Nurturing entrepreneurs, creating enterprises:

Technology business incubation in USA, Brazil and Argentina

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Nurturing Entrepreneurs, Creating Enterprises:
Technology Business Incubation in USA, Brazil and Argentina

Abstract
Technology Business incubation (TBI) is at the convergence of two global tendencies: the increasing economic importance of technology and the consequent rise of a new breed of techno-entrepreneurs that can manage the challenges imposed by it. The present work seeks to analyze and describe the technology incubation process, trying to identify the process’s most critical stages. In such a way, this study understands that the screening stage is the fundamental stage, and it is this perception shall be regarded as the project’s main hypothesis.

The employed methodology included the study of three countries’ experiences in the field: Argentina, Brazil and USA. A qualitative approach was pursued with both Latin American countries, performing on-site interviews with local incubator’s managers. A more quantitative approach was used to include the U.S. market, basically using a closed on line questionnaire, which was answered optionally by NBIA’s registered members.

The obtained results suggest that the screening stage may actually be regarded as the most important, as well as outlining other fundamental issues such as:

1. TBI usually develop strong bonds with government agencies
2. TBI usually develop alliances with academic or research centers
3. TBI usually have multiple financial sponsors

This work main contribution lies in its reconstruction of the incubation process; the analysis of a technology incubator’s needs, the description of the screening stage multiple phases and employed criteria, the explanation of the business models used by incubators, as well as the comparison of the incubation practices in different countries.

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Chapter 1: Introduction

“We are living through one of those rare, perhaps once in a century events… The emergence of modern computer, telecommunication, and satellite technologies has fundamentally changed the structure of the American Economy.”

Alan Greenspan
Testimony before U.S. House of Representative, July 23 1996
Introduction:

A basement computer room at Mercadolibre.com headquarters in Buenos Aires, Argentina, holds what some believe is the heart of the new digital economy. Specially programmed computers track thousands of independent bids and transactions, in an enhanced virtual environment. Management, ideas, design and programming, all XXI century economic resources, are combined so as to help Mercadolibre.com deliver its promise of being the leading online auction site in Latin America.

Over the past forty years, computers have evolved from a specialized and limited role in the information processing and communication processes, to become a general-purpose tool that can be found in use virtually everywhere. Whereas once “electronic computers” were large machines surrounded by peripheral equipment and tended by expert technical staff working in specially constructed and air conditioned centers, today computing equipment is to be found on the desktops and work areas of secretaries, factory workers and shipping clerks, often side by side with the telecommunication equipment linking organizations to their suppliers and customers. In the process, computers and networks have become an integral part of the research and design operations of most enterprises and, increasingly, an essential tool supporting control and decision-making at both middle and top management levels.

Changes attributed to this technology include new patterns of work organization, worker productivity, job creation, profit of companies and, ultimately, prospects for economic growth, national security and the quality of life. Today, the Internet combines people and ideas faster than they have ever been combined before. And that combination changes everything. The basic social conventions of the industrial era were all built around the notion that people moved their bodies in response to information. Today information is reaching the body in such ways, that individuals may undertake a course of action without actually “moving”.

It is therefore technology, the main driver in this revolution. A revolution that some people believe it represents the biggest opportunity in the history of industry and commerce since the first industrial revolution. The kind of chance that non-industrial
nations should take advantage of. However, in spite of this, technology in developing countries is the least understood of all factors of production, and hence the least appreciated.

**Understanding technology’s role:**

For some non-industrialized countries, technology is the scapegoat for their previous lack of progress, the source of leap-frogging development that will allow them to catch up with the industrial nations. Moreover, for the vast majority technology is something that develops somewhere else, possibly to be acquired “off the shelf”, usually embodied in capital goods, and mostly accepted on the advice of capital goods suppliers. However, few countries have understood that is not technology per se that is important, that technology is usually a commodity and that most technology being created in developing countries is just not competitive. As Carlos Magariños, UNIDO’s General Director, said at the 9th International Conference on Management of Technology:

“The reason it is not competitive is that it is not built on technology innovation and the ability to perform such innovation. In countries, developed as well as developing, where technology is applied rather than invented, technology innovation is actually much more important than the technology itself.”

Most developing countries have not understood this. They complain that their industries lack access to technology in the same breath as they complain of lack of access to capital and markets. However, most fail to address that many of their problems with technology lie much nearer home, in their neglect of technology competence in their own education and training systems, in their lack of technological support infrastructure, and in their entrepreneurs failure to understand the crucial role technology will play in their future competitiveness. As Magariños, explains:

“What counts is the entrepreneur’s perception of the role played by different technologies in their businesses, their vision on how these technologies will develop in the future, and their ability to implement the resulting innovations.”
Therefore, two are the global tendencies that appear to drive today’s economic competitiveness: the accelerated pace of technological change, and the emergence of a new breed of entrepreneurs that seek to seize those opportunities brought about by the advents of new technology. The world economy has become one in which the relative advantage of companies and nations is a function of their ability to rapidly commercialize leading science and technology in new products and process. (Mokyr, 1990) In brief, these two global movements can be summarized as follows:

a) Technological innovation:

Industrial countries know that technology innovation plays a major role in shaping industrial performance. They understand that economic gains from technology come as much form widespread diffusion of new products and processes as from their initial developments. But in developing countries, the majority of entrepreneurs, government officials and industry support institutions; are “still crippled with outdated assumptions about technology and the view of its political, cultural and social role…” (Magariños, 2000) The concept that technology is a static recipe for production, something that can be acquired and put to immediate use still remains largely unchallenged.

Equally unchallenged is the idea that technological innovation is always something that is new to the world, always happens somewhere else, and is unrelated to the reality of developing country firms. Innovation is about technical changes at the company level in order to achieve competitive goals, and it can and should happen everywhere.

Technology innovation implies much more than just Research and Development. There is a much larger constellation of inter-related issues, including policies for investment, education and trade, and also concerning strong public-private partnerships within the country and abroad (Tornatzky, 1998). Today only a small number of advanced developing countries have the basic technical and social infrastructure, the human resources and financing mechanisms necessary to enter the
In today’s world, true competitiveness requires entrepreneurial business that can establish strong positions in niche markets through innovative products and services. (Lalkaka, 1998) Such businesses in their start-up stage are the perfect candidates for incubation systems.

b) New venture creation:

A second global wave is the dominant role being played by entrepreneurs in the creation of new ventures in any country’s economy. Technology is responsible for the changes, but also accountable for the new opportunities that arise. As happened during the transition to the industrial age, the revolution fostered a demand for a new type of entrepreneur. It was not so much a generational issue, as it was about knowledge and values. The same appears to be happening today. Different ways of relating, working habits, a whole new culture is emerging empowered by a fresh generation. A new paradigm of company with different codes and standards is quickly rising, seeking to move fast and make the best out of every opportunity. In such a way, the central challenge of industrial restructuring during the next century is to move to new forms of industrial organization; in the relationship between firms; between the industrial sector and the science and technology system; and in the relationship between the state and the industrial sector. (Kaplinsky, 1996). Until now, these new ventures are characterized by small but globally operational firms. The small player advantage includes lower capital intensity, local resource utilization, better communications, efficient networking, niche targeting, and quick responsiveness to changing demand. Advances in information technologies allow “small” operate in comparison to the “large” where it is in design, manufacturing, or servicing (Lalkaka, 1998). The issues of “big versus small” are less strident nowadays that large corporations “mimic” the small through spin-offs and sub contracting, while the small act as big through alliances.

What both governments and the productive sector have to acknowledge is that, at the end of the day, when firms have done everything in their power to cut their costs and match the quality of competing goods from elsewhere, it is their technology and their own technological competence that determines whether or not they make a profit,
whether or not they can export and eventually whether or not they will continue to
exist. When the average labor costs in many manufacturing sectors drop to under 5% of sales value, low wages are no longer a significant advantage (Davidow, 1997). The traditional production factors are giving way to a brand new paradigm characterized by informal networking to mobilize resources, time-based competition, total quality management, and prompt, flexible response to change. Therefore, future growth of a modern small business sector requires renewed efforts to improve its production methods, raise quality, shift to value added products, and grow in symbiosis with large enterprises. It also requires special focus on support systems, which provide integrated services on production, management, marketing and finance. This is where the incubation system provides the competitive edge.

This work understands that the business and technology incubation concept is at the convergence of these two global tendencies. It encourages entrepreneurs by providing new ventures the financial aid and professional services necessary to undertake business responsibilities. It also fosters technology innovation by incubating only those projects that are new in a kind; and also accelerate the technology transfer process, allowing entrepreneurs to go from design, to prototype and commercialization in a much express fashion. Today’s rapid changing global environment calls for restructuring business development systems and creating the skills needed to transform inventions into market opportunities. (Lalkaka, 1998) The business incubation systems attempts to achieve this, and hence the importance of understanding how this institutions evolve, develop and function.

**Business Incubators.**

Indeed technology has created a new array of attractive commercial opportunities, which these young minds have launched to chase. However, many entrepreneurs do not have the space or desire to start a business out of their home, yet finding space and setting up essential support functions is overwhelming financially and energy draining just at a time when their financial and energy resources are most needed for
development of the business itself. (Kautz, 2000) However this is no surprise, as new ventures have always been complex and dangerous quests.

What is definitely a contemporary phenomenon, is the tremendous exposure from the onset of these new technology start-ups, mainly because of the global communication transformation. What is also new is the pace of technological change and of its diffusion globally. First because of its speed of diffusion in the borderless economy, and second because the recognition accorded to technology development as a source of economic growth and business competitiveness. The demand for new technology is already here. Substitution of materials by information and knowledge, and chemical processes by biotechnological ones is already happening (Magariños, 2000). There is a new economy, and thus a new way of creating wealth.

In such a way, globalization of markets is not only creating new opportunities for SMEs in developing countries, but is also signaling that entrepreneurship in those countries urgently needs encouraging and strengthening. Management and technological systems too must be promoted, so that product and process technologies of existing firms can be upgraded, rationalized and new ventures can flourish. To do this, local human resources will have to be developed, particularly in countries where economic development has so far been based largely on foreign investment or where there has been government intervention through state owned enterprises.

In such scenarios, business services that create a favorable environment for entrepreneurship and the expansion of small and medium enterprises must be provided. Such services would, for example, give access to financing, market information, suitable technology, training support, quality certification, etc. This is where a business incubator comes in. Such a system can mature start up and newly established firms, by providing the mentioned services plus office space on a shared, affordable basis. Another by product of this organization is the internal dynamics that come from working together in a common physical space: the joint and cross disciplinary learning that takes place and the opportunity to form the business networks and contacts are also critical to the launch of successful ventures. “By putting 20 startups that are typically isolated from each other all in one site, you will
have 100 to 125 people who tend to have similar backgrounds sharing their networks and contacts. Over the long run, being in that environment will mean people helping each other”, explains Jim Robbins president of the Business Cluster Development.

Highly adaptable, incubators have differing goals: to diversify rural economies, to provide employment, to increase the wealth of depressed inner cities and to transfer technology from universities and major corporations. In such a way, the primary goal of a business incubator is foster economic development by improving the entrepreneurial base. For this reason, on an international level, most of the incubators are usually opened directly by the national or local government. Others, however, have been established by universities or private non-profit organizations, and links with government can vary greatly, from strong to nearly non-existent. The earliest incubation programs were focused on a variety of technology companies or on a combination of light industrial, technology and service firms—today referred to as mixed use/general purpose incubators. However, in more recent years, new incubators have been developed targeting industries such as food processing, medical technologies, space and ceramic technologies, and woodworking. Incubators have even been created for arts, crafts and software development.

