

Barriers for production innovation in small and medium technology-based firms in Brazil

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ABSTRACT

This study aims to identify the main barriers to product innovation in small and medium technology based companies in Brazil. The innovation process and its obstacles are analyzed, by interviewing several agents involved in the process, including entrepreneurs, venture capital investors, and managers of business incubators. The analyses compare two points of view, from the entrepreneurs and investors. As main findings, we found: (i) difficulties concerning legal barriers, costs and availability of capital; (ii) the lack of investors for advanced steps of the development and scarcity of exit modes, raising the investment cycles compared to international averages; (iii) the investors participation close to the entrepreneurs in the business management; (iv) the difficulty to find technical and management qualified professionals to engage in new and uncertain businesses; (v) cultural aversion to risks, inducing both the entrepreneurs as the investors to be more conservative in the decision making, and (vi) sense of good perspectives for the future, tied to the capital availability. As contributions, this research allows to understand the scenario where innovative entrepreneurship happens, as well as the issues that slow down or cause failure in the process. Understanding these issues is the first step to address them systematically. Entrepreneurs that have this information can plan ahead and take measures to accelerate innovation in their businesses. Investors that are willing to support early stage businesses, and knowing the obstacles in this environment, will provide them with better chances to act and mitigate risks of failure in their investments portfolio.

Keywords: Innovation; entrepreneurship; corporate venturing; barriers for innovation.

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1. INTRODUCTION

In the context of companies and entrepreneurship, innovation is a means to create competitive advantage, by increasing a company's share in an existing market or even by creating entirely new markets. Innovation is also good for customer, since it allows delivering better products. Besides being of interest of entrepreneurs, companies and countries, the subject has also allowed the growth of venture capital industry in Brazil, since venture capital firms can often back some businesses in early maturity states, in areas of greater potential growth. (GVcepe, 2008). In order to reach their innovation goals, companies and government define their strategies in R&D, create mechanism to enable innovative enterprises, and to induce innovation in specific areas. In the last few years, we can also observe in Brazil an important change in the attitude of government agencies and policy makers in this area, towards privately owned companies (MCT, 2009). One example is the release by FINEP, the most important agency to finance this area, in 2006, of the first non-refundable financing call for projects from private companies (Economic Subvention). This is being released yearly since then, and aims to accelerate innovation and competitiveness of Brazilian companies, applying non refundable public resources, directly in companies, sharing with entrepreneurs the risks and costs that are inherent to innovation (FINEP, 2010). Its third edition, launched in 2008, distributed R\$ 450 Million (roughly US\$ 300 Million) to 245 selected projects, from 223 companies.

On the companies' side, although Brazil is not well ranked in terms of number of patents and investments are still low when compared to world average, the share of private investments in innovation has been growing. According to the Ministry to Science and Technology of Brazil, in 2007 the companies were responsible for 47.05% of the investments in R&D, and the target is to grow it to 55% by 2011 (MCT, 2009). In this area, venture capital firms have an important role enabling businesses, specially in innovative areas. A research by GVcepe points out that this activity has grown by 50% between 2005 and 2008, reaching US\$ 11 Billion in investments (GVcepe, 2008). On the other hand, despite the growth of public and private investments, there is still a huge gap between research and actual introduction of innovative products. In 2008, while the scientific production in Brazil surpassed 20,000 papers according to Institute of Scientific Information (ISI), taking Brazil to 13th position in the world (MCT, 2009), the country was 29th in number of patent deposits in United States Patent and Trademark Office, with 101 patents (USPTO, 2009).

This gap can be explained by the difficulties to create a company that is able to generate and sustain differentiation through innovation. In this paper, we analyze the

challenges of innovative entrepreneurship, focusing in technology based companies, introducing product innovations in the market. These challenges include funding startups but go way beyond that (OWENS, 2010). We believe that identifying the barriers to product innovation is the first step to allow companies to take action, address these issues and become more efficient in the process of introducing new products in the market.

Innovation, either incremental or disruptive (CHIRSTENSEN, 1997), have risks, which raises the cost of capital to be invested – compared to financing the expansion of a mature business – and makes unfeasible traditional financing options. Especially in Brazil, given the high interest rates and the existence of mature business models with good potential gains, even established companies will prefer to invest in lower risk areas, like growing production of already introduced products. Therefore, there are few alternatives for entrepreneurs to get backed up to develop, prototype and produce a new product concept. Even the existing alternatives from the government or venture capital areas are not well known by most entrepreneurs. Besides that, barriers to innovation go beyond funding, and include a wide range of challenges that go from culture to legal and social restrictions to innovation in certain areas (OWENS, 2009). We believe that understanding these issues in a broad way allows identifying practices that can be adopted to surpass these barriers and that can be replicated in other businesses. By identifying these issues, this paper will answer to the question: “What are the main barriers to innovative entrepreneurship in Brazil? “.

