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ORGANIZATIONAL RESILIENCE: A COMPARATIVE STUDY BETWEEN INNOVATIVE AND NON-INNOVATIVE COMPANIES BASED ON THE FINANCIAL PERFORMANCE ANALYSIS

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Abstract: Organizational resilience is defined as the ability and capacity of an organization to withstand unexpected changes, discontinuities and environmental risks. Innovation contributes to achieve resilience as it enables organizations to renew over time. Our aim in this article is to analyze the relationship between innovation and resilience from the financial performance analysis with EBITDA, ROE and ROA indicators. We investigated a total of 10 companies divided into two groups, where the first was a group of 5 open-capital companies listed in the ranking of the 50 most innovative companies in Brazil, and the second being a group of 5 open-capital companies not listed in the ranking. We performed an analysis in two stages: the first consisted in calculating the indexes selected in the four fiscal years - 2011, 2012, 2013 and 2014 - chosen by coinciding with a period after the 2008-2009 crisis; in the second stage, we compared the indexes of the two groups of companies in the four established periods. The results indicate that innovative companies are able to sustain higher financial results than those non-innovative companies. As a main contribution, our study provides a longitudinal comparative analysis, thus providing evidence on the financial performance of innovative enterprises.

Keywords: Innovation, Organizational Resilience, Innovative Companies, Financial Performance.

INTRODUÇÃO

Competitiveness has challenged companies to create and implement strategies to resist and compete in an environment of uncertainty. In this context, companies need to be resilient in order to be able to face constant changes (Infante, 2005). Organizational studies show that resilience is the organization's capacity to renew itself over time through

innovation. In other words, it is the ability and capacity to withstand unexpected changes and discontinuity, adapting to environmental risks and effectively aligning strategies, operations, management systems and governance structure to guide decision making (Starr, Newfrock & Delurey, 2003; Reinmoeller & Baardwijk, 2005).

Innovation is considered an aspect of human development for its relationship with the species evolution by the search for ways to accomplish tasks, solve problems and meet needs.

The interest in the study of innovation has been intensified since it was observed its importance for the creation and maintenance of businesses (Fagerberg, Mowery & Nelson, 2004). Thus, innovation is an inductive element for obtaining profit and market positioning. The innovation-profit relation is discussed from the propositions of Schumpeter (1942) focusing an innovative individual as an economic agent.

Thus, economic development depends on the profit that rewards and encourages the entrepreneur to seek innovation (Santos, Zawislak, Franzoni, & Vieira, 2015), and therefore, it is related to business performance and development (Szmrecsányi, 2006). Still, the results of some researches about the relationship between innovation and financial performance of companies continue generating conflicting results (Terra, Barbosa & Bouzada, 2015).

Being the profit or the financial return related to innovation and organizational performance, in some authors' opinions, such as Christensen (1997) and Zahra (1996), the management focused on innovation enables the achievement of market-leading, good business performance, success in a competitive environment and, above all, achieving a higher financial performance.

To Nås and Leppälahti (1997), innovative companies achieve growth rates of sales and higher and faster profits than non-innovative enterprises. According to Geroski, Machin and Van Reenen (1993), the number of innovations has a positive effect on profitability and return margins. Thus, with profit and the other financial performance indicators being measures accepted as performance signals, such measures were considered adequate to measure the organizational resilience in this paper.

Previous studies have explored the relationship between innovation and innovation return, but their analysis was limited to confront innovation with other business management elements, such as: investment in intangible assets (Miranda, Vasconcelos, Silva Filho, Santos & Maia, 2013); human resources and innovation (Santos, Basso, Kimura & Kayo, 2014); innovation and marketing effort (Srinivasan, Pauwels, Silva-Risso & Hanssens, 2009); innovation and business strategy (Teece, 1986); adoption of a technology strategy (Zahra, 1996).

Other studies related innovation dimensions to financial performance, such as: returns obtained from patenting (McGahan & Silverman, 2006); the introduction of specific innovation (Geroski et al., 1993); the relationship between radical and incremental innovation (Pereira, Imbrizi, Freitas, & Alvarenga, 2015) and financial impacts (Sorescu &

Spanjol, 2008). Other studies such as Cozza, Malerba, Mancusi, Perani and Vezzulli (2012), Marques, Barata and Manso (2007) and Faems, De Visser, Andries and Van Looy (2010) were limited to analyzing a specific sector of the economy or industry in a region or country.

