ANALYSIS OF VENTURE CAPITAL ATTRACTIVENESS VARIABLES: EVIDENCE FROM BRAZIL

ANÁLISE DAS VARIÁVEIS DE ATRATIVIDADE DO CAPITAL DE RISCO: EVIDÊNCIAS DO BRASIL

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ABSTRACT

This research aimed to analyze whether the innovative factors, financial and Corporate Governance criteria of publicly traded companies are related to the ability to acquire resources via Private Equity funds. Data from Brazilian companies from 2014 to 2018 were collected. A logistic regression with panel data was performed, using the Probit and Logit models. The observed result shows the positive influence of the innovation criteria: spending on R&D, environmental and social investments; financial criteria: ROE and size of investee companies and governance criteria: management and shareholder protection. The results are in line with the findings of the international literature and contribute by offering an objective, empirical analysis of the behavior of attractiveness variables in the environment of companies operating in countries of emerging economies.

KEYWORDS

Private Equity. Attractiveness. Innovation. Governance.

JEL Code: G11, G32, O16

RESUMO

Esta pesquisa teve como objetivo analisar se os fatores inovadores, critérios financeiros e de Governança Corporativa das empresas de capital aberto estão relacionados à capacidade de adquirir recursos via fundos de Private Equity. Foram coletados dados de empresas brasileiras de 2014 a 2018. Foi realizada uma regressão logística com dados em painel, utilizando os modelos Probit e Logit. O resultado observado mostra a influência positiva dos critérios de inovação: gastos em

PandD, investimentos ambientais e sociais; critérios financeiros: ROE e porte das empresas investidas e critérios de governança: gestão e proteção ao acionista. Os resultados estão alinhados com os achados da literatura internacional e contribuem ao oferecer uma análise objetiva e empírica do comportamento das variáveis de atratividade no ambiente de empresas que atuam em países de economias emergentes.

P A L A V R A S - C H A V E
Private Equity. Atratividade. Inovação. Governança.

INTRODUCTION

Today, entrepreneurs and their startups are able to raise funding in a variety of ways, whether from accelerators or incubators, testing centers, university-based funds, crowdfunding platforms and IP-backed financial instruments (Bellavitis et al., 2017).

Emerging economies such as Brazil face the dilemma of scarcity of financial resources in the face of growth demands versus the need to position themselves more prominently on the international scene, which demands a good dose of innovation, both to find solutions in relation to the use of internal resources, regarding the generation of added value and external positioning (Salerno, 2017). In this sense, the environment of emerging economies stands out in the field of investment decision studies.

According to Negri (2018), the total investment in R&D in Brazil (public and private) represents 1.27% of the Gross Domestic Product (GDP), well below the OECD countries, whose average represents 2.38% of the GDP.

According to the 2018 Agenda ANBIMA and B3 report, whatever the size of the country's investment need in the coming years, it will be necessary to find alternative sources of capital, as the financing model that supported Brazilian economic growth for much of the 20th century is no longer capable of making the investments necessary for Brazil to grow sustainably again. (ANBIMA, 2018, pag. 5)

The Brazilian picture shows that, historically, the total investment volumes needed to ensure a level of GDP growth around 5% per year have never been reached (ANBIMA, 2018) and since 2013 the volume of public resources available via the National Development Bank (BNDES) has fallen 26.7% per year; as of 2016, the share of the capital market has been growing as an option for financing growth (ANBIMA, 2018). Thus, private financing has become an increasingly used resource (Abreu et al., 2015), including innovation in its form of funding and distribution, such as crowdfunding (Cordova et al., 2015).

In the world and in Brazil, the figure of the capitalist entrepreneur thought by Schumpeter (Fuck, 2004), financed with resources not coming from government institutions, has been gaining increasing importance (ANBIMA, 2018) in the current market, at a time of budgetary constraint for most governments in the western world. Schumpeter (2005) points out that innovation is directly

linked to business development so that the results create differential and competitive advantage. Resuming the centrality of the private initiative in the innovation process and expanding access to private capital to finance it may be a solution for the institutional impasses the country has been going through since the second decade of the 21st century (Lahr & Mina, 2016).

Private Equity (PE) funds are important financing tools for companies in modern finance, they can act in the growth of already established companies or in the formation of new companies—Venture Capital (VC), with the expectation of benefiting from the growth of these ventures (Demaria, 2010), whether through profit, going public or future sale. Understanding which variables have greater weight in the criteria for choosing PE funds in the search for companies to invest in can lead to understanding the capital preference pattern within a certain market context.

The literature highlights the following variables in the structures of PE funds' investment agreements: i) spending on R&D; ii) sector of activity, such as technology and sustainability; iii) financial criteria such as return, value and margins; and iv) governance criteria. Of course, there are studies that detail other variables that influence investment decisions, such as the status quo bias, the country's attractiveness index, among others (Harbi & Toumia, 2020). The scarcity of works that focus on the importance of the private sector in the face of the challenges of generating innovation in the country makes it difficult to understand how these mechanisms work, their performance and preferences in the Brazilian context. National articles and works related to the topic of financing innovation focus on available public mechanisms, mainly because government programs offer open databases and can be evaluated and reviewed. Recent work points to the growing importance of the influence of private initiatives as a growth vector for innovation (Monteiro et al., 2019) but discussions about this have yet to take place.

Identifying and establishing the causal link between the financing of PE funds and the innovative aspects of the investee companies, as well as the process of defining and selecting business projects, can be considered a matter not yet closed and under study. According to Insper reports (2014), the gains and losses obtained by Brazilian funds are consistent with performances recorded in other parts of the world, such as proportional gains and losses, or levels of success in relation to the invested capital (INSPER, 2014; Minardi et al., 2020), but there is no survey in relation to adhesion criteria commonly used in other countries to assess the eligibility of companies. Therefore, this research sought to answer the following research question: are the innovative factors, financial and Corporate Governance criteria of publicly traded companies related to the ability to acquire resources via Private Equity funds in Brazil?

The study aims to verify how much the Brazilian case adhered to the findings in the literature in relation to the criteria for venture capital and whether they were economically attractive to investors (Private Equity) in publicly traded companies in Brazil in the years 2014 to 2018 and carry out an empirical study evaluating the determining criteria for the allocation of resources by Private Equity funds in Brazil.

This research provides a triple contribution. Firstly, it enriches the academic debate by expanding beyond the predominant focus on public sources, delving into the interactions among the market, companies, academia, entrepreneurs, and capitalists. Secondly, it offers stakeholders a data-driven analysis of the dynamic capital market and its investment criteria, facilitating dialogue and improving

decision-making processes, particularly for innovation companies. Lastly, the research contributes conceptually by offering an empirical analysis that clarifies the behavior of attractiveness variables of public companies in scholarship, presenting the first quantitative survey of the impact of innovation variables on private investments in Brazil and adding to the limited literature on the subject in developed economies.

THEORETICAL FRAMEWORK AND FORMULATION OF HYPOTHESES

Private Equity

In simple words, Private Equity (PE) gives investors the opportunity to finance the development of private companies and benefit from their eventual success (Demaria, 2010), it is characterized by medium or long-term investments that are not negotiable on the stock exchange.

Private Equity operations may include hedge funds, company acquisitions, in whole or in parts, and debt securities, such as debentures and other securities. It also includes Angel finance or investments in early-stage companies—Venture Capital. More sophisticated transactions such as structured transactions with convertible debt, acquisition of publicly traded companies that are subsequently closed and withdrawn from the stock exchange, and illiquid investments in publicly traded companies are also understood as Private Equity (PE) (Cendrowski et al., 2012).

Performance in venture capital refers to the financial success and overall returns generated by an investment. It encompasses the ability of a venture or startup to achieve its business goals, meet financial projections, and ultimately provide positive returns to the investors. Performance is typically assessed through various financial metrics such as return on investment (ROI), internal rate of return (IRR), profitability, and other key performance indicators (KPIs) specific to the venture's industry. Performance in revenue growth was the main results of the Block et al. (2019) study.