2. THEORETICAL BACKGROUND

2.1. Types of Innovation and Impact in Diffusion of Innovations

According to the “Oslo Manual” (OECD, 2005) the concept of innovation assumes some degree of novelty of a product that, at the minimum, must be “new or significantly improved to the organization”. But it can occur in different levels: new to the organization, to a certain market or to the world. The scope of this research includes innovations to a certain market or to the world, in other words, when a company was the first to introduce a product with certain characteristics in the Brazilian market or in its industry. These degrees of innovations also have an impact in another concept that is relevant to this research, the diffusion of innovations. This is a theory about how, why and how fast new ideas and technologies are introduced in different cultures. The study of diffusion of innovations started in psychology and is useful in strategic decisions of the entrepreneur or innovator, when she wants to introduce a new product in a given market. Rogers (1962) proposes that this process

is influenced by four main elements: (i) The innovation itself, its characteristics and impact to users; (ii) The communication channels to the market; (iii) Time necessary for the product to be adopted by users; and (iv) The social system where users live in.

Based on the elements above, we can notice that diffusion of a new product is a communication process, through certain channels, throughout time, targeting individuals that are members of a social system. The goal of this communication is to push these individuals through 5 steps: (i) Awareness of the innovation; (ii) Persuasion, when the individual actively seeks information; (iii) Decision to adopt an innovation, based on the analysis of pros and cons; (iv) Implementation of the innovation, when the individual starts using it, evaluates the real usefulness and may seek more information; and (v) Confirmation, when the individual decides to keep using it or use the full potential of the innovation.

Analyzing cases of diffusion of innovation, Rogers also identified different types individuals (or organizations), according to the way they react and speed of adoption of innovation: (i) Innovators are the first to adopt the novelty, they accept the risks associated with it and have financial resources to absorb failures; (ii) Early adopters are the second fastest, their opinions generally have higher influence to others, because they use more judgment than innovators to make a decision; (iii) Early majority have a great variance in the time to adopt an innovation, taking significantly more time than early adopters, and rarely have the status of influencers; (iv) Late majority will adopt an innovation after most individuals (or companies) started using it, they are normally skeptical and resistant to change; (v) Laggards are the last movers, with strong aversion to change agents.

There are other ways to classify innovations, according to the degree of novelty, which may interest the innovator. In the following session, we will analyze innovation according to incremental, radical or disruptive impact.

2.2. Incremental, Radical and Disruptive Innovations

Now that we explored the concept and degrees of innovation, as well as the process of diffusion of innovations in a social system, it is also important to understand how organizations innovate. There are several models, according to its degree and impact, two of which are explored below. Most innovation theories are strongly influenced by the work of Joseph Schumpeter (SCHUMPETER, 1934), which demonstrates that there is an impact in economic development based in innovation, where new technologies replace old ones, in a dynamic process of “creative destruction”. According to his vision, there is “radical innovation”, which generates fundamental changes in the industry where it occurs.

Incremental innovations, on the other hand, represent the continuous process of change and product improvement. Schumpeter's vision is mostly focused on biggest changes that may change an industry.

According to Christensen (1997), innovation is important to the development of companies, and these have two options to grow their businesses. The first approach is to take market from a competitor, through "sustaining innovations". Alternatively, companies can grow with disruptive innovations. The latter approach can be divided in two categories: (a) Disruptive innovations that create an entirely new market; and (b) Disruptive innovations that initially have lower performance than incumbent technologies, and appeal to lower end consumer at the beginning. Digital photography is in that category, since it was considered a lower quality alternative and eventually eroded most of the market of professional photography.

Christensen's work explores the innovator's dilemma, which occurs with established companies, since the introduction of disruptive innovations can cannibalize and destroy their main business. On the other hand, not launching disruptive innovations allows new entrants to grow and eventually take the established company from the market. Despite the differences in naming and the fact that the first author is more concerned in the economic impact and the second talks about companies' point of view, these theories have a lot in common. For the purposes of this research, it is important to notice there are innovations that improve product performance, without destroying value and not compromising or changing an industry. This group includes examples like ethanol-fueled automobiles, and multi-core processors. There are also innovations like the car itself, which reduced the carriage industry, and cloud computing, which is still in infancy, but many experts say that will destroy the traditional software licensing business.

We are interested in both groups, but it is important to recognize the differences and the implications in speed and ease of diffusion and introduction into the market. Once we understood the concept of innovation and some ways to classify them, we can now analyze what makes some companies able to constantly introduce innovations.

2.3. Previous Research About Innovation Barriers

The innovation theme is becoming ever more popular, in a way demonstrating that people and businesses still have many doubts and difficulties in relation to this subject. A search for the word "innovation" on Amazon.com currently lists more than forty-two

thousand distinct titles. Despite the academic research and all the non-academic publications, the companies keep struggling to become more innovative, combating barriers of different natures, since they understand themselves to be “killing” ideas and causing the failure in the attempts to innovate (OWENS, 2010).

