro, Aragón-Correa & Cordón-Pozo, 2011). This study contributes to aggregating the findings of isolated studies by summarizing them in a single work and providing a more comprehensive view of the topic in question. This article also explores the relationship of combined CE and IE with OP.

OP is the method of value creation for the organization, which creates a metric of change for its financial status, and facilitates decision making by managers and enforcement of decisions by actors. OP also entails a complex relationship between the criteria of profit, productivity, organizational flexibility, intra-organizational tension, effectiveness, efficiency, quality, innovation and profitability (Carton, 2006; Rolstadas, 1998).

CE is a process whereby an organization diversifies through internal development. From this process, questions emerge from entrepreneurs' individual behavior, which affects the organization as a whole. However, CE provides better competitive positioning and transforms the organization, market or industry, creating value by developing innovation. CE provides new business development, new technologies and products, and entry into new markets, thereby promoting improvements in OP (Burgelman, 1983; Covin & Miles, 1999; Hoeltgebaum, Amal, & Andersson, 2014a; Hoeltgebaum, Amal, & Andersson, 2014b; Stopford & Baden-Fuller, 1994).

Macroeconomic factors and structural environment affect entrepreneurial activity. The environment influences the strategy, structure and process of starting any entrepreneurial activity. IE provides entrepreneurs with challenging positions and stable historical actors, building a strategic source of power, which enables these entrepreneurs to discover different areas, and instigates environmental changes (Battilana, Leca & Boxenbaum, 2009; Levy & Scully, 2007; Sánchez, 2013).

Below, we will identify and characterize each dimension and its indicators; following this, the goal of the present work will be defined. This study identifies the variables that influence entrepreneurship in OP. Studying CE makes it possible to identify the influences of the internal organization on OP; here, this is complemented by a study of IE, which enables institutional-factor influences on OP to be isolated. Therefore, the research question for this

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work is as follows: What is the relationship between CE and IE dimensions with the dimensions of OP?

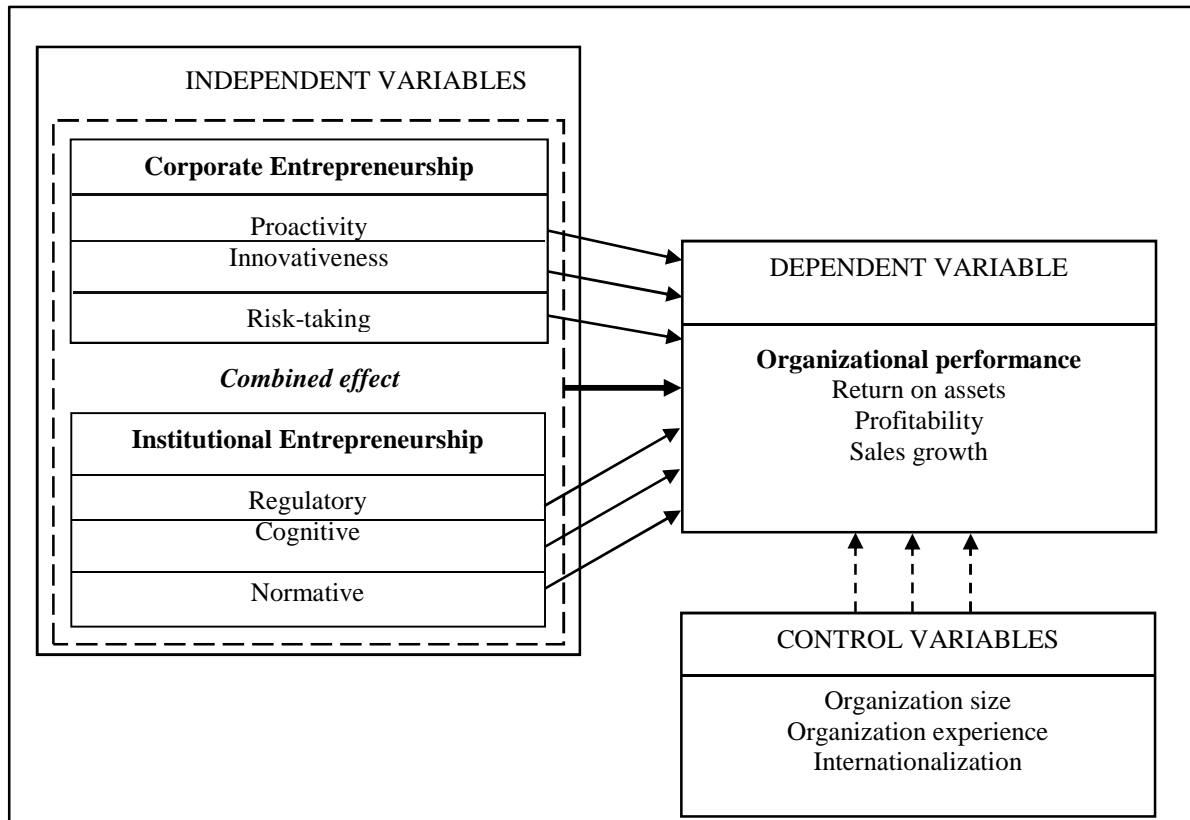
The remainder of this article is structured as follows. In section two we present the literature review and the hypotheses. In section three we present the methodological procedures and in section four we estimate the model and discuss the main findings. We conclude our study in section five.