Thus, two gaps were noted in the literature review regarding financial performance, the benchmarking between innovative and non-innovative enterprises and if innovative enterprises are able to sustain higher performances.

Considering these assumptions, we analyze if innovation generates financial returns and contributes to organizational resilience in Brazilian open-capital companies with traded shares in the São Paulo's Stock Exchange - Bovespa. To do so, we investigated the financial performance in three dimensions: EBITDA, ROE and ROA in 10 companies, comparing five members of the 50 most innovative companies ranking in Brazil by Exame Magazine, to 5 other companies not part of this ranking.

The analyzed indexes were obtained from the statements of the four fiscal years - 2011, 2012, 2013 and 2014 – a period following the global financial crisis of 2008-2009. Period considered adequate to measure responsiveness and business recovery, and therefore, suitable for measuring the resilience aspect.

We analyzed the data in two stages, the first consisting of the index calculation chosen in a defined time series between 2011 to 2014.

The second stage was a comparative analysis of the groups using the statistical Mann-Whitney test. The results in both analyzes indicate the existence of superiority on the financial performance of innovative companies compared to the group of non-innovative companies.

This paper is divided into 5 sections. The first is this introduction, followed by the second section that presents the theoretical reference and which was divided into three subsections: organizational resilience, innovation performance, and financial performance. The third section consists of the paper methodological aspects presenting and justifying the selection of the sample, and its collection and data analysis form.

In the fourth section we present and discuss the results. The fifth and final section is intended for closing remarks, highlighting the results, limitations and future suggestions.

Theoretical reference points

This section presents the arguments and theoretical definitions used to sustain the proposed aspects, and so it was divided into three subsections: organizational resilience, innovation performance, and financial performance.

Organizational resilience

The concept of resilience is used in literature regarding ecology, microbiology and cell regeneration studies, material processing and other

aspects of engineering, business and economics, including the stock market and corporate resilience. In the organizational field and in competition scenarios, the organizations' success depends on the ability to understand and adapt to the nature and dynamics of the business environment.

These elements are related to: competition, technology, costs, taxation, policies and customer expectations (Hamel & Välikangas, 2003). The adaptive management is an integrated and multidisciplinary approach to address uncertainty, which is necessitated by the recognition that the managed resources are changeable as a result of human intervention, that surprises are inevitable, and that new uncertainties will emerge.

From Vieira's (2006) point of view, resilient organizations are those that have the ability to adapt to change, fitting the trends and being able to change the generation of profit.

According to Langvardt (2007), resilient organizations are able to create a structure that gives security and stability during periods of change. In a scenario characterized by rapid technological change and economic equation that requires mobilization of changes, there is a quest for flexibility and adjustment of the structure to the new economic, social, cultural, technological and political contingencies (Barlach, Limongi-France & Malvezzi, 2008).

Corroborating this discussion, Pellissier (2011) points out that to sustain a competitive advantage and seeking innovation, a company must have abilities and capacities to create and recreate an efficient structure and manage the consequences generated by continuous change. To Whitehorn (2011), certain behaviors and strategies are required from companies, such as agility, integration capacity, leadership, ability to foresee changes and the adoption of clear and well-structured communication.

These tools ensure the organization an appropriate structure to face the market challenges. Woods (2006) states that resilience makes us think differently, expanding the concept of risk, integrated system, flexibility and tolerance. Scheffran, Marmer and Sow (2012) corroborate this position by claiming that the organizations' adaptation is the adjustment of systems in response to actual stimuli or expected effects that may impair access to beneficial opportunities.

Dalziel & McManus (2004) define resilience as the union of two components: vulnerability and adaptive capacity. In the authors' opinion, vulnerability is measured by the ease that an organization moves from a steady to an imbalance state when involved in an unpredictable event, and adaptability is measured by the rate of change or recovery achieved by the organization after happening such events.

In Kaplan's (1999) opinion, unpredictability, risk and financial and social instability in the current context, which shows high rates of company mortalities before two years of activity, the concept of resilience brings itself the need for a positive adaptation of the organization to changes that generally represent exposure to adversity situations. The resilient behavior, according to Lengnick-Hall and Beck (2009), allows

companies the development of new learning and implementing new routines and a better use of its resources under uncertainty conditions.