Diversification is the strategy of spreading investments across different ventures or asset classes to reduce risk and enhance the potential for overall portfolio returns. In the context of venture capital, diversification involves investing in a variety of startups or projects to minimize the impact of poor performance in any single investment. Diversification is essential for managing risk in a venture capital portfolio. By investing in a diverse range of ventures, investors aim to mitigate the impact of failures in individual startups, as successful investments can compensate for losses in others. (Buchner et al., 2017)

In summary, performance focuses on the success and financial outcomes of individual investments, while diversification is a risk management strategy that involves spreading investments across a diverse set of ventures to achieve a more balanced and resilient portfolio. These criteria play a crucial role in venture capitalists' decision-making processes as they seek optimal returns while managing the inherent risks associated with startup investments.

However, other criteria are considered when making the investment decision in this context, originally, Tyebjee and Bruno (1984) described the methodological process of analyzing and choosing the companies that will be invested as a process of five subsequent steps: a) birth of the business,

the processes by which the business comes to be considered; b) selection of the business, based on the set of criteria that define the set of projects to be evaluated in detail; c) assessment, measurement of perceived risk and expected return based on various criteria based on key policies; d) business structuring, negotiation of the business price and agreements that limit investor risk; and e) post-investment activities, which are critical to business success and return on investment, such as assistance to the venture in the areas of recruitment, strategic planning, expansion planning and financing or preparation for sale, merger, acquisition or public offering.

Venture capitalists and angel investors typically employ a set of criteria to assess the fundamental elements of entrepreneurial projects. Nevertheless, due to the varying considerations of each investor, prior studies examining investors' decision-making processes have found themselves exploring a multitude of divergent factors. (Ferrati & Muffatto, 2021). The criteria for structuring expected returns based on market attractiveness and product differentiation in comparison to perceived risk, based mainly on the capabilities of the management team and environmental threats, form the basis of evaluation in prospecting where they seek to identify ventures with potential for desired returns (Drover et al., 2017).

Innovative Factors

Spending on R&D is the most used innovation indicator in the literature (Abreu et al., 2015), its application can lead to different levels of technological uncertainty, from basic technology, far from commercialization or disruptive innovations (Kang, 2018) , to scalable technological progress in more stable enterprises and with less risk of novelty but whose effort to innovate is continuous (Lahr & Mina, 2016; Mann, 2018). In this search, external R&D activities can be used, which mitigate the limitation of installed capacity and are common in companies that are already part of industrial networks up to the generation and negotiation of patents, which can be used as a bargaining chip or guarantee (Conti et al., 2013; Hochberg et al., 2018; Mann, 2018) and efficient instruments used to reduce information asymmetries in corporate finance, especially in sectors that imply long periods of intensive research and strict regulatory programs (Abreu et al., 2015; Conti et al., 2013; Kang, 2018).

Financial Criteria

The more structured the origin of PE funds, the stricter the financial criteria to be met by investee companies (Conti et al., 2013). The financial criteria seek to maximize the financial return on their investments (Bellavitis et al., 2017; Gompers et al., 1998, 2016) and are linked to the necessary investment volume, which can directly influence the type of investor (angel, corporate venture capital – CVC, institutional venture capital – IVC) and their financing capacity (Bartoloni, 2013; Jeng & Wells, 2000; Kang, 2018). The conditions of the enterprise, such as the entrepreneur's previous experience, in raising funds (Honjo & Nagaoka, 2015; Kang, 2018),

equity/liquidity of the entrepreneurial partners (Hechavarría et al., 2016) and the use of combined guarantees (pe and credit) (Rassenfosse & Fischer, 2016) are criteria for evaluating the investee companies. The scalability of the projects, a measure for potential global expansion (Teker et al., 2016), that offer potential for maturation, expansion (Teker et al., 2016; Waleczek et al., 2018) and opening on the stock exchange through initial public offering (IPO) (Honjo & Nagaoka, 2015; Jeng & Wells, 2000; Wonglimpiyarat, 2016) are identified as strategic differentials in terms of eligibility for available capital.

Investments, in general, imply risks and conflicts in different layers of their operations, when investments are applied to companies with different levels of technological innovation, they tend to present different elements of capital structure (Abreu et al., 2015), respecting, in a way, the theory of Pecking Order (indebtedness hierarchy) (Fisher & Donaldson, 1962), where less indebted companies can show greater operating profitability, although the use of external financing increases with the innovative effort (Bartoloni, 2013).

Considering innovation startups, whose scenario combines the scarcity of own resources with the difficulties in accessing traditional financing lines, agency and informational asymmetry problems can directly interfere in the capital structure and, consequently, in the relationship with investors. The research, conducted by Block et al. (2019), differentiates between various investor categories, including family offices, business angels, venture capital funds, growth equity funds, and leveraged buyout funds. The findings reveal that revenue growth stands out as the most crucial investment criterion, followed by the value-added of product/service, the management team's track record, and profitability.

Notably, distinctions among investor types are highlighted, demonstrating that family offices, growth equity funds, and leveraged buyout funds prioritize profitability more than business angels and venture capital funds. Venture capital funds, on the other hand, exhibit a greater emphasis on factors such as companies' revenue growth, business models, and current investors.

Governance Criteria

Corporate Governance contributes to sustainable economic development, improving companies' performance and providing greater access to external sources of capital. According to the IBGC (2018), the basic principles of governance are: transparency, fairness and accountability and corporate responsibility.

Governance criteria offer the chance to manage the risks associated with the business, as well as reducing information asymmetry and agency costs. Variables such as the age of the company (Coad et al., 2016; Cole & Sokolik, 2018; Kang, 2018) having a positive impact on the liabilities of novelty (Bergset, 2015; Waleczek et al., 2018) and equity/liquidity of the entrepreneurial partners, linked to the initial capital, are directly proportional to the ease of obtaining external financing as well as the use of combined guarantees (pe and credit) (Hechavarría et al., 2016; Rassenfosse & Fischer, 2016).

Intangible criteria such as the level of trust that investors place in the entrepreneur are measured through attributes such as experience, transparency, network and previous results (Yan et al., 2018). The younger and newer the enterprise, the greater the weight of this variable, in addition to the ability to communicate with the markets, which represent at the same time risk and merit associated with the enterprise (Dorfleitner et al., 2018).

Research Hypotheses

In the literature, a link was found between the risky nature of PE funds and their tendency to seek projects and companies with differential value added and valuation that can be translated in various ways, but in particular, innovation, financial performance and governance (Gompers et al., 2016).

The availability of capital is a key factor for company growth and funds are looking for assets that can offer growth above market gains (Tyebjee & Bruno, 1984), as a result, companies whose innovative efforts stand out tend to be more attractive to investors. (Bellavitis et al., 2017). Therefore, it can be established that:

According to studies by Coad et al. (2016); Gompers et al. (1998); Hall (2002); Mann (2018), one of the characteristics of innovative companies is the high investment in R&D, which generates the production of new products, services and processes whose impact changes the market and its competitive balance.

The authors Bergset (2015, 2018); Jeng and Wells (2000); Yan et al. (2018) mention that sustainable initiatives are attractive to the capital of PE investment funds.

Compatible with the findings in Cole and Sokolik (2018); Conti et al., (2013); Gompers et al. (1998); Hochberg et al. (2018); Kang (2018); Kanniainen and Keuschnigg (2003); Mann (2018); Rassenfosse and Fischer (2016); de Vries et al. (2017), patents are used as efficient guarantee tools for investors and synonymous with innovation, used as a bargaining chip in obtaining resources from capital. Based on the aforementioned literature, the following hypotheses were formulated:

H1: The innovative criteria attract venture capital to Brazilian publicly traded companies.

H1a: Investment in R&D is a significant variable and reflects positively on the attraction of venture capital for Brazilian publicly traded companies.