**2 Theoretical Framework and Hypothesis**

Expanded and in-depth studies of entrepreneurship are necessary to ensure the survival of organizations and their ability to improve their profitability and growth, while institutional change factors provide foundations of competitiveness and position organizations within their fields (Droege & Marvel, 2010; Viotti, 2007; Zahra, Filatotchev, & Wright, 2009).

The lack of previous studies on relations of CE and IE with OP in technology-based organizations opens space for research. The framework for this study is presented in Figure 1. Each indicator of CE and IE influences the final result of OP; thus, the independent variables in the study are CE and IE, and the dependent variable is OP. All variables are considered with reference to prior literature, from which the indicators that best represent them were drawn.

**Figure 1**  
Methodological framework



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Source: Authors' own elaboration.

In the following subchapters, the definitions of each dimension and its variables are presented.

### **2.1 Organizational Performance**

OP is a metric of change of financial status, which informs decision making by managers and the enforcement of decisions by actors. The selected measures represent a positive or negative result obtained by the organizations. Value creation is essential for the overall performance of any organization. The organizational actors have different analyses of the value created by the organization; thus, the performance is objective, which allows the organization to select the best perspective from which to represent its performance (Carton, 2006).

From a systematic perspective, OP is a complex relationship between seven criteria listed by Rolstadås (1998): effectiveness, efficiency, quality, productivity, quality of work life, innovation, and profitability for for-profit organizations or budgetary capacity for nonprofit organizations.

OP enables the organization to become more competitive; however, there is a need to find ways to optimize OP (Kim & Mauborgne, 2003; Zahra & Covin, 1993). Some indicators that measure OP have strong relationships with the criteria listed by Rolstadås (1998), and have been used in studies by authors such as Lumpkin and Dess (2001), Sánchez (2013) and Zahra and Garvis (2000). Rauch, Wiklund, Lumpkin and Frese's (2009) dimensions of corporate entrepreneurial orientation (innovation, risk-taking, proactiveness) are of equal importance when explaining OP.

Return on assets is directly related to the efficiency of the organization, and enables it to identify gains on the assets used. Profitability is the ultimate goal of any for-profit organization, and enables it to understand the success of its investments and profit margins. Sales growth enables the organization to develop positively, strengthening cells and increasing its market share (Bottazzi, Secchi & Tamagni, 2008; Lumpkin & Dess, 2001; Sánchez, 2013; Zahra & Garvis, 2000).

Entrepreneurship can influence the profitability of an organization on a limited scale, as this profitability may also suffer from internal or external influences. The position of an organization when taking risks can lead to growth in profitability (Dess et al., 2003; Zahra, 1991; Zahra, 1995).