In the academic area, this theme is studied under different disciplines. In a general way, the academic studies tend to be descriptive of a defined perspective on a problem. Below are examples of some research areas that deal with this theme:

- The area of people management, aspects such as organization culture and the profile of the recruited collaborators, impact the ability to innovate;
- The area of strategy is strongly linked to the innovation theme, because it makes feasible the implementation of the strategy as well as it is able to focus on development of new products and technologies;
- The area of technology, evidently, is interested in the innovation theme, dealing with the barriers that restrain innovation.

Non-academic authors also bring important contributions to the theme, presenting their cases, experiences and implemented solutions in specific businesses. These reports can eventually include solutions to problems difficult to be addressed and tend to be prescriptive in regards to very specific themes - that are not always re-applicable to other businesses.

Owens’ analysis is based on two perspectives – academic and practical – and on an ample research with managers in different areas and levels, identifying six great themes in which barriers restraining innovation are frequently settled. Even if the focus of this research has been the innovation of existing companies, a great number of these concepts are applicable to innovative enterprises. Following are the types of barriers to innovation (OWENS, 2010):

- Individual: the resistance to change is a present characteristic, in lower or higher level, in practically all human beings. These psychological barriers also labor within an organization that seeks to develop innovation, as well as in the moment that the innovation is introduced into the market.
- Group: the resistance imposed by the group to an innovation may take the form of the organization’s culture, fear, or aversion to risk. This resistance blocks the organization from generating, evaluating and implementing innovations.

- **Organizational:** the following level of restriction to innovation occurs when various groups unite in an organization. These barriers are generated by the strategies, organizational structures, management processes and practices, and have a direct impact on the ability to innovate.
- **Industry:** this type of restriction is a consequence of the way that the organizations compete in their sectors. For example, companies in a not very competitive industry or with products that have no differentiation will tend to be less innovative.
- **Social:** in a wider way, society has mechanisms to protect itself against possibly destructive changes; these are implemented as politics, norms, moral patterns, ethics, laws, rules and other forms of control. The mechanisms can limit severely the innovator's options and creativity.

Owens' focus in his research was on identifying the barriers which restrain existing companies from keeping themselves innovative. He tried to find out how the companies "killed innovation", evidencing that there are many barriers beyond the "innovator dilemma" (CHRISTENSEN, 1997) previously introduced. This model is generic enough to be applied to the universe of innovative entrepreneurs, in starting-up companies whose focus is development of innovative products. In this way, this model, along with the knowledge of practices within innovative companies, the knowledge about the process of diffusion and of the innovation types, serve as base to structure the interviews and analysis that will be presented in the following chapters.

3. METHODOLOGY

According to this study's objectives and to the bibliographical survey about innovation, this chapter demonstrates the methodological procedure used for the research, including the chosen method, the criteria for the choice of interviewees, as well as their profiles and those of their organizations.

3.1. Research Method

The research consisted of interviews of exploratory and inductive nature with different agents of innovation value in small technology-based businesses. The process was divided into two phases, the first being realized in a pilot interview, in which beyond data collection,

the proposal was to validate the script used for the interviews and to identify other agents in the innovation process to be investigated.

Once these initial interviews were realized and the results analyzed, this research focused on a second group of qualitative interviews, with at least one representative of each one of the links of the chain which were identified.

All the interviews were recorded and transcribed for a later analysis. The data available on the sites of the organizations offered the context, such as area, objectives, products and available services, etc.

3.2. Criteria for the Choice of Interviewees

Six interviews were realized, one of which considered “pilot”, which allowed perfecting the script of interviews and identify the other interviewees. All the interviewees in this stage worked in one or more of the following links in the chain of innovation:

- Entrepreneur in businesses with technology-based products which have innovative characteristics and are already generally commercialized;
- Manager of technical mechanism in innovation, as for example, incubator;
- Projects’ evaluator for financial mechanisms for instigating innovation in businesses, as for example, FINEP edicts geared toward businesses;
- Manager of funds investment regarding Venture Capital or Private Equity;

3.3. Data Collection Criteria

The main mechanism for data collection was the open interview, based on a previously defined script, seeking to identify the barriers for innovation in the perspective of each one of the interviewees. The interviews were complemented with secondary data, including the Internet sites of the organizations where each of the interviewees currently works.

3.4. Research Limitations

Opting to realize a series of qualitative interviews capable of covering several links in the chain of innovation, the chosen view demonstrated the scope of the problem. On the other hand, the view of the entrepreneurs in different stages of maturity in their businesses was not explored. A complementary study to this one could be a quantitative research, using the tools based on this study’s findings, addressed to entrepreneurs in different situations:

- Incubators that already have a commercialized product;
- Those that have received investment of Venture Capital;
- Entrepreneurs with products in commercial stage;
- Entrepreneurs who have performed an exit strategy, as for example a strategic purchase, funding capital, among others.