Business incubation is on the rise on a global scale. The United Nations Industrial Development Organization (UNIDO) actively monitors and promotes the development of business incubators worldwide. They estimate that there are 500 incubators in developing and transition countries with an annual growth rate for new incubators being about 20 percent. The majority of incubation programs worldwide receive initial financial support from the government bodies. Many governments consider them as part of the business infrastructure, and the evidence indicates that the annual taxes and other benefits from new economic development more than offset the capital and operating cost subsidy. (Lalkaka, 1999) The private sector appears to participate only when it sees that the program will lead to greater business opportunities and promote spin-offs.
Vision and Objectives of the study:

For the last two hundred years, neo-classical economics has recognized only two factors of production: labor and capital. This is now changing. Information and knowledge are replacing capital and energy as the primary wealth-creating assets, just as the latter two replaced land and labor 200 years ago. There is a new economy driving today’s world. A marketplace with different economic drivers than that of the industrial era. It is therefore time for a new breed of entrepreneurs to rise. Entrepreneurs that were born with these new technologies, and who can master the forthcoming challenges impose by it. It is them who will be able create wealth out of the new opportunity scenarios. It is them that will shape our future. These are the entrepreneurs of which developing nations are so desperate in need of. Educated, risk taking individuals, who can develop new innovative products, processes and who are most likely to succeed in the new digital economy. Under such circumstances is that business incubation makes sense. A country should seek not only to aid, but also to encourage these young entrepreneurs, so as to ensure the future’s economic development of the nation. Not only they will add value due to the creation of products and enterprises, but also they will settle the bases for the new type of competitive benchmark, paramount for survival in the digital marketplace.

Business incubation is about providing comprehensive support to companies in their start-up stages. Incubation professionals are experts at putting together programs and facilities that answer their unique requirements. However, incubators resources are usually very limited and not all entrepreneurs manage to get the help they need and apply for. Therefore, like venture capitalists, incubators must impose selection criteria upon prospective clients. For example, some accept a mix of industries, but others concentrate on market niches. Some may be looking for short run investments (typically 6 to 12 months) while others may be willing to accept greater risks. It is therefore the objective of this work, to analyze those screening criteria trying to describe and understand the different stages in a technology incubation process, studying the experiences of the United States, Argentina and Brazil. The United States was selected due to its clear predominant position in this industry, having being the first country to adopt this practice and encourage it over the two last decades.
Brazil and Argentina were chosen for being the two most economically significant countries in the Southern Cone region, as well as being the leading cultural and political nations in the Mercosur. Business Incubators have sprung in all three chosen countries. However, their degrees of development greatly differ from one state to another. A brief summary of each country’s position is described as follows:

**USA**

The first identifiable business incubator was launched in Batvia New York in 1959. More followed on a limited scale until 1984 when the U.S. Small Business Administration (SBA) began strongly promoting incubator development. At this time there were 20 incubators in operation. Over the next few years that number rose rapidly. The National Business Incubation Association (NBIA), a private membership organization of incubator developers and managers, was launched in 1985 by industry leaders. From an initial membership of 40, it has grown to almost 800 members in 1999. The association is primarily composed of incubator developers and managers, but technology commercialization specialists, educators and business assistance professionals are also well represented. Its mission is to provide training and a clearinghouse for information on incubation management and development issues and tools for assisting start-up and fledging firms.

According to the National Business Incubation Association (NBIA) Survey of Business Incubators, new incubators have been opening at the rate of about one a week since 1986. It is estimated that there are more than 8,000 start up firms housed in incubators and another 4,500 entrepreneurial ventures currently operating on their own were originally launched through incubators, including a number of the Inc. 500. Over 80% of the firms that were started through an incubator are still in operation after a five-year interval, which is the accustomed time period defined by this institution to test an incubator’s efficiency.
BRAZIL

Incubators in this country began in the mid-1980s through an initiative by the National Scientific and Technological Council, and growth accelerated after 1993. Brazil has now 100 business incubators (Guedes, 1999) most in the South and South-east regions, with the objectives of economic development, technology commercialization and employment generation. Some 614 small enterprises are located in the incubators and employ 2700 persons, of whom approximately 29 percent are women. Among the largest sponsors of incubators are federal state agencies (52 percent) and private not-for-profit organizations (40 percent of total). For instance, the Federation of Industries Sao Paulo (FIESP) runs a dozen business incubators as its contribution to entrepreneurial venture development. Most Brazilian incubators have some sort of relationship with academic or research institutions, fact which may help explain why almost more than 50% of incubators are focused on technology development projects.

ARGENTINA

Technology Business Incubation is brand new in Argentina. Most of its incubators were launched early this year, or during late 1999. Due to the lack of governmental support and incentives, most of the local incubators initiatives have private funding, usually from venture capitalists or private equity funds. The usual Argentinean incubator is formed by an angel or private fund, plus a management team usually with a strategic consulting background, coming from firms such as McKinsey, or Boston Consulting Group. Such are the studied cases of Southnet and BtoBen, which can be found at the end of this work (see Appendix I). These incubators tend to seek high revenues in short intervals and thus, most of them have found their focus in the information technology niche, more precisely in the Internet market. Incubators help entrepreneurs plan, design and launch their site, usually until the first investment round. Relationships between academic institutions and these sorts of incubators are rare, probably due to their incompatible long-term objectives. Moreover, incubators that depend from purely academic sources are also not very often, counting an approximate 10% of the total industry.
Study’s Guide:

This research approaches its objectives by exploring the basic aspects of business incubation in the technology venturing market. In such a way, chapter two outlines the basic characteristics of business incubators, their purposes, sponsors and rationale. Moreover, the chapter also includes a classification of business incubators, trying to precisely define the study’s target niche. Following, in chapter three, the main characteristics of Technology Business Venturing shall be examined, before discussing the business incubation process itself. Also in chapter three, the incubator’s business models are described and compared, so that the reader is first introduced in the selection dilemma, which shall be covered in the next chapter. As stated, the incubation process shall be analyzed on chapter four, trying to distinguish between its multiple steps and activities, identifying those which shall be appointed as critical for a successful incubation. In addition, the selection mechanisms and the selection criteria shall also be studied, trying to understand how the latter are managed and applied. Finally on chapter five, an analysis of the various qualitative and quantitative results will be made, so as to discuss the paper’s main conclusions on the final chapter number six.

Hypothesis and Methodology:

This work understands that from the whole incubation process, the screening stage is the crucial slab that enables the incubator to continue operating or, if inefficiently done, forces it to close down. This means that for a self supported incubator, correctly picking its tenants is of paramount importance for its economic survival. Hence, the work’s main hypothesis is:

- The screening stage is the fundamental stage in the incubation process for self supported incubators.1

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1 There are others incubators, which are normally supported by governments or multinational organizations, that are not expected to become self-supported. These incubators are not included in the study’s focus.
In order to achieve its objectives, this study involved several sources of information. First, the correspondent bibliography reviews, most of which are entrepreneurship and specific books, investigations or research papers on the subject all of which may be found at the end of this work. One of the greatest drawbacks that the research had to face was the fact that local bibliographic information was inaccurate or non existent. This was especially truth for countries like Argentina and Brazil. Therefore, in these countries the research was mainly based on “in situ” interviews. In this way, visits and on-site interviews were made with both Argentinean and Brazilian incubator’s managers, in two different ways. Due to mainly to geographical reasons, the nine interviews made in Argentina were organized in two rounds, spaced by a period of ten days. The first round, built up of six interviews, seek to understand the incubation process in an attempt to identify its main stages and activities. The second round of three interviews, was aimed at detecting the local Argentinean specific practices during the screening stage, therefore reformulating the original interview feedback form into a much more specific one (see appendix III). Once in Brazil, five interviews were made: three with incubator’s managers and two with tenants. The incubators chosen were two academic (one private and other public) and a research institute, all obviously with a technology focus. The incubators chosen were the Instituto Genesis depending from the PUC-Río Universidade, the incubator of the Universidade Federal do Rio de Janeiro, and the FAPERJ incubator depending from the Instituto Nacional Tecnológico. Two tenant firms were also interviewed as it was thought this could provide interesting information from those who had actually gone through the selection process. Brazilian incubator’s managers were especially interesting, due to their much bigger experience than Argentinean managers. Basically they have being doing this for a much longer time, and that know-how could prove to be useful to the research. Third and last, in order to include the U.S. experience, all registered NBIA’s incubators managers were asked to complete a close survey questionnaire, which was made available on line. Simply, those who accepted to fill in the survey would click on a given URL and send their feedback over the Internet. The lack of precision associated to this impersonal method, was compensated with the extended bibliography and research papers available on the US business incubation market.
Finally, the online questionnaire, the mail that was sent, as well as a response sample can all be found in their correspondent appendix\(^2\) at the end of this work.

**Limitations of the Study**

Despite the ambitious nature of the project, there were some reasonable built-in limitations to the approach. Most prominent was the simple limitation imposed by the text description for the incubation process. Not only the bibliography was scarce, but many times inaccurate, had other focus, or was just too global to be of any serious use. Moreover, most of the articles, books, or papers found referred to the economic importance of business incubators, but none precisely described the incubation process. Therefore the use of a rich-descriptive method, such as interviews with incubator managers, was found to be the best way to reconstruct a process that was used, but from which no description was available. On the other hand, this sort of qualitative methodology allows only to extract conclusions for the sample that has been studied, as not often these samples are not big enough to reflect universal certainties. Therefore, conclusions should always be applied to the correspondent group and not the entire population.

When referring to the Brazilian incubator’s industry for example, three were the incubators which were visited while in Rio de Janeiro. According to ANPROTEC’s 1999 survey, there are currently eight incubators in all Rio de Janeiro, giving a representative index of nearly 40 percent. However, at a national level this index went down to 3%, as the total incubator’s population was near 100. Hence, all Brazilian forecasts should be strictly kept to those surveyed technology incubators.

The Argentinean business incubator industry, on the other hand, was not greatly affected by this issue primarily for two reasons: first the geographical convenience and second, due to the fact that only few business incubators had developed. Until May 2000, there were approximately 12 incubators\(^3\), all geographically concentrated

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\(^2\) See appendix III.  
\(^3\) A complete listing with all the information concerning Argentinean incubator’s may be found at the end of Appendix I.
in downtown Buenos Aires, mainly with a technology focus. However, the fact that most incubators were brand new led to other limitations such as difficulties in contacting them, and problems when assessing their performance. As most incubators had no graduated tenants, there were no empirical means to evaluate the efficiency of their screening methods, and thus distinguish between a good and a useless practice.

Finally, there were also some limitations when studying the U.S. practices. The weakness of the approach was based on two factors: the typical inefficiency of an optional close survey, and the fact that NBIA classifies incubators according to its sponsor and not its focus. The first factor nearly needs no explanation. Simply out of approximately a thousand members, only a near 14% decided to response the survey. Due to the second factor, the e-mail was sent to all incubators independently of their target industry. Therefore, recollected responses could come from an American-service incubator or an American-technology incubator. Although the sample respects many of the population’s characteristics from the actual population, it would be statistically inappropriate to estimate this representation level according to the percentage of technology focused incubators on the actual population.
Chapter 2: Understanding the nature of a business incubator.

“There is another way to plug into the developing world: Turn the people who live there into entrepreneurs.”

Muhammad Yunus
Founder and managing director of Grameen Bank
What defines a Business Incubator?

Business incubators are similar to laboratory incubators: they provide start-up companies with a controlled, nurturing environment in which to grow strong. Incubators dramatically increase a company’s chances of survival by providing support services and professional advice. (Lalkaka, 1998) In many cases, these services and rental space are offered at below-market rates usually by the government or nonprofit organizations.

Strictly speaking, a business incubator is an economic development tool designed to accelerate the growth and success of entrepreneurial companies through an array of business support of resources and services. A business incubator’s main goal is to produce successful firms that will leave the program financially viable and freestanding. (Kautz, 2000) There is therefore, an intrinsic idea related to the concept of incubators, and that is that these should choose the most economic viable projects. As Monica Keans stated at the National Conference of State Legislatures: “Business incubators are, in effect, like businesses, they need stable funding, clear planning and strong management to succeed.”

The most common type of firms using business incubators are light manufacturing, technology and service firms and those developing new products or engaged in research and development. There are a limited number of construction-related, sales and marketing, or wholesale and distribution firms using incubators. A retail operation is considered a poor option for an incubator.

