UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Innovation in Brazilian SME firms X Governmental Financial Grants

Claudia de A. Vieira Abreu Lima

Graduate School
Master of Science in Innovation and Industrial Management
Master Degree Project No. 2011:54
Supervisor: Rick Middel

Table of Contents

Chapter 1: Introduction

Innovation is a source of technological progression, which constitutes the process from invention to commercialization. The literature agrees that innovation is crucial for creating and sustaining organizational competitive advantage (Essmann & Preez, 2009). Consequently, it has been given extensive attention to the innovation importance for growth and development. Companies are facing intense competition and unstable economic environment. Seeking for new technologies to shorten product life cycles has been a trend to answer a fast changing market (Rothwell, 1994).

The role of the SME in the economy

In this context of economic impact, growth and development, small and medium companies play an important role; Ayyagari et al. 2007 described a unique cross-country database that presented reliable information on the influence of the SME sector to total employment and GDP across different countries.

Another acknowledgement of the SMEs function is in the field of sustaining global and regional economic recuperation, the World Bank Review on Small Business activities determines as its strategy for nurturing economic growth, employment and poverty mitigation, to invest at the development of the small and medium enterprise sector (Ayyagari, Beck, & Demirguc-Kunt, 2007).

Small and medium enterprises play an important social function and a key role in the global economy, especially in less developed countries, given its potential to generate jobs. "*The debate around the development of small firms and the generation of jobs is especially relevant in a world where employment becomes increasingly scarce*" (Grande, Geus, & Geus, 2007).

Moreover, small and medium enterprises provide the revitalization of local economies and act as economic agents who contribute to building productive flexibility of large firms. (Grande, Geus, & Geus, 2007)

Innovation in developing countries

Furthermore, considering innovation support, it is not only important at the company level but also for the development of countries as said before, it can support economic growth (Tidd & Bessant, 2009). According to his recent book, Baumol (2002) stated "*virtually all of the economic growth that has occurred since the eighteenth century is ultimately attributable to innovation*" (Baumol, 2002).

Looking from the angle that innovation is a crucial aspect for companies to develop new technologies and processes that allow them to have productivity growth and competitive advantages gains. In developing countries, the incentive to pursue innovativeness processes and operations should be even more present; in order to compete with the developed countries' well established technological background. In addition to that, developing countries have to gain the "time lost" with the battle of development. However developing countries have a harder path that is related to a certain number of exogenous factors that are usually present in these nations such as: macroeconomic uncertainty; instability; physical infrastructure (lack of basic services

such as electricity or "old" communications technologies); institutional fragility; lack of social awareness about innovation; risk-averse nature of enterprises; lack of entrepreneurs; existence of barriers to business start-up; lack of public policy instruments for business support and management training (OECD, Eurostat, 2005).
Therefore, it is reasonable to say that it is of extreme importance to have companies willing to develop and pursue innovative capabilities in order to support developing countries' economy by prospering and competing in a global setting. In order to respond to this necessity, the innovation agenda has become present in national economic policy throughout the world (Tidd & Bessant, 2009). And one performing tool that should be taken into consideration is governmental grants that could stimulate the innovation process of an organization internally.
Brazil is considered one of the most projecting emerging economies, with two trillion dollars GDP; it is the largest among Latin American countries, the ninth in the world. It perceives the incentive to science and technology and innovation as of higher importance. The country has already passed a law on innovation, with the technological research being mostly performed by public universities and research institutes, which great amount of its funds coming from governmental grants. On the other hand, the Brazilian economy has presented in the past an enormous income inequality, and has been struggling in recent years to narrow the gap. (INSEAD, 2010)
Brazil has one of the most entrepreneurial populations in the world, when measured by the percentage of population creating its own business. A large majority of those companies created are not related to sophisticated technology, however the entrepreneurial culture is an important attribute that has supported the country for pursuing innovation.

Financial Support

If we analyze the developing country Brazil, in South America, governmental financial support is strongly represented by the BNDES Bank that has as mission: "*to foster sustainable and competitive development in the Brazilian economy, generating employment while reducing social and regional inequalities.*" (BNDES , 2010)
Regarding the financial support programs, BNDES has three different financial lines to sustain development of Brazilian firms' innovation capabilities: Innovation Capital, Technological Innovation and Production Innovation. In addition to these lines, in order to mitigate the investments fall due to the international financial crisis, in June 2009, the bank launched a program for investment's support that will endure until December 2010. And at the 2010 second quarter report, BNDES informed that it has invested R$ 82, 5 billions of the program for investment's support, from this amount only R$ 0,5 billion for innovation.
Moreover, a significant characteristic that should pointed out when taking into consideration innovation is the size of the firms. There are differences when we analyze innovation processes in large or small firms. They act in a distinctive way in accordance to the required resources and skills. Small organizations have singular characteristics not present in larger ones - limited resources, lower market power and

informal communications (Hadjimanolis, 2000), what brings more interest to a study that could explore the processes of innovation in this type of organizations.