H1b: Investment in sustainability is a significant variable and positively reflects on the attraction of venture capital to Brazilian publicly traded companies.

H1c: Patent production is a significant variable and positively reflects on the attraction of venture capital to Brazilian publicly traded companies.

According to authors such as Wonglimpiyarat (2016) and Gompers et al. (2016), return on investment is the objective of every capitalist, but measuring the weight of this criterion in relation to other innovation variables can indicate a structure of capital priorities.

Successful divestment, with positive returns, either in the IPO processes or in the sale of investee companies represent the targets of PE funds, as described by Tarrade (2012).

According to Cole and Sokolik (2018); Hechavarría et al. (2016); Kang (2018), investing in profitable companies maximizes return on investment, minimizes the risks and asymmetries inherent in PE, and justifies maintaining cycles of expansion and scalability.

The authors Coleman et al. (2016); Gompers et al. (2016) consider that larger companies have a stability and reliability component in the face of associated risks, such as information asymmetry, agency conflicts, market volatility, legal and fiscal risks. Therefore, the following hypotheses were defined:

H2 – Financial criteria are a significant variable to attract venture capital to Brazilian publicly traded companies.

H2a: Positive return on investment is a significant variable and reflects positively on the attraction of venture capital for Brazilian publicly traded companies.

H2b: Positive margins are significant variables and positively reflect on the attraction of venture capital for Brazilian publicly traded companies.

H2c: The size of companies is a significant variable and reflects positively on the attraction of venture capital for Brazilian publicly traded companies.

The challenge of investing implies a series of risks, including information asymmetry, agency costs, guarantee structures, reliability and experience. Governance is a mitigation vector for these and other second risks (Tarrade, 2012).

The authors Kanniainen and Keuschnigg (2003); Tarrade (2012) define that given the agency risks and information asymmetry associated with the relationship between investor and entrepreneur, the importance of a management structure is significant and an important decision criterion for PE funds.

The appreciation of the use of protection mechanisms for minority shareholders and other interlocutors cited by Correa and Vidal (2012) are important guarantee and balance mechanisms in the management of investee companies.

The entrepreneurs' reliability and ability to communicate with the markets are considered positive criteria, but they also present a risk factor (Block et al., 2018; Dorfleitner et al., 2018) in the relationship between investor and investee. Given the above, the third set of hypotheses was defined:

H3: Governance structures are significant in attracting venture capital for Brazilian publicly traded companies.

H3a: Management criteria is a significant variable and positively reflects on the attraction of venture capital for Brazilian publicly traded companies.

H3b: Shareholder protection mechanisms are considered a significant variable and positively reflect on the attraction of venture capital for Brazilian publicly traded companies.

H3c: Efficient communication with the market is a significant variable and reflects positively or negatively on the attraction of venture capital for Brazilian publicly traded companies.

Methodological Aspects

The research sample is delimited in the period from 2014 to 2018, from the point of view of changes in innovation processes, in Brazil and in the world, this period consistently encompasses the context of growth of companies in the "new economy" (Cozmiuc & Petrison, 2018) more consolidated in the world and in progress in Brazil.

The research sample was obtained from the Eikon – Refinitiv database, formed by publicly traded companies in B3, organized in time series, with cross-sectional data, organized in a panel with information on expenditures on Research and Development, investment in sustainability, sector of activity, financial and governance information. The data are annual and cover the survey period (2014–2018) and encompass the 480 Brazilian companies, defined as headquarters, also known as the country of domicile.

Outliers were treated seeking standardization, in order to adjust the data to the interval of 3 standard deviations from the mean; outliers were excluded from the sample, but without excluding companies. Inconsistent data were discarded, net equity (NE) and investment in research and development (R&D) values were logarithmized, and the fields return on investment (ROE) and SIZE were calculated. The Econometric Views - E-views 10 software was used, a statistical application that allows the manipulation of time series data and other functionalities.

To analyze the variables, a linear regression with panel data was performed, using PROBIT and LOGIT modeling, which aim to describe the relationships between the response variable (Y) and the explanatory variable (X). Figure 1 describes the variables and their calculation method.

Figure 1 - Chart of variables

Abbreviation	Variables	Estimate	Source
Dependent variable			
PE	PE Funds	Dummy, 0 for companies without funding. 1 with contribution	Refinitiv
Independent			
Innovation criteria			
PED	R&D expenses	Amount spent on R&D	Refinitiv
ENVI	Investment in sustainability	Refinitiv score	Refinitiv
PATENT	Patents	Number of patents filed for invention	INPI
Financial Criteria			
SIZE	Net equity	PL	Refinitiv
ROE	Return on Equity (ROE)	Net Income/Net Equity	Refinitiv
VALUE	Company value	Book value per share	Refinitiv
MARGIN	Profitability	Net Margin = Net Income/Sales	Refinitiv

Governance Criteria			
MANA	*Management*	*Refinitiv grade*	*Refinitiv*
SHARE	*Shareholders*	*Refinitiv grade*	*Refinitiv*
CSR	*CSR*	*Refinitiv grade*	*Refinitiv*

SOURCE: DEVELOPED BY THE AUTHORS.

Logit equation model 1, research and development variable shown in equation 01.

$$Prob(PE = 1 \mid x) = G(\beta_0 + \beta_1 RandD + \beta_2 ROE + \beta_3 SIZE + \beta_4 MARGIN + \beta_5 MANA + \beta_6 SHARE + \beta_7 CSR)$$

Equation Logit model 2, variable grade of social and environmental performance shown in equation 02.

$$Prob(PE = 1 \mid x) = G(\beta_0 + \beta_1 ENVI + \beta_2 ROE + \beta_3 SIZE + \beta_4 MARGIN + \beta_5 MANA + \beta_6 SHARE + \beta_7 CSR)$$

Logit equation model 3, variable patents of invention filed demonstrated in equation 03.

$$Prob(PE = 1 \mid x) = G(\beta_0 + \beta_1 PATENT + \beta_2 ROE + \beta_3 SIZE + \beta_4 MARGIN + \beta_5 MANA + \beta_6 SHARE + \beta_7 CSR)$$

Logit equation model 4, set of research and development variables, socio--environmental note, invention patents filed in equation 04.

$$Prob(PE = 1 \mid x)$$
$$= G(\beta_0 + \beta_1 RandD + \beta_2 ENVI + \beta_3 PATENT + \beta_4 ROE + \beta_5 SIZE + \beta_6 MARGIN + \beta_7 MANA + \beta_8 SHARE + \beta_9 CSR)$$

Investment by PE Funds (PE) indicates whether the organization is supported by a private equity fund. It can present 3 situations, never, currently or previously. Records corresponding to never, blank or NA were considered Y=0 and for the criteria currently or previously Y=1. Defined as the dummy variable whose header is PE.

The R&D Spending (RED) variable presents research and development expenses for new products and services reported by a company, in US dollars (US$), in order to obtain a competitive advantage, in the last 5 fiscal years.

The sustainability variable (ENVI) is a score in the environmental innovation category that reflects a company's ability to reduce costs and environmental burdens for its customers. The grade ranges from 0 to 100. The company informs about proactive environmental investments or spending to reduce future risks or enhance future opportunities. In the form of investments made in the current fiscal year, in order to reduce risks and increase opportunities related to the environment, such as investments made in new technologies to increase future opportunities or treatment of emissions (for example, expenses with filters, agents) and installation of cleaner technologies.

The variable patents (PATENT) was obtained from the ranking of national companies with the highest number of patents for invention (PI) in the years 2014 to 2018, published on the INPI website (INPI, 2019) in preliminary statistics from 2013, in the Ranking of Resident Depositors.

Governance variables are identified by rating grades of the level of implementation in companies of governance policies and actions, management, shareholder protection and communication with the market.

