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**THE FAILURE OF EARLY-STAGE
TECHNOLOGY STARTUPS IN BRAZIL:**
a study about the contributing factors to the early-death
of startups between 2009 and 2014 in Southeastern Brazil

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HELIO RICARDO SOUZA DE LEMOS
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HELIO RICARDO SOUZA DE LEMOS

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ASSINATURA DOS MEMBROS DA BANCA EXAMINADORA



Marco Tulio Fundão Zanini
Orientador (a)



Helio Arthur Reis Irigaray



Luis Fernando Filardi Ferreira

I dedicate this work to my family and many friends.

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ABSTRACT

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This research aimed to find out which are the main factors that lead technology startups to fail. The study focused on companies located in the Southeast region of Brazil that operated between 2009 and 2014. In the beginning, a review of the literature was done to have a better understanding of basic concepts of entrepreneurship as well as modern techniques for developing entrepreneurship. Furthermore, an analysis of the entrepreneurial scenario in Brazil, with a focus on the Southeast, was also done. After this phase, the qualitative study began, in which 24 specialists from startups were interviewed and asked about which factors were crucial in leading a technology startup to fail. After analyzing the results, four main factors were identified and these factors were validated through a quantitative survey. A questionnaire was then formulated based on the answers from the respondents and distributed to founders and executives of startups, which both failed and succeeded. The questionnaire was answered by 56 companies and their answers were treated with the factor analysis statistical method to check the validity of the questionnaire. Finally, the logistical regression method was used to know the extent to which the factors led to the startups' failure. In the end, the results obtained suggest that the most significant factor that leads technology startups in southeastern Brazil to fail are problems with interpersonal relationship between partners or investors.

Keywords: Startup, Technology, Entrepreneurship, Innovation, Failure, Causes of Failure

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1 INTRODUCTION

In recent years, Brazil has become increasingly more important on the world stage regarding the subject of entrepreneurship. According to a survey conducted by Global Entrepreneurship Monitor (2013), Brazil ranks 4th in a total of 67 countries with respect to the total number of entrepreneurs in the country. Also according to the same survey, it is shown that among Brazilians, 43.5% dream of becoming an entrepreneur and having their own business, while merely 24.7% of those surveyed want to pursue careers in companies. Another index, The Sage Business Index, points out how culturally daring Brazilians are, with 56% of respondents describing themselves as totally accustomed to risk in an achieve success in their businesses (SAGE, 2013). These features corroborate the classic definition of what it is to be an entrepreneur according to Drucker (1987), where the entrepreneur "is one who is always looking for change, responds to it, and exploits it as an opportunity". These data demonstrate that Brazilians have a good acceptance of risk, as well as a strong entrepreneurial orientation.

Another factor that demonstrates the bias of the Brazilian entrepreneurs is the number of new startups that arise in Brazil and how this number is increasing every year. According to research UHY (BBC, 2011), a network of consultants based in London, the number of startups in Brazil rose on average 7.2% per year between 2006 and 2010. Today in Brazil there are over 10,000 startups that moved nearly R\$ 2 billion in 2012 (PEGN, 2014).

However, the major fuel that heats this promising scenario is the increased availability of capital that is injected into these young companies. The venture capital investments in emerging Brazilian companies have been rapidly expanding, growing at an average rate of 35% annually, according to the 2nd Census of the Brazilian Private Equity and Venture Capital Industry performed in 2013 (Agência Brasileira de Desenvolvimento Industrial, 2013). An increasing number of investors, namely venture capital funds, private enterprises, individual investors or even the government, have been betting their resources on innovative startups. In this scenario, the most attractive market segments for investors that have emerged are the technology and Internet. According to the survey performed by the company TTR (Rodrigues, 2014), of all the investments made in Brazilian startups in 2013, 67% were in Internet and technology startups. By understanding that technology is closely linked with innovation, it makes sense to review literature to more effectively explain the relationship

between technology, innovation and investor behavior. Dosi (1988) argues that technological innovation stems from "search, discovery, experimentation, development, imitation and adoption of new production processes and new organizational settings", and Schumpeter (1982) concludes that "investments in new combinations of products and production processes that directly affect a company in its financial performance and investor return". Therefore, investing in innovative companies is directly linked to the maximization of financial return.

The combination of investors willing to risk their capital and entrepreneurs willing to devise and implement innovative new businesses enables a perfect environment to develop the country's economy. According to the Schumpeterian vision "economic development proceeds aided by three key factors: technological innovations, bank credit and innovative entrepreneur" (Schumpeter, 1961), these factors are visible in the Brazilian scenario. Dornelas also refers to the entrepreneur as the agent responsible for economic growth through "its ability to forward thinking, innovation, their decision making, its dynamism, knowledge, dedication, teamwork and especially the value that it creates for society" (Dornelas, 2008). Fostering innovation by injecting risk capital in domestic entrepreneurs is beneficial for a country like Brazil, whose economy is in development.

However, despite the market's great enthusiasm for Brazilian startups, their success rate is still low. In Brazil, almost half of all businesses close within 3 years, according to data from the IBGE (SEBRAE-PR, 2012). Of the businesses closed, 78.6% are small or young companies. Given the increase in trading volume applied to these companies, it is of paramount importance to understand what makes these companies fail early.

This study aims to map, validate and understand what are the factors, that most contributed to the premature death of technology startups considered early-stage and that acted in Southeastern Brazil. This research will analyze companies that emerged between 2009 and 2014.

This work will present a review of the literature, followed by exploratory research constituted in two phases, qualitative and quantitative respectively, and the conclusion. The following chapter will detail the purpose and relevance of the research as well its structure.

2 OBJECTIVES

2.1 PROBLEM DEFINITION, DELIMITATION AND RESEARCH OBJECTIVE

Despite many investments by venture capitalists in Brazil, the financial rate of return is still low. There have been few studies conducted about the problems that cause Brazilian startups to close their doors. The more knowledge young companies have about the factors that lead to this error, the greater their chances are of preventing it. Therefore, through a literature review in conjunction with exploratory research, an analysis will be performed in order to discover the reasons that cause startups to fail.

This research will exclusively analyze technology startups, because as stated earlier, it is one of the most attractive sectors for investors. Through analysis, 55,4% (IBGE, 2013) of Brazilian GDP is concentrated in the Southeast region and 60% (Startupbase, 2014) of startups in Brazil are distributed in this geographic area, therefore this research will only analyze companies from Southeastern Brazil. The data above demonstrates that this geographic area is not only the center of development for new startups but also where investors seek opportunities. This study will consider the period between 2009 and 2014, which is characterized as the period of post-global economic crisis (Instituto Millenium, 2009), when Brazil suffered no external economic effect of great magnitude.

Therefore, the ultimate goal of this research is to answer the question below:

What are the most contributing factors that caused premature failure of early-stage technology startups based in Southeastern Brazil during the period between 2009 and 2014?

Three more peripheral goals stem from the question above in order to achieve the final objective of this research:

- a) To find theoretical bases that support and explain the general concepts of entrepreneurship, methodologies to prevent business failure and a detailed explanation of venture capitalist. It will also present an overview of the Brazilian scenario for startups.

- b) Identify what are the most common factors that lead young companies to fail by conducting inductive, exploratory qualitative research.
- c) Develop a questionnaire that is able to validate the factors discovered in item b) by conducting quantitative research and analyzing the impact of each factor on the discontinuity of a company, through an exploratory factor analysis followed by a logistic regression.

2.3 STRUCTURE OF THE RESEARCH

This study is structured in four parts. The first one will be a literature review in order to find theoretical frameworks that solidify the understanding of concepts as entrepreneurship, startups and the current methods used to mitigate failures, as well as who is the modern venture capitalist. And finally, it will present an overview about how Brazil is the setting for these young companies.

In the second part, the study will undergo an exploratory bias. It will begin with qualitative research that will be done through semi-structured interviews with experts in the Brazilian startups scenario in order to discover the factors that cause a startup to fail. Experts from different fields were chosen for this research including successful entrepreneurs, angel investors, venture capitalists from investment funds and even government sectors. The data gathered will be analyzed inductively in order to reveal consensus areas from patterns obtained from the experts' answers. Those consensus areas will become factors that will be represented by a group of questions that will be analyzed in the following stage. The objective of this phase is to create a likert-scale questionnaire to validate the factors discovered through the interviews.

In the third part, a quantitative research will be conducted using an online survey that will be sent to owners and executives of startups that started between 2009 and 2014 in the Southeastern region of Brazil. The survey is formed by previously discovered factors, which will be grouped in a set of questions and the answers. The latter will use the likert scale. The data collected will go through an inference statistical process in order to discover which of the factors had a more significant impact on the failure of the sample. A factor analysis will be used to validate the factors identified and the existing correlation between these factors and

the questions from the questionnaire. After identifying which factors are truly significant, a logistic regression will be done to understand to what extent these significant factors lead a company to fail. The sample will have 56 startup technology companies, which started between 2009 and 2014 and whose headquarters were located in Southeastern Brazil.