Innovation Factors

Still handling the subject of the importance of innovativeness strategies for companies, according to Statistics Canada, there are some factors that are present in successful small- and medium sized companies:

- *Innovation is consistently found to be the most important characteristic associated with success.*
- *Innovative enterprises typically achieve stronger growth or are more successful than those that do not innovate.*
- *Enterprises that gain market share and increasing profitability are those that are innovative.*

(Statistics Canada, 2006)

Consequently, in order to create and maintain an innovative organization there are some components necessary to support it. By components, there are some that should be cited as the vision, leadership and will of the organization, the appropriate structure, the individuals, the degree of innovation involvement, the organization climate and also the company's focus. These characteristics are important to be analyzed when studying innovative organizations. (Tidd & Bessant, 2009)

In addition to these components, there are also some innovative capabilities that could be examined to understand the innovation process being carried out inside an organization. According to the Oslo Manual of 2005, when investigating innovation performance in developing countries, it is of more relevancy inquire for investments in human capital specialization, improvement at the linkage with partners (universities, companies that could provide synergy and knowledge sharing, conferences), and the diffusion of Information and communication technologies (ICTs) that could boost the knowledge sharing and innovation than the inquire for the most usual indicators as: investments in research and development activities and revenue increase due to innovation product launches. (OECD, Eurostat, 2005)

The scenario depicted above sets the stage where this study will be performed; the environment of small-medium sized firms in developing countries will be the subject of the analyses.

Reflecting on the aspects depicted above and considering that most of the studies of large or small firms have been made in the context of industrialized countries; with a gap on the innovation knowledge considering the level firm in developing countries (Hadjimanolis, 2000), this study will embrace the analysis of small and medium sized firms in Brazil that pursue innovation and that have been granted with financial support.

Study Purpose

For this study purposes, the BNDES consideration of SMEs will be followed, therefore SMEs will be companies that present an annual gross revenue between sixteen to ninety million reais (Brazilian currency, in euros would be from 7 to 40 millions)

The study of this topic could arise questions as why companies apply for grants, how they can use the aid to develop innovative capabilities, what is the perceived added value of the grant for the innovation process, and in addition to that what kind of different government support the companies would like to have. Narrowing down all these questions we could end in a main research question of the Master Thesis Project as: "***How do government grants stimulate the development of innovation in SMEs in Brazil***?"

The companies when applying for a grant they should present a single project that would be the subject of analysis of the financial support provided by the Bank. However, this research would aim to explore the spill over effects that can result from the grant, not only to the performance of the single former project that was the matter of the grant raising.

It means that the analysis would be performed relating to the aspects involved in the development of innovation capabilities, the ones that could be improved with the support of the financial grant. An interesting aspect is to identify the opportunities that the company has been presented with the financial aid. Not only the investments used for the project of innovation that was presented to request the funds, but also the boost in other activities that could support further development of innovation capabilities. These developments could be related to investments in human capital, the linkage with universities, other partners or markets, and the use of Information and communication technologies (ICTs) to share knowledge within the company.

The goal is to perceive the funds role in the innovation process of the company, if the company could have pursued the path of innovation without the funds or if the fund played an important function in boosting and sustaining innovation capabilities.

Taking into consideration the BNDES financial support performance, the scope of this study would constitute in exploring three different small-medium Brazilian companies that have gotten financial aid from BNDES in order to support the development of innovative capabilities.

Chapter 2: Theoretical Framework

The theory fundaments should support the main subject of the analysis - how government grant stimulate the development of innovation in SMEs in Brazil. The search for the existing literature aimed to draw a link connecting innovation in companies with government support. In order to comprehend this link, a literature review was performed in order to draw a path understanding the innovation management within companies, the components of the innovative organization structure that are important to foster an effective innovation management, and at last the government role in developing/supporting the management of an innovative organization. Therefore, there is a need to understand the existent theory dealing with the organizational components that support innovation management within enterprises. Next to identifying the organizational structure for innovative firms, the following step is, understanding the components that the governmental grants could foster.

Pursuing this criterion, it will be presented components that are important to an innovative organizational structure and then an innovation audit is performed. The innovation audit is a concept that supports the idea of analyzing the company's situation in terms of innovation management. This audit is linked to a diagnosis of the company's organization in managing innovation processes. In accordance to the innovation management structure, it is then explored the BNDES financial impact, possible missed opportunities and room for improvement.

Regarding the theory background that supports and enlightens this research, the fundaments chosen are related to the theory that covers the aspects of "development of innovative capabilities", "the role of financial aid in innovation" and "innovation measurement"

The keywords used on the search for support material were: "innovative capabilities", "grants innovation", "financial aid", "innovation developing countries", "SME role", "innovation SME", "Innovation audit".

Innovation Organization Components

Supporting an assessment to have a diagnosis of the innovation organization management situation, the components involved in the management processes should be addressed. The components that were chosen to be explored are also related in the audit literature. However, in this part they are treated not only as a diagnosis but also as part of the processes throughout the organization. In addition to that, their study reinforces the understanding of the impacts that they have in the organization management.

The objective is to later, lead to the analysis of the impact of government grants in improving or not these components.

Therefore, a theoretical background that is important to use as support to the study is related to the components that are behind an innovative organization – relating to the aspects that could be impacted by the governmental funds.

In fact there is a recurrent trap that innovative organizations are present in a chaotic environment in order to leave place for creative thinking. However there are certain types of innovation that do not work in informal environment. There is a need of finding the specific structure that suits the requirements of the operational processes. Added to the specific structure, an integrated set of components reinforces an environment that enables innovation. (Tidd & Bessant, 2009)

These components were chosen due to the fact that it is possible to search for their existence when analyzing the companies.