Most incubators serve an average of 20 start-up firms. Usually they are located in cities (about 50 %), and the rest in rural areas or the suburbs. About half, host a variety of businesses that can range from small manufacturing to services to high tech. Yet incubators can be structured to encourage growth in particular economic sectors. For instance, in the U.S. approximately 25 percent of incubators are geared toward high tech firms, but they can also be set up to achieve more socially
oriented economic development goals, targeting them to woman or minorities for example. Likewise, they can be focused on rural or low-income urban areas.

**Incubator Characteristics:**

After studying several incubators from different nationalities, some general trends could be observed. The distinguishing characteristics of the studied technology incubator could be summarized as follows:

- A managed workspace providing shared facilities focused advisory services, and inter-action among tenants.
- A small management team with core competences to provide early diagnosis and treatment or referral for business threats and opportunities through a wide network of professionals in the local community.
- Careful selection of 10 to 20 startups groups entering the incubator, their nurturing, growth and graduation after two to three years. The selection and focused help, of course, account for greater survival rate. (Lalkaka, 1998)
- The business incubator itself runs as a business, with the perspective of becoming self-supporting when operations are fully established.
- Initial support is almost always provided by the incubator in species or money.

**About the Incubator’s services:**

Critical to the definition of an incubator is on site management, which develops and orchestrates business, marketing and other scarce resources. Incubators usually also provide clients access to appropriate rental space and flexible leases, shared basic office services and equipment, technology support services, and assistance in obtaining the financing necessary for company growth. There is also a specialized staff who help run the incubator and offer business planning, management and financial services to the clients. Through this staff, the client firms technical assistance with the marketing, accounting, networking, finding sources of financing, and linking to universities and colleges. The goal is to
provide guidance so clients can leave the incubator and stand successfully on their own. It is when the incubator “graduates” may create jobs, revitalize neighborhoods, commercialize new technologies and strengthen local economies. (Matthews, 1995)

The following chart is based on the 1998 NBIA’s State of the Business Incubation Industry Findings. It describes the percentage of US incubators offering various services. As it may be seen, there are certain services that are commonly offered, such as marketing or business assistance, while there are others that are very rare such as video conferencing or product design assistance. In a more developed market, these extra services tend to act as a differentiation agent, which of course helps to attract more “customers” or tenants. In such a way, Figure 2.1 illustrates the services usually offered, and their availability according to the NBIA’s 1998 annual survey.

**Figure 2.1:** Services provided by Business Incubators.

<table>
<thead>
<tr>
<th>Business: Assistance Services</th>
<th>%</th>
<th>Business: Assistance Services</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help with Business Basics</td>
<td>96</td>
<td>Custom Equipment</td>
<td>45</td>
</tr>
<tr>
<td>Conference Room</td>
<td>92</td>
<td>Management Team Development</td>
<td>44</td>
</tr>
<tr>
<td>Marketing Assistance</td>
<td>89</td>
<td>Federal Contract Procurement</td>
<td>43</td>
</tr>
<tr>
<td>Shared Administrative Services</td>
<td>88</td>
<td>International Trade Assistance</td>
<td>42</td>
</tr>
<tr>
<td>Accounting/ Financial Mg</td>
<td>77</td>
<td>Shadow Boards/ Mentoring</td>
<td>42</td>
</tr>
<tr>
<td>Help to access to commercial loans</td>
<td>77</td>
<td>Technology Commercialization</td>
<td>40</td>
</tr>
<tr>
<td>Links to Higher education institutes</td>
<td>76</td>
<td>Computer Lab</td>
<td>40</td>
</tr>
<tr>
<td>Telephone System</td>
<td>65</td>
<td>Intellectual Property Mg</td>
<td>37</td>
</tr>
<tr>
<td>Internet Access</td>
<td>62</td>
<td>New Product Assessment</td>
<td>25</td>
</tr>
<tr>
<td>Investor/ Strategic Partner Link</td>
<td>58</td>
<td>Management Information System</td>
<td>25</td>
</tr>
<tr>
<td>Comprehensive Business Training</td>
<td>49</td>
<td>Product Design Assistance</td>
<td>23</td>
</tr>
<tr>
<td>General Legal Services</td>
<td>47</td>
<td>Video Conferencing</td>
<td>19</td>
</tr>
</tbody>
</table>

The Rationale and origins of Business Incubators:

Small enterprise (SE) support systems have traditionally included: (Lalkaka, 1998)

- Advisory services on the full range of SE concerns, specially management and marketing
- Human resources development through a variety of on the job training, and executive courses and raising enterprise development skills
- Networks, chambers and associations including “entrepreneurs clubs” for mentoring and cooperative activities
- Financial services for credit, equity and guarantees
- Managed work spaces, particularly industrial estates and districts, export processing and special economic zones

The incubation system was derived from the above modalities, and has the latecomer advantage of benefiting from earlier experiences, good and bad. Incubation is a complement to the other schemes, an innovative component of a national small enterprise development strategy. The incubator combines a variety of SE support elements in one integrated affordable package. (Lalkaka, 1998) It has a special niche, that is, nurturing early stage, growth-oriented ventures, through focused assistance with a supportive environment. Its focus is large companies, which, at this time, happen to be small. (Humphrey, 1996)

Who Benefits from Business Incubators:

There are a wide variety of reasons for operating an incubator. There may be a need for job creation in the community, promotion of economic self-sufficiency for a selected population group, diversification of the local economy, transfer of technology from universities and corporations, or sharing venture experiences with new companies by successful entrepreneurs and investors. There is an economic boom for the community, providing jobs and an expanded business base. Small businesses, the
community and sponsoring organizations all benefit from business incubator in different ways:

<table>
<thead>
<tr>
<th>Agent</th>
<th>Benefit</th>
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</thead>
</table>
| Small Business (Tenants)| * Participate in an environment where small businesses can share experiences and conduct businesses with one another, thereby reducing the risks inherent in business start-ups.  
  * Develop increased awareness of and access to financial, professional and technical service assistance.  
  * Gain Access to facilities and equipment otherwise unavailable or unaffordable.  
  * Pay below market rent and share reduce building maintenance responsibilities. |
| Community               | * Increases job creation and job retention  
  * Improve the local economic base by transforming underutilized property into a center of productivity.  
  * Creates greater opportunities for public-private partnerships.  
  * Develops a larger network of participants in local and civic affairs. |
| Sponsors:              | * Transform research and development activities into commercial opportunities for new products and technologies  
  * Redevelop neighborhoods by productively utilizing abandoned and vacant facilities.  
  * Identify suppliers for subcontracting and purchasers of products and services. |


**Incubators efficiency:**

Several studies have documented the effectiveness of incubators. The state of Pennsylvania recently commissioned a study of its Ben Franklin Partnership, a program administered by university-affiliated technology centers, which in turn fund a variety of economic development programs, including incubators. This study showed that for every $1 of state investment in the program $14 of additional state income was generated. Furthermore, firms including incubators tenants receiving partnership funds employed an average of five more people each year than they would have without the funding. The Ohio Department of Development estimates that the
Edison Technology Incubators created 336 new businesses and 2,272 jobs between 1987 and 1998. And tenants of the Advanced Technology Development Center incubator in Atlanta generated $351 million revenues and provided 4,100 jobs only during 1998. (Kearns, 1999)

Moreover, the U.S. Small Business Administration reports that approximately 50 percent to 75 percent of new businesses fail within the first three years. Yet only 10 percent to 20 percent of business-nurtured incubators fail within the first five years. This means that every ten-incubated enterprises, only one fails to leave the nest.

**A Business Incubator Classification:**

According to NBIA’s 1998 industry survey, the best way to classify business incubation programs is according to their primary sponsors. This first refers to the organization that is “behind” the incubator, which is in fact supporting the incubator’s activities. Typically, these may include the government, an academic or research institution or a private agent for example a venture capitalists. The importance of underlining this issue lies is the fact that this actor might influence the “long term” objectives of an incubator. In our previous example, the venture capitalist will be interested in the profit, the academic institution in the technology transfer process and the government in the region’s economic growth.

Although correct, this criterion was found insufficient as though it provided no information about the incubator’s activities. That is why, in order to make more precise distinctions, the incubator’s “focus” was added to the classification scheme. Hence, two were the variables used by this study to classify business incubators:

1. The Primary sponsor of the incubator
2. The Focus of the Incubator
1) The Primary sponsor of the incubator:

According to NBIA (www.nbia.org/facts.html), these could be grouped in four categories.

a) Non profit (Public or Private)

Basically these incubators are sponsored by government or nonprofit organizations, and are primarily for economic development. Their mission includes job creation, economic diversification and/or expansion of the tax base.

In the U.S., state governments or non-profit organizations fund roughly half all North American facilities. Since the 1980s, most states have passed legislation establishing incubator programs, but funding tends to fluctuate. Departments of economic development are usually the source of state assistance, but this can vary depending on the nature of the incubator. States can also take a tax–incentive approach to encourage the development of privately sponsored incubators. For example, Oklahoma offers state income tax exemptions for incubators up 10 years from their inception. In addition, client businesses of incubators may be exempt from state income from state income taxes for three years.

The incubators industry in Brazil is well supported by the Servico Brasileiro de Apoio as Micro e pequenas Empresas (SEBRAE) with the Associacao Nacional de Entidades Promotoras de Empreendimentos de Tecnologias Avancadas (ANPROTEC) serving as a networking role. The program for human resources for technology development (RHAE) as well as the National Bank (BNDESPAR) and state fund such as FAPEMIG also provide finance. Further, government agencies support “bolsistas” or student interns assigned to work with incubators firms. As showed in Figure 2.2, among the largest sponsors of incubators are federal-state agencies and private not-for-profit organizations.

4 Service for Support to Micro and Small Business
5 National Association of Institutions for Promoting Advanced Technology Ventures
Currently, Argentina has no non-profit incubators. Moreover there is no apparent policy from the Federal nor the city government, as to which is the importance of enterprise incubators. This lack of interest and may help to explain why there is so much private activity, and why incubators have only appeared in this country since the end of last year and the onset of this one.

2) Academic Related:

These incubators are affiliated with universities and colleges and share some of the same objectives of public and private incubators. In addition, they provide faculty with research opportunities, and alumni, faculty and associated groups with startup business opportunities.

Universities and colleges are the next largest incubator sponsors in the US, supporting approximately 25 percent of the total incubator industry. This sort of incubator is also quite important in Brazil that, according to ANPROTEC 1999 survey, has more than 30 universities covering one-fifth of total college students participating in incubator projects mainly in technological fields (Lalkaka, 1999). Moreover, there are usually
strong bonds between research and academic institutions with Brazilian business incubators. Supported by the government, Brazilian universities have moved quickly focusing in transforming technological discoveries into commercial opportunities. According to this survey, approximately 70% of all business incubators have some sort of relationship with this kind of institutions, whether formal or informal.

**Figure 2.3**: Brazilian incubator’s links with academic or research centers

What respects Argentina, there appears to be few or no linkage between incubators and universities, or research institutions. This might also help to explain why, their managers and entrepreneurs are more interested in the short run economic profit, that in a long turn growth

3) Hybrid:

These incubators are joint efforts among government, nonprofit agencies and/or private developers. These partnerships may offer the incubator access to government funding and resources, and private sector expertise and financing.

Nearly twelve percent of all North American facilities are jointly funded by public and private sources. For example, in Pennsylvania the state gives each incubator about $45,000 a year for a total of roughly $1 million. On the other hand, nor Brazil nor Argentina, appeared to count with this kind of sponsor.
4) Private, for profit:

Their primary interests are economic reward for investment in tenant firms, new technology applications and other technological transfers, as well as added value through development of commercial and industrial real estate.

In the US, these incubators represent only an average 8%. These organizations are run by investment groups or by real estate development partnerships, which invest in tenants firms in hopes of gaining a profit from successful graduates. Private incubators are also near non-existent in Brazil, merely rounding up a 3%. In Argentina, however, these account for more than 80% of the market. Clearly this is the model that has struck interest among argentine investors and the only that in absence of government intervention was able to flourish.

5) Other:

These incubators are sponsored by a variety of non-conventional sources such as art organizations, Native American, church groups, chambers of commerce, port districts, etc.