In the last part, the discussion will be comprised of an analysis that will clarify and answer the question of the thesis's problem. Furthermore it will present guidelines for future studies. The research roadmap is shown in Figure 1.

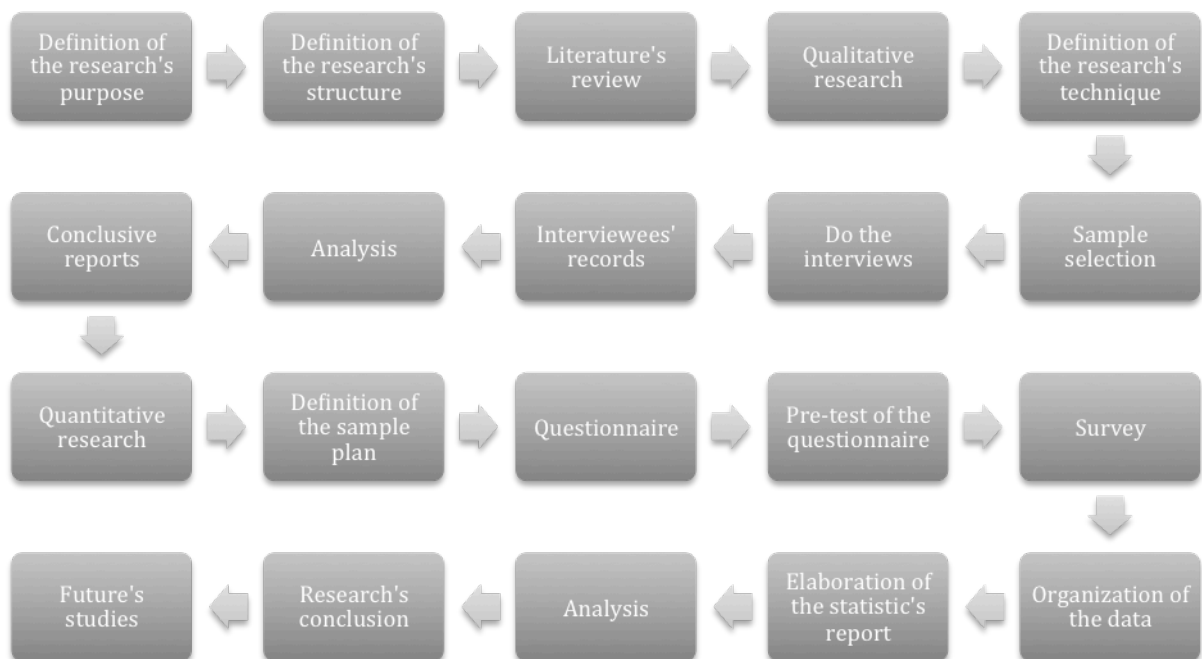


Figure 1 - Research's Roadmap

2.3 RELEVANCE OF THE STUDY

As previously mentioned, there are a diverse range of investors willing to inject capital into startups in Brazil, from the private sector and individuals up to government. Although these investors understand that it is a risky investment *per se*, if they could mitigate the

chances of failure by simply predicting factors that cause negative impacts on young companies, they could reduce their risk and increase the entrepreneurs' chances of success. The studies on the causative reasons for failure in this kind of firm in Brazil are scarce, therefore the companies are obliged to use methodologies that are linked to foreign cases, like many others from Silicon Valley, to mitigate the chances of failure. However, the market, customers, entrepreneurs, investors and the government are Brazilian. This factor alone is a variable that raises doubts about the effectiveness of any generic analysis that can be found in books and foreign research. Hence, this study is relevant and valuable, and will positively impact all actors involved in technology startups in the Southeastern Brazil.

3 THEORETICAL REFERENCES

3.1 ENTREPRENEURSHIP

Entrepreneurship provokes great discussions around the world due to its important role in economic development in developed and underdeveloped countries. For Schumpeter (1961), the "technological innovations, bank credit and innovative entrepreneur, are the most important economic indicators for the development of a country". When all three are working together, the entrepreneur becomes a businessman because he identifies and uses the latter factors in the production process in an efficient and effective manner. The entrepreneurial ideas and projects increase competitiveness in the business environment and consequently increase innovation that demands companies follow globalized standards. This competitiveness arises from the entrepreneurial profile through its professional achievement and business results that directly reflect the economic and social development.

Entrepreneurship is fueled by creativity and innovation. Today's society is marked by increased competitiveness and technological development, hence, it assumes a prominent role by being able to drive the creation of innovative companies that arise from the need that exists to deploy new businesses.

The entrepreneur is breaking paradigms when he differentiates areas of enterprise administration domains, which causes the Schumpeterian vision to predominate. According to Degen (1989) "being an entrepreneur means having, above all, the need for new things, put into practice their own ideas, personality characteristic and behavior that is not always easy to find". Faced with these words, the recruitment of entrepreneurs is a very difficult task and it depends on the sociocultural environment to which the individual belongs. It means that the entrepreneur is a true challenger, who undergoes a constant process of change and adaptation. Therefore, the entrepreneurship process becomes infinite due to its adaptive capacity to the market changes.

Peter Drucker (1987) also assigns the concept of the entrepreneurial role of transferring economic resources from one sector of lower productivity to a sector of higher productivity and greater yield, thus enabling greater efficiency and effectiveness of the

economy. Drucker also cites that the entrepreneur is one who makes a relatively small investment in a product or service and can allocate a high profit margin for his business.

Therefore, the classical definition of entrepreneurship and entrepreneur show how this movement is entrenched in society and how important it is for the economic development of a country.

3.2 STARTUP AND ITS METHODOLOGIES

3.2.1 The Modern Concept of a Startup

"A startup is not just a small version of a large company" (Blank & Dorf, 2012). The consolidated companies execute their business models where their customers, their problems, and the necessary features of their products are all already known. In medium or large sized companies, the way that they make money is clear and their revenues are what allow them to survive. On the other hand, startups operate in "search mode", continuously looking for the "holy grail", which would be a scalable and profitable business model. A startup is a company that operates in uncertainty, where day after day it tries to validate the hypothesis of its founding entrepreneurs. From the viewpoint of a startup, hypothesis is just a fancy name for the word guess. Therefore, there is huge importance on validating the business model to the market and customer. Finding out as soon as possible what does not work is vital for this type of company.

Blank (2013) says "The search for the business model in a startup requires different rules, roadmaps, skills and tools to minimize risk and optimize the chances of success". With this comes the concept of "Customer Development". This methodology deemphasizes the implementation, while it focuses on learning and discovering the right product and a viable business model as close to the customer's needs as possible, as shown in Figure 1. According to Steve Blank "Startups fail not because of their lack of the product, they fail because their lack of customers and a proven financial model" (Blank, 2013). It is worthless for companies to offer the best and most well-built product or service if there is no market ready to consume it in large scale and that at the end of the day it will not be profitable. It is in this exploratory scenario, where a valid business model must be found before the investor's money runs out, that the Lean Startup appears.

Customer Development

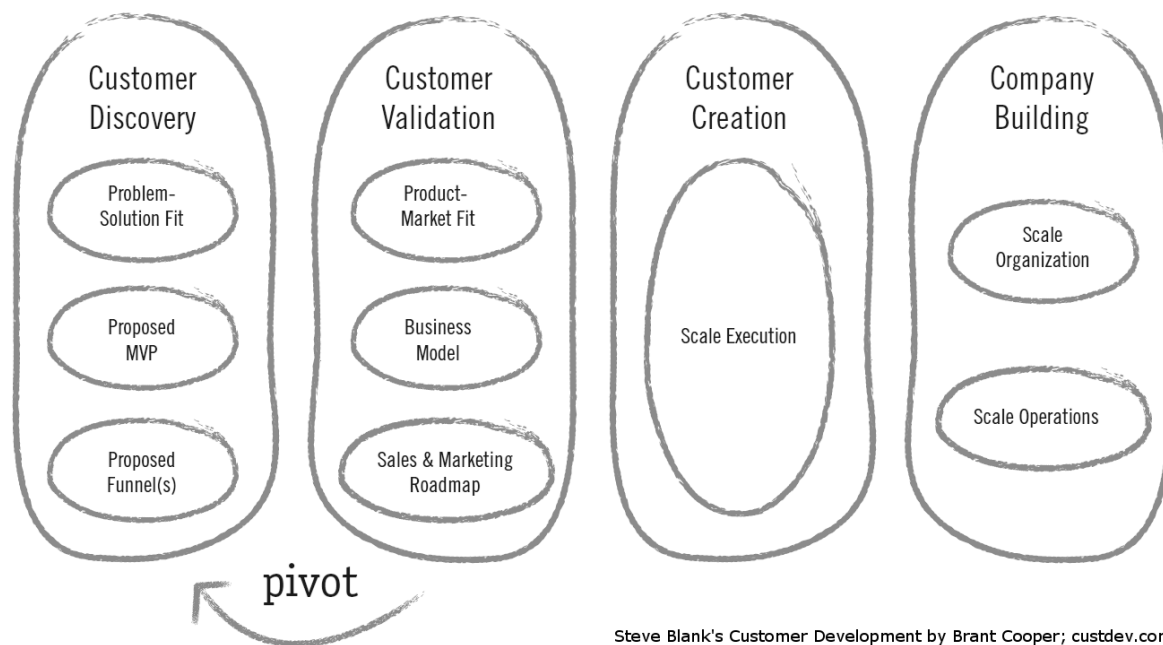


Figure 2 - Customer Development Framework

3.2.2 Lean Startup

According to Eric Ries (2011), creator of the Lean Startup, "a startup is a human institution designed to create new products and services under conditions of extreme uncertainty".