The Management Score Grade (MANA) variable consists of the management category score, it measures a company's commitment and effectiveness in following the corporate governance principles of best practices. The grade is from 0 to 100.

The Shareholder Score Grade (SHARE) variable consists of the effectiveness of a company in terms of equal treatment of shareholders and use of anti-control devices, considered as an important criterion by the authors Correa and Vidal (2012). The grade is from 0 to 100.

The variable CSR Strategy Score Grade (CSR) is the grade that the CSR strategy reflects a company's practices to communicate, which integrates the economic (financial), social and environmental dimensions in its daily decision-making processes, field called CSR. The grade is from 0 to 100.

PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

In the years 2014 to 2018, 480 organizations were found in the sample of companies listed in B3, these 71 companies indicate some PE investment contribution, among the other institutions, 88 are investment funds (FII, FIP, iShares). Of these 71 companies, 13 reported spending on R&D, 37 reported sustainability, and 3 filed 130 invention patents in the period. Ten presented the combined innovation criteria. Of the listed companies that did not receive PE investments, 24 invested in R&D, 8 filed 551 invention patents and 55 presented sustainability ratings in the highlighted period.

The total number of listed companies that obtained investment from PE funds represented 15% of the sample, distributed by sectors of activity identified by the field NAICS (North American Industry Classification System). Among the companies listed on B3, in the relative volume of invested companies, emphasis was placed on the educational sectors, with 50% of listed companies being invested, wholesalers with 40%, health and social welfare with 38% and, tied, the segments retail and agrobusiness with 30%.

Table 1 presents the descriptive statistics of the variables analyzed in the model.

Table 1 - Descriptive Statistics

	PE	R&D	ENVI	PATENT	ROE	MARGIN	SIZE	MANA	SHARE	CSR
Average	0.1500	1.1609	8.6434	0.2838	0.5443	0.1106	19.1637	8.6253	9.0699	9.0134
Median	0.0000	0.0000	0.0000	0.0000	0.1373	0.0306	19.4643	0.0000	0.0000	0.0000
Maximum	1.0000	22.0207	97.8417	102.0000	65.0443	12.2339	25.4789	99.4950	99.4186	98.9362
Minimum	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	7.5332	0.0000	0.0000	0.0000
Stand. dev.	0.3571	4.1902	21.5976	3.6221	2.8190	0.4132	2.4256	22.3509	23.0662	22.9046
Asymmetry	1.9604	3.3795	2.6089	19.9111	16.8169	23.0746	-1.2394	2.6487	2.5462	2.5458
Kurtosis	4.8431	12.6231	8.9057	474.3792	345.2053	647.7650	6.5939	8.8908	8.2404	8.2087
Jarque-Bera	1876.97	13828.86	6210.34	2237841	8242013	39678494	1328.71	6276.48	5339.29	5305.55
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

SOURCE: DEVELOPED BY THE AUTHORS.

The average values of each field demonstrate that the values informed are the minority in the sample, with the exception of the field SIZE, which shows similarity between the mean and the median. All other fields show a large difference between the mean and median values, which demonstrates the small incidence in the sample and the existence of outliers.

PE and MARGIN fields have a standard deviation close to zero, which indicates that the data set for these fields is very close to or nearly equal to the mean. PED, PATENT, ROE and SIZE fields, on the other hand, have a relatively low standard deviation, which indicates the proximity of the sample means. ENVI, MANA, SHARE, and CSR fields have a high standard deviation, which indicates that the data is spread over a wide range of values.

The sample, in general, has an asymmetric character, and, except for field SIZE, which presents distribution to the left tail, whose values are concentrated below the mean, the data set has a right tail distribution, whose values are concentrated significantly above average.

All fields have kurtosis values greater than 3, which denotes a higher, tapered and concentrated distribution than the normal distribution, that is, they have a leptokurtic probability function, the distribution has significantly values far from the mean at several multiples of the standard deviation, that is, heavy tails. In particular PATENT, ROE and MARGIN fields.

The Jarque-Bera test uses as parameters the coefficients of kurtosis and asymmetry, which implies the absence of normality in the sample, although, for sample differentials, normality is applicable.

Table 2 below shows the correlations between the fields in the sample.

Table 2 - Correlations

	PE	PED	ENVI	PATENT	ROE	MARGIN	SIZE	MANA	SHARE	CSR
PE	1.0000									
R&D	0.1455*	1.0000								
ENVI	0.2632*	0.1505	1.0000							
PATENT	-0.0058	0.0777	0.0101	1.0000						
ROE	-0.0062	-0.0369	-0.0538	-0.0109						
MARGIN	-0.0283	-0.0208	-0.0190	-0.0183	0.0134	1.0000				
SIZE	0.1693*	0.2068	0.4758	0.0744	-0.3218	0.0423	1.0000			
MANA	0.2729*	0.2397	0.7421	0.0281	-0.0518	-0.0208	0.4435	1.0000		
SHARE	0.2563*	0.2231	0.7157	-0.0025	-0.0552	0.0063	0.4151	0.6966	1.0000	
CSR	0.2460*	0.2464	0.8240	0.0299	-0.0538	-0.0210	0.5078	0.7866	0.6749	1.0000

NOTES: PE = PRIVITY EQUITY FUNDS; R&D = RESEARCH AND DEVELOPMENT SPENDING; ENVI = SUSTAINABILITY VARIABLE; PATENT = PATENTS; ROE = RETURN ON EQUITY; MARGIN = PROFITABILITY; SIZE = NET EQUITY; MANA = MANAGEMENT SCORE GRADE; SHARE = SHAREHOLDER SCORE GRADE; CSR = CSR STRATEGY SCORE GRADE.

SOURCE: DEVELOPED BY THE AUTHORS

The correlations between the values in Table 2 present some information that is consistent with the data shown in the results of the regressions that will be detailed below, such as the inverse relationship, although very small, between PE and PATENT, that is, in the sample, the companies with more patents had no relation with the resources coming from PE funds. The same reasoning for the ROE and MARGIN fields, that is, the most profitable companies had no relationship with the resources obtained from PE funds.

The positive correlations show governance scores (MANA, SHARE and CSR), sustainability (ENVI) and investments in R&D (PED) directly related to fund investments (PE) with relevance to the first 2.

Tables 3 and 4 shows the PROBIT and LOGIT regressions results.

Table 3 - Probit Regression

	Model I			Model II			Model III			Model IV		
Coefficient	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value
Constant	-1.1007	0.3722	0.0031	-1.1125	0.3725	0.0028	-1.8232	0.3960	0.0000	-1.0692	0.3781	0.0047
R&D	0.0133	0.0069	0.0530							0.0155	0.0070	0.0278
ENVI				0.0040	0.0025	0.1142				0.0050	0.0025	0.0496
PATENT							-0.0084	0.0111	0.4509	-0.0039	0.0101	0.7026

	Model I			Model II			Model III			Model IV		
Coefficient	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value
ROE	0.0069	0.0126	0.5806	0.0069	0.0126	0.5856	0.0148	0.0128	0.2456	0.0065	0.0126	0.6086
SIZE	0.0075	0.0198	0.7051	0.0088	0.0198	0.6590	0.0442	0.0210	0.0351	0.0026	0.0202	0.8987
MARGIN	0.0000	0.2128	1.0000	0.0000	0.2129	1.0000	-0.2423	0.2202	0.2711	0.0000	0.2161	1.0000
MANA	0.0061	0.0022	0.0050	0.0059	0.0022	0.0070	0.0067	0.0022	0.0018	0.0057	0.0022	0.0089
SHARE	0.0043	0.0018	0.0161	0.0038	0.0019	0.0471	0.0053	0.0018	0.0033	0.0034	0.0019	0.0750
CSR	0.0009	0.0021	0.6663	-0.0005	0.0025	0.8510	0.0010	0.0021	0.6567	-0.0011	0.0025	0.6537
McFadden R-squared	0.0742			0.0728			0.0745			0.0794		
S.D. dependent var	0.4117			0.4117			0.4117			0.4117		
Akaike info criterion	0.9766			0.9781			0.9763			0.9738		
Schwarz criterion	1.0043			1.0058			1.0040			1.0084		
Hannan-Quinn criter.	0.9869			0.9884			0.9866			0.9867		
Restr. Deviance	1613.566			1613.566			1613.566			1613.566		
LR statistic	119.7294			117.4107			120.1813			128.0522		
Prob(LR statistic)	0.0000			0.0000			0.0000			0.0000		
Mean dependent var	0.2160			0.2160			0.2160			0.2160		
S.E. of regression	0.3944			0.3948			0.3949			0.3936		
Sum squared resid	239.294			239.705			239.8024			238.0065		
Log likelihood	746.918			748.077			-746.692			742.756		
Deviance	1493.83			1496.15			1493.38			1485.51		
Restr. log likelihood	806.782			806.782			-806.782			806.7829		
Avg. log likelihood	-0.4831			-0.4839			-0.4830			-0.4804		