Only 5% of all North American facilities are funded by these institutions. Nor Brazil, nor Argentina seemed to count with this kind of sponsors.

What we have done so far is to classify the incubators according to their primary sponsor, comparing the experiences of all three different countries. Statistical information was also presented so as to make a comparison between different sponsorship practices in each country. In brief the studied results could be tabulated on the following chart:
**Figure 2.4:** Incubator’s sponsor per country

<table>
<thead>
<tr>
<th>Incubator Type</th>
<th>Country (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Non Profit</td>
<td>51</td>
</tr>
<tr>
<td>Profit</td>
<td>8</td>
</tr>
<tr>
<td>Academic related</td>
<td>25</td>
</tr>
<tr>
<td>Hybrid</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
</tbody>
</table>

NE = Non existent, NA = Non Available

**Source:** own analysis according to NBIA 1998 Industry Findings and Relatorio as Incubadoras de empresas, ANPROTEC 1999.

2) **The focus of the Incubator:**

Nowadays, an incubators focus could be classified into five distinctive categories: (Hayhow 1997)

- Technology
- Service
- Light Manufacturing
- Research
- Mix or Multidisciplinary

**The U.S. experience:**

The latest gathering of core survey statistics in the US, confirm that business incubation programs are playing a significant role in their communities’ economic development. Highly flexible these programs flourish in urban, suburban and rural settings, where they succeed in launching a wide variety of small business that create jobs and generate solid revenues for their regions. According to the National Business Incubation Association the results of 1998 survey were:

- North American Incubators have created nearly 19,000 companies still in business, and more than 245,000 jobs.

---

6 Responses represented 67% of the 587 business incubation programs identifies in NBIA’s database as spring 1998.
• Most incubators facilities (75%) are less than 40,000 sq. ft. (average is 36,657 sq. ft.)

• There should be more than 1,000 incubators operating in the United States by year 2000.

• Incubators overall each serve and average of 20 entrepreneurial firms in 1997.

• Incubators clients may be classified as follows:

![Pie chart showing the distribution of incubator clients]

**Incubators in Brazil:**

As previously stated, Brazilian incubators have counted over the years with great support from the federal government, and frequently have fruitful connections with research or academic centers. It is therefore not a surprise that out of ten business incubators in Brazil, more than five have a technological focus. This was one of the many reasons this country was so interesting to this study, as it has heavily concentrated its business incubators industry on the technology market. Figure 2.5, shows the actual results according to the ANPROTEC’s 1999 annual survey.
**Figure 2.5:** Brazilian Incubator’s focus.

![Bar chart showing the focus of Brazilian incubators: 64% Technology, 22% Services, 14% Mix.]

Source: ANPROTEC, Panorama as Incubadoras de empresas no Brasil, 1999.

**The Argentine situation:**

Although we have seen that neither government nor universities seem interested in fostering the business incubation industry, the private sector has found its opportunity window. This window is represented by Internet and its promise, and of course, by the millions of dollars that each year are being invested on such sector. That is why, more than 2/3 of the local incubators are directed towards Internet sites or Internet applications development. However, this activity seems to be more related to a speculative activity than to a real concern about entrepreneurial education, technology transfer, or economic growth.

Nevertheless, until April 2000, there were not many signs of government interest in the incubator’s industry. None of these organizations received help from the local or federal government, nor they thought official help could be useful. “I do not know how the government could get involved. It is better off helping established SMEs with credits and loans”, said Fernando Braca, Chief Executive Officer of “Migarage.com”.

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Conclusion:

Having now redefined the classification scheme, it is important to precisely define this study’s focus target. Basically the work will be the technology business incubation independently on their sponsor, therefore including technology non-profit, technology profit, technology academic, technology hybrid and basically all technology incubators supported by any other “kind” of sponsor. Figure 2.6, represents this relationship

**Figure 2.6:** The study’s target.

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Incubator's Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Multi</td>
</tr>
<tr>
<td>Non Profit</td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td>x</td>
</tr>
<tr>
<td>Academic</td>
<td></td>
</tr>
<tr>
<td>Hybrid</td>
<td>x</td>
</tr>
<tr>
<td>Other</td>
<td>x</td>
</tr>
</tbody>
</table>

**Source:** Own analysis

In the following chapter we will go into the matter of technology business incubation describing its characteristics, making a classification and understanding the relationship of its business model with the selection criteria used.
Chapter 3: What defines a technology business incubator?

“Technology is important for all developing countries. More important than they realize, and more important than developed countries would have them believe.”

Carlos Magariños
Director General of the United Nations Industrial Development Organization.
What is Technology Business Incubation?

The internationalization of markets brings the necessity of a cultural change within the universities, private enterprises and the government. An industry competitiveness depends on its capacity of constantly innovate and maintain this competitive advantage. In order to win competitiveness firms must be alert to future tendencies and develop new products and productive processes. In order to sustain this competitive capacity, they should, on the other hand reduce the time spaces between the launching of new products, the reengineering of their processes and the instruction of their personnel.

Technology business incubation involves the commercialization of science and technology through newer community-institutional arrangements, which can be thought of as technology venturing (Tornatzky, 1998). These new types of organizational alliances incorporate a dynamic private sector; a creative role for government through the technology policies, initiatives and development programs; and innovative academic relationships. The science and technology policies that promote and flow from these technology alliances are redefining the role and scope of the wide variety of institutions in advancing economic growth through technology. In an ultra competitive global scenario, it is therefore imperative that institutions foster an inter-organizational and multidisciplinary cooperation. (Gibbons, 1994)

As Dr. William Bolton, director of the Cambridge Technology Business Incubator, describes, it is awkward today to think in terms of “this should be done by the government” and/or “this should be done by the private sector”. These are all old paradigms, because the new scenario involves a society where both private and public sectors work together. This is extremely important, especially when the R&D budget of a single GM or IBM is considerable larger than that of many developing nations such as China, India or Brazil (Lalkaka, 1998). The answer, it is clearly a joint effort between private, public and academic agents. Success will come only to those that combine the right contributions of the State and private
sector, stated Magariños at the 9th International Conference on Technology Management. Helping all sides to redefine their roles is no easy task. This should be a joint effort, involving all parts of society.

However, as Tornatzky explains, many of these new entrepreneurs have negligible experience in managing and growing a small enterprise. He says: “they are coming from a life of research in a university laboratory...” The nature of those weaknesses can be seen, for example, by looking at the failure factors described by Bruno McQuarrie, and Torgimson (1992), these tend to revolve around management, and human resources issues, financial problems and issues of product development and marketing. As a result, the practices of technology business incubation tend to be assistance intensive, giving the inventor/entrepreneur the place and time to develop the product as well as access to skills and tools needed to create a successful business.

**Three resources of Technology Business Incubators:**

After reviewing several Technology Business Incubators three were the resources that were constantly present. Although in different proportions, all studied technology incubators were heavily based on:

![Diagram](image)

1) **Capital:**

Without adequate early-stage financing, even technology start-ups with the best ideas cannot transform themselves into successful businesses. Young companies need access to capital for research, prototype development, and testing. Incubators can tap several types of financial resources, including private capital sources and
networks, university-industry research partnerships and industry-government cooperative research and development. (Kearns, 1994)

Even with the variety of programs to finance technology commercialization, finding public or private investment willing to finance an “untested inventor” is no easy task. Private investors, or “angels” often provide the best source for early seed capital for emerging technology companies. These investors are more willing to take risks that other sources can’t or won’t take, and can make up their minds quickly (Ladin, 1994). Venture capitalists are another source of funding for technology companies, but are often out of reach for start-ups without a track record. Venture capitalists make highly selective investments in young companies with high growth potential. They usually become involved in the business at the early expansion stage, to help production, marketing, and distribution, and are not very often willing to invest seed capital at an earlier stage.

**Figure 3.1**: Risk, Investment and venture stages.

Incubators play a major role in the acquisition of seed capital for early-stage technology companies. Essentially, all forms of business assistance provided by the incubator give start-ups an increased opportunity for capital acquisition (Tornatzky, 1998). For instance, incubators help companies develop their management team and board of directors. Investors want to see a solid management team and believe that a weak one will mean business failure, even with the best technology or idea (Matthews, 1995). Most incubators help companies develop their business plan and conduct market research, which is also crucial for financing. More directly, usually incubators operate seed capital pools and maintain formal or informal networks of angel investors and/ or venture capitalists. In short, as showed on Figure 3.1, business incubators are more willing to help technology ventures when other investors don’t, thus assuming more risk but needing less capital to help an embryonary project.

2) Management:

Entrepreneurs who start enterprises based on their own technologies suddenly find themselves dealing with the many responsibilities involved in managing a business. Once the business grows to more than one employee, management issues such as employee selection, professional development, and organizational design, become relevant. In order for start-up to grow into a successful technology business, management, development, networking, strategic planning must all become areas of focus along the development of the technology (Tornatzky, 1998).

Start-up businesses can be so overwhelmed with day-to-day businesses operations that strategic planning is put aside for another day. However identifying short and long term objectives is especially important for the smallest companies. Start-ups businesses are constantly making decisions that affect future opportunities and can often benefit from a structured decision-making process. Michel Robert, strategic planner, says that without strategic planning businesses are practicing “the Christopher Columbus School of Management”. When Columbus left, he didn’t know where he was going. When he got there, he didn’t know where he was. And
when he got back, he couldn’t tell where he had been. In such a way, with strategic planning, decisions can be based on where the business wants to go in the future, not merely on where it is today (Buss, 1995).

3) Technology:

Obviously science, technology and related expertise are by definition at the core of any new technology enterprise. Basically, there were two issues regularly observed around the technology resource. First, that due to their scale, incubators where able to sign contracts with important technology firms, which would clearly be unavailable and unaffordable to new technology start ups. For example, Argentine’s incubator “migarage.com” had a deal with Compaq and Oracle which enabled young firms to start their businesses with top of the line technology and do not have to face a system migration in the future. This provides the tenant with better and newer technology, and reduces an investor’s risk estimates when evaluating the company.

The second is that often not all of the requisite technical expertise to build a variable business has been incorporated or developed by the new enterprise. For example, many companies that are based on technologies derived from university research often need to mature or “harden” their inventions through the development of scaled up designs, prototypes, or alpha and beta test versions. Therefore the incubator goals is to identify early stage research and technology that has a dimly seen or acknowledge commercial potential, and then to breathe life into the potential enterprise and stroke de spirits of entrepreneurship in the researcher or investor.

A classification of Technology Business Incubators:

Previously we had classified Business Incubators according to their focus. However, it was not clear from the onset how Technology Business Incubators could be classified. Therefore, after reviewing the matter, it was determined that incubators could be classified according to their business model. What it is meant
is that, although most of the incubators are initially sponsored and subsidized, they are usually expected to become self supported in the long run. In order to achieve this, incubators must generate resources in some way. This is why, although not all incubators are expected to show profits, yes all should pursue economic revenues, in order for them to become self supported. This study has found three business models frequently used by those incubators that seek to achieve this self-support status, which shall be described and used to classify technology business incubators:

1. The Equity based model
2. The Revenue based model
3. The hybrid model

1) The equity based model:

This business model is quite simple, and thus most commonly used. It simply requires the tenant firm, once it has been accepted into the incubator, to give part of its equity to the incubator in exchange for the equipment and services this provides. How much equity each start up must “give up” depends on the stage of advance of the project and the resources needed to complete its development.

In such a way, the incubator makes an initial investment on the project and receives equity in exchange. The startup grows and if successful, may receive a bigger investment, for example from a venture capitalist. It is usually at this time, when the incubator seeks to sell its equity to recover its investment plus a possible economic profit. When to exit the business, is usually a company’s strategic decision. Some will go with their project until first round, and others will risk more and continue with their tenant until the second round, or eventually the IPO. Of course, the longer the wait, the longer the time you accept risk and thus the bigger the expected profit.

For example, an Argentinean incubator had invested $200,000 on one of its Internet projects, when after six months the latter received a capital injection of
$4,000,000 from venture capitalists. The incubator had 40% of this new company, and decided it was time for the cash out, hence making a $1,200,000 net profit. Maybe this huge return over investment, helps explain why over 80% of the Argentinean incubators have adopted this business model scheme, which seeks big profits in the short run.