Because of the premise of uncertainty to run a business, entrepreneurs usually rely too heavily on their intuition or they spend too much time planning. The Lean Startup methodology suggests that instead of making complex plans based on several untested assumptions or go by intuition, the entrepreneurs should experiment launching a minimally viable product, called MVP, which confirms what customers want and are able to pay in a quick and inexpensive way. The MVP is the result of the question: what is the smallest part of the product that can be launched to solve a problem or meet a demand in a way to find out if there are customers willing to pay?

Following the customer feedback, the company will perform quantitative and qualitative research of the customer cycle through the Build-Measure-Learn loop, and which will make it possible to validate and make a more accurate decision about whether to change, called Pivot, or enhance the product or service as shown in Figure 2. The main goal is to get the right product concept, identify who are the customers that are willing to pay for it and whether it is possible to create a sustainable business, which avoids a waste of resources such as time, money and motivation.

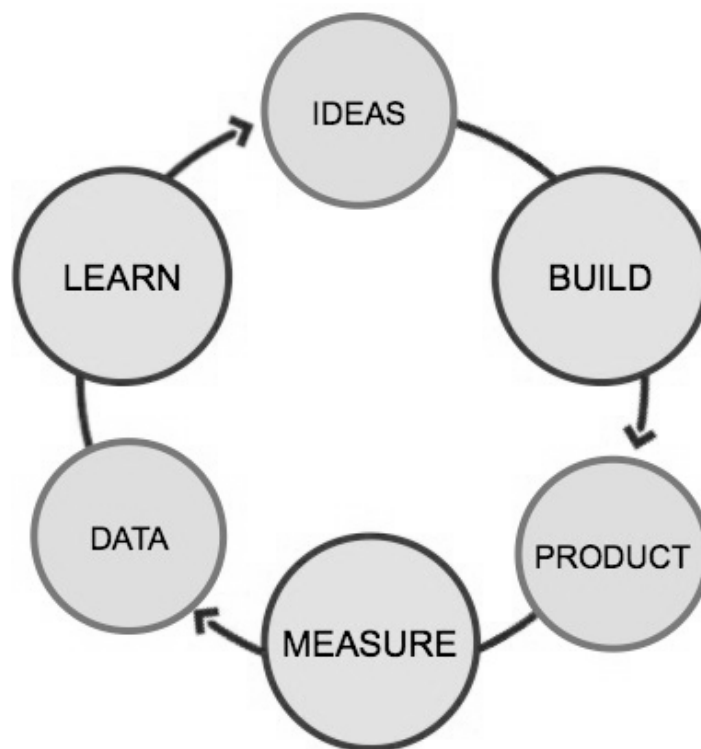


Figure 3 - Build-Measure-Learn Loop

This methodology is based on a mix of practices, such as Toyota Base System (Ohno, 1988), in the Customer Development process described in the book *"Four Steps to the Epiphany"* (Blank, 2013) and a management framework strategy called Business Model Canvas (Osterwalder & Pigneur, 2010).

The Lean Startup principles have come to be taught and encouraged at prestigious U.S. colleges in their MBA courses. Professor of Business Administration at Harvard Business School, Thomas R. Eisenmann is an evangelist of the methodology, and has

produced two recent articles on the topic: "Hypothesis-Driven Entrepreneurship: The Lean Startup" in 2012, and "Teaching a 'Lean Startup' Strategy" in 2011.

"Most startups fail because they lose too much time and money building the wrong product before realizing, too late, how the right product should have been" (Eisemann, Ries, & Dillard, 2011), says the professor of entrepreneurial management, at Harvard Business School, Thomas R. Eisenmann in his MBA course, Launching Technology Ventures. Eisenmann introduces students to the idea of the Lean Startup methodology. The key concepts according to Eisenmann are:

- Rather than wasting months in "stealth mode," a lean startup launches a minimally viable product (MVP) as soon as possible, which is a skeleton that includes enough features to allow useful feedback from early users and adopters. Then the company continues to test hypotheses with successive incremental adjustments for the versions of the product.
- The executives of a lean startup should not invest in scaling the marketing year until they have conquered their product market fit, called PMF, which is the knowledge that they have developed a solution that fits the problem.
- In the language of Lean Startup, "pivot" refers to a major change of direction of the company based on feedback from users. The vision of the entrepreneurs must remain faithful, but with flexibility to support the pivot.

The methodology quickly became popular among tech startups in Silicon Valley. One of the companies that experienced dizzying growth, Dropbox, has publicly disclosed its use of the model: "Using the principles of Lean Startup, in just 15 months, climbed 100,000 to 4,000,000 customers", says Drew Huston, CEO Dropbox (The Lean Startup, 2014).

3.3 VENTURE CAPITALIST

"The entrepreneur is never the one who takes risk, the risk is assumed by those who grant credit, the capitalist" (Schumpeter, 1982). In startup entrepreneurship, Schumpeter emphasized that the investor's risk can be even greater due to the difficulty that a startup

entrepreneur has to create a business model with calculated risks. Thus, depending on how the business risk is, it may be the big draw because the investor can be repaid a million times over. If the business model is not consistent, the venture capitalist may lose his entire investment, which is very common with startup entrepreneurship.

In his analysis, Schumpeter (1961) draws attention to monetized credit economies, noting that most new entrepreneurs do not own the means of production, fixed and working capital or the means to finance the foundation of a company. The entrepreneurs tend to turn to lenders, banks, angel investors, often with nothing to offer as collateral. In the Schumpeterian view, it is the need to fund innovation that makes business attractive to investors. In Brazil, entrepreneurship is no longer a novelty and has attracted venture capitalists throughout the world. This is a paradigm shift in business management.

Venture capital has characteristics that distinguish it from more traditional capital markets or alternative financing debt (Gompers & Lerner, 2004), and therefore it devotes significant resources to understanding new technologies and markets, always in search of promising startups. It provides these companies with their financial resources, training them in the early part of their lives (Petersen & Rajan, 1995). High uncertainty is documented in the organizational ecology literature (Hannan & Freeman, 1989), which typically limits the access of these companies to traditional sources of financing. It is recommended that startups wait for a venture capitalist because they have necessary resources that enable a greater chance of having a higher rate of growth in comparison with a company that did not receive this type of funding. The main resources are:

- Auto-selection of the venture capitalists and the startups in order to find a beneficial match for both sides, which have the potential to combine great business growth with great business (Petersen & Rajan, 1995)s management experience (Zacharakis, 1998) (Zacharakis, 2000).
- From a corporate governance perspective (Sapienza & Gupta, 1994), take an active role on the board and monitor business performance (Fried, Bruton, & Hisrich, 1998), as well as structure the compensation of senior managers (Kaplan & Stromberg, 2003).

- The venture capitalist brings its network with experienced infrastructure providers, such as accounting firms, law firms, executive search firms and potential professional managers.
- The capitalists bring their reputation that has a positive impact on growth. The process requires detailed analysis of the management team, their technology, products and viability of their business plan (Gorman & Shalman, 1989) (Fried & Hisrich, 1995).

3.4 THE BRAZILIAN SCENARIO

3.4.1 The Government

Since 1991, the technology policy in Brazil has evolved with the creation of new tools to encourage innovation, according to the National Association for Research, Development and Engineering of Innovative Companies (ANPEI). Among them, the most notable are: the tax incentives, the mechanisms of economic support for technology-based companies, the incentive of patents, supporting research and technological development. The incentive instruments have a strategic focus on semiconductors and software, drugs and medicines, capital goods, aerospace, nanotechnology, biotechnology and alternative energy sectors (Arruda, Velmulm, & Hollanda, 2006). In this scenario, it can be concluded that there are opportunities for entrepreneurs to start businesses based on innovation, especially in high-technology sectors.