NOTES: PE = PRIVITY EQUITY FUNDS; R&D = RESEARCH AND DEVELOPMENT SPENDING; ENVI = SUSTAINABILITY VARIABLE; PATENT = PATENTS; ROE = RETURN ON EQUITY; MARGIN = PROFITABILITY; SIZE = NET EQUITY; MANA = MANAGEMENT SCORE GRADE; SHARE = SHAREHOLDER SCORE GRADE; CSR = CSR STRATEGY SCORE GRADE.

SOURCE: DEVELOPED BY THE AUTHORS

Table 4 Logit Regression

Coefficient	Model I			Model II			Model III			Model IV		
	Coeff.	Stat.T	p-value	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value	Coeff.	Stat. T	p-value
Constant	-1.7613	0.6323	0.0053	-2.9389	0.6964	0.0000	-3.0675	0.6984	0.0000	-1.7109	0.6512	0.0086
R&D	0.0212	0.0115	0.0646							0.0247	0.0119	0.0379
ENVI				0.0070	0.0041	0.0857				0.0081	0.0042	0.0512
PATENT							-0.0120	0.0186	0.5199	-0.0063	0.0176	0.7200
ROE	0.0110	0.0217	0.6119	0.0247	0.0213	0.2462	0.0259	0.0212	0.2212	0.0102	0.0223	0.6471
SIZE	0.0089	0.0338	0.7921	0.0678	0.0369	0.0662	0.0757	0.0370	0.0405	-0.0005	0.0349	0.9881
MARGIN	0.0000	0.3677	1.0000	-0.4490	0.3967	0.2578	-0.4948	0.3976	0.2133	0.0000	0.3791	1.0000
MANA	0.0098	0.0035	0.0051	0.0099	0.0035	0.0047	0.0108	0.0035	0.0018	0.0094	0.0036	0.0084
SHARE	0.0070	0.0029	0.0168	0.0076	0.0031	0.0138	0.0091	0.0029	0.0018	0.0057	0.0031	0.0714
CSR	0.0015	0.0035	0.6623	-0.0016	0.0040	0.6888	0.0017	0.0035	0.6231	-0.0016	0.0041	0.6977
McFadden R-squared	0.0730			0.0756			0.0740			0.0780		
S.D. dependent var	0.4117			0.4117			0.4117			0.4117		
Akaike info criterion	0.9778			0.9752			0.9768			0.9753		
Schwarz criterion	1.0055			1.0029			1.0044			1.0098		
Hannan-Quinn criter.	0.9881			0.9855			0.9871			0.9881		
Restr. Deviance	1613.566			1613.566			1613.566			1613.566		
LR statistic	117.8123			121.9054			119.4492			125.8153		
Prob(LR statistic)	0.0000			0.0000			0.0000			0.0000		
Mean dependent var	0.2160			0.2160			0.2160			0.2160		
S.E. of regression	0.3947			0.3944			0.3949			0.3940		
Sum squared resid	239.6380			239.2904			239.8076			238.4408		
Log likelihood	-747.8768			-745.8302			-747.0583			-743.8753		
Deviance	1495.754			1491.660			1494.117			1487.751		
Restr. log likelihood	-806.7829			-806.7829			-806.7829			-806.7829		
Avg. log likelihood	-0.4838			-0.4824			-0.4832			-0.4812		

NOTES: PE = PRIVITY EQUITY FUNDS; R&D = RESEARCH AND DEVELOPMENT SPENDING; ENVI = SUSTAINABILITY VARIABLE; PATENT = PATENTS; ROE = RETURN ON EQUITY; MARGIN = PROFITABILITY; SIZE = NET EQUITY; MANA = MANAGEMENT SCORE GRADE; SHARE = SHAREHOLDER SCORE GRADE; CSR = CSR STRATEGY SCORE GRADE.

SOURCE: DEVELOPED BY THE AUTHORS

The three criteria used to choose the most appropriate model, AIC, SC and HQ, for the analyzed models Logit and Probit, maintained the same slight difference indicating the Probit function as the most suitable, although it has already become clear that it is not a normal sample, the tests show an average difference of only 0.0001 which makes the two samples similar in results and consistency.

The most significant variables were PED and ROE and the least significant was PATENT. Table 5 shows the Logit and Probit Difference.

Table 5 - Logit and Probit Difference

	R&D	ENVI	PATENT	3 VAR	Average
Akaike info criterion	*0.0012*	*-0.0029*	*0.0005*	*0.0014*	*0.0001*
Schwarz criterion	*0.0012*	*-0.0029*	*0.0005*	*0.0014*	*0.0001*
Hannan-Quinn criter.	*0.0012*	*-0.0029*	*0.0005*	*0.0014*	*0.0001*

NOTES: R&D = RESEARCH AND DEVELOPMENT SPENDING; ENVI = SUSTAINABILITY VARIABLE; PATENT = PATENTS.

SOURCE: DEVELOPED BY THE AUTHORS

Hypothesis H1a was confirmed by the results of the regressions, whose coefficient showed a positive variation from 0.0212 (LOGIT) to 0.0133 (PROBIT), which demonstrated the positive influence of the R&D investment innovation variable (PED), that is, in the sample, companies that invested in R&D were 20% more likely to receive a contribution from PE funds. This result, the positive relationship between investments in R&D and contributions from PE investment funds, is in accordance with the previously mentioned assumptions.

This result, the positive relationship between investments in R&D and contributions from PE investment funds, is in accordance with the assumptions cited by the authors Conti et al. (2013); Corsi and Prencipe (2019); Hochberg et al. (2018); and Lahr and Mina (2016).

Hypothesis H1b was confirmed by the results of the regressions, whose coefficients ranged from 0.007 (LOGIT) to 0.004 (PROBIT), which demonstrated the modest but positive influence of the sustainability innovation variable (ENVI) on the attractiveness of PE investment funds, which is in accordance with the assumptions cited previously in other words, investment in sustainability is a significant variable in attracting risk capital. This result is in line with Bergset (2015, 2018); and Yan et al. (2018).

Hypothesis H1c was not confirmed, as the PATENT variable showed no significant influence on the sample, whose coefficients ranged from -0.012 (LOGIT) to -0.008 (PROBIT) which demonstrates that in the sample of companies that invested in patents, they were not related to investment amounts from PE funds. This finding is in disagreement with the authors Conti et al. (2013); Hochberg et al. (2018); Honjo and Nagaoka (2015); Kang (2018); Mann (2018) who consider patents as important assets for companies that design innovation and an attractive currency of exchange and guarantee for investors.

Hypothesis H2a was confirmed by the results of the regressions, whose coefficients ranged from 0.006 (PROBIT) to 0.026 (LOGIT), which showed a positive influence of the variable return on investment (ROE). This finding, the positive relationship between companies with positive return on investment and PE/ investment funds, is in accordance with the previously mentioned assumptions. This finding, the positive relationship between companies with a positive return

on investment and PE/ investment funds, is in line with the authors Bergset (2018); Corsi and Prencipe (2019).