According to Langvardt (2007), one of the main reasons for failure in business management is the doubt regarding the idea of repair or reinvention of the business model. The authors believe that the adaptability or resilience capacity must be a strategic aspect and should not respond to specific crises or momentary losses, but being able to anticipate changes and prevent their businesses from being adversely affected by them.

According to Hamel and Välikangas (2003), an organization is resilient when it is able to build the future, rather than defending the past.

Authors such as Ruth (1996) and McCann (2004) relate resilience to the strategic agility of an organization and also its performance. Lengnick-Hall, Beck, and Lengnick-Hall (2011) point out that the ability of an organization to resilience occurs by incorporating a set of knowledge, skills, abilities, routines and processes by which it guides itself to act in order to withstand the disruptive shocks.

Innovation and business performance

If innovation is considered a business driver from its creativity (Oliveira, Laranja, Lahorgue, & Born, 2016) and transformation foundations, to the point of being considered as an engine of economic growth (Schumpeter, 1942), then, it must be considered as a favoring aspect of resilience. Among the advantages that innovation is seen as creative, there are: the temporary monopoly of the invention and pioneering and the economic development generated by the followers' run in an attempt to imitate the pioneering inventor by the search for new inventions.

The idea of economic development is based on three grounds: entrepreneurship, credit and the combinations that trigger changes in the economic activity, which is based on business competition.

Innovation in its various dimensions converges to a common point, the competitive advantage. The Organisation Economic Co-Operation and Development [OECD] (2005), through the Oslo Manual, defines regarding the novelty degree, supported by Tidd, Bessant and Pavitt (2008). In this classification two classic definitions are presented: incremental innovation, when there are improvements or continuous changes in character of products and / or processes; and radical innovation, when it radically happens changes in the product or process.

Following this classification line, Henderson and Clark (2001) proposed the existence of intermediate levels between the incremental and radical innovations and suggest two additional types: the architectural, characterized by the reconfiguration of processes and the redesign of the structure, keeping the dominant design concepts intact; and the modular, when there is an introduction of design concepts and components to the architecture of a technology with no changes in the original architecture.

Still, regarding the categorization of innovation, the Oslo Manual (OECD, 2005), presents four categories: product - good or new or significantly improved service; process: a new or improved method of production or distribution; marketing - new marketing method with modifications on products or packaging, positioning, promotion or pricing; and organizational - new methods in business practices, organization or management of its relationships.

As regarding access, two discussions are exponents: the first is ambidexterity, proposed by March (1991).

According to him, access to technology is given in two ways: exploitation - expansion of domestic capacity, from the use and improvement of existing resources and internal processes; and exploration - the process of exploring new markets, new technologies and new products and the pursuit of discovery via R & D.

Corroborating this thought, O'Reilly and Tushman (1994) emphasize the importance of these concepts and highlight that successful organizations structure exploitation and exploration sectors, separately. The second discussion is the proposal of Chesbrough (2003) about open innovation. The author proposes the existence of an open flow of ideas and resources and the movement of knowledge on the border between the company and the market, where the company can use external ideas, combine them with internal ideas, innovate and take the advantage from the exploration of capabilities.

The opposite concept proposed by Chesbrough, Vanhaverbeke and West (2006) is the closed innovation, defined by him as a restricted process to the company's ability itself to capture, enhance, and develop innovation, using only one input, the R & D, and an output, the market.

Regarding the confrontation of uncertainty environments and technological or economic discontinuity, innovation is also indicated as an aspect able to help equip the ability of companies at this stage.

Authors such as Anderson and Tushman (1990) and Jensen (1982) define technological discontinuity as rupture or "disruptive" innovation, in their opinion, in the technological environment moments of stillness occur, in which companies that come out ahead in product development, create technologies and capabilities considered superior, they get profit from pioneering.

However, in their opinion, discontinuity clashes that alter these periods occur, caused by the followers' pursuit to replace the dominant project. Christensen and Overdorf (2000) say that disruptive innovation favors the market destroying process and also the dominant companies creatively and generates a constant innovation-refresh cycle.