The figures would be as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Initial Investment</strong></td>
<td><strong>$200,000</strong></td>
</tr>
<tr>
<td><strong>Gross Revenue</strong></td>
<td><strong>$1,600,000</strong></td>
</tr>
<tr>
<td><strong>Net Revenue</strong></td>
<td><strong>$1,400,000</strong></td>
</tr>
<tr>
<td><strong>ROI</strong></td>
<td><strong>800%</strong></td>
</tr>
<tr>
<td><strong>Time elapsed:</strong></td>
<td><strong>6 months</strong></td>
</tr>
</tbody>
</table>

**Source:** own Analysis

Under the equity model, it is clear that the profit and economic viability of an incubator depends entirely on its tenant’s success, or expected success as in our previous example. However, not always venture capitalists investments are so big, nor firms prove to be so successful in so little time. The current Nasdaq trembling and the fear that this financial “bubble” should explode has made venture funds to raise their selection demands and reduced the available funds for Internet ventures. Fortunately there are other models, which reduce the incubator’s risk, but still help its tenants.

2) The Revenue based model:

A different model is the revenue-based model, which as its name describes is not based on equity but revenue produced by the tenant firm. Those projects that are accepted to the incubator, agree in two things. First, to pay a monthly fee for their expenses of lights, security, Internet connection, fax, etc. The fares are usually subsidized and depend upon de incubator, but still they must pay approximately $500 per month, as long as they stay in the incubator. Second, they must also accept to continue paying the incubator, once they have leaved it. They must “give
back” the incubator a fixed percentage of their future sales, for as long as they
have stayed in the incubator. For example if a company has stayed for three years
in the Brazilian PUC-Rio incubator, it will required to pay the incubator 1% of its
gross revenues for the following three years. Hence, not surprisingly this business
model also depends heavily on the future success of its tenant’s, although not as
much as the equity-based one.

It should be clear that there is no time for product development in this model.
Those tenants willing to apply to these incubators should have at least a prototype
of the product or technology they are seeking to commercialize. The incubator
then acts more like an administrative or commercial office, whose main objective
is to sell and manage marketing strategies.

To exemplify we could take another real case, which was studied at the Brazilian
PUC’s incubator. The company considered is called “Ac-virtual” and they focus
mainly on architectural and construction consulting. They are close to leave the
incubator (this is their last year) and their past revenues and future estimates are
described on figure 3.2:

**Figure 3.2**: Ac-virtual Gross Sales

![Ac-virtual Gross Sales Graph](attachment:image.png)

**Source**: Relatorio Annual da Incubadora PUC-rio, 1999.
Starting in December 1998, with a gross revenue close to $50,000, the tenant quickly was able to soar its sales with the help of the incubator, up to close $150,000 at the end of 1999. New clients (including other tenants in the incubator), and private firms, will make this project reach an estimated of $300,000 by the end of this year, leaving the incubator in financially healthy conditions. Moreover, much is expected from this firm, which in the following three years is projected to reach five times that number.

However, it is important to understand, how this business model is producing revenue for the incubator. During the first three years, the tenant pays a fixed monthly rent, for its expenses and overheads, based on the square meters of its office. Once the firm leaves the incubator it usually becomes more and more successful, gradually earning more money. This is when the incubator starts recuperating its investment and making the difference. As showed in figure 3.3, for the mentioned example, over 60 percent of the revenue produced by this tenant was produced once it had left the business. Altogether, this venture had required the incubator an investment close to $35,000 and had produced a gross revenue of approximately $50,000.

**Figure 3.3:** Tenant income production distribution.

![Figure 3.3](image.png)

(Source: own analysis)

Clearly, the required investment with this model is smaller, and so is the expected return. Usually these types of incubators have much more less capital to invest
that the others, and thus the necessity of asking their tenants for a monthly fee. Moreover, it is not less the risk these incubators must face, due to the fact that the most important part of their income will come from the future success of their tenants, however based on real value creation, and not in a financial speculation. If for some reason the project fails, the incubator assures itself almost 40 per cent of its total expected revenue.

3) The hybrid model:

Although not very common, a third model in which the incubator finances its operations with a combination of revenue and equity, also exists. From the onset this seemed to be a logical combination, even though no empirical evidence of this kind of incubator was found. In fact, there was never a real personal contact with this business model, but instead were assisted by the Executive Director of the NBIA, Mr. Dinah Adkins. As he explained:

“There is a minority of non-profit incubators that also negotiate royalty and/or equity agreements in addition to requiring rents and service fees. These are some of the technology-focused incubators, and they usually require about 3-5 percent of the firm's equity, as well as royalty payments of a small percentage of gross sales. This royalty payment is normally based on the length of time the company has been in the incubator. If the company has been in the incubator for three years, it may be required to pay a royalty on gross sales for three years. But this varies. The purpose of the royalty/equity arrangement is to supplement rents and service fees (and thus support the incubator program), since these fees do not normally cover all the costs of the incubator staffing and assistance.”

Clearly, this business model does not incur in so much risk as the equity based model as it receives partial payments during the tenant’s residence in the incubator. Nevertheless, it does incur in higher risks than the revenue based model, as the incubator is receiving equity in exchange for part of its services. Moreover, a higher risk, logically implies a higher expected revenues. Figure 5.4, tries to resume this situation.
Clearly, all three-business models emphasize the importance of a good project selection, mainly because the incubators economic sustainability depends heavily on its tenant’s future success. As previously described, the equity based model allowed the incubator to have fewer projects, which meant higher risk, as the incubator had a scarce risk diversification with so many projects. On the other side, the revenue-based model allows the incubator to assist more projects, reducing the associated risk. However, the risk in this case is increased by the fact that the incubator depends upon the tenant firm to produce “real” wealth and not just receive a capital investment. “We have to sell, sell and sell. And after that sell, sell and sell”, said Roberto Arana, Executive Manager of the Instituto Genesis at PUC-Rio. Therefore, it is quite clear that each model, in its very own way, makes the financial future of the incubator depend on the future of its tenant. One model requires the incubator larger amounts of capital and thus, only allows it to assist a few projects at a time. The others, only recuperates its initial investment if its tenants are economically successful once out of the incubator. Thus, in all cases, carefully selecting which projects to support is no easy task. If chosen correctly, incubator’s might be successful. If chosen improperly, however, unsuccessful projects can be expensive and endanger an incubator’s normal operation. And it is
not only a matter of selecting the right idea, but also the right people and the right moment for that combination of ideas and people.

Now that the business model is understood, we are able to study the incubation process, and within it, the fundamental stages that will build it up. There we will look into the matter of the screening stage, its activities and criteria, and maybe try to understand how incubator managers can select the strong from the feeble projects.
“Creating a culture of innovation is the best competitive tool a company can have today, and the best weapon American has in an the increasingly global marketplace.”

Lewis W. Lehr
then CEO of 3M.
What is business incubation?

Business incubation is about growing businesses from scratch. Rather than trying to attract businesses, the incubation approach emphasizes creating and retaining new jobs by tapping the workforce and other economic resources already within a state. Incubation programs provide physical office space and a full array of businesses service to star-up companies. Each incubator client-or company housed in the incubator-gets its own office space, generally with a low cost, flexible lease. At the same time, all the incubator clients share office resources such as conference rooms, administrative staff telephone system/phone answering, and Internet access so that their overhead costs can be minimized.

Business incubation is a dynamic process of business enterprise development. Incubators nurture young firms, helping them to survive and grow during the startup period when they are most vulnerable. Incubators provide hands-on management assistance, access to financing and well-organized exposure to critical business or technical support services. They also offer entrepreneurial firms, shared office services, access to equipment, flexible leases and expandable space.

The conceptualization of an incubation process

One of the difficulties when doing this conceptualization was the poor bibliographic resources that were available. Most of the business incubation materials heavily concentrated on this issue positive impact on a regions economic development, but very few was found on the actual process itself. Therefore, one of the tasks was to reconstruct this process based on the performed interviews.

In order to do this, a typical process-analysis methodology (Harrington, 1993) was followed, hence differentiating between an input-output relationship. A three level
analysis was performed dividing the process into stages and the stages into activities, therefore describing the following relationship:

Typically the incubation process begins with an analysis of what a company needs and ends with the company “graduating” to become solid and independent. In between, the company receives tailor-made services that pint it toward success.

**Figure 4.1**: A graphical representation of the incubation process

Each stage is quite simple, and could be easily explaind. First, an idea reaches the incubator and is usually examined directly by its managers. This task is not often assigned to any other subordinates, but performed directly by the top executive
authorities. There are usually various phases in the **screening stage**, which shall be further explained ahead in the chapter. If the project is accepted it moves over to a **development stage**, where each project has to perform unique tasks depending on their particular degree of advance. For instance, in the case of a new Internet site, the entrepreneurs aided by the incubator may need to recruit a team of programmers, designers, all from scratch. Others, may have a prototype of their product and may only need to find a place where to produce it massively and a couple of vendors to assist them with the marketing. Once the company is up and running, the **ongoing phase** begins, basically trying to improve what has been done until now. In the example of the Internet site they might want to expand their operations to other countries, close strategic alliances with other sites, etc. Eventually they will be doing everything necessary in order to achieve (or surpass) their previously established goals. Finally, there is a time, that usually varies from one to three years, that the project decides to leave the incubator and the latter exits the business. The incubator’s **exit strategy** usually depends upon specific criteria, as well as from their business model. For example, equity based incubators often look upon investment rounds, while revenue based and hybrid models regularly use tenant’s employee number or tenant’s time inside the incubator. As explained by Sebastián Villa, Chief Financial Officer of “Southnet”, an Argentinean equity based incubator, “*We usually go with our tenants up to their first investment round*”.

**The screening stage:**

The challenge is to make good choices (few false positives and/or false negatives) and do it economically. Incubators need entrance review methods to judge the viability of a technology and the capabilities of the entrepreneur to start a business. Several programs adopt explicit or implicit decision models, based on their own company’s capabilities and criteria. In this way, the methods incubation professionals use to screen clients for admission necessarily vary according to program mission, resources, facility characteristics and space availability. Beyond these, the elements of figuring out which companies will be right for the program are strikingly similar from incubator to incubator (Hayhow, 1998). Whether simple or elaborate client screening is usually on part technique and one part experience.
What to do first:

Most of the screening processes, even the most formal and elaborate, begin with a less formal initial contact, a telephone or face-to-face conversation. Asking the prospect to submit a brief application commonly the following step. It is important not to underestimate the usefulness of these forms, for many incubators eliminate early those applicants who do not qualify under the incubator’s general criteria. “This has saves a lot of staff time that might have been wasted in meeting for hours with companies that we could not, by our charter, work with”, said Sam Pruett director at the Technology Incubator in Fayetteville.

Diego Henin president/CEO at Latin ventures said, “everything up to due diligence is informal at his incubator.” He asks prospective clients to send whatever they have business plans, brochures, technology descriptions. Often an intern can assess the material against the incubator’s specific entry criteria or ask for additional information if the documents look promising but incomplete. “If we like what we see but need more information, we set up a meeting with (me) or vice president.”

At some incubators, such as the Instituto Genesis incubator in Rio de Janeiro, the informal steps actually transform into a pre-incubation program. “Our process starts with the relevant center management counseling prospective clients. In some cases, we have continued this counseling over a couple of years before someone eventually becomes a tenant”, says Executive Director Roberto Arana. The counseling appears to have the added benefit of refining the pool of applicants, therefore making a much more express screening stage. “We end up not rejecting many people who formally apply for accommodation,” says Arana, who explains that after counseling, many would be applicants realize they are not interested or ready for the incubator.