Beyond quantitative researches, deepening the study could be done through case studies, not only with successful businesses according to the determined criteria, but also with businesses that did not reach their objectives.

4. RESULTS

In this section the results of the pilot interview will be presented, in terms of approach refinement, the profile of the people interviewed and those of their organizations and analysis of the results per se.

4.1 Pilot Interview

The first person interviewed in this stage, other than being an entrepreneur at a business that has an innovative product, has experience in management of the incubator and has had a role in evaluating business projects, submitted to CNPq. The script of the pilot interview included questions about the organization and a great number of questions that sought to cover each of the dimensions presented by Owens (Owens, 2010). It was observable that an interviewee that is willing to take the challenge of innovation, and that works directly with this issue, is capable of covering spontaneously a great part of the themes, with a smaller number of open questions.

From this, the specific questions that sought to address each of the dimensions individually were eliminated. Also it led to the conclusion that the organizational data and previous projects of the businesses should be obtained as secondary sources (business site, for example), leaving more interview time to explore the main theme, resulted in the script adopted in the subsequent interviews.

4.2. Profile of the Interviewees and Organizations

In the following, the profiles of the interviewees as well as those of the organizations for which they worked are shown:

- Berthier Ribeiro Netto – Google Director

Founder of Akwan TI, acquired by Google, company in which he works as Engineering Director. Akwan became the R&D Center of Latin American Google and offers research services to final users and companies.

- Carlo Dapuzzo – Monashees Partner

Monashees is a venture capital company that invests in “high risk” enterprises, focused on big markets (> R\$ 1 Billion) or potential new markets. The typical investment - between R\$ 250 Million and R\$ 5 Million, are made in the Internet and Education areas. The company also helps in the business management.

- Guilherme Ary Plonski – Anprotec President / Professor at Universidade de São Paulo

Anprotec represents the interests of incubators, technological parks and enterprises, through an wide offer of activities to build capacities, articulation of public policies, generation and dissemination of knowledge. Anprotec aggregates 272 entities, that represent 400 incubators and 6300 enterprises, representing a total of 33.000 work placements.

- Marcos Simões - Empreender Endeavor Institute

The Empreender Institute started up from a partnership with Endeavor Initiative Inc., an international non-profit organization that promotes entrepreneurship in developing countries. Endeavor’s objective is to make Brazil a global reference in entrepreneurship. The model of the performance consists of selecting entrepreneurs, strengthening their businesses through a net support of mentors – volunteers and partners, that advise and support these businesses.

- Mara Abel – Endeepor / CEI-UFRGS Ex-Director

ENDEEPER develops solutions for characterization of petroleum reservoirs and knowledge management, and started as a spin-off of Intelligent Database Group coordinated by UFRGS (Federal University of Rio Grande do Sul). She was also director of CEI, a technology-based incubator that encourages innovative projects.

- Sílvia Meira – Chief Scientist CESAR / Member of the Council of Porto Digital / Professor at Federal University of Pernambuco

CESAR is a private center of innovation, creating products, services and companies in IT and Communication. CESAR has developed products and services that cover the whole process of innovation, from the idealization to launching. Porto Digital is a cluster that shelters companies of IT in the city of Recife, and has provided setup of dozens of companies.

4.3. Analysis of the data From the Interviews

The analysis of the data from the interviews will be shown bellow. This analysis is divided into three parts:

Firstly, the main barriers that each of the interviewees cited were identified and put together according to the pattern introduced by Owens (Owens, 2010), adapted to the context of innovative technology-based entrepreneurship;

Next, patterns in the answers were indentified, which resulted in “groups” of interviewees, with complementary perspective about the theme studied;

Finally, a consolidation was made, presented in “4.3.3. Consolidated Analysis: Barriers & Groups”, which counters the perspective of the groups interviewed according to the each dimension of Owens’ patterns.

4.3.1. Analysis of Barriers Identified by Interviewees

For this analysis, Owens’ pattern of 6 types of barriers for innovation, a generic standard applicable to the innovation context in established businesses as well as in innovative enterprises, was adjusted to the context, according to the description of each of the sections that follows.

4.3.1.1. Individuals’ Barriers

The analysis of individuals’ barriers has as a focus on the characteristics of the entrepreneur himself/herself and those of the remaining people involved in the entrepreneurship, such as collaborators and suppliers. The function of this section is to identify eventual obstacles related to capacity, personal profile, educational background, abilities, cultures and beliefs. Barriers of this nature were mentioned spontaneously by all the interviewees, many times as the most relevant obstacle to the innovative entrepreneurship in Brazil.

