

The influence of venture capital on innovation in Brazilian startups

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Abstract

This work verifies the influence of venture capital on the propensity of Brazilian startups to innovate. The central argument lies in the theoretical indication that venture capital is one of the best financing mechanisms to stimulate business innovation. The study adopted a quantitative approach to define the dimensions that were explored qualitatively in a second stage. The research applied questionnaires to companies that received funding from a venture capital fund, and then selected some of the respondents for interviews. The results indicate that the venture capital invested aim mainly at the commercial insertion of technologies that investees already developed or are in development process. This type of funding fails to prioritize research and development, which would allow the creation of new technologies to expand the investees' competitiveness in the future.

Keywords: Venture Capital. Innovation. Ambidexterity.

O aporte de venture capital e a predisposição de startups brasileiras em inovar

Resumo

O objetivo desse trabalho é verificar se o aporte de *venture capital* influenciou a predisposição de *startups* brasileiras em inovar. O argumento central recai na indicação teórica de que o aporte de *venture capital* consiste em um dos mecanismos de financiamento mais adequados para estimular atividades de inovação em empresas. Metodologicamente, adotou-se postura mista, na qual a etapa quantitativa serviu para delimitar as principais dimensões a serem exploradas na etapa qualitativa. Dessa forma, foram aplicados questionários em empresas de um fundo de *venture capital* e, em seguida, selecionadas aquelas dentre as participantes da primeira etapa para realização de entrevistas. Os resultados indicam que o aporte de *venture capital* tem como objetivo central a inserção comercial de tecnologias já desenvolvidas ou em fase de desenvolvimento pelas empresas, deixando de priorizar ações de pesquisa e desenvolvimento que permitam a criação de novas tecnologias para a competição futura das empresas aportadas.

Palavras-chave: *Venture Capital*. Inovação. Ambidestralidade.

El aporte de venture capital y la predisposición de startups brasileñas

Resumen

El objetivo de este trabajo es verificar si el aporte de *venture capital* influyó en la predisposición de las *startups* brasileñas para innovar. El argumento central recae en la indicación teórica de que el aporte de *venture capital* consiste en uno de los mecanismos de financiamiento más adecuados para estimular actividades de innovación en empresas. Metodológicamente, se adoptó una postura mixta, en la cual la etapa cuantitativa sirvió para delimitar las principales dimensiones a explorar en la etapa cualitativa. De esta forma, se aplicaron cuestionarios en empresas de un fondo de *venture capital* y luego se seleccionaron empresas entre las participantes de la primera etapa para la realización de entrevistas. Los resultados indican que el aporte de *venture capital* tiene como objetivo central la inserción comercial de tecnologías ya desarrolladas o en fase de desarrollo por las empresas, dejando de priorizar acciones de investigación y desarrollo que permitan la creación de nuevas tecnologías para la competitividad futura de las empresas que recibieron aportes.

Palabras clave: *Venture capital*. Innovación. Ambidestralidad.

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INTRODUCTION

Innovation has been widely studied from an evolutionary perspective, contemplating various theoretical elements which make clear the systemic nature of this phenomenon and the various levels of analysis related to it, such as discussions regarding paradigms, trajectories and technological regimes (DOSI, 2007, 2006, 1990, 1988; KRISTENSEN, 1998; MOWERY and ROSENBERG, 2006; PEREZ, 2004), national, regional, and sectoral innovation systems (FREEMAN, 1995; MALERBA, 2003, 2002; PAVITT, 1985), the relationship between innovation and development (SCHUMPETER, 1985), the search for a theory of innovation (NELSON, 2006a, 2006b; NELSON and WINTER, 2005, 2004), as well as other subjects such as public policies (ARIENTI, 2003; GADELHA, 2001) and catching up (PACK, 2006; NELSON, 2004).

The influence of the financial system in the resource allocation process in the innovation performance of companies is one of these evolutionary elements, and it can be identified as the central component in the writings of Schumpeter (1985) about innovation (O'SULLIVAN, 2004). However, even though the researchers who have sought to understand the relationship between economic growth and finance have discussed this theme in regard to the initial postulates of Schumpeter (1985), this relationship has apparently been neglected by a significant portion of researchers (O'SULLIVAN, 2004).

This can be verified in Brazilian studies (CORDER and SALLES FILHO, 2006, 2004; MAÇANEIRO and CHEROBIM, 2009; MELO, 2009; PACHECO, 2007) and international studies (ALMUS and CZARNITZKI, 2003; BROWN, FAZZARI and PETERSON, 2009; DOSI, 1990; HALL and LERNER, 2009); and in the search to relate the strengthening of innovation systems to the available financial mechanisms. The focus, in this case, has been on macroeconomic aspects and public policy that, for the most part, do not contemplate the understanding of innovation dynamics on an organizational level.