The H2b hypothesis was not confirmed by the results of the regressions, whose coefficients ranged from -0.494 (LOGIT) to 0, which demonstrated the absence of influence of the net margin variable (MARGIN), that is, in the sample, the profitability of the companies was not related to the amounts invested by PE funds. This finding is at odds with Cole and Sokolik (2018); Hechavarría et al. (2016); Kang (2018).

Hypothesis H2c was confirmed by the results of the regressions, whose coefficients ranged from 0.076 (LOGIT) to 0.007 (PROBIT), which demonstrated the positive influence of the equity variable (SIZE). This finding agrees with the cited bibliography, which point to the positive influence of the size of companies on the risk assessment of PE funds. Coleman et al. (2016); Gompers et al. (2016) and Kang (2018) also observed the positive influence of company size on the risk assessment of PE funds.

Hypothesis H3a was confirmed by the results of the regressions, whose coefficients showed a positive variation between 0.011 (LOGIT) and 0.007 (PROBIT), which demonstrated the slight positive influence of the management grade variable (MANA). The finding is consistent with the authors, who point to the positive influence of companies' management control mechanisms in the risk assessment of PE funds. Bellavitis et al. (2017); Gompers et al. (2016); Rassenfosse and Fischer (2016); Teker et al. (2016); Tyebjee and Bruno (1984) also point out the positive influence of companies' management control mechanisms on the risk assessment of PE funds.

Hypothesis H3b was confirmed by the results of the regressions, whose coefficients showed a positive variation between 0.017 (LOGIT) and 0.003 (PROBIT), which demonstrated the slight positive influence of the variable of shareholder participation score (SHARE). The finding is consistent with the authors, who point to the positive influence of governance and shareholder protection mechanisms on the risk assessment of PE funds. The positive influence of governance and shareholder protection mechanisms on the risk assessment of PE funds is also observed by Dorfleitner et al. (2018); Kang (2018); Waleczek et al. (2018).

Hypothesis H3c was not confirmed, as the variable CSR – communication grade with the market did not show a significant influence on the sample, whose coefficients ranged from -0.002 (LOGIT) to 0.004 (LOGIT). This finding is in agreement with the authors who point out the ambiguity of the concept of communication with the market as a benefit, but also a risk for investors. These findings are in line with the authors who point out the ambiguity of the concept of communication with the market as a benefit but also a risk for investors, cited in Klabunde (2016); Yan et al. (2018).

The findings showed that innovation criteria are attractive criteria for capital and are in accordance with the vision of innovation and development structured by Schumpeter (Tarrade, 2012) whose equation of innovation and innovative effort by the entrepreneur, who is not the owner of capital, feeds the generation of surplus and provides the means to sustain capital development to finance the maintenance of economic growth and new innovative ventures.

In the Brazilian case, the reduced role of patents drew attention. Both as risk mitigation and guarantee devices at the disposal of capital that, especially in the American case, are considered

an asset of exchange for entrepreneurs, as well as indicators of innovative development of companies in the market. A detailed analysis of the causes of this situation and its reasons is beyond the scope of this work, but understanding the legal and institutional structure that culminate in this discrepancy in relation to the global market is a point to be understood.

Considering the sample, composed only of publicly traded companies, after analyzing the data, it can be seen that the financial criteria appeared with a lower weight than expected when the study started; falling behind the innovation criteria and even the governance criteria, although they are still positive factors from the point of view of capital.

A possible explanation to be evaluated, from the point of view of risk management and considering the modus operandi of PE funds, investing in already profitable companies minimizes asymmetries and possible losses, but likewise minimizes future gains, since healthy companies have access to other forms of financing their innovative projects, where they do not need to give up their autonomy, consistent with the pecking order (Fisher & Donaldson, 1962), or they may impose a high cost to the investor's capital.

From the point of view of future potential and opportunity cost, the smaller and less profitable the company to be invested, the "cheaper" and with greater opportunities for innovation and realization of future profits, although the associated risks are greater and with important asymmetry problems.

Considering the associated risks, from the investors' point of view, information asymmetries, agency conflicts and, in the case of Brazil, market volatility and legal and tax risks, seeking larger companies means more stability and reliability (Gompers et al., 2016; Rassenfosse & Fischer, 2016).

The relevance of investments in R&D over financial factors can mean the propensity to take risk in view of the possibility of innovation and the advantages that this variable can bring over competitors (Schumpeter, 1983). However, these two criteria are presented in an antagonistic way, considering that the most relevant innovative development opportunities currently lie in small startup companies, a conflict that is evident in the traditional investment models of PE funds.

The governance criteria that aim to provide the mitigation of agency costs associated with investing in projects with high levels of risk and information asymmetry proved to be fully in line with the findings in the literature. Transparency in relationships and management in accordance with guaranteed criteria are important tools for defending capital and maintaining investments.

Considering the results obtained from the question we sought to answer, whether PE funds operating in the Brazilian market evaluate and use criteria such as levels of investment in R&D, financial performance, strategic sectors and governance to invest in national publicly traded companies, it was satisfactorily and positively answered.

The innovation criteria such as investment in R&D and sustainability were considered positive from the point of view of PE investment funds, the financial criteria showed relative relevance, but in a positive way, and the governance criteria also showed a positive reading for investment capital.

The criteria that had no significance were only number of patents and profitability, which did not invalidate the other criteria since they were independently measured.

FINAL CONSIDERATIONS

This study aimed to analyze whether the innovation, financial and governance variables would present attractiveness characteristics for venture capital (Private Equity and Venture Capital) in publicly traded companies in Brazil from 2014 to 2018. Based on the obtained literature, the variables that stood out in the investment agreement structures of the PE funds described were: i) R&D expenses; ii) sector of activity, such as technology, sustainability, etc.; iii) financial criteria such as return, value and margins and iv) governance criteria.

Considering the results against the tested hypotheses, they showed that hypothesis H1a – investment in R&D is a positively significant variable and was confirmed; H1b – investment in sustainability is a positively significant variable and has been confirmed; H1c – attractiveness of patents for Brazilian investors is not a significant variable, this hypothesis was not confirmed. Two of the three criteria were confirmed, H1 is considered to have been confirmed, the innovative criteria are attractive to Brazilian investors.

The tested hypotheses showed that the hypothesis H2a – positive return on investment is a positively significant variable and was confirmed; H2b – positive margins are not significant attractiveness variables and not confirmed; H2c – company size is a significant attractiveness variable and was confirmed. Two of the three criteria were confirmed, it can be considered that H2 was confirmed, the financial criteria are attractive to Brazilian investors.

Hypothesis H3a – management criteria is a positively significant attractiveness variable and was confirmed; H3b – shareholder protection mechanisms are considered a positive variable of attractiveness and was confirmed; H3c – efficient communication with the market is not an attractiveness variable and was not confirmed, but it maintained its adherence to the literature. Considering the results, it can be considered that H3 was confirmed, the governance structures are attractive to Brazilian investors.

The positive conclusions about the results raise more questions, since the universe evaluated in this study is limited to Brazilian companies, which means a small portion of companies located in emerging countries.

The surprise in this study was the lack of influence of the negotiated/deposited patents criterion on the attractiveness of PE funds, within the universe of publicly traded Brazilian companies. It would be necessary to understand whether this phenomenon would apply to companies from other emerging economies, and also what fiscal, regulatory and normative determinants imply in this scenario.

This research contributes in three aspects. Firstly, enrich the academic debate on the subject. To date, most of the available work has focused on analyzing and detailing the processes and dynamics of investments from public sources, such as development agencies, credit lines and public subsidy policies (Buainan, et al., 2017; Lemos & Cario, 2017; Negri, 2018; Salerno, 2017), but the analysis of just these aspects, although fundamental, presents only a part of the interactions between the market, companies, academia, entrepreneurs and capitalists.