The presence or not of the components bellow could be analyzed at the companies in order to identify if the financing project aggregates value to the company's innovation structure:

Components of the innovation organization
1- Shared Vision, leadership and the will to innovate
2- Appropriate structure
3- Key Individuals
4- High involvement in innovation

5- External Focus

Table source: (Tidd & Bessant, 2009)

Shared Vision, leadership and the will to innovate

According to Tidd at al. 2009, top management commitment is usually associated to successful innovation organization, the challenge is to have this concept converted into the daily life of the company, meaning, the management having attitudes that clearly demonstrates its support of innovation.

Surveys reveal that the role of leaders is the best indicator of innovativeness of enterprises. An analysis by McKinsey in 2007, for example, with a sample of 600 managers and professionals, indicated that the two main characteristics that promote innovation in enterprises are: the existence of strong leaders who encourage and protect innovative behavior, and senior executives who spend their time directing and managing innovation. However, experience in developing an organization where innovation plays a central role is often disappointing for most executives.

Although they cite innovation as an important aspect for growth, few executives explicitly lead and manage for innovation purposes.

Some do it on an ad hoc basis when necessary. Others allocate innovation as part of the agenda of senior executives. In a few cases, innovation is fully integrated into the strategic processes of the company. Some leaders' actions, which are shown to be effective in encouraging innovation, include the definition of the type of innovation that promotes growth and achievement of strategic objectives of the company, the inclusion of innovation in their formal agendas, in regular meetings of the leadership and the establishment goals and performance objectives related to innovation.

It is emphasized the role of leader as a driver of organizational process change appointed as designer (design scenarios), guide (helps in the development of people, enhances the group, encourages commitment and creativity) and Professor (reveals mental models, promotes learning, works in a systematic way) assuming different postures. (Senge, 1990)

Since the inhibition of innovation often occurs due to pressure by short-term results. Backed by the exclusive focus on performance rewards in the short term, this pressure contributes negatively to the formation of innovative leaders, who think not only for today but also in the future. An innovative leader must connect pragmatic visions with dream visions.

The vision and leadership discourse should promote a sense at the employees that there is room for their growth in the company, bringing even more competent people than themselves to the organization.

Another factor inhibiting innovation comes from the failure of executives to model behaviors that encourage innovation, such as risk taking and openness to new ideas. In an innovative culture, employees know that their ideas are valued, believe it is safe to express themselves and feel comfortable to develop them. This type of environment can be more effective in sustaining innovation than monetary rewards. (Tidd & Bessant, 2009)

According to the literature cited above leadership is a pillar to the innovation management, representing an important key for success. The presence of leaders that encourage innovation in a broader sense throughout the company, spread and emphasize the importance of an innovative vision, indicates an organization that follows an innovative organizational management directive. Therefore, the presence of this component in the company could give an affirmative indicator that it is an institution that has a pro factor supporting its innovative endeavors.
Having said that, the study of this component would aim to search for the leaders actions in the company, their behavior towards innovation management, in terms of support, commitment, and "spreading the word".
In addition to the analysis of the leadership behavior in the company, the use of this background should lead to an understanding if the grant has a direct or indirect impact in the innovation process embedded at the component.

Appropriate structure

The componenet of "appropriate structure" suggests that in order to the company be able to support innovation and act as an enabler, there is a need of the formal structure to fit the requirements of the people's believes and behaviors. The structure could act either reinforcing the innovation or not, by blocking the comunication, stressing with the hierarchial organization. Therefore the importance to understand and work on an organization that harness the innovative climate. (Tidd & Bessant, 2009)
The practice of innovation requires the observation of the fundamental aspects related to the internal atmosphere, aiming to create an appropriate organizational environment. The organizational dimension of innovation involves quite complex variables such as competence of the team responsible for design innovation, recruit the right people, leadership, organizational integration, administrative support, interdepartmental conflicts. (Leifer, O'Connor, & Rice, 2002)
According to the theory concept of "fit and focus", a company's operations' organization has congruence between the strategic choice in competing in the market and the way its operational arrangement is structured, built and managed.
The thought of "focus" is related to "fit". The company should focus in choosing a structure that fits its organization's strategy. It should even aim to simplify its operations, limiting the range of products or services and even get rid of others that could hamper the focus of the company.
There are fundamental components involved in this strategy's implementation: the company' s choice about capacity, in-sourcing, outsourcing, or vertical integrated, sites, information and process technology, resource allocation, human resource systems, work planning and so forth.
The idea behind this concept of "fit and focus" lays on the company's objective in being outstanding form its competition by exceeding in a specific capability. This capability could be related to different operational tools or performance, like higher quality, dependability, flexibility or speed / responsiveness. Aiming to be the number one of only one of these operational characteristics, the company has more chance to succeed than targeting many of them.

However it has to be pointed out that objective should not be misguided to operational excellence, it should be having a organizational structure that enables the company execute its strategic choices. (Hayes, Pisano, Upton, & Wheelwright, 2005)

Key Individuals

Another crucial tool to innovative organizations is the key individual that acts as enabling figures. The innovation projects are usually surrounded by uncertainty and not all of them are doomed to succeed. Therefore, the need of distinct figures that works as motors of the new ideas and projects. (Tidd & Bessant, 2009)

The presence of key individuals is a variable that has been strongly linked to the success of technological innovations. This is an individual who informally emerges in an organization and makes "a decisive contribution to the innovation by actively and enthusiastically promoting its progress through the critical stages". (Howell & Higgins, 1990)

In addition to that the technical knowledge also is important to make the innovative projects work through, however not only technical expertise is a must, the part of giving inspiration to others of the group when facing issues or obstacles, allowing commitment and motivation of the team.