The characteristics of innovation activities aligned with the absence of studies that seek to understand the process of financing on an organizational level lead to questioning about the best way to realize investments intended to stimulate innovation activities in organizations.

Among the studies that seek to indicate the appropriate mechanisms for this scenario, authors such as Florida and Kenney (1988), Gompers (1994), Kortum and Lerner (2000), Ramalho (2010), Schwiendbacher (2008), Wadhwa, Phelps and Kotha (2016) and Weber and Weber (2007) present discussions that indicate venture capital as one of the most appropriate mechanisms to stimulate the capacity of organizations to innovate and enable entrepreneurs to develop their ideas and products, making them commercially viable.

Discussions involving the relationship between venture capital and the innovative capacity of organizations still haven't demonstrated advances in the understanding of the causal relationships that involve this phenomenon, as can be seen from the works of Hirukawa and Ueda (2008) and Kortum and Lerner (2000), which, despite presenting controversial results, seek to explore these relationships on the sectoral level.

Thus, the providing of venture capital seems to assume an active posture in companies realizing the modifications considered necessary, with the objective being returns on the invested capital. This being said, the central problem of this study is represented by the following question: how do the changes implemented by venture capital funds influence the predisposition of companies to innovate?

In addition to this introduction, the present article presents four more sections devoted to the discussion of the theoretical basis for the development of this study, the methodological procedures, the presentation and discussion of the results, and the final considerations.

THEORETICAL REFERENCES

The theoretical discussion of this article begins with the conceptual delineation of innovation, highlighting the concept and the bases of the main scales of ambidexterity developed up until now. Then, we will describe the central elements which constitute venture capital as a relevant mechanism in the financing of innovation activities.

Innovation and the concept of ambidexterity

Studies of innovation are developed predominantly based on support from the theoretical and epistemological bases proposed by Schumpeter (1985), in the Theory of Economic Development and by Nelson and Winter (2005), through their Evolutionary Theory of Innovation.

In Schumpeter's seminal study (1985), entrepreneurial activity is responsible for introducing new combinations into the economy (new products, processes, raw materials, markets and organizational forms) which culminate in breaking with market structures through creative destruction.

In turn, Nelson and Winter (2005), in proposing a theory of an evolutionary nature, recalled the seminal work of Schumpeter (1985) and based their work on Darwinian biological proposals, suggesting that innovation activities are introduced into a systemic context that is dependent on technological trajectories, which in turn are dependent on the actions of public and private institutions.

Keeping these elements in perspective, Fagerberg (2004) conceives of innovation in such a way as to differentiate it from processes of invention. To the author, these terms are relatively close and need to be taken into consideration, seeking a better delineation of both. In this manner, Fagerberg (2004) bases his work on Schumpeter's concept (1985) and affirms that invention consists of the occurrence of a new idea, product or process, while innovation consists of putting this invention into practice, or in other words, making new products available in the market, or utilizing new business processes.

It is in this sense that Miller and Morris (1999) state that the final objective of innovation is to create or guarantee a competitive advantage for organizations and this is why they are the central point of any situation of social well-being and the source of competitive advantages. Thus, innovations are central elements for the establishment and materialization of competitive strategies (SCANDELARI, 2011).

The constant need to search for innovation, from the perspective of business processes, as well as incremental improvements in existing products and the launch of new products in the market, lead this study to analyze innovation through the lens of organizational ambidexterity (O'REILLY III and TUSHMAN, 2004; RAFAILIDIS, TRIVELLAS and POLYCHRONIOU, 2017; RAISCH and BIRKINSHAW, 2008; RAISCH and TUSHMAN, 2011; TUSHMAN and O'REILLY, 2002, 1996).

The concept of ambidexterity, in essence, refers to the capacity of the individual to use either hand with the same ability, and this has been incorporated into the organizational literature and used as a metaphor for an organization being able to *explore* and *exploit* innovations with the same degree of skill (LUBATKIN, SIMSEK, LING et al., 2006).

To Benner and Tushman (2003), the concept of ambidexterity involves the use of distinct forms of learning simultaneously, balancing various managerial preoccupations, the short and the long term, and organizational centralization and decentralization, among other things.

The dimensions of ambidexterity are related to the context of radical and incremental innovations in the sense that organizations seek to act in the development of new technologies at the same time that they refine existing technologies which are already available in the market (JANSEN, VAN DEN BOSCH and VOLBERDA, 2006; MARCH, 1991; RAFAILIDIS, TRIVELLAS and POLYCHRONIOU, 2017).