The second aspect of contribution is to offer stakeholders and shareholders an analysis, based on real data, of the capital market and its investment criteria, an extremely dynamic segment that has been gaining importance throughout the second decade of the 21st century (ABVCAP, 2019; Cozmiuc & Petrison, 2018; Negri, 2018), which can facilitate understanding and, consequently, dialogue between capitalists and entrepreneurs, enabling improvements in decision-making processes, especially for innovation companies, which they can organize resources more productively and become more efficient in attracting private resources.

And the third, and equally important, is the conceptual aspect that aims to offer an objective, empirical analysis with the following contributions to the existing literature: firstly, it clarifies, in an unprecedented way, the behavior of the attractiveness variables of public companies in scholarship, while previous studies only lightly mention the subject. As far as is known, it is the first quantitative survey of the weight of innovation variables in the composition of private investments in Brazil. Finally, as the literature on the subject is still limited and refers almost exclusively to developed economies, this work adds to the existing body of knowledge by presenting the analysis of the Brazilian case.

Subsequent research endeavors should aim to identify additional facets within the relationship among investors, companies, and the market that play a crucial role in shaping robust frameworks for financing innovation and the corresponding companies. These forthcoming studies can contribute to a more comprehensive understanding of the dynamics involved and offer insights into factors that are essential for fostering sustainable structures conducive to innovation financing. Additionally, it is crucial to note that the current data will be updated to ensure the ongoing relevance of the study.

REFERENCES

Abreu, E. S. de, Bruni, A. L. Gomes, S. M. da S. & Paixão, R. B. (2015). Relações Entre Inovação Tecnológica E Estrutura De Capital: Um Estudo De Empresas Brasileiras De Capital Aberto. *RAI Revista de Administração e Inovação*, *12*(1):326-350. https://doi.org/10.11606/rai.v12i1.100327

ABVCAP. (2019). *Inside VC Brazil.* Available at: https://www.abvcap.com.br/pesquisas/estudos.aspx?c=en-us. Accessed on: December 5th, 2019.

ANBIMA. (2018). *Mercado de capitais - Caminho para o desenvolvimento.* Available at: https://www.anbima.com.br/data/files/96/25/43/1A/5845661086B1AE5678A80AC2/Relatorio-Agenda-Mercado-de-Capitais-ANBIMA-B3-Digital_1_.pdf. Accessed on: July 11th, 2019.

Bartoloni, E. (2013). Capital structure and innovation: Causality and determinants. *Empirica*, *40*(1):111–151. https://doi.org/10.1007/s10663-011-9179-y

Bellavitis, C., Filatotchev, I., Kamuriwo, D. S. & Vanacker, T. (2017). Entrepreneurial finance: new frontiers of research and practice. *Venture Capital*, *19*(1–2):1–16. https://doi.org/10.1080/13691066.2016.1259733

Bergset, L. (2015). The Rationality and Irrationality of Financing Green Start-Ups. *Administrative Sciences*, *5*(4):260–285. https://doi.org/10.3390/admsci5040260

____, L. (2018). Green start-up finance – where do particular challenges lie? *International Journal of Entrepreneurial Behavior and Research*, *24*(2):451–575. https://doi.org/10.1108/IJEBR-11-2015-0260

Block, J., Hornuf, L., Moritz, A. (2018) Which updates during an equity crowdfunding campaign increase crowd participation? *Small Business Economics*, *50*(1):3–27. https://doi.org/10.1007/s11187-017-9876-4

_____J., Fisch, C., Vismara, S., & Andres, R. (2019). Private equity investment criteria: An experimental conjoint analysis of venture capital, business angels, and family offices. *Journal of corporate finance, 58*: 329-352. https://doi.org/10.1016/j.jcorpfin.2019.05.009

Buainain, A. M., Junior, I. DE S. L. & Corder, S. (2017). Desafios do Financiamento à inovação no Brasil. In: *Inovação no Brasil: avanços e desafios jurídicos e institucionais*. Editora Blucher, 97–124.

Buchner, A., Mohamed, A., & Schwienbacher, A. (2017). Diversification, risk, and returns in venture capital. *Journal of Business Venturing, 32*(5), 519-535. https://doi.org/10.1016/j.jbusvent.2017.05.005

Cendrowski, H., Petro, L. W., Martin, J. P. & Wadecki, A. A. (2011). *Private Equity History, Governance, and Operations*. Canada: John Wiley and Sons, 738 p.

Coad, A., Segarra, A. & Teruel, M. (2016). Innovation and firm growth: Does firm age play a role? *Research Policy, 4 5*(2):387–400. https://doi.org/10.1016/j.respol.2015.10.015

Cole, R. A. & Sokolik, T. (2018). Debt financing, survival, and growth of start-up firms. *Journal of Corporate Finance, 50*:609–625. https://doi.org/10.1016/j.jcorpfin.2017.10.013

Coleman, S., Cotei, C. & Farhat, J. (2016). The debt-equity financing decisions of U.S. startup firms. *Journal of Economics and Finance, 40*(1):105–126. https://doi.org/10.1007/s12197-014-9293-3

Conti, A., Thursby, J. & Thursby, M. (2013). Patents as signals for startup financing. *Journal of Industrial Economics, 6 1*(3):592–622. http://doi.wiley.com/10.1111/joie.12025

Cordova, A., Dolci, J. & Gianfrate, G. (2015). The Determinants of Crowdfunding Success: Evidence from Technology Projects. *Procedia - Social and Behavioral Sciences, 181*:115–124. https://doi.org/10.1016/j.sbspro.2015.04.872

Correa, E. & Vidal, G. (2012). Financialization and Global Financial Crisis in Latin American Countries. *Journal of Economic Issues. 46*(2):541–548. https://doi.org/10.2753/JEI0021-3624460229

Corsi, C., & Prencipe, A. (2019). High-tech entrepreneurial firms' innovation in different institutional settings. Do venture capital and private equity have complementary or substitute effects?. *Industry and Innovation, 26*(9), 102 3-1074. https://doi.org/10.1080/13662716.2018.1561358

Cozmiuc, D. C. & Petrison, I. I. (2018). Innovation in the Age of Digital Disruption: The Case of Siemens. In G. Jamil, J. Pinto Ferreira, M. Pinto, C. Magalhães Pessoa & A. Xavier Ed, *Handbook of Research on Strategic Innovation Management for Improved Competitive Advantage* 477-497. IGI Global. http://doi:10.4018/978-1-5225-3012-1.ch025

Demaria, C. (2010). *Introduction to Private Equity*. Chichester. West Sussex, UK: John Wiley and Sons, Ltd. https://doi.org/10.1002/9781118467350

Dorfleitner, G., Hornuf, L. & Weber, M. (2018). Dynamics of investor communication in equity crowdfunding. *Electronic Markets, 28*(4):523–540. https://doi.org/10.1007/s12525-018-0294-5

Drover, W., Busenitz, L., Matusik, S., Townsend, D., Anglin, A. & Dushnitsky, G. (2017). A review and road map of entrepreneurial equity financing research: Venture capital, corporate venture capital, angel investment, crowdfunding, and accelerators. *Journal of management, 43*(6), 1820-1853. https://doi.org/10.1177/0149206317690584

Ferrati, F., & Muffatto, M. (2021). Reviewing equity investors' funding criteria: A comprehensive classification and research agenda. *Venture Capital, 23*(2), 157-178. https://doi.org/10.1080/13691066.2021.1883211

Fisher, A. J., & Donaldson, G. (1962). Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity. *The Journal of Finance, 17*(3), 554. https://doi.org/10.2307/2977084

Fuck, M. P. (2004). [*Teoria do Desenvolvimento Econômico, de Joseph Schumpeter*]. *ComCiência–Revista Eletrônica de Jornalismo Científico*, Vol. 57. Available at: https://www.comciencia.br/dossies-1-72/resenhas/2004/08/resenha1.htm. Accessed on: october 8th, 2018).