There are many individual aspects that intervene in the innovative entrepreneurship; the following are some of the ones most frequently mentioned:

Cultural barriers and of mentality, which limit the quantity of entrepreneurs and projects that have a “high impact” perspective, with potential to win over the high growth market or to create an entirely new market with a high growth potential. The majority of enterprises end up having a perspective of the business as a “lifestyle” (only sufficient to be economically sustainable) instead idealizing a great business;

In the perspective of investors and other agents that foment the innovation, predominates among the entrepreneurs an idea of the “business owner”, and few are willing to allow the access to new partners, divide the decisions with the new partners and professionalize the management, conditions considered essential by the investors to mitigate the business’ risks;

The entrepreneurs-innovators in high technology areas tend to be technicians, focused on solving obstacles in the constitution of a product within their specialization area. These individuals are not always capable of translating a product to the client’s language, unable to leave the technical speech to pinpoint the benefits to the final client. This deficiency can be fatal to the process that disseminates the innovation.

4.3.1.2. Group Barriers

The concept of “group” adopted related to the environment where a knowledge construction takes place which makes feasible innovative products; this includes university and research centers. Regarding this perspective, the interviewees highlighted the following points:

- Difficulty of the public university, where a great part of the basic research in Brazil takes place, to look kindly upon entrepreneurial activity, which complicates the usage of the scientific knowledge in enterprises. Frequently the result is that the knowledge reached based on public resources turns into publications, many times internationally and with high visibility, but rarely makes a business feasible, which would turn knowledge into generation of value, jobs and revenue;
- Lack of favorable culture to the innovation in broader terms, which could be fomented throughout the education process, and that means that a very small parcel of those leaving universities have ambition to start up a business and, of those, few seem to have a perspective of high impact business, besides an even smaller parcel effectively putting this ambition into practice.

4.3.1.3. Organizational Barriers

In this research, the concept of organization has been understood as the environment where the development of innovative products happens, such as incubators as well as the environment inside the micro and small technology-based businesses that invest in innovative

products, besides the organization of client businesses, in which the implementation of new products takes place. The aspects mentioned most frequently by the interviewees were:

- The great part of incubators and research centers have a bigger focal point and are densely taken over by people interested in surpassing the technical barriers for a product creation, rather than focusing on a business problem or deepening the knowledge of the users' needs. There are few that work on the other stages of the innovation process, such as articulation with investors, approximation to businesses, etc;
- In the case of products concentrated on the corporate market, there is a natural resistance to changes, when the products reformulate the way people work and, especially in client businesses that are not exposed to the international competition, there is no search for products and other efficient processes, and there is little receptivity to innovative products, even if these generate significant productivity profit and competitive.

4.3.1.4. Industry Barriers

Since we have dealt with innovative entrepreneurship, the concept of “industry” that was adopted corresponds to the environment that allows the development of these enterprises and their transformation into businesses, such as risk capital, fomentation mechanisms and partnership businesses in the development of new products. Some barriers frequently mentioned by the interviewees:

The chain value of risk capital has been little developed in Brazil, and the few investors willing to finance the development of innovative products have difficulty in finding alternative exists (start-up capital, investors in subsequent stages or strategic buyers for the invested businesses);

In the investors' perspective, since they need to be willing to perform for a long cycle until the egress or even be willing to stay with the business, these become more selective in the projects. At the same time, they do not find businesses with a high impact perspective to justify their entrance.

4.3.1.5. Social Barriers

The social barriers in this study have to do with legal, regulatory and cultural issues in the country. The problems highlighted by the interviewees were:

(i) Highly bureaucratic business environments, which generates costs, a misplacement of the entrepreneurial focus, and imposes the same complexities and obligations as on a big business; (ii) Legal barriers which complicate the usage of governmental purchase power to ferment innovation, besides there are regulatory difficulties in other areas, such as the creation of investment funds, the usage of tax incentive in innovation activities by a greater part of the businesses, and (iii) Low tolerance to failure, in a cultural point of view as well as in the legal one, which ends up limiting the view of the entrepreneurs.

4.3.1.6. Technical Barriers

Little by little the technical barriers were highlighted in a general way and, in some cases, explained as “irrelevant” in comparison to the others. This perspective seems consistent with the current unsteadiness between scientific production in the country and the production of innovative enterprises and patents. The barriers more frequently mentioned also relate to people and education:

Intensive enterprises in highly qualified manpower, especially those that attempt to develop competitive products internationally, still face difficulty in recruiting the necessary talent. Despite the dimension of the academic production in Brazil, the schools with international standards are still few;

There is difficulty in finding qualified people to fill key positions to transform enterprises in big businesses.

4.4. Interviewees' Grouping

An important finding from the analysis of the interviews' transcripts, after relating the main obstacles identified by each of the interviewees, was the fact that these people were able to be placed into clearly-defined groups. In each group, there is a great conscience of prioritizing in terms of the innovation obstacles. A contradiction of perspectives was not notorious, however a clear different in the order of priorities was perceivable.