The central discussion of the work of March (1991) revolves around the tradeoff made by organizations in terms of *exploration* and *exploitation*. The author argues that the preoccupation of managers in terms of identifying which activities should be financed tends to prioritize the search for new solutions that will break with existing knowledge (*exploration*) or the search for improvements in efficiency for activities that are already executed (*exploitation*).

The construction of instruments that verify the capacity of organizations to develop solutions to improve their efficiency (*exploitation*) and, at the same time, diagnose the performance of the efforts to develop new products and services that break with established knowledge (*exploration*) can contribute to improving the organization's competitiveness and advances in the understanding of a series of elements in the theoretical discussion of the field of Organizational Performance.

Among the factors that make it possible to use organizational ambidexterity to explain organizational phenomena, we may note the capacity of this subject to relate to various theories of the administrative environment, with a vision

based on resources, central skills, the market, dynamic capacities, and innovation, among other things, as cited by Popadiuk (2010).

Keeping in mind the constant search for metrics of innovation and the rise of discussions about organizational ambidexterity, we have studied and compared the main ambidexterity scales developed by He and Wong (2004), Jansen, Van den Bosch and Volberda (2006), Lubatkin, Simsek, Ling et al. (2006) and de Popadiuk (2010).

The analysis of the instruments revealed two scales which are significantly appropriate to seeking a measure of innovation on the organizational level, with one of them being the scale developed by Lubatkin, Simsek, Ling et al. (2006). The authors made sure to associate the subject to elements that relate directly to the capacity of an organization to innovate in an incremental or radical fashion, in addition to presenting the definition of its constructed aspects related to the form of knowledge used in each axis and contemplating the aspects addressed by He and Wong (2004) and Jansen, Van den Bosch and Volberda (2006).

From a methodological point of view, the Lubatkin, Simsek, Ling et al. (2006) scale presents a reduced number of indicators, which contributes to a reduced number of organizations being necessary for the utilization of structural models, as compared to the works of Popadiuk (2010), which due to the elevated number of indicators presented in the instrument requires larger samples, as explained by Hair Junior, Anderson, Tatham et al. (2005), which in turn increases the complexity of the data collection.

Venture capital

Venture capital is a type of investment in which the investor applies resources to companies with elevated growth and return potential (MENDONÇA, CHEROBIM, WOEHL et al., 2012). This participation may occur in the form of the acquisition of shares or participation rights (quotas of limited companies, convertible debentures, etc.) or by acquiring of quotas of specific investment funds, with the object of earning large gains in capital over the medium to long term (FINEP, 2001).

Sahlman (1990) seeks to characterize venture capital as a form of investment realized by a professionally managed capital fund, with investments made in private businesses during various stages of development, in which the fund managers are directly involved in the management of the businesses through participation on company boards of directors and retaining economic rights to these companies' results.

To Kortum and Lerner (2000), this type of investment consists of a way of participating in young private companies, in which the investor assumes the role of financial intermediary, and is active in the company's management, acting as a director, advisor and even a manager. This definition presents elements that meet certain characteristics – cited by Chesbrough and Tucci (2004), Colombo, Cumming and Vismara (2016), Florida and Kenney (1988), Gompers and Lerner (2001), O'Sullivan (2004), Ramalho (2010), and Wadhwa, Phelps and Kotha (2016), Weber and Weber (2007) – as being inherent in the financing of innovation activities, given that the fund responsible for supplying financial resources already has specific knowledge and information which will contribute to the management of the business, and as a result, its innovation activities.

The origin of the term *venture capital* is significantly imprecise. According to the Brazilian Agency of Industrial Development (ABDI) (2011, p. 41), the word *venture* in the sense of running risks, "was originally used around 1560" and, by roughly 1580 it had acquired the meaning of a "company of a venture nature," which indicates that the association of the term with risky ventures dates back a long way.

The predecessor of contemporary venture capital firms arose at the end of the 19th century and the beginning of the 20th century with wealthy American families searching for investments with potentially large returns (GOMPERS, 1994; GOMPERS and LERNER, 2001). This means the allocation of investments in innovative businesses with great growth potential.

Venture capital is as an appropriate instrument for the financing of innovation activities due to some elements that permeate the functioning of the financial system itself in terms of company innovation dynamics. In Schumpeter's seminal work (1985), the concession of credit corresponds to the basic function of capitalists, and it is through this means that capitalists manage

to force the economic system to follow other channels of development. From the author's perspective, a capitalist is someone who has enough capital to finance new business combinations and generate new business cycles.