In the first phase of the screening process, Migarage.com a local Argentinean incubator, places emphasis on phone calls, informal meetings, and review of existing documents. Prospects who are still in then running the complete a two-page summary
of their business concept. Only if the director, Fernando Braca gives the summary a positive review does he require the company to present a full business plan. The summary includes a brief overview of the main sections included on a typical business plan:

- **Description of the industry, the company and its products**
- **Market research and analysis** (Customers, market size, competition, market share)
- **Marketing plan** (Marketing strategy, pricing, sales tactics, promotion, distribution)
- **Design and development plans** (Development status, proprietary products, risks.)
- **Manufacturing and operations plans** (Facilities and equipment, regulatory issues)
- **Management team** (Key personnel, board, professional advisors, organizational plan)
- **Overall schedule**
- **Critical Risks assumptions** (Contingency plans)

Figure 4.2, shows a typical application summary, used by the incubator of the Northwestern university.

| NORTHEASTERN UNIVERSITY/EVANSTON RESEARCH PARK |
| EVANSTON BUSINESS & TECHNOLOGY CENTER |
| SMALL BUSINESS INCUBATOR |

| Firm: ____________________________ Contact: ____________________________|
| Street: ____________________________ |
| Title: ____________________________ |
| City: ____________________________ Phone: ____________________________ |
| State: ___________ ZIP ____________ Business: Existing ____ New _____ |
| Target Date for Tenancy: ____________ Space Required: ____________ |
NOTE: If you have a descriptive summary of your business and the resumes or vitae of the principals involved, please attach.

| Date company formed/incorporated: ____________________ |
| Current Occupation: ____________ Years in business: ____________ Education/Training: |
| Employees: |
| Business/Product Description (include description of product or process, target market and current stage of development): |
| Technology Involved: |
| Space, utility, equipment, business or technical needs: |

**Getting formal:**

Once the process gets to the more formal stage, a screening panel is commonplace, though there is considerable variation in its size and content. Usually the top directive figures, such as director and associates, are involved. However, some incubators have review boards which make the final decisions. For example, the *Instituto Genesis* at Rio de Janeiro has a 16-member review board composed of professionals employed by the incubator, plus representatives from both the government and the incubator’s private local sponsors. At university-related incubators, the panel often includes academics, who among other things, can help assess the entrepreneurs’ credentials in their fields.

Moreover, many incubators include consultants in the formal screening. “We may call upon network of additional specialized technical reviewers to give input usually on the financials, and the technology feasibility analysis,” says Regina Fatima, Executive Director of the incubator at the Federal University of Rio de Janeiro. However, most incubators’ mangers agree that a face-to-face interview with the company principals or a presentation with can add real value. “It saves time and gives the committee a chance to meet and evaluate a person directly, not just rely on what they look like on
paper”, explained Julio Flavio Lima, Executive Manager at the National Technology Incubator, Brazil.

Should the screening process require that prospective clients submit a business plan? Most incubators require one, though a fair number will provide applicants with some help getting to that point. They may do so by referring applicants to a small business development center or a volunteer or low-priced consultant. Some might even give prospective clients a guideline for preparing a business plan. “I encourage them to work on a rough draft that can get back to me to review and make suggestions”, said Arana. Or some very few might even develop the business for them, as done by Migarage.com. “We develop their business plan, and we do not charge them for this service”, explained Fernando Braca.

Many incubators also relegate the business plan requirement to the middle or tail end of the screening process, figuring that a written business plan represents a significant investment of time and effort. Why require it until it becomes clear that the company is a hot prospect? Instead they allow initial interviews or less demanding application forms to weed out the unready, or over demanding. “… I would not mind receiving a business plan for all the projects that are prospective tenants, but we know that it is an activity that demands lots of time and effort and thus we prefer to ask them for a complete business plan, only to those who look interesting to us. What is the point of making the others lose their time.”, explained Silvina Guglietti from Latin Lab.

Formal screening procedures can provide a seamless entry to the incubation process. At Superior Business Center in Wisconsin, the screening committee devises what they call a customized learning work plan. After admission into the incubation program, “the screening committee periodically meets with tenants to review new progress towards the tenant’s learning work plan and to monitor the plans and to monitor tenant’s ongoing compliance with and appropriateness for, the program”, said Executive Director Charlie Glazman. Once the work plan goals are satisfied, the company graduates from the incubation program. Others incubators, negotiate a contract even before the final board approval. The staff wants to make certain that it and the company have consensus on milestones the company must meet and the right
and responsibilities they will have. However, this stage can be a real “deal breaker” as explained by Sebastian Villa, CEO of Southnet “If there are big difference, that could be a deal breaker, or you might need some more time negotiation”. This practice is quite common among private-for-profit incubators like the mentioned example.

**From the gut**

As sophisticated and thorough as the admissions process can get, many managers are not afraid of admitting that intuition and experience are vital screening tools. Even in a highly objective environment such as an incubator formed by ex management consultants from firms like Booz-Allen and Hamilton or Mc Kinsey, these sort of “soft” criteria are not underestimated. As explained by Cristianne Close, Business Developer for BtoBen, “You have a basic idea, and then there is a lot of gut feelings… Basically, the two things we look upon the most are the people and the idea. Specially the people and their potential.”

Matias Mose, Executive Director of Aper.net an incubator with offices in Buenos Aires, Boston and London, has found that giving the gut greatest weight pays off. He and staff screened over 15 companies over the last two years mainly by subjective means. They ferret out whether the applicant is open to suggestions, truthful, and leaves an overall good impression. “Our selection methods are not so hard. We focus primarily on the project’s management. We have lots of interviews with the team, and during those meetings we test them. We pay attention to their questions, to the work they bring us, to the kind of feedback we obtain, etc. Basically, we try to see how efficiently the work”, explained Mose.

The bottom line is that most of incubator’s managers end up using a mixture of both facts and intuition. “It is pretty hard to be entirely objective, as webring our life’s experiences to the table when evaluating products and projects”, said Fernando Braca of Migarage.com. There are thin lines between con artists and entrepreneurs, managers and administrators, and a special sense is needed to detect those who really have the development skills necessary for the job.
Understanding the screening stage:

Conceptually a screening stage could be divided into two further stages a pre-selection and a selection. The pre-selection phase is when the applicant must either fill in a standard application or present some sort of simple business plan or financial analysis to the incubator’s managers. There are usually many interviews with the incubator’s staff, revising the idea, going over the business model, trying to evaluate the group’s vision, cohesion and implementation ability. “Ideas you can get them from the Internet. The key is to get together the management team that can make it happen. And good talent is difficult to find in Latin America. And good talent with an Internet mentality is even more”, explained Cristianne Close from BtoBen.

If the idea appears to be interesting and the group solid, the project might then be able to move on to a next phase. Most probably, if not done already, they will be asked to develop a complete business plan. Once finished, the idea is newly review by specialists (such as consultants) and some more meetings might be necessary to work on some changes. “We call this stage the rediscovery stage, because here is when the idea is redefined”, explained Matias Mose from Aper.net. Only when all parts are agreed, the reviewed business plan is ready to face the final review which is usually done by a special board, or the by the incubator’s top management. Very few are able to reach this stage, and it when the final legal arrangements are done. (For example a contract is signed or an equity negotiation takes place) “Only a two percent of the original group usually reaches this stage”, said Sebastian Villa from Southnet. Typically, this whole procedure normally takes from one to two months.

In which ways and proportions incubators base their screening method in the pre-selection or the selection phase is an internal strategic decision. Both phases share distinctive amounts of formal and informal procedures, and each part is characterized by a higher degree of one kind of activity. Usually, for example, the pre selection phase is much more informal, consisting mainly on face-to-face interactions, discussions and brainstorming. The selection phase is mucho more formal, requiring the applicants to develop a business plan, and make a formal presentation. The following figure, summaries the described situation:
Figure 4.3: Formal and informal activities during the screening stage

<table>
<thead>
<tr>
<th>Activities</th>
<th>Informal</th>
<th>Formal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Interviews</td>
<td>1) Interviews</td>
<td>1) Equity negotiation (equity models).</td>
</tr>
<tr>
<td>2) Idea discussion</td>
<td>2) Idea discussion</td>
<td>2) Business plan analysis</td>
</tr>
<tr>
<td>3) Business Counseling</td>
<td>3) Business Counseling</td>
<td>2) Business plan presentation</td>
</tr>
<tr>
<td>1) Fill in application</td>
<td>1) Fill in application</td>
<td>3) Personal financial report (revenue and hybrid models)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4) Contract signature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre selection</th>
<th>Selection</th>
</tr>
</thead>
</table>

### About the selection criteria

Every screening stage have criteria behind them that define who is entitled to enter the incubator and who does not. Mission goals and objectives of the Incubation Program should dictate the basic characteristics of the desired applicants. Although each incubator’s admission requirements differ in the details, it was observed that the criteria were used mainly to evaluate two things: the people and the project. Thus, was thought that the best way to classify these criteria was according to their use, either for evaluating people or the idea. What follows are those criteria that appeared most commonly repeated in the nineteen studied incubators:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>People</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management team with a clear and shared vision</td>
<td></td>
<td>Idea being an innovative one</td>
</tr>
<tr>
<td>Management team compromised</td>
<td></td>
<td>Attractiveness of the market (market</td>
</tr>
</tbody>
</table>

---

7 Seven Argentinean (appendix I), three Brazilian (appendix II), and nine North American (appendix IV)
with the project, willing to accept personal risks and or use personal assets in the project

- Management team with strong implementation capabilities
- Management team with some experience in the business
- Management team with enough time disposal to push forward the project
- Management team with well balanced competences (not all CEOs)
- Management team greedy and aggressive
- Have adequate resources to pay rent, salaries and overheads. (revenue based incubators)

volume, fragmentation level, amount of players, market share of each player, etc.)

- Project being non competitive with the rest of the projects in the incubator.
- Idea being economically viable
- Project’s “fit” with the incubator.
- Cost of adding value to the project
- Incubator’s real capacity to add value to the project.
- Idea technologically feasible
- Expected return over investment
- Attractive business Model (clear revenue streams, interesting niche, scalability, etc.)

However, these admission criteria are not applied altogether, but instead they are strategically distributed during the pre-selection and the selection phases. For example, during pre-selection, incubators usually tend to employ people selection criteria much more than during the selection phase. Conversely, during the latter, it is the project that usually is placed under the spot, as the people’s qualifications have already been tested. We would therefore have a situation where criteria are applied in some premeditated fashion, and it this combination that provides the bases for an efficient screening stage.

Clearly the criteria and its combination are responsible for the effective selection of the projects. As explained by Julian Mellicovsky from IRSA incubator, “The selection depends upon certain corporate criteria, as well as from our possibility of adding value to the project.” Previously we have described what were the most usual
selection principles. However without the proper combination, those criteria are of little use. Therefore, a recreation of a usual criteria combination is also described as follows:

During Pre-selection:

<table>
<thead>
<tr>
<th>People</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Management team with a clear and shared vision</td>
<td>• Project’s “fit” with the incubator</td>
</tr>
<tr>
<td>• Management team with well balanced competences (not all CEOs)</td>
<td>• Project being non competitive with the rest of the projects in the incubator</td>
</tr>
<tr>
<td>• Management team with some experience in the business</td>
<td></td>
</tr>
<tr>
<td>• Management team with strong implementation capabilities</td>
<td></td>
</tr>
<tr>
<td>• Management team with well balanced competences</td>
<td></td>
</tr>
</tbody>
</table>

As one may observe, during the pre-selection phase most of the attention is placed over the management team and only few or macro considerations are taken over the idea itself. For example, if accepting a certain project would engender a negative competitive unconstructive internal-environment, then the project would probably get rejected no matter what. Similarly, if the incubator focuses its operations in the information technology market, an aeronautical engineering project would probably no have the right fit and end up being rejected. Hence, as it may be seen by the criteria abundance, it is people who are being evaluated, for some the most important asset of a company.