According to Zahra (1996), sales growth is directly related to the ability of an organization to innovate and launch new products, and also contributes to market participation rates and OP. For this, research and development teams should be well equipped to create support for OP. Thus, we propose the following hypothesis:

H1: The greater the presence of CE and IE, the greater the OP.

### **2.2 Corporate Entrepreneurship**

CE is composed of formal and informal activities, which seek the creation of new business through innovations in products or processes, or market development.

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This activity occurs at functional or project levels, in order to improve the competitiveness and performance of the organization (Zahra, 1991).

Stopford and Baden-Fuller (1994) emphasized that the term “CE” emerged with reference to individual entrepreneurs’ behaviors. If this is true, individual entrepreneurs have the capacity to influence actions in the organization as a whole. CE also helps to identify three types of corporate entrepreneurship: (1) the creation of new organizations within a venture; (2) the activity most associated with the transformation or renewal of existing organizations; and (3) situations in which organizations change the rules of competition for their industry.

Proactivity is freedom for renovation with extensive experimentation by groups. Organizations can be proactive when they lend ideas to others as a way to break past behaviors (Covin & Slevin, 1991; Stopford & Baden-Fuller, 1994; Zahra, 1993a).

Thus, Lumpkin and Dess (1996) point out that the common attributes of CE described by Stopford and Baden-Fuller (1994) are autonomy, innovativeness, risk-taking and aggressive competitiveness, which are important attributes in the development of CE. Essentially, these attributes are informed by aspects of organizational culture, a system of shared values, and corporate vision.

Lumpkin and Dess (1996) suggested the development of various types of organizational behaviors that induce CE to be more strongly characterized by attributes in different combinations. Research by authors such as Kuratko and Audretsch (2013), Lumpkin and Dess (2001), Zahra (1991), Zahra (1993a) and Zahra and Covin (1995) have confirmed the positive relationship between CE and OP, demonstrating that growth of entrepreneurship is positively associated with OP.

Proactivity is an important indicator of CE, and can be understood as the capacity and emphasis of an organization when introducing new products, services, or technology into the market. The competitive position of an organization in relation to proactivity is instigated by renewal processes (Zahra, 1993b; Zahra, 1995; Zahra & Covin, 1995). Thus, we propose that: H2: The greater the proactivity of an organization, the greater its OP.

McFadzean, O’Loughlin and Shaw (2005) defined CE as an effort to promote innovation in an uncertain environment, where innovation is understood as the process of creating value for the organization, suppliers and customers. Innovation improves OP, in terms of developing new or modifying existing products, processes or organizational systems. Innovation also supports organizational actors in order to build new ideas, experiments and creative processes, which help in the development of the product or process, allowing experiments to go beyond the reality of the organization. However, when innovation is not present in the organization there is no CE, even when other dimensions can be identified (Covin & Miles, 1999; Covin & Slevin, 1991; Lumpkin & Dess, 1996; Zahra, 1995; Zahra & Covin, 1995). With this in mind, we propose the following:

H3: The greater the innovativeness of an organization, the greater its OP.

The concept of risk-taking is often used to generically describe entrepreneurship. The ability of an organization to take risks is directly associated with its support for innovation, even if the success of these innovative activities is uncertain. However, such activities enable the organization to exploit opportunities and gain competitive advantage. Therefore, the ability of the organization to take risks provides a better basis on which to make profits (Lumpkin & Dess, 1996; Zahra, 1995; Zahra & Garvis, 2000). Thus:



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H4: The greater an organization's propensity to take risks, the greater its OP.

### 2.3 Institutional Entrepreneurship

Battilana et al. (2009) described the concept of IE as the adoption of leadership when building an institution. To be characterized as an institutional entrepreneur, an organizational actor needs to follow two steps: initiate changes that create conflicts of opinion and actively participate in the implementation of these changes.

The perspective of institutional theory on the concept of IE characterizes the entrepreneur as an innovative institution, or an agent of institutional change. This characterization leads to numerous motivations and builds innovation into different scenarios. The institutional entrepreneur has to understand and choose institutional logics by observing the selected innovation scenario. Selection of these institutional logics depends on the institutional logic of the field in which the organization operates, even if the market is transitory (Greenwood & Suddaby, 2006; Leca, & Naccache, 2006; Pacheco, York, Dean, & Sarasvathy, 2010).