The alignment between the financial market and the innovations realized by organizations form the central element of the economic development process and make it possible for entrepreneurs to introduce their products into the market, bearing in mind the possibility of forming temporary monopolies (KING and LEVINE, 1993; SCHUMPETER, 1985).

Among the elements that induce problems involving the understanding of adequate mechanisms for financing innovation activities in organizations, there are some that stand out as stated by Hall (2005), such as prospects of small returns on investment by virtue of the inability to achieve profits originating from an invention, as well as the uncertainty and risk associated with products which managers view with little optimism.

Companies need to find mechanisms that make possible more appropriate financing of innovation activities, and it is necessary to understand that "[...] the financing of innovation consists in the structuring, formal or not, of the available resources that need to be dedicated to stimulate research, development and innovation" (MAÇANEIRO and CHEROBIM, 2011, p. 60).

METHODOLOGICAL PROCEDURES

Keeping in mind the objective of this article, which is to verify whether investments from venture capital influence the predisposition of Brazilian startups to innovate, we have realized a study with a mixed approach following the assumptions of Creswell and Clark (2013) and Creswell (2010).

We began with quantitative research procedures, researching 19 of the 36 companies with a venture capital fund oriented specifically to investments in young companies or projects that have not yet become companies. The venture capital fund selected to orient our questionnaires and interviews was created in 2007 with an investment of R\$80 million made by a public investment bank, focused on seed capital. This fund was selected specifically due to our focus on financing businesses with great innovation potential, linking them in a direct manner to the research problem under investigation.

The process of applying the questionnaires during the first phase of research was initiated by individual phone calls to each one of the invested companies, seeking to identify the person responsible for the necessary information, followed by sending an email with our instrument, classifying it as a non-probabilistic sample in terms of accessibility. This process occurred over four months and was completed when we realized that further responses were becoming less and less likely over time.

The innovation activities in this study were operationalized through an instrument developed by Lubatkin, Simsek, Ling et al. (2006), taking into consideration the dimensions of *exploration* and *exploitation*, segmented in six indicators for each group, according to the commented tables in the discussion section and a 5 point Likert-type scale ranging from "totally disagree" to "totally agree".

The second phase of the field research, qualitative and descriptive in nature, consisted of semi-structured interviews – recorded and later transcribed for analysis – with managers or owners of five companies which received investments during three distinct stages. The selection of the companies during this phase occurred in accordance with the companies' availability to participate. To accomplish this, the 19 companies which participated in the first phase of the study were contacted again, and just five made themselves available for the realization of in-depth interviews. The interviews were also based on the dimensions of *exploration* and *exploitation*, according to the concept of Lubatkin, Simsek, Ling et al. (2006), with the objective of exploring the actions of venture capital funds in these dimensions.

The utilization of semi-structured interviews enabled us to get a better understanding of how the venture capital fund realizes modifications in the resources and organizational skills to stimulate radical innovation (*exploration*) and incremental innovation (*exploitation*). We addressed issues that clarify the reasons why companies seek this form of financing; what were the modifications realized in terms of resources and organizational skills, and how they influenced innovation dynamics in companies that received venture capital investment.

The invested companies, all based on technology, were named according to the Greek alphabet, and the descriptions of the companies of the interviewees are deliberately vague to maintain the anonymity of these companies and the managers who contributed to this study.

Box 1
Characterization of the Companies and Respondents

Organization	Description
<i>Alpha</i>	<i>Alpha</i> went through a disinvestment process. Before the investment, the company was incubated and developed products with an elevated degree of knowledge. The interviewee is the owner of the company, and possesses a PhD.
<i>Beta</i>	A company based on the development of technologies, it possesses, along with two founding partners the venture capital fund used in this study, a third investor which is also a venture capital fund. The interview was conducted with one of the two founding partners who has a Master’s degree in the company’s area of operations.
<i>Gama</i>	<i>Gama</i> is a company that has been in the market for more than ten years, and before the investment it was incubated and won a prize for its innovation. The interview was conducted with one of its founding partners, who before the company’s formation worked in the financial area. The other founding partner has a specific degree in the company’s area of operations.
<i>Delta</i>	The company has been in the market for more than 10 years, its current team numbers more than 50 employees, and it has received more than one investment from venture capital. The interview was conducted with a manager hired by the venture capital fund which is the object of this study.
<i>Sigma</i>	With more than one venture capital investment, this company has presented significant growth in revenues over recent years. It has already won a prize for innovation and also was incubated. The interview was conducted with one of the founding partners who has a Master’s degree and a thesis developed in the company’s market segment.