4.4.1. Perspective of the Entrepreneurs

The interviewees directly involved in enterprises generally speak of these main barriers:

- Availability of qualified manpower and suppliers with whom to establish partnerships. Even though none of them identified the technical knowledge as a barrier in

itself, the little availability of well-educated people to work in intensive companies is an obstacle to the business growth that depend on manpower;

- The university does not favor the emergence of innovative enterprises and, in some cases, there is an ideological view by part of the academic groups, who are opposed to transforming the research results into commercial products;
- Few options of “low costs” capital, feasible to an innovative company, which will many times be effective for years without generating revenue, ends up limiting enterprises to less innovative products, less risky, which can generate revenue in a short time;
- High complexity and high costs of managing a company in Brazil, in case of a micro or small business, demand an investment in the administrative area which is equal to or greater than the investment in the product itself.

4.4.2. Investors and innovation inducing agents’ perspective

Here not only fund of risk capital was considered, but also those who perform as investors in a natural person, as “angels” and agents that ferment or induce innovation. Some coherence in the perspective of these different agents was found, among which:

- Few entrepreneurs and few projects with a “high impact” view, in other words, with potential for quick growth, exploring a big marketing and growth potential, or that can create an entirely new market with high potential. The majority of the projects have a perspective that they call “lifestyle”, capable of growing up to a point, generating revenue, but stopping at a limit, which makes them unattractive for this type of investor;
- Many entrepreneurs have a perspective of the “owner”, more than one appropriate to the “entrepreneur”, finding it difficult to accept, along with the capital disbursement, the aggregation of a partner with whom to divide decisions and difficulties in accepting the managing professionalization;
- Little post-innovation culture in the country as a whole, which along with a culture of little tolerance for failure, does not favor the outbreak of entrepreneurs with a bold views;
- In the level of public politics, a lack of comprehension about the great diversity within the business universe in Brazil and its different needs. This cognitive dissonance

complicates the process of addressing the obstacles of governmental competence in a systematic and efficient manner;

- Difficult in finding and engaging key people, capacity of joining the entrepreneurs' group that are capable of transforming a small entrepreneurship into a great company. This is related to the lack of professionals as well as to the lack of availability to join a business in a beginning stage.

4.5. Consolidated Analysis: Barriers and Groups

Table 1 show the barriers cited by the interviewees which groups were previously described. The “Entrepreneurial Perspective” shows the barriers highlighted by the interviewees directly involved in innovative enterprises. The column “Investor and Inducing Agents’ Perspective” contain the points highlighted by agents related to financing and to the induction of enterprises. Chart 1 summarizes this research’s findings and confronts the different agents’ perspectives, offering a more extensive view of the research theme. We noticed that there were no contradictions among the perspectives, but a difference of emphasis and a difference of rank in terms of the most relevant obstacles.

TABLE 1: BARRIERS FOR INNOVATION IN TWO PERSPECTIVES

Type of Barrier	Entrepreneurial Perspective	Investors and Inducing Agents’s Perspective
Individual (Entrepreneur / innovator)	<p>Little availability and low manpower quality and available service rendering in Brazil make difficult the constitution of teams and well as the relationship with suppliers;</p> <p>The entrepreneurial mentality tends to be focused on internal market, not seeking the creation of innovative and competitive products on a global scale;</p> <p>The innovator – entrepreneur generally has a technical profile and has difficulties in turning the technical speech into one of benefits for the clients.</p>	<p>Few entrepreneurs have a view of entrepreneurship of “high impact” – with high potential for transformation of an industry and growth potential – predominating the “lifestyle” entrepreneurship;</p> <p>Cultural barriers of great part of investors, such as view of the “owner” and not of the partner, which complicates agreements with investors and limits business growth;</p> <p>Overestimation of the idea in itself, in relation to the business execution, limiting the search and the agreement with partners and reimbursement of “smart money”, necessary for a high impact entrepreneurship;</p> <p>Loss of focus by entrepreneurs, because of the view regarding technology and their possibilities, in detriment of the spotlight on business</p>

