

# An evaluation of the Brazilian business incubators innovation

## UMA MENSURAÇÃO DA INOVAÇÃO NAS INCUBADORAS DE EMPRESAS BRASILEIRAS

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### ABSTRACT

The business incubators are considered an environment that collaborates to the creation and development of companies, especially the ones which present innovator character and an intensive intellectual content. To evaluate the main mechanisms used by the Brazilian business incubators to measure the innovation, this paper describes a study including various Brazilian institutions. This research focused aspects such as type of innovation developed by the companies in the business incubators, the types of partnerships with other research centers, the courses developed or administered in the innovation area, beyond the traditional innovation performance indicators used by the companies, for example, number of patents and R&D statistics. Based on the information provided by some Brazilian business incubators, it was possible to analyze the best Brazilian regions in innovation measurement, the main types of partnerships and others.

### KEYWORDS

Business Administration, Innovation, Business Incubators.

### RESUMO

As incubadoras de empresas são entidades que colaboraram para a criação e o desenvolvimento de novas empresas, especialmente pelo fato de possuírem caráter inovador e intenso conteúdo intelectual. A fim de avaliar os principais mecanismos utilizados por elas no auxílio aos novos empreendimentos, este trabalho descreve um estudo realizado junto a diversas incubadoras brasileiras. O foco principal esteve direcionado a aspectos como tipo de inovação desenvolvido pelas empresas nas incubadoras, tipos de associação que as incubadoras possuem com outros centros de pesquisa, cursos ministrados na área de inovação, além dos

indicadores de desempenho utilizados pelas empresas como, por exemplo, número de patentes e estatísticas de P&D. Baseado nas informações levantadas foi possível analisar as melhores regiões brasileiras em termos de inovação, os principais tipos de parcerias entre outras análises.

### PALAVRAS CHAVE

Administração de Empresas, Inovação, Incubadoras de Empresas.

### 1. INTRODUCTION

In the last years, the globalization has been demanding an increase in competitiveness and continuous improvement of the companies. Independently of size or business area, all kinds of companies need to implement good administrative techniques and to develop new production systems or products through an innovation process.

The authors of this paper emphasize though that the innovation process may be easier in big companies where the resources and skills are usually readily available. However, micro and small businesses cannot be left out of the innovation process simply due to the fact this resources may lack, given the role they have in the economic growth of a country.

The importance of them to Brazil can be proved by data of a Brazilian institution that support this kind of business, called Sebrae. According to this data, they employ 56.1% of economically active population and contribute with 38% of wealth generated by the nation. Although this importance, the mortality registered for this type of company show a difficult situation where 59.9% collapse before the fourth year of existence (SEBRAE, 2004).

In this context, it is pointed out the importance of institutions known as business incubators, which favor the creation and the development of micro and small

enterprises, in special those with innovative characteristics and with intensive intellectual content.

In the present paper, the authors firstly analyze the theory of innovation and how Brazilian business incubators measure it in start-up companies. Secondly, it was described the methodology used in the survey finalizing then with the third stage where the result analysis was done.

## 2. THE THEORY OF INNOVATION

As soon as in the eighteenth century, Adam Smith indicated the relation between capital accumulation and manufacturing technology, studying concepts regarding technological changes, job division, production growth, and competition (Freeman and Soete, 1997). In the nineteenth century, List pioneered the introduction of the intangible investment concept, stating that "the state of a country results from the accumulation of all discoveries, inventions, improvements, perfection and efforts by the generations that lived before us: that constitutes the intellectual capital of the human race."

According to Schumpeter (1988): "It is necessary that we develop means to integrate 'materials' and knowledge in order to reach economic development, and thus, the discontinued introduction of new combinations of the above mentioned elements is the innovation process itself.

We can see that Schumpeter approached innovation as the introduction of new products that transform the competitive environment: [...] in the capitalist world, it is not competition that counts, but the competition of the new item, the new technology, the new source of supply, the new type of organization [...] competition for a decisive cost or a quality advantage that does not reduce the profit margins and the productivity of companies (Schumpeter, 1988).

Within that rough approximation with innovation, Schumpeter suggested three basic stages for the innovation process:

1. Invention, as the result of a process of discovery, of new technical principles, potentially open to the commercial exploration, but not necessarily undertaken;
2. Innovation, as the process of development of an invention in a commercial manner;
3. Diffusion, as the expansion of an innovation, new products and processes in the market.

Innovation is, therefore, limited to the marketing of a new product or the implementation of a new

manufacturing process.