Source: Elaborated by the authors.

The mixed method approach utilized (CRESWELL and CLARK, 2013) made it possible to improve the reliability and validity of the study results through a triangulation methodology, which made it possible to use the results of the structured questionnaires applied to guide the semi-structured interviews. This made it possible to verify elements of apparent instrumental validity and synchronous reliability (PAIVA JÚNIOR, LEÃO and MELLO, 2011).

In the following section we will discuss the study results, presenting first the quantitative data and then the content of the semi-structured interviews.

PRESENTATION AND DISCUSSION OF THE RESULTS

Next, we will present the debate about the predisposition to innovate of the startups which received investment from the studied venture capital fund. Later we will discuss the actions of the fund in innovation activities.

The invested companies’ predisposition to innovate

This study presents the concept of organizational ambidexterity as a way to investigate the innovation dynamic of companies, given that according to this approach, organizations need to improve the skills that they have and at the same time develop new knowledge to explore future opportunities (LUBATKIN, SIMSEK, LING et al., 2006).

The process of analyzing the central trend, using the average and standard deviation, was complemented by information about the asymmetry and kurtosis of the data distribution, seeking a better understanding of the predisposition of companies to innovate. Based on the scale we sought to identify how companies position themselves in general, in relation to the development of innovation activities.

Table 1
Average of the Central Trend of the *Exploration* Dimension

Indicators	Average	Std dev	Asymmetry	Kurtosis
Seeks new technological ideas thinking “outside of the box”, or in other words, outside of the limits of the company	4.74	0.452	-1.170	-0.718
Bases its success on its ability to explore new technologies	4.47	0.964	-1.995	3.257
Creates innovative products and/or services for the company	4.84	0.375	-2.041	2.410
Seeks creative ways to satisfy the needs of its customers	4.63	0.496	-0.593	-1.856
Aggressively enters new market segments	3.11	1.100	-0.229	-1.105
Actively targets new groups of consumers	3.21	1.134	-0.204	-0.861
Overall Average	4.17	-	-	-

Source: Study data.

Table 1 displays the predisposition to innovate in accordance with the concept of *exploration* (BENNER and TUSHMAN, 2003). The elevated results obtained in the affirmation that companies seek new technological ideas outside company boundaries indicate that the managers who compose the sample seek to develop new ideas.

In turn, the creation of new products and/or services presented the highest average among the *exploration* indicators (4.84) and the lowest standard deviation (0.375). Through the obtained results we can see the clear preoccupation with developing innovations that can be profited from commercially. The preoccupation with the launch of new products and/or services is one of the central elements to Schumpeter’s new combinations (1985).

This preoccupation with the launch of new products and/or services can also be verified by the fourth indicator, which is related to the search for creative ways to satisfy customer needs, as well as a concern with future demands. This preoccupation is seen as being central to the competitiveness of businesses in the long term, as argued by Lubatkin, Simsek, Ling et al. (2006) and Raisch and Tushman (2011) within the context of organizational ambidexterity.

In terms of aggressively entering new market segments, we can perceive a more conservative posture on the part of invested companies and their managers. Given that this questionnaire was realized with technologically based companies during the maturation of their products and services, the results suggest that these firms are more preoccupied in establishing themselves in the market segments in which they act rather than investing organizational resources in exploring new segments.

The last *exploration* indicator displays a perception similar to that verified in the previous variable. The results of this indicator also demonstrate a conservative posture on the part of these companies in exploring new groups of consumers, which is one of the new combinations proposed by Schumpeter (1985). Thus, it is possible to identify the preoccupation of companies in consolidating their operations with current consumers and reinforces the classic argument of March (1991) about the *trade-off* realized by organizations in terms of *exploration* and *exploitation*.

In general, this demonstrates the preoccupation of companies in developing new products and/or services, exploring new ideas, and seeking new technologies to satisfy the needs of their customers in a creative manner. However, operating in new market segments with new groups of consumers was shown to be less accentuated, indicating a more conservative posture on the part of these companies in regard to these items.

In terms of the realization of incremental technologies, innovations aimed at existing consumers, and improvements in organizational processes that result in greater efficiency (BENNER and TUSHMAN, 2003), it was possible to identify, as shown in Table 2, that all of the indicators received an average equal to or greater than 4.00, which corresponds to partial agreement with the proposed indicators.