The government has continued this movement and last year launched a national program to accelerate startups, called Start-Up Brazil, which has invested R\$ 50 million in 150 young technology companies. Start-Up Brazil is a federal government initiative, created by the Ministry of Science, Technology and Innovation (MCTI) in partnership with some accelerator groups in order to support emerging technology-based companies. The government believes that startups have the role of continuously revitalizing the market, although these kinds of companies need a conducive environment to develop themselves as well as achieve their success. The figure of the accelerator appears in this context as a strongly market-oriented agent, usually from private sources with good financial investment capacity, which has the function of directing and enhancing the development of startups. In

this program the accelerators were chosen by the government. The program integrates the Greater IT Strategic Software and IT services, which is one of the actions of the National Strategy for Science, Technology and Innovation (ENCTI), which elects the information and communication technology (ICT) among priority programs to boost the Brazilian economy.

3.4.2 Accelerators

It is a system created in Silicon Valley to test business models and help technology startups to grow and generate profits in the shortest possible time. Since 2011, 39 accelerators have been created in the country, according to the Brazilian Association of Startups (2014). Of this total, about 25% opened their doors last year, in 2013 (Estadão, 2014).

The first accelerator with this model was Y Combinator, founded in Boston in the United States in 2005, and later began to operate in Silicon Valley. Y Combinator (2014) has already launched successful businesses such as Dropbox (2014) and Airbnb (2014).

The idea was imported to Brazil in the late 2000s. Aceleradora, the first Brazilian accelerator, was created in São Paulo in 2008 and has supported more than 200 startups (Aceleradora, 2014). The second, called 21212, was created in Rio de Janeiro and it has helped more than 30 companies.

The model was popularized and as a result some accelerator companies were chosen by the government to be partners of the Start-Up Brazil program. By 2015, the project will provide 300 startups with R\$ 200,000 each in grants from the National Council for Scientific and Technological Development (CNPq) to pay the salaries and support the accelerators.

Former executives and experienced entrepreneurs form the teams of the accelerators and, thus, nowadays creating an accelerator has become an alternative as a professional career.

The network of experienced mentors is a key part of an accelerator. They give advice to startups voluntarily in exchange for networking and the opportunity to meet promising businesses firsthand and that may be a target for future investments.

There is, however, a delicate question regarding the role of the accelerator, which is the amount of shares given to the accelerator in exchange for equity investment offered. In Brazil, accelerators take, on average, a slice of 5% to 20% of the business in exchange for contributions of R\$ 15,000 to R\$ 100,000. In the U.S. this slice hardly exceeds 10%. This can be a problem because equity of 20% increases the market value of the startup and makes it unattractive to other investors. There is also the question of motivation of the entrepreneur, considering that with every new round of investment, the amount of his shares will likely be diluted.

However, the Brazilian accelerators must still prove their efficiency and generate large and successful companies as proven by Silicon Valley accelerators.

3.4.3 Angel Investors

Brazil has a history of angel investment since the beginning of the 1990s, however it has always occurred passively, i.e., entrepreneurs, through their own social networks, submit their projects to businessmen, executives and successful professionals who, in turn, provide them with financial resources, experience, knowledge and networking. Even today, most of the Brazilian angel investments are performed by non-active investors who usually make just one or two investments throughout their lives. It is unsatisfactory for both of them, because for the entrepreneur it is hard to access financial capital and for the angel investor it is even harder to access intellectual capital provided by the entrepreneurs.

Today, the country has 6,450 angel investors and the amount invested by them in 2013 increased 25% over the previous year, reaching R\$ 619 million (Spina, 2014).

3.4.4 Venture Capital Funds

In late 2012, Brazil had more than US\$ 53 billion of committed capital for investments in companies, of which more than \$ 33 billion were represented by investment vehicles with capital exceeding US\$ 500 million. Annual investments increased from US\$ 6.4 billion in 2008-2009 to US\$ 21.2 billion in the triennium 2010-2012. In this triennium, the internal rate of average annual returns of the sample, stood at 23% before taxes, with a standard deviation of 34%, according to the study GVcepe (FGV-SP, 2013).

Even private companies are opening funds to invest in this type of company, as with the example of giant Microsoft, which announced R\$ 300 million to be invested in startups in Brazil starting in 2014. The idea is to help technology companies that have difficulty finding funding in the range between R\$ 120,000 and R\$ 3 million. The program will also provide a huge network of partners to the companies. These partners will act as startup accelerators in strategic areas, including mentors, operational and technological support, physical space, business networking and financial support. The president of Microsoft Brazil said: "There are many interesting opportunities for startups, and besides financial gain, investment promotes growth of the country. Brazil has become a major technology hub for developing companies" (Microsoft, 2014).

Redpoint e.ventures announced in 2012 the launch of its first fund worth US\$ 130 million. This is the largest venture capital fund in Brazil that focuses on startups working with Internet. It is also the first fund sponsored by venture capital funds from the first line of Silicon Valley, being totally dedicated to investments in the Brazilian region (Redpoint Ventures, 2012).

Another venture capital fund in Brazil is Confrapar, which invests its funds in technology companies, and whose shareholders include family offices, pension funds, banks and agencies. It currently has 11 companies and has invested R\$ 275 million with offices in São Paulo, Rio de Janeiro, Belo Horizonte and Curitiba (Confrapar, 2014). The management, which is made up of more than 80 shareholders, has the background and experience in technology, media, education, healthcare and financial services industries, allowing a broader view of the market. This creates opportunities for the companies that belong to its portfolio. The Confrapar contacts network is of paramount importance to the leverage of the company (Gorman & Shalman, 1989) (Fried & Hisrich, The venture capitalist: A relationship investor, 1995).

3.4.5 Startups' Concentration

After the Ministry of Science, Technology and Innovation (MCTI) announced in 2013, the geographical distribution of the startups chosen for the Start-Up Brazil, it was clear where

the concentration of startups is in Brazil. About 61% of registered startups come from the Southeast, 17% from the South and 13% from the Northeast (Madureira, 2013). There were 908 projects analyzed, from 672 national companies and 236 international companies. Upon analyzing who managed the investment program, it was determined that 65% of the startups selected came from the Southeast, 18% from the South and 12% from the Northeast. Furthermore, in the Southeast, São Paulo has 35% of the participating startups, while Minas Gerais has 18% and Rio de Janeiro has 15%. These three states make up almost 70% of the selected companies in Brazil. São Paulo is the largest city of prominence in the Brazilian startup market and this is due to an increased concentration of financial capital there and greater international dynamics.

Although Sao Paulo appears to be a better city to undertake entrepreneurial endeavors, Rio de Janeiro has a higher concentration of accelerators. The Startup Brasil program has five accelerators from Rio de Janeiro and only two from São Paulo. Startup Brasil has nine accelerators in total.

Leaving the axis of cities like Rio de Janeiro and São Paulo, there are other important centers such as Belo Horizonte, which is the capital of Minas Gerais, and Campinas, which is located in São Paulo. In Belo Horizonte, the hub was dubbed San Pedro Valley and brought together around 100 startups. In Campinas, the companies have already created an association, called Association Campinas Startups, which is a benchmark for training entrepreneurs.

Despite being very difficult to reproduce the Silicon Valley environment, where the concept of ecosystem is very advanced, Brazil is heading in a direction favorable to the emergence of a similar environment. The factors that characterize a startup hub are a mix of connections that involve not only startups, but also all other actors in the entrepreneurship chain, such as the government, investors, accelerators and universities. In this context, Brazil is on the path to creating its own knowledge network.

4 METHODOLOGY

4.1 DELIMITATION OF THE UNIVERSE

To keep the research narrow, in the exploratory qualitative research only professionals that have worked directly and actively with startups between 2009 and 2014 were interviewed. Among people interviewed, there are some successful entrepreneurs, angel investors, venture capital fund managers, accelerator managers, entrepreneurship teachers and managers from government that have been involved with startup programs.

In the quantitative research phase, the sample was comprised of 24 executives or founders of technology startups that started their operations from 2009 to 2014. All of these companies received initial investments and were headquartered in Southeastern Brazil.

4.2 PHASE ONE - QUALITATIVE RESEARCH

4.2.1 Interviews

All interviews were semi-structured, which contained a script of questions that were occasionally directed in order to enrich the outcome of the study and ensure that all information provided was accurate. Altogether there were 24 interviewees in this phase and they came from different areas as shown in Table 1.

Table 1 - Distribution of interviewees by area

Interviewees area	Percentage
Entrepreneurs	25%
Angel investors	16%
Venture Capital	9%
Government	16%
Academics	9%
Accelerators	25%

The interview guide is shown in Appendix 1. Interviews were conducted in person or by telephone during the period from January 5, 2014 and February 15, 2014 and they took an average of 20 minutes.

4.2.2 Results

After the end of the interviews, an inductive analysis was carried out of all the data collected from nearly eight hours of records, to extract empirically, the most common factors that cause failure in this kind of company, which is the target of this study. It became clear that the problems are concentrated in four main areas which represented the following factors:

F1) Lack of financial capital leads companies to fail

F2) Lack of human capital leads companies to fail

F3) Lack of business education of entrepreneurs and investors leads companies to fail

F4) Issues related to interpersonal relationship of entrepreneurs and investors lead companies to fail

Within each area the respondents raised several questions and issues that directly cause the failure of a technology startup in southeastern Brazil. The detailed explanation of the construction of the factors will be presented in the following section.