The different institutional pillars—regulatory, cognitive and normative—can change the entrepreneurial capacity of an organization, providing different levels of entrepreneurial activity (Busenitz, Gomez, & Spencer, 2000).

The regulatory pillar consists of laws, which are regulations and government policies that may support or inhibit entrepreneurial activities (Busenitz et al., 2000; Scott, 1995; Veciana & Urbano, 2008; Wicks, 2001). In order to directly impact the entrepreneur, laws facilitate entrepreneurial activity shares, as well as increasing or reducing business risks.

The primary regulatory function of an institution is to constrain and regulate behavior, implement rules, and inspect or review the conformity of actions of others in the institution with these rules (Scott, 1995). With this in mind, we propose that:

H5: The more tightly an organization is institutionally regulated, the greater the OP.

The cognitive indicator directly reflects the knowledge and skills of an organization's staff when operating a new business. The indicator represents individual behavior based on rules and subjective meanings that build thoughts, feelings and actions (Busenitz et al., 2000; Scott, 1995; Veciana & Urbano, 2008; Wicks, 2001). Thus:

H6: The greater an organization's cognitive institutional presence, the higher its OP.

Normative questions identify the degree to which organizational actors are satisfied with entrepreneurial activity, along with the value of creative skills and innovative thinking. This normative aspect represents a behavioral model based on obligatory dimensions of a social interaction. Thus, if the cultural context and values of an entrepreneurial organization are higher than those in another, a higher level of entrepreneurship will result (Busenitz et al., 2000; Scott, 1995; Wicks, 2001), leading us to posit that:

H7: The greater an organization's institutional normative capacity, the higher its OP.

## 3 Method

This study utilized a quantitative research method via a structured questionnaire for construction and replication of the data collection. The study drew from Lumpkin and Dess (2001) to measure CE; Busenitz et al. (2000) to measure IE; and Zahra and Garvis (2000) to define the criteria for OP.

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The questionnaire included 28 questions divided into four blocks, which individually represent each study criteria, covering the issues necessary to measure each indicator and achieve specific goals. The dimensions are outlined, along with the control variables, as follows: CE reveals the presence of proactivity, innovativeness and risk-taking in the sample organizations, and has nine related control variables. IE refers to the institutional context in which the organizations operate in terms of their regulatory, cognitive, and normative situation, and comprises 13 issues. OP reveals the satisfaction of respondents in relation to performance, through verification of return on assets items, sales, and profitability growth, and has seven issues. The control variables consist of the organizations' size, age and internationalization.

We used three different methods in order to analyze the data. Cluster analysis, or “k-means”, used three convergence criteria classes with a maximum of 10 iterations. Decision tree analysis, with 60 cases of training, enabled us to identify the rules for evaluating OP as a function of CE and IE. Finally, multiple correspondence analysis provided a factorial map of the research.

This survey was conducted in the city of Blumenau, which makes it a reference in the development of systems depending on their size. The region hosted 700 organizations in 2012, of which 230 were in the systems development area, and another 400 operated within system implementation and support or general computer services, generating a turnover of approximately 400 million, and employing, directly or indirectly, about 10,000 people.

#### **4 Model Estimates and Discussions**

First, we validated the dimensions proposed in this study through hierarchical clustering, also known as cluster analysis or hierarchical classification. This analysis built hierarchically organized sub-groups based on similarities between the entities, with organizations grouped according to their levels of training provided (Loesch & Hoeltgebaum, 2012).

We generated an average variable by grouping the variables by the study indicators. For example, the CE indicators were represented by the variables PRO1, PRO2 and PRO3 gathered under DPRO; the INO1 variables, INO2 and INO3, were gathered under DINO; and the ASS1 variables, ASS2 and ASS3, were gathered under DASS. Similar groupings were performed for the dimensions IE and OP.