As for the innovation performance, in this paper, we chose to specifically highlight the financial performance, discussion in which Geroski et al. (1993) argue that some aspects need to be analyzed, among them, the relationship: Profit, production and marketing, and the earnings x spending relationship with R & D. These authors emphasize the need to observe the correlation between production and profitability of innovation, in other words, the performance differences between

innovative and non-innovative enterprises. This analysis is important because it considers the direct association between innovation and two essential aspects: the first, superior performance (better results) and the generation of advantage in the market; and second, the change or improvement process of the company's internal capacities (Geroski et al., 1993).

Other discussions on innovation performance are found in the literature. Boone (2000) points out that there is pressure on companies to innovate and generate returns, Brito, Brito and Morganti (2009) emphasize the difficulty to measure innovation and to establish a direct relation with performance. Dosi (1998) highlight the existence of performance differences among companies with different levels of access to technology. Baily and Chakrabarty (1985) corroborate this discussion and point out that these imbalances result from differences in costs and innovation production.

According to Teece (1986), ownership or incorporation of factors, including other companies, markets and structures, knowledge and patents are important to profitability. Biancolino, Maccari and Pereira (2013) underline the value chain in innovation as a factor to achieve revenue and profitability goals, as to Tran, Hsuan and Mahnke (2011), capabilities that represent process innovation also result in added value and increased financial results.

Considering the convergence of the theoretical discussion on innovation for an aspect, if not central, more closely related - the generation of profit and return -, the establishment of this correlation is necessary for understanding of how contributor innovation is to the organization's performance.

Financial performance

Neely and Gregory (1995) define performance measurement as the process of quantifying certain action. According to Hacker and Brotherton (1998), a performance indicator system is considered effective when it allows administrators to evaluate whether a particular set of actions is meeting or not the objectives outlined. Kennerley and Neely (2002) point out that among the various management techniques, those related to performance measurement are always present.

Although there are a number of non-financial nature indicators, the financial ones are still the best known and usual, either by the quantitative nature or by goals they meet, generating richness, profit and return. According to Bruni, (2008) and Ross, Westerfield and Jaffe (2009), the most important indicators and more used by companies are related to the invested capital cost and cash and return levels obtained on them.

Copeland, Koller and Murrin (2001) say that there is a concentration of efforts in business management for value creation as the most important measure of performance. This fact is due to the increasing importance of shareholders and the consequent need to generate richness in order to reward them.

Value creation, return on capital and richness generation, in addition to creating jobs, paying taxes and contributing to economic development, constitute the economic viability of a company, including return on their investments in innovation. According to Copeland, Koller and Murrin (2001), the intrinsic value of the company is based on its ability to generate cash. Fama and French (1993) point out that in the company's decisions, risk is a present element.

The idea of no return or total or partial loss of the capital creates even greater pressure on the expected return of an investment. In this sense, Bruni (2008) points out that the financial decisions imply, in an investment of time and money, something whose outcome is unknown and will only occur in the future in an environment of uncertainty.

Based on each decision and financial attitude, regarding generating results, these decisions should be selected aiming to reach the best possible result (Gitman, 2010). Performance measurements and control systems must be formal business routines, based on information and procedures.

Managers use these measurements to extract indicators that help them to maintain or alter standards of activities (Kellen & Wolf, 2003). The financial analysis for result measurement is the organization of financial information to assist its users in the decision-making assessment and action orientation (Silva, 2006).

Thereby, Frezatti and De Aguiar (2007) call attention that, when analyzing an investment decision, the ability to generate returns should be measured, which main measures are the indicators: EBITDA - Earnings Before Interest, Tax, Depreciation and amortization, an indicator that affects the management control in order to identify impacts generated by planning and control of the organization (Frezatti & De Aguiar, 2007); ROE Return on Equity, defined by Rai, Patnayakuni and Patnayakuni (1997) as a measure of performance assessed by productivity or the result obtained in the own reinvested capital, and ROA - Return on Asset which, according to Damodaran (2012), measures the operational efficiency in terms of profit generation from assets.

EBITDA, ROE and ROA are financial performance indicators that measure respectively, operating return, revenue and cost management capacity and the ability to generate returns on the total investments.

The operating return indicates management efficiency in operations. Return on equity indicates the volume of reinvestment and the outcome of this, without considering investments with third-party capital.

The return on total assets, including receivables, inventories and assets financed with third-party's capital, represent the level of management efficiency, due to these specific features, these indicators were selected to be used in this paper.