4.2.2.1 Financial Capital

The subject financial capital pointed out the greatest differences in opinion among respondents. Some interviewees said that lack of capital is the most critical factor for a startup, while others claimed that the abundance of venture capital in the region is not healthy for the companies.

The CEO of one of the largest venture capital funds in Brazil said the problem is not getting investment to leverage the company at first, but in getting a second round of investment to continue the business. In this situation his opinion demonstrates that the biggest

problem is acquiring financial capital to leverage an already operational business or to maintain a company that is not profitable yet, but is on the right path. In this case, in his point of view, the lack of capital harms companies, even if the company is not so young.

According to a director of a government agency that promotes innovation, the main obstacle to the young companies is to show guarantees to get credit from a financial institution, because they do not have any prior financial history. Once again, an interviewee cited the lack of capital as a major issue for startups in Brazil, where financial institutions need some guarantees to give loans that are not in line with the financial profiles of startups. Usually the financial institutions require that companies have a long revenue history or a guarantee given by the founding partners. Financial history is very complicated because, commonly, a company with a short life does not find a sustainable and profitable business model from the time of its birth. On the other hand, the guarantees from the entrepreneurs do not represent the lifecycle process of a startup *per se*, because this kind of company, usually, is formed by an entrepreneur and a venture capitalist who assume different roles and are different people.

One factor raised by an entrepreneur with over 15 years of experience in Brazil, is how receiving a large investment could generate a feeling of comfort that might be harmful to entrepreneurs. This comment was interesting, because it shows a different aspect of the capital when receiving a huge amount of capital is an issue. One interviewee described that when an entrepreneur receives a large amount of capital in Brazil and the venture capitalist understands the Lean Startup model it becomes a problem for the company because all the concerns are focused on the discovery and validation of a profitable business model instead of the quick return of investment. The interviewee understands that a lot of entrepreneurs are not prepared to face the abundance of capital along with the absence of a tight monitoring system and financial goals for the part of investor.

Another interviewee, who is the manager of a government program to promote startups, shared the same opinion of the previous interviewee and stated that an initial large investment generates a false optimism in the company. Corroborating with the others interviewees, he also affirms that receiving a lot of financial capital in the beginning can cause a company to overestimate its product or solution, since the investor also over valued the company.

Therefore, financial capital will also be included as a factor that negatively impacts a startup. This factor will become a group of questions related to this theme using sentences stemmed from the interviews and it will be included in the questionnaire that will be used in the next phase.

4.2.2.1 Human Capital

The second macro point raised was related to human capital. Although a few interviewees said that there is a shortage of manpower, the majority said that it is not a problem. The real problem, according to them, is the cost of manpower. It is extremely expensive and often it makes impossible to run a business. Most of the interviewees cited that the labor force is abundant and easy to find, which stems from the high concentration of good universities in Southeastern Brazil.

A Rio de Janeiro based entrepreneur, who was the CEO of an American multinational company, said it is extremely difficult for a startup to compete with large companies to hire good professionals, since the budget of a fledgling enterprise is much less flexible than a consolidated company. Therefore, the loss of good professionals to large companies, which offer more desirable salaries, is a factor that leads to the companies' failure. The lack of manpower at the right price was an issue raised by many respondents and it is justified by their lack of financial power to compete in the Brazilian market. Furthermore, young companies usually have a limited budget during their early stages and often provide participation of the company as compensation. However, many employees are still not familiar with these participation mechanisms and do not see the value and potential of them. Furthermore, the large companies already understand that this type of mechanism is a growing trend and they are offering participation plans in order to weaken this strategy which has often used by small businesses. Specifically in Southeastern Brazil, there is a huge concentration of multinational companies and large conglomerates. It is not an easy race, so more and more startups are seeking manpower within universities, where the person has not even join the job market yet, and so they provide a more less traditional work environment with more flexibility, because such features are more difficult for large corporations to implement.

The issue of human capital was also another factor discovered through the inductive analysis and will be part of the questionnaire with a group of related questions.

4.2.2.1 Entrepreneurship Education

The third group of problems is related to business education. Many respondents used the term entrepreneurship education to refer to the knowledge needed to manage a startup. Most of the respondents believe that there is a lack of channels to disseminate technical knowledge about entrepreneurship.

One interviewee, who is part of a group of angel investors and also a university professor, said surprisingly: "The closest that many teachers of entrepreneurship came to having a business is a micro company whose purpose is to issue invoices". This statement is somewhat controversial because it puts into question the training of educators who are teaching entrepreneurship. This respondent raised the point that the problem of the lack of entrepreneurial education is a result of the absence of experience of the educator in the field. The result is less experienced entrepreneurs and an increased chance of failure.

Some interviewees mentioned that many companies eventually close early due to a lack of skills in well-known business modeling tools and an exaggerated romanticism. It was also mentioned that premature investment in marketing, as well as anticipated business growth, are both critical sins that these young companies can commit. Two points stand out: the first is the lack of technical knowledge in business. One interviewee pointed out that many entrepreneurs do not understand methods and do not know how to use tools, like Lean Startup and Business Model Canvas, and their concepts or the academic theories behind these technical names. As a result, this lack of skill makes these companies commit basic errors of planning, as early investments in several areas before a validated business model has been developed. Many entrepreneurs learn from bad experiences, but all the technical knowledge they need to mitigate the risk of business has always existed, however it just has not reached them.

The second point raised was over exaggerated romanticism. This is also a result of a lack of knowledge of what it means to have a company in real life and its difficulties due to various responsibilities and challenges they face along with the business.

The point raised by an entrepreneur who is now a partner of five technology startups in Rio de Janeiro and São Paulo, is how tax complexity and rules governing employment contracts, are barriers to the development of many businesses because most entrepreneurs are not familiar with this type of liability, which is not linked to the core business. For him, there should be more training and more access to information for entrepreneurs so they are not negatively surprised by peripheral factors, which are essential to the smooth running of the company.

One respondent, who is a director of a group of angel investors based in Sao Paulo, pointed out common mistakes made by entrepreneurs in the region: overestimation of the product by the entrepreneur, inefficient analysis of the market's size and the competitors. A successful entrepreneur, who is now CEO of a holding company owned by a major Brazilian television group, said that most startups end up failing as a result of a technical inability to create and execute a plan in line with the capital invested. The lack of all these skills mentioned by this respondent are due to the lack of technical knowledge to run a business and they should be basic knowledge for anyone who is setting up a new business.

Another point that was raised by the executive director of the Coca-Cola startup acceleration program in Brazil, is that the ecosystem of the region is still very weak. For him, the lack of interaction between companies to disseminate knowledge, means that many promising companies fail. Despite being the region with the highest concentration of companies and investors, there are few events and initiatives that encourage contact between businesses, such as lectures and workshops. Not only does the government want this type of stimulus, so does the academic community. The shortage of public or private incentives and the scarcity of entrepreneurial education are becoming some of the critical points leading innovative companies to fail.

With this, the factor of entrepreneurial education will also become a group of questions in the next step.

4.2.2.1 Interpersonal Relationship

The fourth area is about interpersonal relationship. One operations director of an accelerator based in Rio de Janeiro, which participates in the Startup Brasil program, said that the leading cause of closing startups is fighting among partners. For that reason, this accelerator analyzes the team of entrepreneurs and how they interact with each other before providing them with capital. These comments were very interesting for it was the first time that a factor related to human interaction was mentioned. The director said that it was not enough for entrepreneurs to have technical or business knowledge and a good team, they also need to have a good personal relations among themselves. Taking into account that this program provides financial capital, this director believes that this factor overlaps the other three factors previously identified.

Another point raised by a member of a venture capital fund in Minas Gerais was related to how the lack of alignment between the entrepreneur and the investor can generate problems for the company. In his opinion, if the relationship is turbulent, this will most often lead to the demotivation of both parties, which may result in the departure of a key member of the operation. This investor from Minas Gerais also highlights that this relationship problem reverberates for employees, thereby hurting the company as a whole. When the interpersonal relationship is problematic in a startup, the entrepreneur may see his investor as the boss figure and this concept goes against what usually motivates an entrepreneur to undertake such entrepreneurial challenges. On the other hand, investors also need to understand that the capital invested is at risk and, therefore, it is of utmost importance that agents who manage the investors' capital are motivated in order to achieve greater leverage of their investment.

Through a survey designed to identify the main factors that lead startups to fail, an analysis will be done to validate and identify what degree of impact each factor has on causing startups to end. This validation will be performed in the subsequent phase.