#### **Figure 2 Cluster Dendrogram**

Organizadores:

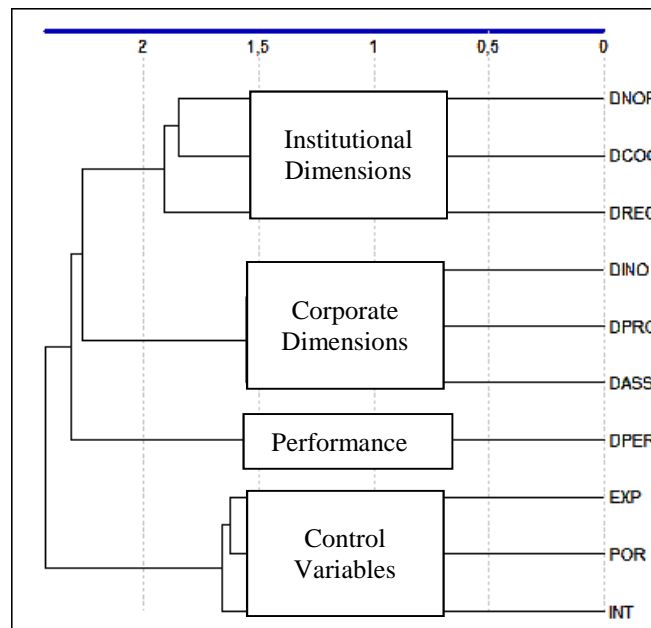


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Realizadores:



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Source: Authors' own elaboration.

Figure 2 shows a dendrogram of the model. The grouping of variables occurred in accordance with the theoretical definitions. IE grouped the DNOR variables, consolidating the average normative indicator, DCOG, from the cognitive indicator and DREG as the average regulatory indicator, as suggested by Busenitz et al. (2000). This grouping represented a proximity between the variables grouped on each tree branch. However, DNOR and DCOG have more correlations within the dimension.

The variables that were consolidated as average CE indicators, as defined by Lumpkin and Dess (2001), were grouped in a separate dimension. This group portrayed a greater proximity between the indicators represented by the variables DINO, DPRO and DASS. The DINO and DPRO variables presented the strongest correlation.

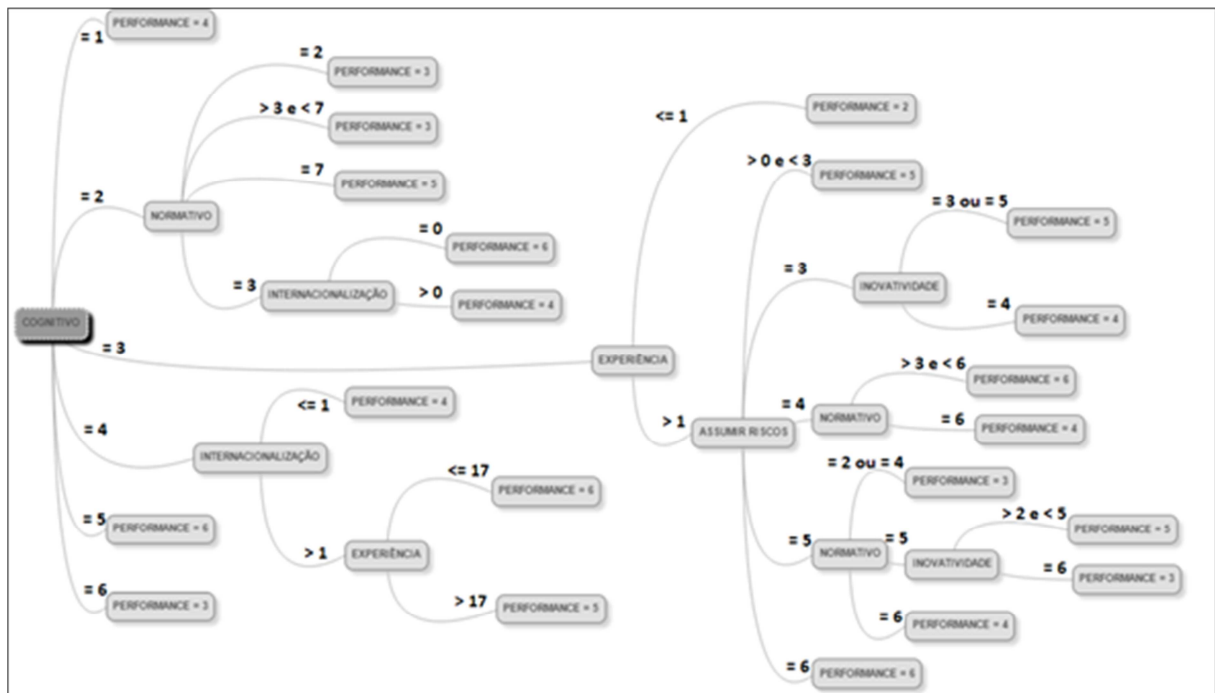
Finally, the control variables were grouped and shown to have proximity to the three dimensions of the model. This group had a less close relationship with the dimensions of IE and CE, but direct proximity to the level of OP.