Table 2
Measures of Central Trends in the *Exploitation* Dimension

Indicators	Average	Std dev	Asymmetry	Kurtosis
Is committed to improving quality and lowering costs	4.74	0.452	-1.170	-0.718
Continually improves the reliability of its products and services	4.84	0.375	-2.041	2.410
Increases the level of automation in its operations	4.11	0.809	-0.907	1.216
Constantly surveys current customer satisfaction	4.00	1.000	-0.745	-0.314
Synchronizes its offers to obtain customer satisfaction	4.53	0.697	-1.205	0.328
Dives deeper into its base of existing customers	4.68	0.582	-1.766	2.540
Overall Average	4.48	-	-	-

Source: Study data.

More elevated responses and lower standard deviations indicate that companies have directed their actions toward a commitment to improve quality and reduce costs, which can increase customer satisfaction and at the same time optimize organizational performance to reduce costs, as foreseen in the literature (RAISCH and BIRKINSHAW, 2008; RAISCH and TUSHMAN, 2011).

For the second indicator, the elevated average value (the highest of all of the indicators in the *exploitation* dimension) together with the low standard deviation (the lowest of all of the indicators in this dimension) reinforces the idea that these companies believe that they are improving the reliability of their products and services which also will positively affect their customer satisfaction and organizational performance numbers (LUBATKIN, SIMSEK, LING et al., 2006).

Seeking to increase automation in company operations was the third indicator of the *exploitation* dimension. Even though this was the second lowest indicator in this group, it's still possible to state that its value is elevated, and this represents the preoccupation of company managers with increasing their operational automation. Thus, it is also possible to obtain greater operational efficiency and reduce costs, which is in empirical and theoretical alignment with the other dimension numbers.

The fourth indicator corresponds to the preoccupation with realizing constant customer satisfaction surveys in terms of the products and/or services offered by these companies. This indicator had the lowest average value and greatest standard deviation for this dimension.

The results suggest that, even though there is a concern with conducting customer satisfaction surveys, there is still a reasonable variation between the companies, suggesting that for some this is not a constant practice. Even so, the asymmetry identified in this variable demonstrates a greater concentration of data to the right of the scale, or in other words, among the categories of partial or total agreement with the statement.

The fifth indicator refers to the search to align company offers with the goal of obtaining satisfaction on the part of current customers. In this indicator it is also possible to verify that managers believe that companies have acted in the sense of realizing offers that can generate benefits for, and satisfy, current customers.

The last indicator, which refers to deepening the relationships with existing customers, demonstrates a preoccupation in acting in a more profound manner with the customers that the companies already have. This way, the company creates a portfolio of satisfied customers and can count on them being more active in their revenues.

These indicators together indicate that organizations have performed actions that seek to strengthen their activities related to incremental innovation, reinforcing their already existing products and technologies to differentiate them or resist competition from competitors, in accordance with the conception of ambidexterity seen in O'Reilly III and Tushman, (2004) and Tushman and O'Reilly (1996, 2002).

When we compare the two dimensions, it is possible to verify that the companies which received venture capital investment present an elevated predisposition to act on both the *exploration* axis (developing new products and/or services, operating

in new market segments, and seeking new consumers, among other things), as well as the *exploitation* axis (improvements in quality, cost reduction, operational automation, client satisfaction, among other things). However, we observed that the *exploitation* dimension presented higher average results, indicating that companies can, at any moment, act in a more accentuated manner to provide incremental improvements to the elements they already possess.

The actions of the fund in innovation activities

During the semi-structured interviews that made up the qualitative phase of the study, we observed that overall the main contributions of the venture capital fund were related to action plans and control.

It may be perceived that the actions of the fund are oriented towards optimizing the utilization of the invested funds, given that the hiring of personnel is based on the shareholders' agreement with the invested companies and that the hiring of a financial manager who does not necessarily need the approval of the founding partners.

Through these investments these companies increased their working capital, with management being taken care of by a manager indicated by the fund itself. This person, in turn, together with the entrepreneurs established the strategic planning of the companies together with monitoring mechanisms used by the fund. In consonance with this, there was a change in the legal organization of the firm, which was mandatory for operationalizing the investments, and there was also a series of governance mechanisms to be explored. The legal change required the companies to become private corporations, which resulted in an increase in taxes and fees for these companies.

Given that the objective of venture capital funds is invariably an acceleration in business growth preparing for a future exit, it was verified that the adoption of this posture is directly aligned with the interest in maximizing gains for the fund's exit as cited by the literature (GUO, LOU and PÉREZ-CASTRILLO, 2015; STOWELL, 2010).