GEM - GLOBAL ENTREPRENEURSHIP MONITOR. (2018). *Empreendedorismo no Brasil – Relatório Executivo GEM*. Available at: https://datasebrae.com.br/wp-content/uploads/2019/02/Relat%C3%B3rio-Executivo-Brasil-2018-v3-web.pdf. Accessed on: December 11th, 2019)

Gompers, P. A., Gornall, W., Kaplan, S. N. & Strebulaev, I. A. (2020). How Do Venture Capitalists Make Decisions? *Journal of Financial Economics, 135*(1):169-190. https://doi.org/10.1016/j.jfineco.2019.06.011

Gompers, P. A., Lerner, J., Blair, M. M. & Hellmann, T. (1998). What Drives Venture Capital Fundraising? *Brookings Papers on Economic Activity in Microeconomics*, 149–204. https://doi.org/10.2307/2534802

Hall, B. H. (2002). The Financing of Research and Development. *Oxford Review of Economic Policy, 8*(1):35–51. https://doi.org/10.1093/oxrep/18.1.35

Harbi, S., & Toumia, O. (2020). The status quo and the investment decisions. *Managerial Finance, 46*(9), 1183–1197. https://doi.org/10.1108/MF-11-2019-0571

Hechavarría, D. M., Mattheus, C. H. & Reynolds, P. D. (2016). Does start-up financing influence start-up speed? Evidence from the panel study of entrepreneurial dynamics. *Small Business Economics, 46*(1):137–167. https://doi.org/10.1007/s11187-015-9680-y

Hochberg, Y. V., Serrano, C. J. & Ziedonis, R. H. (2018). Patent collateral, investor commitment, and the market for venture lending. *Journal of Financial Economics, 130*(1): 74–94. https://doi.org/10.1016/j.jfineco.2018.06.003

Honjo, Y. & Nagaoka, S. (2015). Initial Public Offering and Financing of Biotechnology Start-ups: Evidence from Japan. *Research Policy, 47*(1):180–193. https://doi.org/10.1016/j.respol.2017.10.009

IBGC. (2018). *Princípios Básicos de Governança Corporativa.* Available at: https://www.ibgc.org.br/blog/principios-de-governanca-corporativa. Accessed on: june 26th, 2018.

INPI. (2019). *Estatísticas preliminares. Instituto Nacional da Propriedade Industrial.* INPI. .-Available at: https://dados.gov.br. Accessed on: February 17th, 2020.

INSPER. (2014). *An analysis of the private equity and venture capital investments in Brazilian companies in the last 3 0 years. INSPER-Spectra Analysis.* Available at: https://www.insper.edu.br/wp-content/uploads/2018/09/Analysis-Private-Equity-Venture-Capital-investments-in-Brazilian-companies-versao13-04-15.pdf. Accessed on: April, 2 7th, 2019.

Jeng, L. A. & Wells, P. C. (2000). The determinants of venture capital funding: Evidence across countries. *Journal of Corporate Finance, 6*(3):241–289. https://doi.org/10.1016/S0929-1199(00)00003-1

Kang, H. (2018). Pharmaceutical Start-ups' Technology and Financing Strategy. *Journal of Pharmaceutical Innovation, 13*(4):1–12. https://doi.org/10.1007/s12247-018-9326-0

Kanniainen, V. & Keuschnigg, C. (2003). The optimal portfolio of start-up firms in venture capital finance. *Journal of Corporate Finance, 9*(5):521–534. https://doi.org/10.1016/S0929-1199(02)00021-4

Klabunde, A. (2016). How much should an investor trust the startup entrepreneur? A network model. *J Econ Interact Coord 11*, 293–312. https://doi.org/10.1007/s11403-015-0147-7

Lahr, H. & Mina, A. (2016). Venture capital investments and the technological performance of portfolio firms. *Research Policy, 45*(1):303–318. https://doi.org/10.1016/j.respol.2015.10.001

Lemos, D. Da C. & Cario, S. A. F. (2017) Os sistemas nacional e regional de inovação e sua influência na interação universidade-empresa em Santa Catarina. *REGE - Revista de Gestão, 24*(1): 45-57. https://doi.org/10.1016/j.rege.2016.05.002

Mann, W. (2018). Creditor rights and innovation: Evidence from patent collateral. *Journal of Financial Economics, 13 0*(1):25–47. https://doi.org/10.1016/j.jfineco.2018.07.001

Minardi, A. M. A. F., Kanitz, R. & Bassani, R. H. (2020). An Overview of the Private Equity and Venture Capital Industry in Brazil. *Entrepreneurial Finance Emerging Markets, 20*:145-160. https://doi.org/10.1007/978-3-030-462 20-8_10

Monteiro, J., Oliveira, J., Nejaim, V. & Pinto, W. (2019). Novas formas para financiar empresas em fase de crescimento inicial: venture capital e private equity. *Revista de Administração e Contabilidade da Faculdade Estácio do Pará.* Disponível em: <http://www.revistasfap.com/ojs3/index.php/rac/article/view/259>.

Negri, F. de (2018). *Novos caminhos para a inovação no Brasil.* Available at: http://repositorio.ipea.gov.br/bitstream/11058/8441/1/Novos%20caminhos%20para%20a%20inova%c3%a7%c3%a3o%20no%20Brasil.pdf. Accessed on: November 28th, 2018.

Rassenfosse, G. & Fischer, T. 2016. Venture Debt Financing: Determinants of the Lending Decision. *Strategic Entrepreneurship Journal, 10*(3):235–256. https://doi.org/10.1002/sej.1220

Salerno, M. S. (2017). Políticas de inovação no Brasil: desafios de formulação, financiamento e implantação In: Coutinho, D. R., Foss, M.C. & Mouallen, P.S.B. *Inovação no Brasil: avanços e desafios jurídicos e institucionais*, 79–96. http://dx.doi.org/10.5151/9788580392821-03

Schumpeter, J. A. (1983). *The theory of economic development.* New Brunswick. NJ Transactions Books Reprint.

___, Joseph A. (2005). Development. *Journal of Economic Literature. 43*(1):108–120. https://pubs.aeaweb.org/doi/10.1 257/0022051053737825

Tarrade, H. (2012). *Cross-Border Venture Capital Investments: Why Do Venture Capital Firms Invest at a Distance?* Gabler Verlag, Wiesbaden https://doi.org/10.1007/978-3-8349-6939-2

Teker, D., Teker, S. & Teraman, Ö. (2016). Venture Capital Markets: A Cross Country Analysis. *Procedia Economics and Finance, 38*:213–218. https://doi.org/10.1016/S2212-5671(16)30192-7

Tyebjee, T. T. & Bruno, A. V. (1984). A Model of Venture Capitalist Investment Activity. *Management Science, 30*(9):1051–1066. http://www.jstor.org/stable/2631723

de Vries, G., Pennings, E., Block, J. H., & Fisch, C. (2017). Trademark or patent? The effects of market concentration, customer type and venture capital financing on start-ups' initial IP applications. *Industry and Innovation, 24*(4), 325–345. https://doi.org/10.1080/13662716.2016.1231607

Waleczek, P., Zehren, T. & Flatten, T. C. (2018). Start-up financing: How founders finance their ventures' early stage. *Managerial and Decision Economics, 39*(5):535–549. https://doi.org/10.1002/mde.2925

Wonglimpiyarat, J. (2016). Exploring strategic venture capital financing with Silicon Valley style. *Technological Forecasting and Social Change, 102*:80–89. https://doi.org/10.1016/j.techfore.2015.07.007

Yan, Z., Wang, K., Tsai, S.-B. B. & Zhou, L. (2018). An empirical study on internet startup financing from a green financial perspective. *Sustainability, 10*(8):2912. https://doi.org/10.3390/su10082912