A second role that emerges as imperative is the one of organization sponsor, indicating the responsibility not only to deal with technical issues but also to be able to convince others that might criticize the project's fundamentals or to gather important individuals that contribute to the project. (Tidd & Bessant, 2009)

High involvement in innovation

Everyone possesses the ability to create and solve problems; the leap to company's innovation success lays on the ability to find tools to make the focus on these abilities on a daily basis and throughout the company's processes. The incremental innovation of one individual could be limited however the sum of these changes could become greater in their extent.

There is an example of this situation cited above, the Japanese concept of "kaizen" of continuous improvement. Automobile enterprises like Toyota and Matsushita gather value suggestion and feedbacks from their employees that result in improvements implemented.

The key to focus on improvement in order to become a better innovative organization is present in the way that the employees feel enabled to find and solve issues. They should not fear the mistakes, just the opposite they should seek different resolutions. It is also important that these ideas are shared among the company in order to have building blocks that different people learn and add pieces of ideas.

Moreover, there are studies that point out that there is a secondary effect with this learning experience, meaning that the more people are involved in changing processes more they appreciate the change itself. (Tidd & Bessant, 2009)

In terms of company's resources, the major difference is related to people, through proper management of intellectual capital that makes possible the constant improvement of organizational skills. There is a controversy surrounding the model and the labor relations manager profile that will prevail in organizations in the future,

but the functional integration seems to be a common issue in all approaches. It is defined learning organizations as those "skilled at creating, acquiring and transferring knowledge and modifying their behavior to reflect this new knowledge and insights". (Fleury, 2002)

External Focus

There is a constant discussion in the literature towards the importance of the focus on the customers needs in order to obtain the innovative product. The networking approach is also commented, meaning that not only the customers are essential for the company understanding, but as well all the chain, suppliers, collaborators, competitors and multiple players.

Going even beyond this concern with outside the company's boundaries, the company could be seen as not a simple single entity but a cluster of industries of collaborative partners, a group of mutual learning. This concept gives direction to the idea of shared product development, strategic alliances, regional small-firm clusters, and industry associations. (Tidd & Bessant, 2009)

Another approach of the motivations of companies for pursuing associations, from the strategic point of view, is brought by Lorange and Roos (1992), pointing to the previous position and objectives of the companies, which are classified into four types: stand, reach, remain and restructure. Two concepts are linked to this approach: the importance of cooperation for the central activity of the company and the company's relative position in its market. (Lorange & Roos, 1992)

Innovation Audit

Innovation is a process that permeates the entire organization and therefore the integration and joint efforts from different areas are fundamental for successful management focused on the development of new processes or products.

An important step to implement an innovation management process within the company is to establish an appropriate organizational structure. Therefore, it is important that the organization knows which are the main variables that affect their innovative potential.

An innovation audit can foster the definition of this structure, giving a diagnosis of the organization, with the purpose to assess the company's current situation, highlighting their strengths and key opportunities for improvement related to innovation. This assessment allows an analysis of the organization's flow of decision making process, in addition to that can identify people's profile to act as facilitators of the process and the staff's training needs. (Coral, Ogliari, & Abreu, 2009)

The innovation audit is a tool that could be used to reflect on how the innovation is managed on a firm. The financial audits could be used as comparative to explain the objective of the innovation audit. Like the financial audits where the company's health and financial operations could be checked, the innovation audit is formulated with questions based on efficacious and failed experiences of other companies. This checklist is than used as a score to pinpoint areas that are efficient and other that could be improved.

The innovation audit could be used to produce a management framework that can be applicable to improve innovation through the understanding of the organization

situation in dealing with innovation management. The results of the audit give a valuable measurement of innovation towards the organization management and learning about innovation. It gives at a strategic management level the organization gaps that could exist regarding the management of the process of innovation with the objective of creating competitive advantage. (Verhaeghe & Kfir, 2002)

The important fact here is to consider the innovation audit as a key of reflection and understanding of the company's management innovation directives, and not to use as a scorecard or to be considered as winning prizes. The aim should be through understanding the current situation be able to draw a plan to implement changes where is needed. (Tidd & Bessant, 2009)

There are different kinds of innovation audit; the innovation management presented by Hull at al (2000) is focused on the knowledge management aspect important also to innovation management. This audit seeks to understand the potential contribution of Knowledge Management on the company's innovation activities.

Another audit, presented by Chiesa at al. (1996), is the technical innovation audit. The main aspect analyzed at this audit methodology is the process of technical innovation. The audit encompasses the management activities and the tools used to perform innovation.

The innovation audit analysis presented by Coral at al (2009) covers five main organizational aspects: Innovative organization, strategy, learning, linkages and processes. Within these aspects, the factors considered are:

Innovative organization:

- Sharing the vision, mission and goals: to assess whether the vision, mission and goals are disseminated and understood and how they are transformed into operational goals in departments and individual level;
- Leadership style: evaluates how much the company, through its managers, allows and encourages an open environment with broad participation and empowerment of employees;
- Participation and employee motivation, leadership style and empowerment decision-making;
- Technical team: knowledge base and level of qualification people;
- Company's organizational structure: type, rank, training of project teams;
- Areas involved in the innovation process and how the integration between them;
- Innovative environment: it evaluates whether the company has an environment where people know they can bring forth innovative ideas, receiving support from the company. Successes are rewarded publicly;
- Existence of communication barriers and internal resistance;
- Available resources (personnel and financial) and access to finance;
- What is the vision of managers about the role of innovation for the company.