During the interviews, it was found that changes made by funds were designed to commercialize the technologies already developed by the companies, and, as a result, an increase in revenues and market value to provide maximum return on the money invested. As a result, the innovation activities did not constitute a focus for the realized changes; in some cases, it was argued that the fund's behavior inhibits activities of this nature.

To the Alpha entrepreneur, it would be an illusion to believe that the fund influenced the company's innovation activities, given that the company already had a strong orientation in favor of innovation and, according to the entrepreneur, this would be lost if all the changes required by the fund occurred. The entrepreneur further argued:

[...] if the fund's resources were seen as a source of innovation, you can be sure that this would be hijacking the resource and killing the company, because if I were to develop a project with the money invested, I would just begin to develop and then close the company, because this funding is not enough to develop a company. The project is not simply developing, but also entering the market. This funding frequently is not sufficient. [...] (Interview with the Alpha company entrepreneur).

In the responses of the Alpha entrepreneur, there is no acting by the fund to stimulate innovation activities. In fact, the entrepreneur goes beyond this, and discusses the functioning of the national system of innovation, which, according to him, should utilize venture capital funding as a final resource for contributing to the commercial exploitation of products developed through economic subsidies. In this case, the entrepreneur inserts venture capital as a mechanism to accelerate the diffusion of innovation, which from Schumpeter's perspective (1985), corresponds to inserting an invention commercially and this in turn contradicts the theoretical perspective of venture capital as the appropriate mechanism for financing innovation activities (COLOMBO, CUMMING and VISMARA, 2016; GOMPERS, 1994; GOMPERS and LERNER, 2001; KORTUM and LERNER, 2000).

The manager's perception that the fund does not serve to stimulate innovation should be noted. This specific point is aligned with the responses of entrepreneurs when they analyze the reasons that they sought this type of investment and make reference to commercial exploitation of the developed technologies. The fund's actions in respect to innovation are cited by the Gama entrepreneur as follows:

[...] None, for innovation, none. The fund, from my point of view, had no role whatsoever. [...] Innovation plays no part in their business model. On the contrary, it constrains many things, requires rigidity, while innovation requires flexibility, risk and a series of things which are contrary to the way that funds act. [...] I don't know if in another region the fund does something along these lines, but here we had the inverse sense of innovation, which is the most alarming thing (Interview with entrepreneur of Gama company).

In the case of the Gama company entrepreneur, new aspects appear which make it possible to understand the actions of the fund in respect to aspects of innovation. According to this entrepreneur, innovation is not part of the concept of negotiation and the actions undertaken by the fund do not contribute to innovation, because the investment brings with it a series of elements of control which are contrary to what a company needs to develop technologies.

In a significantly different sector and a different region as compared to Gama, the Sigma entrepreneur points out that the fund does not contribute to innovations, but indirectly helps the company have greater visibility after the investment.

According to the Sigma entrepreneur, given that the fund does not have a way to contribute to the development of innovation in these companies and lacks the technical knowledge of this area of operations, it can act to contribute to the elaboration of projects to raise funds from economic subsidies as the company seeks to develop new technologies.

Located in the same region as the Sigma entrepreneur, the Delta manager argues that it does not make sense for a venture capital fund to stimulate the development of new technologies. According to the Delta manager, the fund's orientation has to be to improve the operational results of their companies. In this way, it makes sense that venture capital funds do not try to induce innovation activities in companies. During the interview, the Delta manager emphasized that the role of venture capital is to identify investment opportunities to recover the capital invested and obtain gains from the invested companies.

The Delta manager further argues that there are great expectations related to the development of innovation. However, according to him, companies need to develop, in fact, one-off evolutions in their products. It is important to point out that these evolutions correspond to incremental innovations in existing products and services.

The Delta manager paints a much more practical perception of the actions of venture capital funds which, in other words, is the understanding that they are designed to maximize the results of the business for their exit (GUO, LOU e PÉREZ-CASTRILLO, 2015; STOWELL, 2010). It should be noted that the manager was hired by the fund to assume the financial management of the business, which resulted later on in the managerial control of the business; the original partners concerned themselves just with the development of the existing product.

In terms of the influence of the fund on innovation activities, the Beta entrepreneur also was quite emphatic that the fund did not influence the company's innovation. The entrepreneur relates the expectations when the fund was brought in:

[...] We already had in mind that the investment would be a little bit more than money. We did not have enormous expectations that it would offer more than this. First of all, one management team to deal with 33 companies is a high demand and we are physically far away. So, we were distant from the national management, hierarchically and physically. So, we expected that it would just be something beyond money in this sense (Interview with Beta entrepreneur).