Considering the arguments and theoretical assumptions about the relationship between innovation and financial return, as well as innovation as a corporate management aspect that demands investments and financial sacrifice and, hence, the generation of return and higher performance.

This paper seeks to contribute to this discussion, i. e., that innovative companies generate higher financial returns than non-innovative companies, and therefore, it indicates that innovative enterprises are more resilient and better resist crisis periods than non-innovative ones. For this, the following research hypotheses are formulated:

H1- Innovative companies have higher EBITDA than non-innovative companies.

H2- Innovative companies have higher ROE than non-innovative companies.

H3- Innovative companies have higher ROA than non-innovative companies.

Method

The method used to do it was a descriptive study that represents a kind of research, usually used to describe socioeconomic, financial and technical phenomena. The sample is classified as non-probabilistic sampling for convenience, made up of 10 companies divided into 2 groups. Group 1 consists of 5 innovative open-capital companies with shares traded on the São Paulo's Stock Exchange (Bovespa). These companies are part of the 50 companies ranking held to be the most innovative enterprises of Brazil, and which was developed by Exame magazine. In this ranking, only 11 companies are open-capital companies, only 5 were chosen due to the need to identify other companies in the same sector not classified by the ranking.

The selection criterion was the existence of companies listed in Bovespa operating in the same sector in order to form pairs and to establish a comparative analysis. Therefore, the second group consists of 5 other companies selected among the companies listed in Bovespa, not part of the ranking, selected by the criterion of belonging to the same economic sectors of the ranked companies. Because there was no identification of non-innovative companies in equivalent number to the 11 open-capital companies in the ranking, the number of companies was limited to 5 in order to form comparison pairs.

Box 1

Companies selected for the sample composition.

INNOVATIVE ENTERPRISES	NON-INNOVATIVE ENTERPRISES
JBS S.A.	Marfrig Global Foods S.A.
Natura S.A.	Sweet Cosméticos S.A.
Porto Seguro S.A.	Cia Seguros Aliança da Bahia S.A.
Banco Bradesco S.A.	Banco Mercantil do Brasil S.A.
Whirlpool S.A.	IGB Eletrônica S.A.

Created by the authors based on the Exame magazine and Bovespa's ranking data.

Data collection was performed through access to the Bovespa's website related to the standardized financial statements: Balance Sheet (BS) and

Fiscal Year Financial Statement (FYFS) for the years 2011, 2012, 2013 and 2014. The period of analysis was defined because it matched with the fiscal years related to the period after the international financial crisis of 2008-2009, which was considered an appropriate period for measuring organizational resilience.

Due to the small size of the sample, to compare both groups of companies we opted to use the non-parametric Mann-Whitney test. This test measures if two samples come from the same or different populations. As a 0.05 significance level was used, p-values below this value, it can confirm the existence of statistically significant differences between the groups (Hair, Black, Babin, Anderson & Tatham, 2009; Marôco, 2011). For this analysis, we used the Statistical Package for Social Sciences software - SPSS v. 20.

Results and Discussions

The first analysis step is the calculation of the indicators: EBITDA, ROE and ROA of the 4 selected fiscal years, as shown in Table 1.

Table 1
Performance indicators of the selected companies

Innovative enterprises					Non-innovative enterprises				
COMPANY/	Fiscal Year				COMPANY/	Fiscal Year			
INDICATOR	2011	2012	2013	2014	INDICATOR	2011	2012	2013	2014
JBS S.A.					MARFRIG GLOBAL FOODS S.A.				
EBITDA	1,781	2,720	4,149	7,803	EBITDA	981	1,430	876	1,102
ROE	-1.49%	3.55%	4.83%	9.38%	ROE	-21.87%	-5.45%	-28.76%	-34.77%
ROA	-0.68%	1.53%	1.63%	2.93%	ROA	-3.14%	-0.91%	-5.03%	-3.57%
NATURA S.A.					SWEET COSMETICOS S.A.				
EBITDA	1,315	1,370	1,416	1,365	EBITDA	63	-7	-18	-28
ROE	66.97%	66.89%	72.13%	64.53%	ROE	-1.32%	-134.36%	-54.60%	-54.47%
ROA	21.96%	16.08%	13.49%	10.29%	ROA	36.31%	-59.61%	-159.98%	-613.71%
PORTO SEGURO S.A.					CIA. SEGUROS ALIANÇA DA BAHIA S.A.				
EBITDA	1,268	9	1,268	427	EBITDA	-11	-19	-22	-19
ROE	12.33%	13.40%	23.71%	14.60%	ROE	16.09%	7.68%	6.05%	20.18%
ROA	3.50%	3.60%	6.85%	3.91%	ROA	6.82%	3.22%	2.42%	8.48%
BANCO BRADESCO S.A.					BANCO MERCANTIL DO BRASIL S.A.				
EBITDA	27,947	32,201	29,371	35,092	EBITDA	368	735	602	562
ROE	18.67%	15.91%	17.32%	18.73%	ROE	11.00%	15.81%	8.99%	-27.21%
ROA	1.54%	1.42%	1.49%	1.66%	ROA	0.61%	0.95%	0.62%	-1.50%
WHIRLPOOL S.A.					IGB ELETRÔNICA S.A.				
EBITDA	360	872	1,068	1,053	EBITDA	2	160	-52	641
ROE	20.52%	29.94%	33.30%	33.47%	ROE	-13.50%	-317.37%	-43.88%	-3720.22%
ROA	7.07%	10.34%	12.48%	11.54%	ROA	-3.90%	23.73%	-5.32%	-725.19%