Strategy

- Current technology strategy;

- Marketing positioning (segment, market share, product portfolio, customers, competitors, etc.);
- Skills in relation to current products and technology development (the professional profile, knowledge, among others).

Learning

- Systematic monitoring and dissemination of information and identifying opportunities;
- Staff development: evaluates whether the company invests in staff development at all levels, anticipating needs, and monitoring of results;

Linkages

- External engagement: assess how external groups (partners, suppliers, customers, consultants, universities) are involved in a formal way at the right time during the development cycle. And if they are understood and recognized the value / importance of the external resource;
- The company's experience in working with teams and with partners (consultants, research institutes, suppliers, customers, universities, etc.).
- Customer orientation: assesses how customer-oriented is the company as a whole. A customer-oriented company identifies the needs and expectations, and this information will be disseminated within the organization to identify possible opportunities for innovation;
- Relationships with suppliers, evaluates whether the company maintains partnerships based on mutual trust with suppliers, as well as those involved in product design and continuous improvement;
- Relationship with universities and research centers: assesses the extent to which cooperation with universities and / or research centers, and systematic and comprehensive.

Processes

- Investment in modeling technology, assesses the existence of strategies to find new process technologies that can improve quality levels, costs and services;
- Strategy of technology products, assesses the level of understanding of how the company uses its core competencies in technology and how to monitor competitors' technologies;
- Generation of innovative product concepts: evaluate whether the company has a structured way to verify customers' needs and how wide and external involvement in developing concepts for new products;
- Information systems: assessing how the company's information systems are integrated and are used to manage the business in a proactive manner without creating barriers
- Infrastructure R & D: evaluate the existing R & D how much the degree of modernization and meeting the needs of the company, highlighting the importance of keeping under control the strategic skills;
- Employee involvement: measures the degree of involvement of employees, how they contribute to the process of decision making in business and how

their ability to contribute; flexibility in the workplace: assessing the current capabilities of work teams in terms of formal qualifications;

(Coral, Ogliari, & Abreu, 2009)

In this current study, the innovation audit presented by Coral at al (2009) was chosen, because of its focus. This audit is related to the process of the innovation management however not only present in technological enterprises as the one presented by Chiesa at al.(1996). The knowledge management is also an important factor for innovation management however this study would like further elements; therefore the audit presented by Hull at al. (2000) was not followed.

The innovation management audit can represent a strong tool as it draws a picture of the innovation management situation of each company studied. Furthermore, it gives the guidance to the analysis of the innovation components of the company impacted by the governmental grant. Its use fosters the ability to understand the areas that the company should be focusing on, and also aiming these areas to improve with the help of the grants.

Government Role

Another aspect that could enlightens the analysis of the governmental financial aid impacting Brazilian SMEs working towards innovation is the role of the Government in supporting innovation in national sphere.

A well functioning National Innovation System depends of the capacity to actuate on its institutional base, which is anchored at the triad: government, technological research development institutions and enterprises. Brazil has indicators that point to the direction of development; it has been improving the results towards the technological and scientific production and also increasing the total amount of financial resources to support projects. Among the many scientific production indicators, two that stand out are the systemic increase of new doctors degree, nowadays it surpasses the ten thousand yearly, and, the capacity to publish scientific reviews at specialized sectorial magazines, where the country answers to 1.5% of the global production (Coral, Ogliari, & Abreu, 2009)

The expansion of measures to support innovation is important in the segment of small and medium enterprises (SMEs), since their production units do not have, as large firms, diversity of production lines to spread the costs and risks involved in launching new products, neither financial capacity to fund activities that require long-term maturity prior to obtaining economic results.

On the other hand, a positive side is represented by the production flexibility, allowing them to redirect activities to new niches of production and develop new products before a large company can decide on its production and complement, with intermediate goods, production lines from larger companies. The adequate support to the segments of smaller firms can help to decrease the bottlenecks which prevent more intensive processes for innovation and greater internationalization of business operations. (Morais, 2007)

There are important actions that the government should include in the agenda. Governments that have facilitating policies inspire innovation climate by supporting

key factors and inputs. Formulation of rules encompassing patents, copyrights and piracy issues set an important stage for innovation boosting.
In addition to that, other sources of innovation support include the regulation of tax policies reduction or incentives in research and development. And the ideas exchange between government and companies should address the industry needs in order to have sync between the actions taken and the industry requirements. (INSEAD, 2010)
Government should stimulate investments in research and development of the enterprise sector with fiscal and non-fiscal instruments. Financial instruments such as tax incentives and research grants in order to succeed, it is needed a strong emphasis placed on non-fiscal measures, and one of the most important of them is human resource development. (Mani, 2004).

Framework

Following the literature review just introduced, a theoretical framework is presented bellow that will be used as guidance of the analysis in this study.
First, the exploration of the innovation organization management components supports the analysis of the financial grant's impacts. Second, the innovation audit gives the diagnosis of the situation of the companies, giving the direction of missed opportunities and future improvements.