4.3 PHASE TWO - QUANTITATIVE RESEARCH

4.3.1 Measuring Instrument

The survey was structured after an inductive analysis of exploratory qualitative research, in which the factors that most contributed to the failure of technology startups in Southeastern Brazil between 2009 and 2014, were defined as a lack of: financial capital, human capital, entrepreneurial education and interpersonal relationship. This survey was done with both companies that failed as well as companies that are running, for many companies are able to survive failure despite having some of these factors. This research will correlate the negative contribution of each factor for both the companies that failed as well as for those that did not, so that one can understand the extent to which the factors contributed to the failure of a startup. The measurement will be calculated based on data collected from the Likert scale from the questionnaire of the previous phase. All of the points raised by respondents were classified into four separate groups of questions, which represent the main factors, containing four questions each, totaling 16 questions

4.3.1.1 Sample Group

The final sample of this quantitative research study consisted of 56 representatives of startup companies originating from southeastern Brazil. The requirements included that the company be Brazilian, born since 2009, characterized as a technology startup and the respondent had to be part of the company's executive team or one of its founders.

4.3.1.2 Pilot Tests

The pre-tests were conducted in June 2014 with the purpose of providing materials to improve successive versions of the questionnaire. During the time the pre-tests were being carried out, the following topics were evaluated: the clarity of the wording of the questions, possible resistance to responding to certain questions, appropriateness and sufficiency of response options, adequacy of the sequence of questions and the time required to complete the questionnaire.

The pre-tests were designed as a gradual process to improve the questionnaire, which was developed in three stages. In the first stage, the first version of the questionnaire was sent to four experts who participated in the qualitative research. Furthermore, the questionnaire was presented to an experienced professor and doctoral candidate in management at EBAPE/FGV, who is specialized in applied statistics. Comments and suggestions resulting

from this stage lead to the second version of the questionnaire. In this stage, the number of questions was reduced from 85 to 20 and it was raised the need to send the questionnaire to entrepreneurs who failed and those who did not fail, so that one can compare the level of criticality of each of the four factors analyzed. Also, it was suggested that a free text field be added so that respondents can describe which factors they felt had the highest level of criticality.

In the second step, the new version of the questionnaire was sent to eleven respondents and they were encouraged to make comments detailing the difficulties of any kind, which arose during the completion of the questionnaire. In this version, the structure of the questions was changed as well as the Likert scale for the responses. The purpose of all this was to have a better understanding of how the respondents interpreted the questionnaire. A third version of the questionnaire was made as a result of this step.

In the third and final stage, the same respondents from the previous stage were presented with the new version of the questionnaire, and only doubts and questions that arose spontaneously were recorded. In this step several other characteristics were also analyzed and defined such as the layout, screen size, automatic checking for invalid values and other aspects related to data processing. The biggest change resulting from this stage was the addition of the "Not Applicable" option on the Likert scale. This response option will be ignored in all statistical analysis. The importance of re-testing was shown at this time, because it was only in this third stage that the necessity for this response option was discovered.

Another important lesson learned in the pre-test was that one should simplify the entire understanding of the text as much as possible, from questions, to information and even the answers on the Likert scale. Any word that diverts from everyday language becomes a barrier to how the respondent understands the survey. Another problem discovered in the pre-test was the ambiguity of some questions. This means that questions must be written as clearly as possible, even if it seems a bit repetitive. The layout of the questionnaire was adjusted to be as clean as possible and to fit on one page only, which reduces resistance to the questionnaire.

4.3.1.3 Final Questionnaire

After all of the pre-tests, the final questionnaire was formulated as shown in Appendix 2. In total there are 16 questions presented in random order using a Likert scale from 1 to 5, which represents the level of negative contribution of that sentence for the company. On the index scale, a 1 represents no negative contribution for the startup, while a 5 on the index represents a strong negative contribution of the sentence. The Likert scale is shown in Table 2.

Table 2 - Likert scale Questionnaire

Nothing	Little	Neither little nor a lot	A lot	Strongly	Not applicable
1	2	3	4	5	-

A free text field was added for respondents to describe which factor they believe has been the most crucial for a negative performance of the company. Also, three questions were added in order to map the region of each startup in question, to make sure that it is located in the Southeastern region of Brazil, as well as to know in which year the startup began and the position of the respondent in the company. The Qualtrics platform was used to host the survey and to send the emails to the sample group.

The survey ran from June 30, 2014 up to July 30, 2014. In the next phase of this study, the quantitative one, alphanumeric representations will be used for the questions from the questionnaire and their respective related factors, as can be seen in Table 3.

Table 3 - Factors Group

Factor Group	Questions
F1 (Lack of Financial Capital)	FIN_01 FIN_02 FIN_03 FIN_04
F2 (Lack of Human Capital)	HUM_01

	HUM_02 HUM_03 HUM_04
F3 (Lack of Entrepreneurial Education)	EDU_01 EDU_02 EDU_03 EDU_04
F4 (Interpersonal Relationship Problems)	REL_01 REL_02 REL_03 REL_04

4.3.2 Treatment of Data

IBM SPSS Statistics software, version 22.0, will be used to treat the data. First, a factor analysis of the survey results will be done since the objective is to analyze the correlations between a large number of variables that define a set of common factors and this method is able to "analyze patterns of complex multidimensional relationships (Hair, Anderson, & Tatham, 2005)". An exploratory factor analysis will be used because it is "useful in finding a structure for a set of variables or data reduction" (Hair, Anderson, & Tatham, 2005). The Principal Component Analysis (PCA) method was chosen because, in this method, the components are calculated using all the variances of the manifest variables and the result is the shared variances are not separated with different values. There will not be any restriction, *a priori*, established on the estimation of components nor on the number of components to be extracted. With this technique it will be possible to identify the relationship between the survey questions and the hypotheses in order to confirm whether the survey is correctly validating the hypotheses and whether the questions are correlated among each other and to which factor they represent.

Once the constructs are obtained and validated, a logistic regression will be rotated to identify to what extent a factor generates more of an impact on a company, leading it to fail, compared with a company that was similarly affected by the same factor but did not succumb to its effects. The objective is to understand the criticality each factor has on causing a

company to fail, since there are companies that face the same problems and are still alive. Logistic regression was chosen for its ability to "treat statistically when the dependent variable is categorical and the independent variables are metric" (Hair, Anderson, & Tatham, 2005).

4.3.3 Results

4.3.3.1 Descriptive Statistics of the Sample

Before establishing the validity and reliability of the measurement model, descriptive statistics were calculated to examine the profile of the sample.

Nearly one third of the sample is startups that no longer exist, as can be seen in Table 4, and that is relevant to the validation of the logistic regression process.

Table 4 - Startup Status

Startup Status	%
Running	70.37%
Closed	29.63%

Geographical distribution of the startups is shown in Table 5. The vast majority of startups that responded to the survey are from the state of Rio de Janeiro. One factor that explains this concentration is that the researcher of this study is from the state of Rio de Janeiro and his network of contacts is stronger in this region.

Table 5 - Geographical Distribution

Geographical Distribution (state)	%
Rio de Janeiro	74.07%
São Paulo	14.81%
Minas Gerais	11.11%

Regarding the companies' lifespans, a greater concentration of the companies had less than two years of life. The values shown in Table 6 demonstrate that the number of younger companies participating in this study is double compared with companies that are between three and four years old. A relation could exist between the quantity of older companies and the result of companies that no longer exist due to their longer period of operation. However, of the companies that were born between 2009 and 2012, only 31% of the companies have ceased to exist. The percentage above is very similar to the percentage of all the companies from the last five years added together. In conclusion, there is no correlation between the lifespan of the company and the percentage of failure.

Table 6 - Startup Age

Company Started in	%
2009-2012	32.65%
2012-2014	67.35%

Regarding respondents' positions, an overwhelming concentration of respondents, 81.48%, were founders who held executive positions in the companies, as shown in Table 7. This shows respondents had knowledge and access to information on the factors that undermined the company.

Table 7 - Respondents Title

Position	%
Founder and Executive	81.48%
Executive and Non-founder	3.70%
Employee with shares	5.56%
Employee without shares	9.26%

4.3.3.2 Measurement Model

Convergent validity was established, which means the indicators that comprise each construct correlated with each other, forming an internally consistent construct. Discriminant

validity, which examines whether indicators associated with each latent variable are confused by respondents with indicators associated with other latent variables, was also established. Finally, the reliability of the measurement model used was examined. "The measurement model demonstrates the relationship between the constructs, latent variables and their indicators, and observable variables (Prado, 2006).

A Principal Components Analysis (PCA) was performed to verify whether widely accepted criteria for convergent and discriminant validities were met. "The application of confirmatory factor analysis seeks to determine whether the observed data behave with the theoretical expectation" (Aranha & Zambaldi, 2008).