Schumpeter's definition of innovation opens up two main routes to innovation:

" The implementation of equipment in a new process which is bought from another company or the sales of a new product obtained from another company. For such kind of innovation there is no need for intellectual incentive or creative effort; and

" The marketing of new products or implementation of new processes it has developed.

Schumpeter's Theory of Economic Development distinguishes five types of innovation activities involved in the innovation process (Schumpeter, 1988):

1. The introduction of a new product or the qualitative change in an existing product;
2. A new process of innovation in the industry (not necessarily involving new knowledge);
3. The search for a new, untapped market space, one in which a specific industry has not penetrated, regardless of its prior existence;
4. The development of new provision sources for raw-materials or other contributions, regardless of the fact that such source existed previously or not;
5. An organizational change.

The forms of change remain as 'the fundamental impulse that perpetuates and maintains the capital system in motion' (Schumpeter, 1988), despite the author having considered three factors that later reduced the development rate, since the end of the nineteenth century:

1. The entrepreneurship, as a means of competitive behavior that searches for new combinations of elements generating innovation;
2. The human factor as a component of economic activity and consequently of innovation;
3. The long-term view that individuals should incorporate.

Schumpeter's critics consider such concept of innovation too broad, once it is related to technical, marketing and organizational aspects (Arundel et al., 1998).

Innovation, according to Schumpeter (1988), refers to radical innovations, that is, those that produce great economic or marketing impact, leaving the innovations of incremental nature and technical improvement to a second plan.

### 2.1 THEORIES ON INNOVATION DEFINITIONS

To Tushman and Nadler (1986), innovation is the

creation of some product, service, or process that is new to the business unit. The authors distinguish two types of innovation:

(1) product innovation, when there is change in the product an organization manufactures or in the service it offers;

(2) process innovation, which is the change in the way a product is made or a service is provided.

Definitions having been presented, we take as the basis of the present study the Schumpeterian definition, described earlier, in which innovation is the discontinued introduction of new combinations of "materials" and knowledge in society, which will lead to economic growth.

## **2.2 INNOVATION PROCESS MEASUREMENT**

A measurement is a process of counting or comparing in which we aim to compare attributes in terms of shared characteristics, which requires, a priori, similarities between attributes so that comparisons may be established in a quantitative manner.

"There is no consensus (in literature) on which variables should be included to explain the innovative effort, on the nature of the interrelation among the variables, nor on the most adequate empirical measurement," according to Matesco (1993) apud Andreassi (1999).

As innovation is a novelty and the creation of something qualitatively new, there is the problem of measuring and comparison, once it is not only the extension of technical attributes or a combination of pre-existing characteristics. "It is difficult, if not impossible, to evaluate attributes by means of measures and techniques and, therefore, the degree of innovation of a product (Smith, 1998).

### **2.2.1 INNOVATION INDICATORS DEFINITION**

The political and academic concerns were the driving force underlying efforts in the field of development of innovation indicators in the last decade.

Due to innovation's central role, such impulses, combined, led institutions and their investigators to search for the development of better quantitative indicators with the aim of having a tool to aid not only the economy but also innovation policies to create social unity by means of economic development (Freeman and Soete, 1997).

### **2.2.2 TRADITIONAL INNOVATION INDICATORS**

The traditional innovation indicators provide us with measures of organizations' summarized innovation activities, but should also distinguish between innovation as "adoption" and innovation as "creative activity" (Arundel et al., 1998).

The following may be cited as examples of traditional indicators: patent data, scientific journals, and the labor force or number of employees working as scientists and engineers in research areas, that is, the cost with R&D (Research and Development).

Some indicators are presented with the intent of measuring the innovative effort, although there is no consolidation of a unique method of innovation measuring.

Based on studies carried out by Archirbugi (1988), Patel and Pavitt (1995) and Sbragia (1986), the innovation indicators most commonly used in economic studies have been classified in six categories: statistics of R&D, patents, macroeconomic indicators, direct monitoring of innovation, bibliometric indicators, and semi-quantitative techniques.

Such indicators, in the present study, are called innovation traditional indicators, once new studies for the definition of innovation indicators are yet to be carried out.

## **3. BUSINESS INCUBATORS: INTRODUCTION AND STATUS IN BRAZIL**

According to MCT (2000a, p 6), the National Program to Support Business Incubators defines a business incubator as "mechanism to help the creation and the development of micro and small enterprises, offering the complementary formation in entrepreneurship and management".

The definition of Spolidoro (1999, p.13) apud Oliveira (2003, p.29) emphasizes the importance of business incubators in innovative environment. According to him, a business incubator can be defined as "an environment that favors the creation and the development of companies, products and services, in special those with innovator and intellectual characteristics".