During the Selection phase, the situation observed is the exact opposite. The management team has been evaluated and it is now time to focus on the projects and its most strategic dimensions.
<table>
<thead>
<tr>
<th>People</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Management team with enough time disposal</td>
<td>• Incubator’s cost in adding value to the project</td>
</tr>
<tr>
<td>• Have adequate resources to pay rent, salaries and overhead</td>
<td>• Incubator’s real capacity to add value to the project</td>
</tr>
<tr>
<td></td>
<td>• Expected return over investment</td>
</tr>
<tr>
<td></td>
<td>• Attractive business Model</td>
</tr>
<tr>
<td></td>
<td>• Attractiveness of the market</td>
</tr>
<tr>
<td></td>
<td>• Idea being economically viable</td>
</tr>
</tbody>
</table>

Clearly these criteria, and the way they are employed are related to the activities conducted by the incubator’s managers, which were previously described. For example, the fact that during pre-selection there is a higher concentration of “people criteria” is directly related to the fact that during that phase more informal practices are conducted. This happens mainly because people are tested in a more informal manner than what the project is. In such a way, during the selection phase more formal activities are conducted, applying those criteria to evaluate mainly the project.
“There is no doubt that every country in Latin America is and should be awake to the opportunity of the Internet.”

Bill Gates
Enterprise Solutions Conference
Miami, March 21, 2000
Understanding the screening stage’s objective:

With the exemption of venture capital-model programs, which admit only high-growth potential companies, most incubators screening practices aren’t generally designed to be next year’s Inc. 500 winners. Their main purpose is simply to “weed out people we cannot help before we put a lot of time and effort into them”, explained Diego Henin from Latin Ventures.

Incubator’s want to make sure that a company has enough strategic capabilities to prepare them for that time and effort. Screening makes sure that the incubator’s resources and the entrepreneur’s needs are in synch, the company has the basic ingredients for success, and everyone is ready to do business.

Furthermore, with economic development at the core of most incubators’ mission, it might be undesirable to design an admissions process that creams off just a few companies. After all, only three percent of start-up companies become extremely high growth, job-generating companies. Meanwhile almost all communities have solid companies in the making, companies that have potential to produce good jobs and endure over the long haul to strengthen a region’s economic base.

About the U.S. market survey:

As explained in the work’s methodology, in order to include the US experience, a quantitative scheme was employed. The reason for this was to collect valuable feedback from a much more developed market, which could also prove to be useful to test the study’s hypothesis. A close survey was therefore, used to NBIA’s registered US incubator’s managers, which these would randomly reply. Besides the questions that could be answered with a “yes” or “no” response, others consisted in ranking an event from 1 (extremely unimportant) to 5 (extremely important). However, prior to
analyzing the study’s fieldwork results, it is important to understand certain characteristics of the sample obtained from the US market.

- The sample represented an approximate 14%, having 140 incubators responding to the survey out of a total approximate value of one thousand incubators (total incubation population)
- The U.S. states represented in the sample were: Texas, Philadelphia, Washington, New York, California, Connecticut, Massachusetts, New Jersey, Virginia, Iowa, North Carolina.
- The sample respected the natural proportions shown by population (as seen on chapter 2)

**Figure 5.1:**

![Incubator type representation](image)

**Source:** own analysis

Once that these considerations have been made, it is time describe the study’s main results and conclusions.

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8 The table with the complete statistical results from this survey can be found at the end of this work, in the appendix III.
The results:

The work’s main hypothesis was:

*The screening stage is the fundamental stage in the incubation process for self supported incubators.*

When conducting the research’s field work, several and very different opinions about this hypothesis were observed. Some were very clear and conclusive. For example, when asked about the relative influence that the screening stage had on the overall incubation process Fernando Braca from Migarage.com said, “I would tell you that easily a 60% of a successful incubation depends on a successful screening. If you make a mistake selecting a feeble project and that project then fails, this may be have a devastating effect to your company simply because it affects its track record. After that, it will be difficult for other projects to trust you, and you will be loosing customers.” About this matter the US market was also surveyed and a number that was close to the 60% of the sample answered that the screening stage was in fact the most important part of the incubation process.

**Figure 5.2:** Importance of the screening stage (U.S. market)

![Screening stage is most important](image)

Source: see appendix III
Others, however, thought that what was really important was the strategic process later reflected in the business plan. This analysis typically includes the market characteristics, a technology feasibility report, the business model to employ and the project’s main revenue streams. “The most important for an incubator, from my point of view, is the strategic analysis of the project. It is of no use to have a working capital for a couple of months but no strategy behind”, explained Diego Henin. This analysis has to do with many of the project’s most undisclosed issues: how do you finance, where do you expand, who do you plan to make alliances, which is the market share you plan to obtain, etc. It is about strategy, and the need for a better time to market response. To this, Cristianne Close from BtoBen added, “For me the strategic process behind your implementation is crucial. It happened to us that we had three projects that started on the same day, with the same money, and more or less the same management, and however, some are much more advance than others.” This issue was also inquired in the US market. An approximate 40%, some 56 votes, ranked it as very important (four in the scale), and only 21% as extremely important. Another 21% understood that this was a three, and another 18% that it was so not important.

Still, some did not agree with this last idea. It was not the strategic process, but the implementation of the project that was looked upon as the most important. On such an issue, Matias Mosse commented, “How can something that clearly is a commodity be so important? What is really essential is getting the job done, faster or even better than what it was originally planned. Why did Office Net have more success than Office Shop? Because they had a better business plan? Clearly not.” Logically, a project’s implementation cannot be predicted beforehand. But what can be evaluated is a team’s implementation ability, again an activity performed during the screening stage. Therefore, if the team’s implementation ability was regarded as extremely important, what could be thought as crucial was a careful selection of the project’s management team. One of the main reasons for this maybe that a complete trust must be deposited in the project’s managers, as the incubator has usually no governance upon its tenants. As previously explained, the incubator is either a minority stockholder (equity based model), or has no stocks at all (revenue based model). However, the decisions taken by the project’s management team will in some way affect the future of the incubator.
To this Fernando Braca explained, “We do not have the responsibility of running the firm, but we do have to trust them and the decisions they undertake.” Moreover, Matias Mose added, “Generally we try to select projects that enclose a good management team, and we trust it. We aim not to get involve in the day-to-day activities, but to give them the space they need. We are there to help.” When surveyed, the US market responded that for more than 65% the team’s implementation ability was extremely important. Figure 5.4 describes these results.

Figure 5.4:

**Team implementation ability**

![Pie chart showing team implementation ability with percentages: 66% for 5, 25% for 3, 9% for 4, 0% for 1, and 0% for 2.]

Source: see appendix III.

Consequently, no consensus appeared to be made among the incubator’s managers. Each one was defining a different activity as crucial. However, what was interesting was that the fact that all these activities were involved in the screening stage. Unconsciously, people were referring to activities rather than to stages, when asked about what was the most important part in an incubation process. Therefore, the key resided in the definition of the screening stage. As explained by Southnet Chief Financial Officer, Sebastian Villa, “If you define screening stage from the point that the project is received, up to the point where the decision is taken to accept the tenant and start working, then there is no doubt that this is the most important stage in the whole incubation process. Moreover, there are moments during this stage that are more important than others. The first time you see the guy is not so important, but when you are negotiating equity its because you already know where you want to go, and how do you want to do it.” In such a way, all interviewed incubator managers
were later asked to assign a proportional value to each stage in the process, hence obtaining a measure of each stage’s relative importance. The results observed were as follows:

<table>
<thead>
<tr>
<th>Contact</th>
<th>Company</th>
<th>Screening</th>
<th>Development</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fernando Braca</td>
<td>Migarage.com</td>
<td>60 %</td>
<td>20 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Diego Henin</td>
<td>Latin Ventures</td>
<td>55 %</td>
<td>25 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Sebastian Villa</td>
<td>South Net</td>
<td>55 %</td>
<td>35 %</td>
<td>10 %</td>
</tr>
<tr>
<td>Silvina Guglietti</td>
<td>Latin Lab</td>
<td>50 %</td>
<td>30 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Cristianne Close</td>
<td>BtoBen</td>
<td>35 %</td>
<td>45 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Matias Mose</td>
<td>Aper.net</td>
<td>55 %</td>
<td>30 %</td>
<td>15 %</td>
</tr>
</tbody>
</table>

In addition, another interesting fact was encountered when several incubators’ managers were interviewed and asked about their learning and improving practices, especially in Brazil where managers have a longer and richer experience in incubating projects that in Argentina. There it could be noticed that the screening stage was a stage in constant revision and improvement. “The screening stage was something that really matured from the onset of the incubator until today. At first we focused too much on the business plan. Today, we also look upon it, but we look much more to the team and the people behind the project. Their vision, cohesion and time disposal are fundamental.”, said Regina Fatima, Executive Director of the COPPE incubator at Rio de Janeiro. Apparently, it was accustomed by incubator’s managers to constantly review and evaluate the screening’s stage effectiveness. Periodic meetings were held, in which all methods and criteria were revised and updated. “Yes, our experience did help to improve the screening process. After one of our previous graduates decided to remain a small enterprise, we started thinking that we had to add certain additional criteria that would test specific ethic, psychological and organizational factors from the entrepreneurs before we accepted them into the incubator. We want firms to want to become big, because it is expensive for us to assist an enterprise who wants to remain small”, explained Raul Arana from Instituto Genesis at PUC-Rio. Clearly, the fact that screening methods and criteria are revised and improved, suggest the stage’s relative importance.
Having in mind the incubator’s business model is also important. As explained on the previous chapter, all described business models made the incubator’s economic and financial future dependent on its tenant’s success. Therefore, one could argue that incubators have good reasons to impose their prospective clients a careful and meticulous selection procedure. To this Sebastian Villa added, “We only accept around 1% of all the projects we receive” It is important to understand also, that the screening stage should not simple be regarded as a stage where the actual decision of accepting or rejecting a project is taken. Figure 4.1, on chapter IV describes all the activities that are involved during the screening stage. Therefore, this stage actually adds value to the project, especially during the pre-selection process. It is during this stage that the incubator detects the project’s flaws and seeks the way to fulfill that defect. As explained by Cristianne Close, “Usually the projects that we see are missing something, and it is important that they receive the best at each stage of development. You need a whole bunch of things. That is why the incubator is so interesting, because it assists you where you are more weak, and it makes the best out of your strengths.” To this, Roberto Arana added, “Yes, I do think that this stage (screening) is a time when the incubators adds value to the original proposal. Specially because of the meetings and discussions we have with the team.” Finally, according to the US survey, an approximate 89% agreed that the screening stage was at least very important.

![Importance of the screening stage](image)

**Source:** see appendix III

There is therefore, qualitative, quantitative and logical evidence to suggest that the hypothesis **should be accepted.**
Chapter 6: Conclusions.

“Terabit access, gigahertz processors, planetary networks, and disk drives on the heads of pins will be ... they'll just be. Face it - the Digital Revolution is over.

Yes, we are now in a digital age.”

Nicholas Negroponte
Beyond Digital
Regional Development Through Technology Venturing:

The world is changing in terms of how business is conducted. As we look into the future, the more important transactions will be those that involve knowledge-building activities. (Tornatzky, 1998) In such a way, information and knowledge are replacing capital and energy as the primary wealth-creating assets, just as the latter two replaced land and labor 200 years ago. In addition, technological developments in the 20th century have transformed the majority of wealth-creating work from physically based to knowledge-based. Technology and knowledge are now the key factors of production. With increased mobility of information and a global work force, knowledge and expertise can be transported instantaneously around the world, and any advantage gained by one company can be eliminated by competitive improvements overnight. The only comparative advantage a company might enjoy will depend on its process of innovation (combining market and technology know-how with the creative talents of knowledge workers) and its ability to derive value from information. (Barua, 1999) Technology business incubation is an important economic development strategy that can be leveraged to facilitate academic, government, and business collaborations at the community and regional levels.

Results and conclusions.

After reviewing the main results from Chapter V it may be concluded that:

The screening stage is the fundamental stage in the incubation process for self supported incubators. Quantitative and logical results might have been important but qualitative data proved to be decisive. The two main reasons for this may be that for an incubator manager, the screening stage is much more than selecting the most financially attractive projects. Instead it is a process by which the incubator adds value to the company, to the extend that some incubator instead of having a pre-selection phase have an entrepreneurship program that seeks to prepare entrepreneurs for what will be like when running their own venture. It is also a process where the incubator seeks to choose among those to which it may add some real value, although these might not be the most attractive projects in absolute economic terms. Therefore
this stage is much more than selecting. It is about creating and adding value. It is about helping and preparing people to become entrepreneurs. It is about aiding others to pursue their dreams and visions.