Type of Barrier	Entrepreneurial Perspective	Investors and Inducing Agents's Perspective
		applications and/or on the final client.
Group (environment where the erection of knowledge occurs for innovator – entrepreneurship, such as university, Research Center, etc.)	The university as a public institution has difficulty taking kindly to commercial entrepreneurial activity, complicating the emergence of innovative enterprises from academic origin.	Little encouragement to a pro-innovation culture and entrepreneurship, which reflects on the fact that a minority of those leaving university undertake the practice and, among these, predominate a “lifestyle” perspective.
Organizational (environments where the products and clients of innovative products are developed)	<p>In the case of products with a focus on corporate market, for industries less exposed to the international competition, there is little interest in and receptivity for innovative products and productivity revenues through technology;</p> <p>Few big companies in Brazil see the possibility of open innovation and licensing developed technologies for innovative entrepreneurs, which could be incorporated in their products;</p> <p>Introduction of innovative products in client companies, which alter the way in which people work, faces natural oppositions to change and companies are not prepared to manage these changes;</p> <p>Some industries in Brazil are dominated by international chains and have little autonomy to decide the purchase of innovative products in Brazil, which complicates the introduction of products with the focus on corporative clients);</p> <p>Few incubators are capable of being effective beyond establishing a basic infrastructure, making easier investments and connections (with investors, companies that could license technology those incubated, with the market, etc).</p>	<p>Incubators and research centers generally are filled by those who seek research and solve problems of technical domain, but there are few people focused on the search of the most appropriate technology to solve big problems and create businesses, built on the perspective of the final client;</p> <p>The majority of innovative enterprises do not have all the management competencies to become great businesses, not all of them count on the support of incubators and not all incubators are equipped with these competencies;</p> <p>Enterprises focused on solving technical problems, and when seeking capital – be it public or private – seek imbursement of money and not “smart money” (Money, connections with the market, etc.).</p>
Industry (capital and instigation for enterprises)	The chain of value is still underdeveloped, with few investors willing to disburse money in innovative businesses;	Lack of projects with perspective of high growth (aiming at a high growth market or that can create an entirely new market), that are attractive enough

Type of Barrier	Entrepreneurial Perspective	Investors and Inducing Agents's Perspective
<p>Industry (capital and instigation for enterprises(continuation))</p>	<p>Alternative exits for the investors are limited (there is a lack of investors in intermediary stages, low probability of opening capital and few strategic purchases), demands that the investor have willingness for a long term investment.</p>	<p>to mobilize investors;</p> <p>The products proposed bring few innovations or bring innovations only in a regional scale, which are not competitive internationally;</p> <p>Investors in initial stages need to be prepared for a cycle of maturation which tends to be long in Brazil in relation to other countries, due to the shortage of investors for all the stages (especially intermediary stages);</p> <p>Based on the facts above, funds of venture capital tend to be more selective, moreover they are still limited to great centers, such as São Paulo;</p> <p>Financial support with public Money to develop innovative products is limited to some areas of interest to MCT e FINEP, and many are limited to aspects of technical support and do not include the stages of introducing a product into the market;</p>
<p>Social (country, including legal, regulatory and cultural questions)</p>	<p>Highly bureaucratic environment raises the costs of making business and takes the way the focus of the entrepreneur in regards to the innovation, in order to dedicate great part of the energy to meet legal, fiscal and bureaucratic requisites;</p> <p>Lack of legal and fiscal regimes for innovative enterprises, expose micro and small businesses to the same costs and complexity of manage as those of a mature and established business.</p>	<p>Lack of a perspective that there is a great diversity in the universe of 5.5 million effective businesses in Brazil, generates a cognitive barrier for the problems to be tackled systematically in terms of defining public policies and incentives to innovation entrepreneurship;</p> <p>Legal and regulatory barriers still difficult to the constitution of new investment funds of investment capital, reducing the scope of investors;</p> <p>Current legal framework complicates the use of the State buying power to instigate innovation, since the innovative product is frequently disqualified in terms of the public edicts;</p> <p>The legislation that allows companies to obtain fiscal benefits to invest in innovation favors a limited number of companies;</p> <p>High transaction cost makes difficult</p>

Type of Barrier	Entrepreneurial Perspective	Investors and Inducing Agents's Perspective
		<p>for bigger businesses to invest on innovation in smaller businesses, with imbursement of capital to suppliers that develop innovative components for their products;</p> <p>In the cultural aspect as well as in the legal one, there is a low tolerance to failure, discriminating and punishing the entrepreneur that "breaks" a company;</p> <p>Regime of juridical insecurity in the country limits the access to new investors.</p>
Technical	<p>No technological availability barriers were highlighted (reflecting Brazil's position in terms of scientific production), but these technologies are dominated by very few people, and there is a difficulty in finding manpower for enterprises with high density of knowledge; A limited number of universities is capable of educating people with international standard to perform in companies that intend to compete internationally.</p>	<p>Difficulty in finding people for key positions for transforming an entrepreneurship into a big business.</p>

5. CONCLUSIONS

Based on the theoretical reference regarding the innovation theme, the interviewees with different agents in the innovative-entrepreneurship context and the analysis of the obtained data, the present study presented a very ample qualitative view of the innovation environment in Brazil. The theoretical reference research established the foundation for the study, offering subsidies for the stage of data collection with interviewees and their analysis. The interviewees established a view applied to the Brazilian scenery and the innovation entrepreneurship technology-based context. Among the conclusions from the initial stage (that of a bibliographical survey) is the fact that the innovation is related to economic development (Schumpeter, 1934), through the creation of differentiated products and exporting possibilities. Another finding reported that the innovation is something concrete, susceptible to being measured and verified (OECD, 2005), which is a pre-condition for its management, be it in the business' environmental or governmental level. Another point, verified in the literature as well as in the practice of companies considered innovative, is that the innovation

can be learned and encouraged (Drucker, 1993). Therefore, once the comprehension of this process (and its barriers) has been attained (Owens, 2010), it is possible to take concrete actions to accelerate the innovative entrepreneurship.