Research data (2015).

In this first stage of analysis, the indicators show higher results for innovative companies in the 4 fiscal years. Even when they are decreasing results, they are more pronounced in non-innovative enterprises.

Aiming at obtaining results from an analysis with greater robustness and sophistication, we opted for the statistical analysis, applying the

Mann-Whitney test. Table 2 shows the EBITDA of innovative and non-innovative companies between the years 2011 and 2014. It is noted from the p-values and the Mann-Whitney test ranks that two years showed significant differences - 2011 and 2013 - and, in both, the innovative companies had higher rates than non-innovative companies.

Table 2
EBITDA analysis of innovative and non-innovative enterprises

EBITDA					
Year	Company	N	Mean Rank	Sum of Ranks	p. value
2011	Innovative	5	7.6	38	0.028*
	Non-innovative	5	3.4	17	
2012	Innovative	5	7	35	0.117
	Non-innovative	5	4	20	
2013	Innovative	5	8	40	0.009*
	Non-innovative	5	3	15	
2014	Innovative	5	7.2	36	0.076
	Non-innovative	5	3.8	19	

Research data (2015).

* Significance at 0.05 level

Table 3 shows the ROE of the two groups of companies. In all analyzed years is noted that the performance of innovative companies was significantly higher than the non-innovative companies, as it can be observed in the columns of ranks and p-values in Table 3.

Table 3
ROE analysis of innovative and non-innovative enterprises

ROE					
Year	Company	N	Mean Rank	Sum of Ranks	p. value
2011	Innovative	5	7.2	36	0.076*
	Non-innovative	5	3.8	19	
2012	Innovative	5	7.4	37	0.047*
	Non-innovative	5	3.6	18	
2013	Innovative	5	7.6	38	0.028*
	Non-innovative	5	3.4	17	
2014	Innovative	5	7.4	37	0.047*
	Non-innovative	5	3.6	18	

Research data (2015).

* Significance at 0.05 level

In table 4 can be seen the ROA of the 10 companies in which the years 2013 and 2014 also showed significant differences for innovative and non-innovative enterprises. Similarly, it can be said that innovative companies have higher rates than non-innovative enterprises.

Table 4
ROA analysis of innovative and non-innovative enterprises

ROA					
Year	Company	N	Mean Rank	Sum of Ranks	p. value
2011	Innovative	5	6.2	31	0.465
	Non-innovative	5	4.8	24	
2012	Innovative	5	6.6	33	0.251
	Non-innovative	5	4.4	22	
2013	Innovative	5	7.6	38	0.028*
	Non-innovative	5	3.4	17	
2014	Innovative	5	7.4	37	0.047*
	Non-innovative	5	3.6	18	

Research data (2015).

* Significance at 0.05 level

Finally, the existence of differences between innovative and non-innovative companies was verified considering financial ratios accumulated between 2011 and 2014. It should be noted in this way that innovative companies have significantly higher financial ratios (EBITDA, ROE and ROA) than the non-innovative companies in the period, and thus, it can be inferred that the innovation variable presents reflection in the analyzed indexes. These results, in the first instance, contradict the results of Terra, Barbosa and Bouzada (2015), because in the survey emphasize the absence of a positive relationship between the innovation performance in the process (product) and profitability (growth).