The movement of business incubators started in 1959 in New York City (U.S.A.), when a tractor factory of Massey Ferguson closed and left a great number of people unemployed. The facilities of the factory were bought by Joseph Mancuso that decided to divide the construction in small boxes and rent them for start-up

companies. Besides the low price, the companies also could share some types of equipment and administrative services (REDE INCUBAR, 2004).

One decade later, the U.S government decided to stimulate the creation of new companies in the Silicon Valley using a similar system to that used by Joseph Mancuso. In that occasion, the government offered legal, administrative and technical support to new entrepreneurs to start their enterprises. Making reference to the system used by Mancuso, the U.S government called this system as business incubators (REDE INCUBAR, 2004).

In Brazil, according to Sebrae (2004c), the movement of business incubator started in 1984 with the creation of five technological institutions located at Campina Grande (PB), Manaus (AM), São Carlos (SP), Florianópolis (SC) and Porto Alegre (RS). They had been created to transfer the knowledge from universities to companies. Up to 1987, Brazilian business incubators hadn't have importance, but in this year it was realized the International Seminary of Technological Parks and created the National Association of Promotional Entities and Advanced Technologies (ANPROTEC, in portuguese), emphasizing the concept of business incubators and entrepreneurship in Brazil.

Presently, there are 283 business incubators in Brazil. They are divided according their actuation:

- " 55% with technological characteristics;
- " 19% with traditional characteristics;
- " 18% with mixed characteristics; and
- " 08% with others characteristics.

In the last two decades the number of business incubator in Brazil increased in a fast pace, as shown in Figure (1).

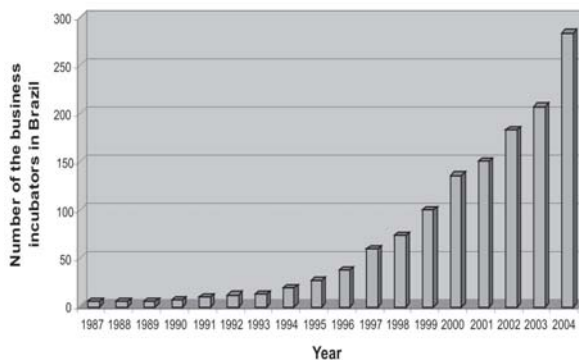


Figure 1- Number of business incubator in Brazil (ANPROTEC, 2004).

#### 4. METHODOLOGY

This work has been prepared considering the steps proposed by Gil (1987) to make a survey. According to

him, this kind of investigation begins with the definition of objectives, structuring and elaboration of the questionnaire which be tested and improved after solving possible problems that have been found. Next step corresponds to the choice of the sample to be surveyed, sending then the questionnaire. After some weeks, the researchers can start the analysis and interpretation of the questionnaires sent back. The last step is to present the results of the survey.

Following the steps presented by Gil (1987), the objective of the survey was to verify the innovation mechanisms in some Brazilian business incubators. The questionnaire elaborated by the authors of this article was tested with some professors of State University of Campinas (SP) and then sent to a list of 176 Brazilian business incubators. After two months, 17 questionnaires were returned, being the data analysis started. The sampling technique utilized was the intentional non-probabilistic and more details can be consulted in item 5 of this article.

#### 5. RESULTS

After analyzing the answered questionnaires, some graphs were plotted and are presented below. Each question is represented per one graph in the same order they appeared in the questionnaire. Some extra information is added after the graphs and is referred to extra commentaries made by the interviewed enterprises during the survey.

Does the incubator have any methodology to measure innovation process?

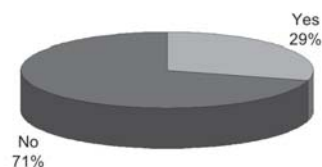


Figure 2- Percentage of business incubators that have/don't have a methodology to measure innovation

One of the interviewed business incubator highlighted that besides having a methodology to measure innovation, they count on an academic professor to help them in adopting the best practices on the market.

**What kind of innovation do the enterprises develop in the incubators?**

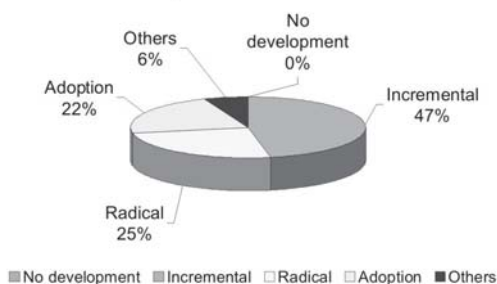


Figure 3- Kinds of innovation the enterprises develop in the business incubators in Brazil

As shown in figure 4, the majority of the innovation activities in the business incubators is the development of new products, followed by processes and services.