In the above excerpt, it is possible to verify that the partners did not believe in the influence of the fund on innovation activities, as well as other operational elements of the company, given the hierarchical and physical distance of the company from the fund, which for other entrepreneurs was also a negative factor, because it made the communication processes slower and often confusing due to the various intermediaries in the process.

Even though Beta did not expect much more than money from the investment, the entrepreneur points out that even though the fund did not influence innovation activities, the fund is constituted by innovative companies. In this way, it is possible to observe another indication that the products that result from innovation activities attract investment from venture capital.

Given this, stimulating innovation activities is not the objective of the fund during these investments, but rather stimulating the growth of commercial activities and, according to the invested companies, establishing mechanisms for financial control and monitoring organizational performance.

FINAL CONSIDERATIONS

The present study seeks to verify whether venture capital investment influences Brazilian startups in their predisposition to innovate. To accomplish this, we conducted a study with a mixed approach which makes it possible to observe how companies perceive the development of innovation activities, and to understand how the fund acts in innovation activities.

The results obtained demonstrate that these companies receive investment for ambidextrous innovation; in other words, exploring the development of new technologies and also the exploitation of technologies already commercialized by the company.

It is possible to argue that the fund realizes investments in companies with high potential for innovation, which suggests that venture capital funds seek to invest in this type of company, keeping in mind the possibility of future gains with the growth of demand for the technologies developed by these companies.

During the interviews it was found that these investments did not direct companies to develop incremental innovations (exploitation) or radical innovations (exploration), but rather permitted the invested companies to strengthen their short-term competition mechanisms and at the same time develop a base for future competitiveness.

This becomes evident in the responses of the interviewees, which emphasize the orientation of the fund in exploiting innovations developed by these companies from a commercial point of view, or in other words, introducing previously developed innovations into the market. Thus, we found that the stimulus of the fund in terms of innovation activities was restricted to this aspect.

From Schumpeter's point of view (1985), it would be possible to affirm that the fund's activity stimulates innovation activities. However, from the perspective of organizational ambidexterity, this affirmation loses force, given that it does not present actions of *exploitation* or *exploration* that occur due to the fund's influence.

Thus, the actions of the fund adopt an immediate posture, seeking to leverage the companies commercially to initiate exit procedures and as a result achieve a return on the realized investment. Even though the commercial introduction of these products can be considered an aspect of innovation according to the Schumpeterian perspective; from the perspective of ambidexterity this positioning can harm these firms' capacity to compete in the long term, given that the company stops developing new elements that make future competition possible.

The reality found in this study makes it clear that there exist, at least for the context of this fund, distortions in relation to the role of venture capital as an inducer of innovation activities which can directly affect the invested companies, as well as the development of public financing policies for innovation.

From the point of view of public policies, the actions of the fund make it clear that the objective is to maximize operational gains to promote an acceleration in the market value of the invested companies, orienting its actions towards the diffusion of innovations already realized by these companies. Thus, formulators of public policies should perceive that resources employed in this mode of funding may not lead to the desired effects in terms of the development of new technological solutions.

In terms of the actions of invested businesses, we can verify a possible theoretical conflict of the studied reality, given that, if innovation is conceived of from a perspective of organizational ambidexterity, venture capital is not an appropriate mechanism for the financing of this, taking into consideration its actions to further the diffusion of technological solutions that have already been developed by the invested company. In general, this may also signify that the literature regarding venture capital as an appropriate mechanism to finance innovation activities may need to be revised, bearing in mind new research approaches to innovation, especially those that are oriented towards the ability of companies to compete in current and future scenarios.

We would like to point out that few studies have been realized empirically that seek to identify the influence of investment capital on the activities undertaken by these companies. In this case, this study has identified elements which can be explored in future studies for a better understanding of this phenomenon. Thus, we suggest the realization of quantitative studies with significantly larger samples, contemplating companies invested in by various funds, which will make it possible to use mechanisms of causal investigation, such as regression models and structured equation modeling.

Moreover, from a qualitative perspective, various elements may be explored, such as conflicts between propriety and management, and identifying from interviewee responses what can be addressed from the point of view of agency theory, including aspects related to the loss of control of organizations by entrepreneurs. Exploratory studies could also deepen the understanding of the reality encountered by this study, addressing funds without the participation of public resources. New propositions for the acting of venture capital funds and other mechanisms of innovation financing could be developed from the perspective of organizational ambidexterity.

Finally, the principal limitations of this study are related to the fact that few companies participated in the study, especially in the qualitative section – due to the low volume of businesses within the study's scope – as well as the fact that this study does not present the counter-arguments of the studied fund managers.

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