Components	**Key Characteristics**	**Intended Analysis**
Shared Vision, Leadership Will to innovate	Shared goals and clearly articulated Broad strategic intent Top management commitment	Presence of leaders, vision and strategy directives Indirect or direct impact
Appropriate structure	Organizational plan that fosters creativity, learning and interaction	Identify organization structure Indirect or direct impact
Key Individuals	Roles that give vitality and promote innovation	Existence of key individuals Indirect or direct impact
High involvement in innovation	Broad participation in the organization and activity of continuous improvement	Innovation activities present throughout the company Continuous improvement Practices Indirect or direct impact
External Focus	Guidance through internal and external customer	Company's alliances Customer orientation Indirect or direct impact

The table depicts the components explored their most important characteristics and the intended analysis of each of the components.
It is important to point out that the analysis done at the companies have the objective to perceive the management of the components throughout the organization. The component of Shared Vision, Leadership and will to innovate for example, the relevance of the analysis will stress at the point if the companies have actors that function as leaders, if so, if the leaders are able to spread and support the vision of

innovation throughout the company. Moreover, also concerning this component, it should have an analysis if the top managers are committed with a strategy towards innovation. With these analysis is later relevant to understand the impacts that the BNDES financial grant had or could have had in developing this component. In this case, it would be if grant has the power to interfere in the presence or not of leaders in the companies or if it has an impact over the companies' strategy.

Regarding the component appropriate structure, the main characteristic of this component lies in the kind of structural behaviors are encountered at the company. In terms of the company plan to foster innovation processes throughout the entire organization. The study planed at the company should identify the existent organization structure in order to add value to the final analysis how or if the financial grant impacted this component.

The key individuals are considered as the personnel that play crucial roles at the company's process of innovation. The analysis would aim to detect the existence or not of these key individuals and if the grant had any kind of influence on this component.

The component of high involvement in innovation is related to the company's objectives towards innovation. In this concept is also embedded the idea of continuous improvement in the daily activities of the company. Therefore the analysis is concerned to detect the practices of continuous improvement throughout the organization and the influence of the BNDES's financial support.

The last component related to external focus, is concerned with the attention of the company dealing with external partners, as the clients, suppliers, competitors, universities. The study aims to understand the links that the company pursues in addition to the BNDES's grant development of these links.

The innovation audit works as the tool to draw the company's diagnosis towards innovation management, adding to the diagnosis of the current situation it supports the understanding of missed opportunities of the grant's investment, and the perception of future opportunities to the companies.

Chapter 3: Methodology

Research Strategy and Design

The Master Thesis Project should be conducted with an inductive strategy. Meaning that there will be a theory generation, the research will not be conducted to test an already existed theory. Therefore a qualitative approach will be taken into place; there will be no employment of measures.

Three Brazilian SME companies are subject of the study, taking into consideration that three companies are involved; we could say that the research design will have a multiple case study design. The emphasis is on each individual case with the objective to generate an intensive examination of each one. This approach is undertaken in order to be able to identify unique characteristics of the subject of the analysis. The aim is not to reach a generalization of the findings, but identify and analyze the unique features that are present in the companies chosen to be studied. In this research

analysis the multiple case study is used in order to collect empirical data that investigates a contemporary phenomenon within its real-life context
However, a comparative approach could also take place in order to establish similarities or differences of the companies regarding their experience towards the governmental aid that they have been granted. It could be interesting to see what are the unique characteristics present in the development of innovative capabilities and what are the common ones.
In this section the discussion lays in the data-gathering task that should be performed in order to have an effective data to support a deep analysis towards the main research question of the Master Thesis Project, as stated before: "***How do government grant stimulates the development of innovation in Brazilian SMEs***?" .

Research Methods

As said earlier, there will be conducted analysis at three Brazilian companies; an overview of the cases chosen is presented on the following table:

Organization	Areas of activity	Site location	Size:	Innovation Project
Poly Easy	Polyethylene pipes	Sao Paulo, BR	Medium	* Technology Development and Prototyping of Field Joints for Thermally Insulated Pipelines * System Development in Application of Thermal Insulation Excerpts New Curved Duct
Arinos Quimica	Products derived from Polyurethane	Sao Paulo, BR	Medium	* Develop, optimize, validate and disseminate the use of Agent Expander Methyl AL in several polyurethane systems to replace HCFC 141B Expanding Agent
Labtec	analysis and quality control	Sao Paulo, BR	Small	* Multi-residue chemical Analysis of Veterinary Drugs Residues of medicines (drugs) in animal tissues.

Table sources: (Poly Easy do Brasil Ltda., 2007), (Arinos Quimica Ltda, 2010), (Guabi, 2005)

These companies were chosen as they present the characteristics listed bellow:

- They are considered as medium sized companies by the BNDES Bank (Gross Annual Operating Revenue between 16 MM BRL and 90 MM BRL);
- They have been approved for governmental grant from BNDES Bank in 2010 in the innovation program;
- They have undertaken innovative strategies;
- They are situated in Sao Paulo, representing an easy access.

Following a qualitative research strategy, there is a need to perform interviews with the companies mentioned before. These interviews would explore in depth information of how the companies have applied for the grant, what are the actions that they have planned to perform with the grant, what are their success objectives, how

they perceive the grant as necessary to develop their innovative capabilities and so forth.

In fact, two sets of interviews could be relevant. For qualitative interviews, semi-structures and unstructured interviews can take place.