The distances between each variable were calculated using Euclidean distance and the aggregation method for the nearest neighbor. The aggregation method determines how to classify the distance between two variables. In the nearest-neighbor method, the shortest distance between the possible combinations of objects occupied by the two variables is considered (Loesch & Hoeltgebaum, 2012).

**Figure 3**  
CE decision tree: IE and OP



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Evaluation of the behavior patterns of CE and IE indicators depending on OP was possible using the decision tree. The decision tree, relating CE and IE jointly with OP, is shown in Figure 3.

Organizations with higher OP indices have certain characteristics regarding the evaluation of their CE indicators and IE, and specific profile characteristics in particular.

Organizations that possessed an index of 6 for OP had a value of 2 for the cognitive aspect, while most segments in the sample evaluation received a value of 3 for the normative indicator and internationalization equal to 0. Other cases yielding an index of 6 for OP include when cognitive is equal to 3, older age 1 and to taking risks as equal to 4 and regulatory between 3 and 6, equal to or take risks 6. As well as cognitive equal to 4, further internationalization than 1 and less than or equal to age 17 years. Organizations that have the cognitive state equal to 5 have perceived PO levels of 6.

Table 1 consolidates the results of the analysis and the tests of the model's assumptions, representing the positive or negative impact of each hypothesis in relation to OP. It also shows a summary of the hypotheses.

**Table 1**  
**Consolidation of hypotheses**

Hypotheses		Effect	Sig.
H1	Proactivity	+	0.619
H2	Innovativeness	+	0.256
H3	Risk-taking	+	0.643
H4	Regulatory	+	0.721

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H5	Cognitive	+	0.043 **
H6	Normative	+	0.219
H7	Innovativeness	+	0.009 ***
	Risk-taking	-	0.053 *
	Normative	+	0.076 *
H8	Organization size	+	0.416
H9	Organization experience	+	0.222
H10	Internationalization	+	0.031**

\*  $p \leq 0.07$

\*\*  $p \leq 0.05$

\*\*\*  $p \leq 0.01$

Statistical analysis confirmed acceptance for H1, H6 and H10 when analyzed for a group of companies that developed information systems. Hypotheses H6 and H10 were found to have a direct relation to OP when studied individually. Thus, when only the cognitive indicator is presented, higher levels of OP can be expected; alternatively, when an organization has a high presence in foreign markets, it is expected to present high rates of OP.

H1 outlined three indicators—innovativeness, risk-taking and proactiveness that, when combined, positively impact OP; however, this result is only seen when the risk-taking indicator has a negative effect on OP.

Information-systems organizations that offer support for innovation but do not take risks beyond their capacity have the ability to leverage their performance results. In addition, the values, beliefs and norms of those who are familiar with the context of technology-based organizations are satisfied and in accordance with the reality of the field. This provides adequate entrepreneurial drive for organizations to remain healthy, and improves their survival prospects. These aspects are of great importance for professionals of technology-based organizations.