**Where are the innovation activities focused on?**

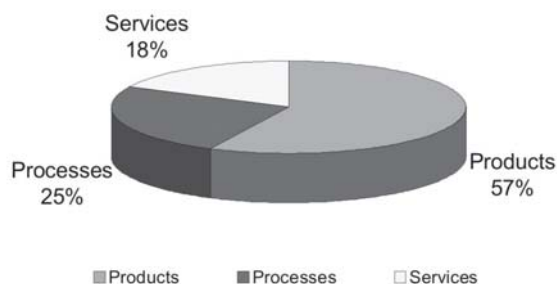


Figure 4- The focus of the innovation activities in the business incubators

Table 1 presented below shows some of the innovation activities which are being developed by the business incubators.

Table 1. Innovation activities being developed by the business incubator in Brazil

| Products   | Processes   | Services   |
|--|---|--|
| <ul style="list-style-type: none"> <li>▪ New software's</li> <li>▪ Conductor glasses</li> <li>▪ New thermo isolation materials</li> <li>▪ Industrial Automation</li> <li>▪ Electronic plates</li> <li>▪ Non metallic minerals</li> <li>▪ Microcontrollers</li> <li>▪ Printer inks</li> <li>▪ Food</li> <li>▪ Electro electronics</li> <li>▪ Medical and deontological devices</li> <li>▪ Agro industrial products</li> </ul> | <ul style="list-style-type: none"> <li>▪ Food processing</li> <li>▪ New building processes</li> <li>▪ New traffic teaching system</li> <li>▪ Industrial Automation</li> <li>▪ Plastic decontamination process (oil packages)</li> </ul> | <ul style="list-style-type: none"> <li>▪ Internet projects</li> <li>▪ Web systems</li> <li>▪ Networks</li> </ul> |

**What kind of institution does the incubator keep partnership with to develop innovator activities ?**

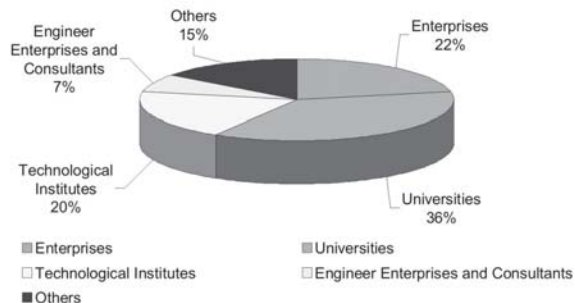


Figure 5- The partnership between the business incubators and other institutions

**Does the incubator provide courses about innovation to the enterprises in?**



Figure 6- Percentage of business incubators that provide/don't provide courses about innovation

### Does the incubator have one the indicators below?

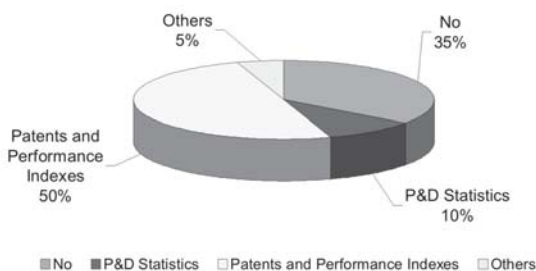


Figure 7- Some of the innovation indicators in the business incubators

## 6. CONCLUSION

The present paper presents interesting characteristics about the innovation processes in the Brazilian business incubators. As it was shown in Figure 2, the majority of the business incubator that answered this survey (71%) does not have any methodology to measure innovation process. This fact is considered strange since the expectative is to find in institutions as business incubators an environment that favors the innovator characteristics, reaffirming the Spolidoro (1999) definition.

Focusing on the kinds of innovation in the incubated enterprises, it was noticed that the majority of them (47%) develops incremental innovation (Figure 3). This number tends to increase more because the concept of radical innovation is not figured out by them. Maybe it explains 25% of radical in this survey. It is important to highlight that a radical innovation is hard to be developed by the enterprises in the business incubators due to the high investments it demands.

Figure 4 shows a large incidence of products innovation (57%) compared to processes and services innovation since the great part of the interviewed enterprises has activities related to industrial sector.

According to Figure 5, 58% of the business incubators keep partnerships with universities or big enterprises to develop innovator activities. With these partnerships they are capable to get more financial resources and to access new technologies.

Around 60% of the business incubators provide courses about innovation to assist start-up companies. However it is important to point out these courses are available by the business incubators but not always are watched by the entrepreneurs.

Finally, it was verified that the main innovation indicators used by the business incubators are the

number of patents and performance index.

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