**Implications of the hypothesis:**

Besides the actual refusal or acceptance of the tested hypothesis, the obtained results have further implications. By now it is clear that special care and attention should be given to the screening stage, in the process of fostering technology business incubation. The criteria used and their proper combination, will also constitute a critical success factor which may affect the development of any incubator. These criteria mainly depend on two things: the incubators objectives and its resources. As stated, an incubator is said to have two objectives, one linked to an economic development mission, while the other was dependent on who its main sponsor was. The resources, on the other hand, will also depend partly on the sponsor, but also in the sort of connections or alliances that the incubator is able to make.

As explained on the work’s first chapter, incubators are not only meant to create new businesses, but more important to strengthen and foster a country’s entrepreneurial base. Preparing people to take more active roles in their communities, making them understand that having ambitions and goals to achieve in life is not a negative thing, as well as fostering a real entrepreneurial culture between a region’s population, are no easy tasks and thus as important as creating new companies.

It is this that many countries have understood, and it is therefore not surprisingly that incubators worldwide are being sponsored by non-profit, governmental and academic institutions. Moreover, incubator’s managers have also recognized that in order to accomplish their goals, this sort of help and connections are essential. Maybe this explains why when surveyed the U.S. market, 86% of the responses indicated they had connections with a local or national government agency and a relationship of any kind with an academic or research institution (see Appendix III). That maybe also why in Brazil, over 80% of all business incubators receive some sort of governmental support (as seen on figure 2.2) and about 60 % have some sort of relationship with
academic or research institutions. Moreover, when surveyed the U.S. incubator industry about the importance of these relationships, what was found was that a striking percentage had rated it, as at least very important. (4 or more) This is what may be seen on figures 5.1 and 5.2.

**Figures 5.1 & 5.2:**

![Bar chart: Connections with local officials and Academic/Research](image)

**Source:** appendix III.

Of course, the private sector will also be present if the economic rewards look attractive. This is not new, nor bad, as investments funds are often directed towards high growth activities. Today, as once had been biotechnology, the Internet appears to be the right investment and thus, not surprisingly, many for profit incubators are focusing on this market. However, as soon as something new is discovered, funds will start leaving this business and being attracted to a new one.

Consequently in order to produce a real change, incubators should be intended for much more socially desired objectives, and for this to happen non profit and governmental sponsors are fundamental. Business incubators provide comprehensive support to companies in their start-up stages, but also help entrepreneurs to achieve their dreams and communities to develop a better life standard.
Other Possible investigations:

Further, research could be pursued in the following subjects:

Which would be the factors needed to be present, so that the state takes an active role in the business incubation activities. Which are the mechanisms in which the government can help to foster and maintain business incubation?

Traditional measures of comparative advantage have broadened to include innovation and technology. This in turn requires that communities, companies as well as academic institutions implement newer approaches as well as business models that will account for globally competitive market systems. Which should be the rightful combination of private, public agents, when fostering incubation systems?

Why is the bondage between incubators and universities so strong in others countries, and still so feeble in Argentina?

The fact that the screening methods and criteria were constantly revised and improved reflected the stage’s relative importance. However, it is not clear how other steps are improved. Are all stages evaluated systematically? O was this just a characteristic of the screening?

A new hope:

Today technology is changing the world as we used to know it, and promises that it will continue changing it, even at higher rates. Therefore, technology is at the heart of all changes and it is also technology what has created the new windows of opportunities. Opportunities that ought to be capitalized by a new breed of entrepreneurs. Entrepreneurs that had grown up digitally and that will shape tomorrow’s visions.

In such a way, a well designed incubation program can build an entrepreneurial culture in its region, pulling together the support of financial institutions, business
owners, schools, community leaders, government institutions, and business assistance professionals. What is more, technology incubators can accelerate the learning process through entrepreneurial education, peer counseling, know-how networks, and university ties. Tenant companies can solve problems faster by targeting the right problem and leveraging resources to achieve a workable solution. Technology transfer to successful product/process commercialization is significantly enhanced by access to know how networks and by the center’s entrepreneurs utilization of these networks. This clearly has a spill over effect over the rest of the economy, as not only new ventures are created but also new knowledge is being spawned. Technology business incubators can benefit public and private participants, technology transfer processes and regionally based economic development. (Tornatzky, 1998)

This study started referring to Mercadolibre.com. There is no certainty that this company will be successful or a complete fiasco. Anything seems to be possible on the Internet right now, and only time will tell. Either way, these sort of people who managed to do it without the system must be regarded with care, as they are the entrepreneurs of the future. Should the company succeed, it should serve as a reference for the rest. Should it fail, then their know how should be put to use in another technology venture. The primary drivers of technology business incubation are entrepreneurs/ champions (people who make things happen) and technologies or ideas that have a potential to be commercialized. It is in times of revolutions that big opportunities call for big changes. Non-industrialized countries have long been waiting for such a chance. It is upon them to make the best out of this opportunity.
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Baêta, Adelaide Maria Coelho; *O Desafio da Criação: Uma análise das incubadoras de empresas de base tecnológica*, Editora Vozes, Petrópolis 1999.

Barua, A. et al; “Measuring the Internet Economy”, *Center for research in Electronic Commerce*, University of Texas at Austin, 1999.


Humphrey, J; “Principles for promoting clusters and networks of SMEs”, Institute of Development studies, University of Sussex (UK), 1996.


**Internet:**


Glossary

ANPORTEC
Associacao Nacional de Entidades Promotoras de Empreendimentos de Tecnologias Avancadas.

Bit
A binary digit representing the smallest unit of data in a computer system. It can only have one of two states representing 0 or 1.

Byte
A string of bits, usually eight, used to store one number or character in a computer system.

Business Model
The unique way in which organizations coordinate and organize work activities, information, and knowledge to produce a good or service.

Business Incubator
Business incubators are special facilities in which a number of new and growing businesses operate under one roof with affordable rents, sharing services and equipment, and having equal access to a wide range of professional, technical and financial programs.

Business Incubation
Business incubation is a dynamic process of business enterprise development. Incubators nurture young firms, helping them to survive and grow during the startup period when they are most vulnerable.

Data
Streams of raw facts representing events occurring in organizations or the physical environment before they have been organized and arranged into a form that people can understand and use.

Data Workers
People such as secretaries or bookkeepers who process the
<table>
<thead>
<tr>
<th><strong>Electronic commerce</strong></th>
<th>The process of buying and selling goods or services electronically involving transactions using the Internet, networks, and other digital technologies.</th>
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<tbody>
<tr>
<td><strong>Electronic Payment system</strong></td>
<td>The use of digital technologies such as electronic funds transfer, credit cards, smart cards, and Internet based payment systems to pay for products electronically.</td>
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<tr>
<td><strong>Ethics</strong></td>
<td>Principles of right and wrong that can be used by individuals acting as free moral agents to make choices to guide their behavior.</td>
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<tr>
<td><strong>Feasibility Study</strong></td>
<td>Process seeking to determine whether the solution is achievable given the organization’s resources.</td>
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<tr>
<td><strong>Gigabyte</strong></td>
<td>Approximately one billions bytes. Unit of computer storage capacity.</td>
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<tr>
<td><strong>Implementation</strong></td>
<td>Final stage in a decision model, when the individual puts the decision into effects and reports on the progress of the solution.</td>
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<tr>
<td><strong>Information</strong></td>
<td>Information is a stimulus that has meaning in some context for its receiver. Some (if not all) kinds of information can be converted into data and passed on to another receiver. Relative to the computer, we can say that: Information is made into data, put into the computer where it is stored and processed as data, and then put out as data in some form that can be perceived as information.</td>
</tr>
<tr>
<td><strong>Information Processing</strong></td>
<td>The conversion, manipulation, and analysis raw data into a form that is more meaningful</td>
</tr>
<tr>
<td><strong>Information System</strong></td>
<td>Interrelated components working together to collect, process, store, and disseminate information to support decision-making, coordination, control and analysis in an organization.</td>
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<tr>
<td><strong>Information Technology:</strong></td>
<td>IT (information technology) is a term that encompasses all forms of technology used to create, store, exchange, and use information in its various forms (business data, voice conversations, still images, motion pictures, multimedia presentations, and other forms, including those not yet conceived). It's a convenient term for including both telephony and computer technology in the same word. It is the technology that is driving what has often been called &quot;the information revolution.&quot;</td>
</tr>
<tr>
<td><strong>Intellectual property</strong></td>
<td>Intangible property created by individuals or corporations that are subject to protections under trade secret, copyright, and patent law.</td>
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<tr>
<td><strong>Instituto Nacional de Tecnologia</strong></td>
<td>National Technology Institute, in charge of promoting the development of Brazilian technology advances.</td>
</tr>
<tr>
<td><strong>Internet</strong></td>
<td>International network of networks that is a collection of hundreds of thousands of private and public networks.</td>
</tr>
<tr>
<td><strong>Intranet</strong></td>
<td>An organization’s internal network based on Internet and World Wide Web technology and standards.</td>
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<tr>
<td><strong>Knowledge workers</strong></td>
<td>People such as engineers or architects who design products or services and create knowledge for the organization.</td>
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<tr>
<td><strong>Mass Customization</strong></td>
<td>Use of software and computer networks to finely control production so that products can be easily customized with no added cost for small productions runs.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Microprocessor</td>
<td>Very large-scale integrated circuit technology that integrates the computer’s memory logic, and control on a single chip.</td>
</tr>
<tr>
<td>Megabyte</td>
<td>Approximate one million bytes. Unit of storage capacity.</td>
</tr>
<tr>
<td>Megahertz</td>
<td>A measure of cycle speed, or the pacing of events in a computer; one megahertz equals one million cycles per second.</td>
</tr>
<tr>
<td>NBIA:</td>
<td>National Business Incubators Association</td>
</tr>
<tr>
<td>Nanosecond</td>
<td>One-billionth of a second.</td>
</tr>
<tr>
<td>Network</td>
<td>Two or more computers linked to share data or resources such as a printer or modem.</td>
</tr>
<tr>
<td>Operating System</td>
<td>The system software that manages and controls the activities of the computer.</td>
</tr>
<tr>
<td>Patent</td>
<td>A legal document that grants the owner an exclusive monopoly on the ideas behind an invention for a determinate amount of time; designed to insure that inventors of new machines or methods are rewarded for their labor.</td>
</tr>
<tr>
<td>Program</td>
<td>A series of statements or instructions to the computer.</td>
</tr>
<tr>
<td>Programmers</td>
<td>Highly trained technical specialists who write software code or instructions.</td>
</tr>
<tr>
<td>Protocol</td>
<td>A set of rules and procedures that govern transmission between the components in a network.</td>
</tr>
<tr>
<td>PUC-Rio</td>
<td>Pontifícia Universidade Católica do Rio de Janeiro</td>
</tr>
<tr>
<td>Software</td>
<td>The detailed instructions that control the operation of a</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>computer system</td>
<td>Generalized programs that manage the resources of the computer, such as the central processor, communications links, and peripheral devices.</td>
</tr>
<tr>
<td>Terabyte</td>
<td>Approximately one trillion bytes. Unit of computer storage capacity.</td>
</tr>
<tr>
<td>URL</td>
<td>(Uniform Resource Locator) The address of a specific resource on the Internet.</td>
</tr>
<tr>
<td>Virtual Organization</td>
<td>Organization using networks linking people, assets, and ideas to create and distribute products and services without being limited by traditional organizational boundaries.</td>
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<tr>
<td>Venture Capital</td>
<td>Capital (as retained corporate earnings or individual savings) invested or available for investment in the ownership element of new or fresh enterprise -- called also risk capital.</td>
</tr>
<tr>
<td>Web Site</td>
<td>All of the World Wide pages maintained by an organization or an individual.</td>
</tr>
<tr>
<td>World Wide Web</td>
<td>A system with universally accepted standards for storing, retrieving, formatting, and displaying information in a networked environment.</td>
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