4.3.3.3 Convergent Validity

To obtain convergent validity, the loading values of all indicators should be equal to or greater than 0.50. Table 8 shows loadings derived from the exploratory factor analysis for all latent variables used in the research. Some latent variable indicators, mainly about lack of human capital (F2) and lack of entrepreneurial education, did not have an adequate factor loading, with their values being less than 0.5, and therefore were removed from the study. All standardized factor loadings included in the study ranged from 0.526 to 0.843, as shown in Table 8. "The loadings suggest that the instrument has adequate convergent validity" (Hair, Anderson, & Tatham, 2005).

The results of the average variance extracted (*Average Variance Extracted - AVE*), which reflect the overall amount of variance of the indicators explained by the latent construct (Joseph F. Hair Jr., 2006) was also above the accepted threshold of 0.5 for the evaluation of convergent validity (Fornell & Lacker, 1981), as shown in Table 8.

Table 8 - Rotated Matrix Full

Rotated Component Matrix ^a				
	Component			
	1	2	3	4
FIN_01	.020	.286	.638	.068

FIN_02	.107	.843	-.016	-.011
FIN_03	-.069	.646	.450	.074
FIN_04	.104	.769	.206	.087
HUM_01	-.231	-.303	-.361	-.434
HUM_02	-.559	-.317	-.162	-.376
HUM_03	-.248	-.408	-.122	-.325
HUM_04	.105	.169	-.099	.824
EDU_01	-.271	-.257	.452	.443
EDU_02	.332	-.154	.756	.174
EDU_03	-.078	-.213	-.313	-.665
EDU_04	.251	.090	.578	-.023
REL_01	.634	-.126	.263	-.063
REL_02	.762	.258	.087	-.090
REL_03	.526	.282	.099	.219
REL_04	.839	-.093	.094	.183

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Hence, factor F2, which represents the problem of human capital, and factor F3, which represents lack of entrepreneurial education, will be excluded from the remainder of the quantitative study. Therefore, a new measurement model was estimated, after exclusion of the above indicators, which resulted in an acceptable convergent validity of the constructs, as shown in Table 9.

Table 9 - Rotated Matrix Capped

Rotated Component Matrix^a			
	Component		
	1	2	
FIN_02	.105	.864	
FIN_03	-.019	.722	
FIN_04	.156	.837	

REL_01	.729	-.041
REL_02	.757	.255
REL_03	.597	.224
REL_04	.863	-.098

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

4.3.3.4 Discriminant Validity

The correlation matrix shown in Table 10 was used to assess the discriminant validity of the measuring instrument. "A measuring instrument has good discriminant validity if all respondents associated the questions to their respective latent variables" (Kock, 2012), i.e., if all questions in the questionnaire were understood and answered correctly according to their real meaning.

Table 10 - Correlation Matrix

		Correlation Matrix ^a						
		FIN_02	FIN_03	FIN_04	REL_01	REL_02	REL_03	REL_04
Correlation	FIN_02	1.000	.465	.661	.115	.318	.115	.006
	FIN_03	.465	1.000	.389	.046	.141	.089	-.027
	FIN_04	.661	.389	1.000	.037	.244	.346	.073
	REL_01	.115	.046	.037	1.000	.469	.122	.512
	REL_02	.318	.141	.244	.469	1.000	.368	.480
	REL_03	.115	.089	.346	.122	.368	1.000	.468
	REL_04	.006	-.027	.073	.512	.480	.468	1.000

a. Determinant = .119

The standard criterion used to evaluate discriminant validity is to compare the square root of the average variance extracted (AVE) with the correlations between the latent variables. "The square root of AVE should be greater than any correlations involving the latent variable analyzed" (Fornell & Lacker, 1981). The measuring instrument showed good discriminant validity.

4.3.3.5 Reliability

The reliability analysis of the constructs was assessed using Cronbach's alpha analysis. According to Kock, "a measuring instrument has acceptable reliability if the indicators associated to each latent variable were understood the same way by different respondents" (Kock, 2012). Values above 0.7 for *Cronbach's alpha* of the construct provide evidence of reliability, or internal consistency, of the latent variables measured. Nevertheless, the SPSS reliability analysis was used to measure the most appropriate value. This value is shown in Table 11.

Table 11 - Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
.711	.710

Most of the factors were above the Cronbach's alpha used, as shown in Table 12.

Table 12 - Reliability Results

Cronbach's Alpha	FIN_02	FIN_03	FIN_04	REL_01	REL_02	REL_03	REL_04
0.711	0.864	0.722	0.837	0.729	0.757	0.597	0.863

REL_03 was the only variable that did not have satisfactory values, which suggests its exclusion from the analyses and the impossibility to use it in this work.

The results presented in this section provide inputs to validate the relations that will be tested in the next stage, since the measuring instrument showed discriminant validity, convergent validity and, with the exception of REL_03, all other variables showed acceptable reliability.

4.3.3.6 Logistic Regression Results

Binary logistic regression or logistic regression, the statistical technique used in this study, is defined as a statistical multivariate analysis technique commonly used to develop models that aim to understand or predict the existing relationship between a categorical variable, which assumes one of two possible values, and a set of explanatory variables (Hosmer, Lemeshow, & Sturdivant, 2013). The basic premises to be analyzed are:

- a) the conditional mean of the regression equation will be a value defined between zero (0) and one (1);
- b) the equation errors will follow the binary distribution; and,
- c) the results obtained may be regarded as probabilities.

In this study, the binary distribution will be done depending on whether the startup failed or not.

The results in Figure 4 show that the problem of financial capital, item F1, was present and had a significant impact to the same extent in companies that no longer exist, as well as in companies that still exist.

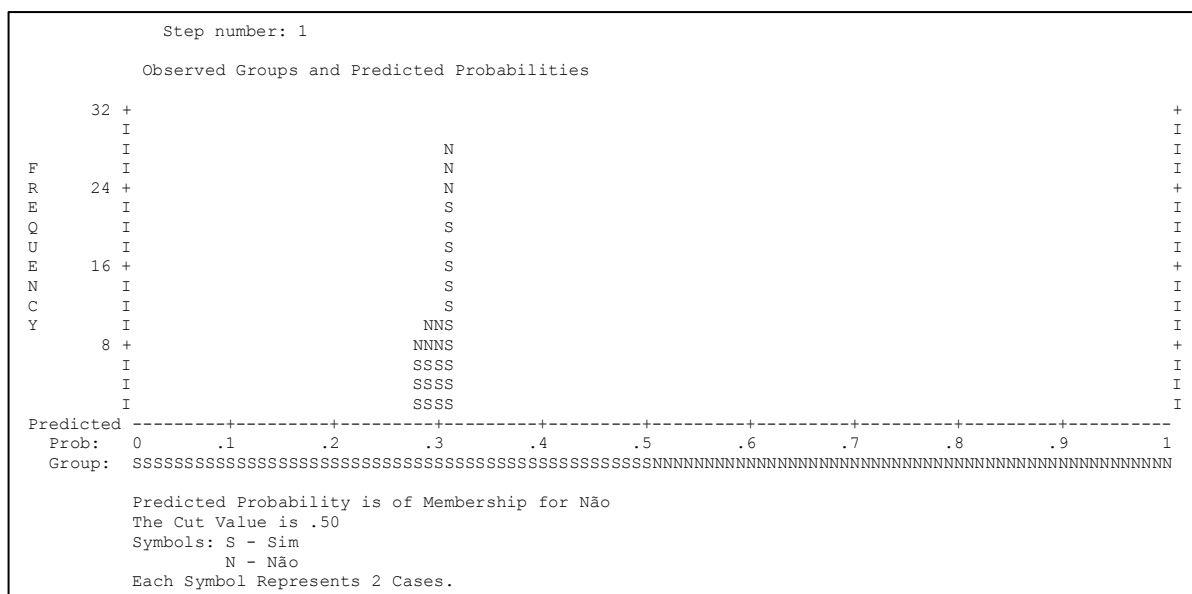


Figure 4 - Predicted Probability for F1

However, the results in Figure 5 show the problem of interpersonal relationships between partners or investors, item F4, was present in both, but had a more significant impact in companies that no longer exist than in companies that still exist.