Table 5
Analysis of the consolidated data of innovative and non-innovative companies

2011 up to 2014					
Indicator	Company	N	Mean Rank	Sum of Ranks	p. value
EBITDA	Innovative	5	28.4	568	0.000*
	Non-innovative	5	12.6	252	
ROE	Innovative	5	28.5	570	0.000*
	Non-innovative	5	12.5	250	
ROA	Innovative	5	26.4	528	0.001*
	Non-innovative	5	14.6	292	

Research data (2015).

* Significance at 0.05 level

Considering the results obtained from the analysis of financial ratios and evaluation of the data using the Mann-Whitney test, the innovative companies have, respectively, higher EBITDA than those non-innovative enterprises and also present growth rates of this indicator at higher levels. These results confirm the H1, which states that the innovative companies have higher EBITDA than the non-innovative companies.

As for the ROE indicator, the analysis results indicate the existence of performance and evolution superiority of this indicator for most of the innovative companies in relation to non-innovative ones, with greater

balance between the insurance companies, which confirms the H2 – Innovative companies have higher ROE than non-innovative companies during the period.

Therefore, when analyzing the ROA index, similar to the results presented by the ROE, the innovative companies have higher performance and also performance bearing capacity over the analysis period, being registered balance and less difference between the insurance companies in the two groups, confirming H3 – Innovative companies have higher ROA than the non-innovative companies in the period selected for analysis.

The results, in general, indicate the existence of higher performance for innovative companies when compared to non-innovative companies which operate in the same economic sector. The results of the insurance companies indicate that service companies have greater homogeneity of financial performance between innovative and non-innovative ones. Finally, we can highlight that the literature visited is inconclusive about the relationship between innovation and financial performance (Terra, Barbosa & Bouzada, 2015), and that the proposed article provides evidence that when analyzing more widely the innovative and non-innovative companies of same sector, it shows the existence of differences in financial performance between innovative and non-innovative companies, and therefore, the innovation variable can be reflected in the financial performance. Especially because innovation is a matter of survival and sustainability of organizations in a context of high competitiveness in the market (Dorow, Wilbert, Jenoveva Neto & Dandolini, 2015) and the reflection extends the continued market presence and continuity of the organization.

Conclusions

This paper aims to analyze comparatively innovative and non-innovative enterprises, assuming the existence of a higher resilience level in innovative companies, from the generation capacity and financial performance support in an international economic post-crisis period, comparatively analyzing the Brazilian open-capital companies divided into two groups, innovative and non-innovative companies, keeping the similarity between the economic sectors. The results obtained from the analysis of EBITDA, ROE and ROA indexes are an indicative of higher performance of the innovative companies compared with the non-innovative companies.

Considering the assumptions underlying this article that innovation should be considered a performance enhancer factor of companies and that it can make them more likely to withstand periods of crisis or make them less vulnerable to unexpected changes in the business environment. The results confirm the assumptions made when they indicate the occurrence and support of higher financial performance of innovative companies that are part of the Exame magazine's ranking, as compared to other open-capital companies in the same sector.

Therefore, this paper contributes, albeit in a preliminary way, not only to confirm the arguments and previous studies, which make innovation the ability to generate competitiveness and higher performance, as highlighted by the superiority of financial performance and the ability to better withstand periods of crisis, i.e., making them more resilient.

Even though we consider the limitations of this article by aspects such as: sample size, limited to 10 companies; differences between companies compared to each other, being big companies, time of existence and maturity in the market; the analysis period, limited to 4 fiscal years; and indexes analyzed, limited to 3, we consider that the study presents evidence that merit further development, given the superiority of innovative companies, which may represent an important reflex to increase investment in innovation by enterprises, governments encouraging innovation and the consolidation of innovation as a promotion aspect of business and economy development.

We recommend the expansion and intensification of this kind of studies with the inclusion of other analytical elements, sectors, company categories and indicators in order to strengthen positively the arguments and assumptions of innovation as an enlargement factor and performance support.

As a suggestion for future studies, we recommend the use of comparative analysis with the adoption of rankings from innovative companies with non-innovative ones acting in a similar sector, but with the inclusion of other indicators and other statistical analyzes that can bring greater robustness to the results.

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