The results of the estimated regression model are reported in Table 1. The main findings point to a positive impact of the cultural cognitive distance on organizational performance, and was found to have statistical significance of 5%. The other factors related to institutional distance, although positively correlated with the OP, were not found to be statistically significant. The second important result of our estimated model shows that the higher the internationalization of firms, the higher their organizational performance (at a statistical significance of less than 5%). Finally, in order to look at the interaction between corporate entrepreneurship variables and institutional variables, we tested the H7. The innovative and normative variables were found to be statistically significant and to have positive effects on the organizational performance of firms at a significance of 10% and 1%, respectively. However, it seems that the effect of risk-taking has a negative moderating effect on organizational performance, and is statistically significant at 1%. The corporative entrepreneurship variables, taken as individual variables, were not found to be statistically significant; however, all the variables were shown to have positive correlations with OP.

The same can be stated for the institutional variables, both regulatory and normative, even though, when taken in isolation, they were found not to be statistically significant, but were positively correlated with OP. When we consider the interaction between normative factors and corporate entrepreneurship variables, these variables moderate the effect of the corporate

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entrepreneurship variables in terms of the effect of OP, and this was statistically significant. This suggests that firms' innovativeness and normative institutional behavior can be seen more as moderating variables than as exerting a direct effect on OP.

We controlled for the size and experience of the firms; however, such variables, although positively correlated, were found not to be statistically significant. To sum up, the regression model provided support for H5, H7 and H10.

Grouping of the CE indicators in one dimension, and IE and OP in the other, improved understanding of CE capabilities and IE in terms of the overall entrepreneurial context, which may be the internal organizational environment, the organization or the organizational field as a whole.

## 5 Conclusion

The relationships between the dimensions of CE and IE with OP were confirmed by a dendrogram generated via cluster analysis (see Figure 2), which thereby answered the main research question of this study. The variables were standardized to 0 with an interval of three different classes, as follows: (1) proactivity, innovativeness and risk-taking; (2) experience, size and internationalization; and (3) regulatory, cognitive, normative and performance indicators. The classes had a variation of 1.95 and a variance of 13.64.

Figure 2 allowed us to verify the groupings and the relationships between the IE variables. The normative (DNOR) and cognitive (DCOG) variables had a strong relationship and were grouped with the regulatory variable (DREG). Thus, H4, H5 and H6 were confirmed—that is, IE was proven to have an influence on OP. Similar associations were found in relation to CE: the variables innovativeness (DINO) and proactivity (DPRO) had a strong relationship with each other, and were grouped with the risk-taking (DASS) variable; these variables were influenced by the variable performance (DPER), and H1, H2 and H3 were also confirmed by the dendrogram.

H7 was similarly confirmed by the dendrogram, highlighting the existence of a relationship between the two groups of variables. The first group consisted of the variables of IE and the second group those of CE.

The decision tree analysis enabled some direct relationships to be identified between IE and CE with OP. This indicated that the organizations performed well when cognitive capacity was high, or when they had a low cognitive ability. It might be necessary for organizations to have been established for over a year and to take more risks in order to achieve better performance in the market.

It is possible to define two patterns or behavioral rules to explain OP. When the cognitive capacity of an organization is low, but the organization is more than one year old and is able to assume many risks, its performance will be high. This information was confirmed in 24.9% of the cases studied here. On the other hand, when the cognitive ability of the organization is high, the performance also reaches a high level. This information was confirmed in 11.2% of the cases.

The multiple correspondence analysis allowed us to identify a factorial map of the data-collection instruments and responses. Thus, the distance between the normative, regulatory and innovativeness variables, which had a strong influence the other variables studied,

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explains the low relationship with the other variables. In the same way, the innovativeness, proactivity and cognitive variables, which had a low influence on the other variables studied, explained the distant relationship with the other variables. In this study we did not consider the fact that the sample companies were mostly born globals in the IT industry, which may have influenced the results of the research. It is suggested that future research be conducted in other industries and in different kinds of companies.

The instrument was also limited by the dimensions studied, and did not include other variables that are not related to corporate entrepreneurial activities or organizations, which can influence OP.

A final limitation pertains to the fact that the organizations studied did not have public statements to verify their size, age and internationalization level, which required open questions in the survey instrument and meant that the respondents' interpretations could have biased the data.

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