Therefore, in the first interviewing set, a semi-structured interview will have formulated questions by the researcher in order to access information that could be then compared between the three companies. In this case, an audit questionnaire was chosen to identify the companies' innovation management environment (Tidd & Bessant, 2009).

In addition to that a set of information should be collected beforehand in order to access the main points of interest for the research, and also acquire knowledge about the company – main business, organizational structure. Then, the researcher will be able to formulate the questions that would aggregate value for the main research question that are presented at each company.

Afterwards, a set of unstructured interviews could be conducted in order to give more freedom to interviewees to talk about the topics that the researcher could point out as being the most important from the first interviewing set. At this part the interviewee could express his point of view about the innovation aspects that the BNDES fund was responsible. The initial interview guide is presented as part of the appendix.

A point that should stand out in this task, it is the importance to take care of some aspects that could hamper the research. It is stated that some issues that could be present in a qualitative research are the excess of subjectivity, the difficult to replicate and the problems linked to generalization (Bryman & Bell, 2007). In order to deal with these issues there are some actions that should be taken care, for example, the data analysis should not be solely influenced by the researcher view. In addition to that, it should have a focus on the quality of the theoretical inferences in order to give assessment to generalization of the research (Bryman & Bell, 2007).

In this study the interviewee's answers were related to the theory in order to identify reasoning behind the findings presented.

Before the interviewing process, a meeting was established with the companies' managers, in order to present the objective of the study, and information from the companies history and management was collected.

The interviews took place with the managers that were involved with the innovation activity in the company, especially with the BNDES funding project. The first set of information gathered from the companies' interview was an audit questionnaire establishing the companies approach to manage innovation.

The second round of interviews was performed with the same managers when they were able to express their ideas in terms of the BNDES funding situation and also the opportunities for the future.

The interview guides are related at the annex.

Data Analysis

The approaches of data analysis that are more frequently present in a qualitative research are analytic induction, narrative analysis and grounded theory. In this study it

will be used the grounded theory approach, as it is the one that could be used an iterative process. It means that an improved theory could be formulated while data is gathered. Moreover, as said before, in this research there will be a generation of theory, and this theory will derivate from the data collected.
Another task that will take place is the coding task, where the data collected will be broken into smaller pieces in order to facilitate the analysis and as well to determine the most crucial aspects that deserve further questioning. With the coding is also possible to identify common aspects between the two companies facilitating comparison analysis.

Chapter 4: Empirical Findings

In this chapter it will be discussed the information gathered with the interviews under the light of the theoretical framework previously discussed.
The data collection supports an analysis regarding the innovation path that the company has pursued. The companies chosen have applied for an innovation fund of the Bank BNDES in Brazil.
The objective here was also to study the companies understanding of their own situation regarding innovation environment. In addition to that, the analysis also sought to understand the impacts and the effects that the funds could have in the company's innovative performance.
First it is presented the aspects regarding the innovation structural components of the companies dealing with innovation management, and next, and audit innovation data, establishing a current innovation organizational management diagnosis of the companies.
The three companies were asked to answer a questionnaire that can be checked at the appendix. This questionnaire covered five aspects in order to identify the innovation management in the company. These five aspects were: Strategy, Processes, Organization, Linkages and Learning.
Unfortunately the company LabTec did not answer the questionnaire.
For each question the companies were asked to give a score in a range of 1 to 7 specifying how well the manager felt that the company manages innovation. The score 1 represented "not true at all" and the score 7, "very true".
The strategy aspects questioned collected information about the vision of the company related to innovation, how clear the enterprise is in terms of strategic necessities surrounding innovative behaviors.
The questions about processes gathered data about the organization involvement in innovation in their daily activities. In addition to that, it also gave focus on the companies attitudes towards continuous improvement. Concerning the organization aspect, there was a focus on the information about the company's structure in performing innovation management properly.
Regarding the linkages questions, they aimed to assemble findings about the company's approaches concerning external and internal customers.
And the last aspect is learning, where the concept of learning capability was explored.
Following this current situation diagnosis, it is depicted the secondary impact of the

BNDES grant supporting or not the development of these aspects.

LabTec

Company's description

Labtec was formally constituted in October 2005 (10/06/2005), but its operational activities, with own income, only began in 2008. However, it exists as a division of Mogiana Food for years since the founding of this company, July-1974. As the Mogiana Food began competing with multinationals that were already established in Brazil and it had its own known brands, one way to give credibility to their products was to provide quality certificates. Thus, it came the idea of the creation of the lab for analysis and quality control.

In the nineties in order to further ensure the quality assurance and the performance, a large investment was made in the laboratory. Following that, other investments were made in various kinds of analysis such as:

- Animal nutrition
- Veterinary
- Microbiology
- Stability studies
- Residue studies

Already in this decade it was established the National Program for Control of Residues and Contaminants – PNCRC by the Ministry of Agriculture, Livestock and Supply. This Program aims to control the drugs used in animals for consumption, particularly among those who have a great export potential - cattle, pigs and poultry. Even with the Government owning laboratories, they are insufficient for the demand, therefore it was decided to open to the private sector the possibility to provide these services. The Mogiana Company invested in tools, training and certifications. However, to qualify for accreditation it was required to be incorporated as a company and in a different factory of Mogiana. Again, with investments, it was formed the company Labtec, in 2005 and in 2008 it began providing services to third parties at a facility in Hortolandia - SP - in a rented building.