With these premises in mind, the choice of the criteria for choosing the interviewees, data collection through qualitative interviews and their later analysis were made. The picture portrayed, which related the barriers identified by the agents inserted in the context of innovative enterprises' developments, sought not to attach itself to a pessimistic or optimistic view of reality, but merely to frame the problem in a way as complete as possible based on the collected data. It is believed that a clear comprehension of the barriers for innovation is an essential step, so that these can be addressed in a systematic way, or so that the entrepreneurs or agents, attentive to the restrictions which are imposed upon them, can anticipate the risks and raise their chance for success.

On one hand, there is the difficulty that the entrepreneurs face regarding the legal barriers, the cost of making business, and the complication of investing capital to their businesses and, in some cases, the difficulty to engage enough qualified manpower. These factors many times leave the entrepreneurs few alternatives for generating short term revenue, taking the focus off the high impact view, leading the entrepreneurs to more conservative decisions. On the other hand, the investors and other agents that work to promote entrepreneurship, tend to highlight the lack of projects ambitious enough, with growth potential, to justify the investment. In Brazil, there are not enough investors for the following stages and there are few exit alternatives, demanding longer cycles of investment than the international average, the investors need to be highly selective in their choices. Once an investment has occurred, there is a worry in placing people in key positions in the invested businesses, to work along with entrepreneurs in order to transform an idea or a product into a great business.

In both of the perspectives, there is always a difficulty to find qualified manpower – technical as well as in management positions – and willing to embark in a new business. In the case when one finds these highly qualified professionals, the cultural barrier, the low tolerance to failure, is a limiting factor. Entrepreneurs as well as professionals who have a difficulty in making the option for a new business with high potential for growth (and the inherent potential for failure) are led toward the “safer” professional decisions, choosing a established or low risk businesses.

Insofar as capital availability, interviewees in both groups admit that the market is still incipient, but also report the fact that Brazil has a short history and a stable economic explains

that the venture capital is incipient in the country. Therefore, an optimistic view predominates, that a virtuous cycle is about to begin, since the best enterprises can attract more investors and a greater offer of capital would make creating a high impact business a more attractable idea. It remains to be known whether the actions of the government could support the education of better professionals, reduce the costs of making business in Brazil, and in a concise manner, reduce the difficulties faced by innovative entrepreneurship.

This research has shown a perspective of the innovative environment, where the views of different roles allowed to pinpoint the obstacles that need to be overcome to become successful. The spotted barriers at times slow down or block the success of entrepreneurs, investors and the actions that seek to induce innovation. With this, one hopes to contribute that the problems that are under the regency of these agents may be addressed in a systematic way. Even though some obstacles are beyond the reach of these agents, the conscience of these challenges can contribute to taking the precautions that mitigate risks. The innovators may decide their path, accepting the fact that entrepreneurship like a lifestyle, though making possible the creation of short term revenue and possessing fewer risks, is not very interesting for risk investors. The decision based on this model is not less correct than one based on a high impact choice, but the expectations of the entrepreneurs must be clear in regards to this principal, so as to be able to focus on the realization and search for adequate mechanisms to finance their business, raising the chances of building an economically stable business. Those that opt for high impact entrepreneurship, must have the concept of the potentials that investors look for, the need for a sufficiently big and feasible view, so that the capital investment may be justifiable for a long term, when in Brazil the investor may resort to low cost and profitable alternatives. It is necessary to understand still, that to raise the chances for success, the investor will not only invest capital, but also management capacities and access to a network of relations. Therefore, the entrepreneur should be prepared, when with an investor, to divide the decisions about their business, adopting a truly entrepreneurship perspective and not that of the “owner”.

During the articulation of this research, there was a choice made for a wide-reaching view in terms of innovation environment, covering different agents, such as entrepreneurs, incubators and investors. Facing this diversity of perspective, a qualitative approach to data collection was adopted. Once this view was built, a natural step would be the quantitative research in one of more of the segments of interviewees. Another possibility to deepening, which would be valuable, was the realization of case studies and in-depth research.

The quantitative research among venture capital funds would allow the organization the view of the prevalent obstacles to overcome in action plan. In the entrepreneurship universe, the research among entrepreneurs in different stages (incubators, companies with products in the market, etc, would allow to identify the obstacles as well as the actions adopted by companies that reach the market, which can be replicated by future entrepreneurs.

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