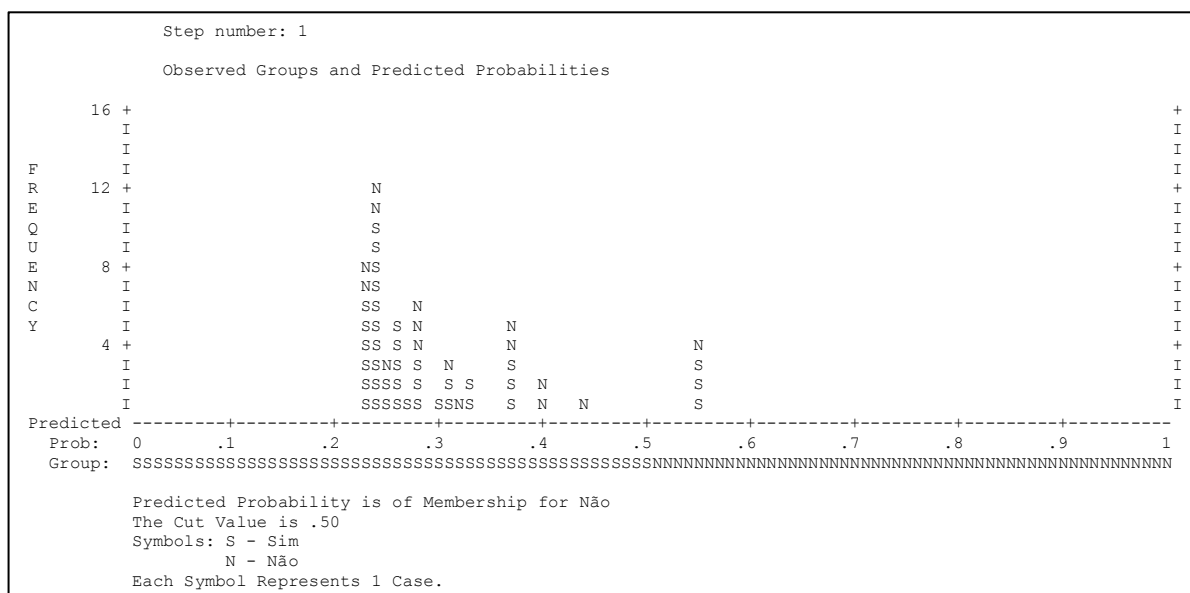


Figure 5 - Predicted Probability for F4

The results suggest that the problem of lack of capital is present in technology startups in Southeastern Brazil, however, both companies that failed as well as companies that survived have experienced this issue. Although the issue related to the problem of interpersonal relationships between partners and investors were considered harmful by startups in general, the startups that failed reported these problems more vehemently. The analysis suggests that the problem of interpersonal relationships is a more critical factor than the problem of lack of capital for the startups studied in this research study.

5 CONCLUSION

The final objective of this thesis was to investigate what are the main factors that lead technology startup companies in Southeastern Brazil to fail. In order to achieve this goal, several initiatives were done, from a literary review, to qualitative and quantitative exploratory research.

Over the last five years, few studies have been conducted on the factors that cause startup companies to close their doors. Although there have been many recent case studies, such research focuses on consolidated companies that have been in the market for a long time. Therefore, this work fills a gap on understanding the main causes of death to young companies in Brazil

This study suggests there are four main factors that lead startups to fail. The first is lack of financial capital. Through qualitative research it became clear that this factor was raised almost unanimously by interviewees, even interviewees who are part of an investment group affirmed this problem exists. The problem of human capital was the second factor raised. Results from interviews on this subject were divided into two; many interviewees stated there is simply a lack of human while another part of respondents cited the high cost of existing human capital as the biggest problem. The third factor was the issue of lack of entrepreneurial education, which leads many companies to fail to perform effective management. Furthermore, this study suggested that the Brazilian academic environment is not prepared to form managers for companies of this size, nor does it offer structure for these companies to gain some educational support. The fourth and final factor was the problem generated by turbulent interpersonal relationships between partners and, oftentimes, with investors. The factor analysis increases the complexity of the study since it shuns the traditional patterns studied in business schools, since it is uncommon to teach students how to choose a business partner or how to behave with an investor.

Once the four factors were highlighted after conducting a study with experts in the field, it was time to start the quantitative research in order to validate the data obtained until that point. More than 80% of the respondents in the research conducted were founders of startups, which suggested that the factors such as problems of financial capital and interpersonal relationships are actually found in this type of company. This affirmation took

into account companies that were born in the last five years and part of the technology segment.

This study also suggested, after analyzing the two factors by crossing them with companies which both failed as well as succeeded, that the problem of financial capital, although present, does not have a much more negative impact on a company that failed than on a company that succeeded. In contrast, the problem of interpersonal relationships between partners and investors was noted significantly in companies that failed.

Another suggestion made that corroborates the result, is the fact that despite going through a global economic crisis in 2009, the crisis did not affect the percentage of companies that failed from 2009 until 2014. The percentage remained constant over the last five years within our sample.

Finally, this study suggests that the most critical factor among the above mentioned, which caused technology startup companies from Southeastern Brazil over the last five years to fail, has been the problem of interpersonal relationships between partners of startups and/or their investors.

This study ends by stating that all the suggestions presented in this work did not take into account the academic or professional profiles of the founders of the companies or their investors, nor did it take into account the size of the initial investment that each company received.

6 LIMITATIONS, CONTRIBUTIONS AND FUTURE RESEARCH

6.1 METHODOLOGICAL LIMITATIONS

The study contains a limited amount of respondents. If the sample amount had been larger, the results might have been even richer and more accurate. The factors related to the problem of human capital and lack of entrepreneurial education, which were repeatedly cited in the qualitative research, could have been analyzed in the quantitative part if there had been a greater quorum of respondents.

6.2 THEORETICAL CONTRIBUTIONS

This study fills a gap regarding previous studies on what factors, in practice, undermine startup companies in southeastern Brazil.

This study confirms the importance of seeking to understand the reasons behind the difficulties that technology companies, which are starting their operations, face on a daily basis.

This study contributes to a better understanding of what really hinders technology startups in Brazil.

6.3 PRACTICAL CONTRIBUTIONS

There are four main factors that hinder technology startup companies in Brazil: lack of financial capital, lack of human capital, lack of entrepreneurial education and interpersonal problems between partners and investors.

Of these four factors, two are evident: the lack of financial capital and problems with interpersonal relationships.

Although, the lack of financial capital harmed companies that are still running today, the problem of interpersonal relationships affected startups that failed much more significantly.

The problem of interpersonal relationships is the most critical factor that leads technology startups in southeastern Brazil to fail.

6.4 FUTURE RESEARCH

Future research could further study the problem of interpersonal relationships between partners in technology startups. Learning more about the problem in-depth and discovering what the main points of friction are, could lead to a better understanding of its causes. A detailed study on this factor is relevant because tools could be developed to mitigate the large number of startup companies that fail in Brazil and, consequently, improve the country's economy.

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8 APPENDIX

Appendix 1 - Questions of Interview

1 - In your opinion, what are the most critical factors that cause the premature failure of a technology startup in Southeastern Brazil?

2 - (*if necessary*) Do you have any opinion about the relation between human capital and startups in this region?

3 - (*if necessary*) Do you have any opinion about the relation between financial capital and startups in this region?

4 - (*if necessary*) Do you believe there are any regional aspects that affect the startups in this region?

Appendix 2 - Questionnaire

Fatores que contribuem para uma Startup falhar no Brasil

O objetivo desta pesquisa é entender quais são os motivos e em qual intensidade eles contribuem para uma Startup falhar no Brasil. Se você tem ou já teve uma Startup no Brasil está apto a responder esta pesquisa.

Ela é 100% **anônima** e de apenas **uma** página.

Muito obrigado.

A **Startup** que você estará se referindo para responder as perguntas **ainda existe?**

Sim

☐

Não

☐

Responda às afirmações pensando na **Startup da questão anterior:**

	Não	Pouco	Nem pouco nem muito	Muito	Totalmente	Não se aplica
Investimentos no departamento comercial ou de marketing de forma prematura prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
O custo de mão de obra elevado prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A falta de uma segunda rodada de investimentos para dar continuidade no negócio prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A saída de um ou mais sócio fundador por problemas de relacionamento prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Não	Pouco	Nem pouco nem muito	Muito	Totalmente	Não se aplica
O relacionamento conturbado entre investidores e os sócios fundadores prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problemas de relacionamento entre a equipe e os sócios fundadores prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Falta de conhecimento de como gerir uma empresa prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A acomodação por ter recebido um investimento alto prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Não	Pouco	Nem pouco nem muito	Muito	Totalmente	Não se aplica

A falta de capital financeiro para iniciar a empresa prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A dificuldade de conseguir crédito em uma instituição financeira prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Perder funcionário para empresas mais consolidadas prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problemas de relacionamento entre os sócios fundadores prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Não	Pouco	Nem pouco nem muito	Muito	Totalmente	Não se aplica
A falta de mão de obra especializada prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Funcionários não verem valor em plano de participação (ex: stock options) prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A falta de análise ou superestimação do mercado prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
O desconhecimento ou a dificuldade de colocar em prática ferramentas como o Lean Startup ou Business Canvas Model prejudica ou prejudicou a startup.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Não	Pouco	Nem pouco nem muito	Muito	Totalmente	Não se aplica

Descreva o fator que você acredita que **mais** prejudica ou prejudicou a **Startup**:

Qual o estado da startup?

Quando a startup começou?

antes de 2009

☐

entre 2009 e 2012

☐

entre 2012 e 2014

☐

Qual sua posição na startup?

- ☐ Fundador e executivo
- ☐ Apenas Executivo (com ou sem ações da empresa)
- ☐ Funcionário com ações da empresa
- ☐ Funcionário sem ação da empresa