With market growth and the prospects that exist mainly in the sectors it operates and others who may come into play would go to a proper place, adequate to new prospects and investment in professional training, development of new analysis methodologies and equipment first level.

The company has purchased land with 20,000 m2 and has already made a design of a laboratory with 2,000 m2 built area in the same city Hortolandia - SP. With this laboratory and investments in personnel, training, outside consultants, equipment, certifications and other laboratories it will become a Reference Stability Control and Animal Wastes and it may also enter into other sectors that are not currently serviced.

- Sectors of activity and key products / brands;

Current activities of the Lab Tec are providing services of Physical Chemical Analysis focused on Quality Control, Stability Studies and Analysis of Veterinary Drugs Residues of medicines (drugs) in animal tissues.

It does not have a brand, but their analysis and certifications are issued in the name of Tec Lab Chemical Analysis Laboratory.
With the investment plan that is submitting the BNDES, the company will enter into other segments of analysis, which are detailed in the following chapters.

Shared Vision, leadership and the will to innovate

- Corporate strategy

The company main products and services are: Studies and Analyses focused on - Product Stability, Waste Medicines, Pesticides and other Contaminants and the physiochemical Raw Materials and Products Formulated.
Following the study details:
- Stability Studies: This service consists on a set of tests designed to provide information about the stability of products as to the limits previously specified to establish their validity and period for use and determine the packaging and storage conditions.
These studies are divided into two categories; one is complement to the other, namely:
i) Accelerated Stability Studies
Studies designed to accelerate the chemical degradation or changes of a physical product in forced storage conditions forced. The Data obtained, combined with those from studies of long duration, can be used to assess long-term changes in conditions not accelerated and to assess the impact of short exposures conditions beyond those set forth in the labeling. These tests are usually done in high temperatures and humidity, for a short period of time.
ii) Studies of Long-Term Stability
Studies designed to verify the physical, chemical, biological and microbiological characteristics of a product during the recommended period of validity. And they are used to establish or confirm the expiry date, and establish recommendations for storage conditions.
They are usually done at room temperature and for a period equally or exceeding the validity period stipulated by the product manufacturer.
All companies that produce food or medicines to the human and animal sector, must necessarily carry out these types of tests, even before market their products.
- Waste-Studies of Drugs and other Contaminants: This service consists on a set of tests designed to provide information about the amount of drug residues, pesticide or other contaminant remaining in the flesh of animals intended for human consumption, or those residues found in vegetables, legumes and fruits.
These wastes may be from treatments to control crop pests, treatments to correct the soil type, external pest control in animals, or from the treatments to combat the diseases that affect animals.
Another application for this type of testing is the establishment of the period grace or quarantine, during which the animal or plant must be free from contact with certain types of medications or inputs that leave no trace after its use.
These tests are relatively complex and require equipment sophisticated, usually operated by highly specialized personnel.

Besides the companies that manufacture pesticides and medicines, also those who use this type of material are consumers of this type of tests, as well as manufacturers of food and feed medicated.
Other companies also need to perform the tests, for example, exporters of meat, fish and their derivatives, which must prove the absence of any residue or contaminant in the products for export, mainly to countries as Europe, Japan and the United States.
- Physiochemical Analysis: This service is related to physicochemical analysis of raw materials and / or formulated products, enabling a better understanding of materials, thus helping the development of formulations efficient, resulting in safer products and quality assured. It can be considered a tool for optimizing production through monitoring the various parameters that influence the performance of products and that become almost indispensable for quality control.
All types of industries that manufacture products used for treating human or animal use this service. In addition to that, chemicals industries, cosmetic industries, manufacturers of fertilizers and sanitizers also use this service.

- Market Structure

We can somehow say that the main market that LabTec will direct their research began in 2005. This year, through the Program for Control of Residues and Contaminants, CRCA, the Ministry of Agriculture began requiring studies on product Waste registration and issuance of certificates of analysis for export of meat (beef, poultry, swine, equine and bovine live) milk, honey, eggs and fish. In order to lead this path, LabTec structured its laboratory, sought for outside expertise (literature, conferences) and developed methods of analysis. Since then, it has grown requirements for analysis and currently there are 10 laboratories accredited. These labs cannot meet the current demand and with the increase of current analysis as well as the emergence of new ones, this gap will become more critical.
Today, LabTec is not yet part of the accredited laboratory network. The company's strategy to develop the methodology of multi-residue analysis - new method object of the BNDES's project - then ask for their accreditation, presenting the market a remarkable difference.
With respect to physiochemical analysis is a supplement to control quality of companies and also the possibility of increased product performance.

Appropriate Structure

- Administration

The company has a fully professional management with a reduced number of employees. The Board is exercised by the zootecnist Savio Ambrozin, who is also the Technical Director of companies Mogiana Food Rations and Midwest.
There are 03 management positions that would be characterized as directors: General Manager of the Laboratory, Quality Manager and Commercial Manager. Afterwards, they have 02 managers of laboratories: Waste Study and Study of Stability and an administrative oversight.
The company Mogiana Foods coordinates Labtec's financial department.

- Industrial units and their location;

The Laboratory and the company's headquarter is located at Hortolândia - SP, in a rented building. However, with the investment project, it will move to its own facilities to be building at another street also in Hortolândia, on the land already acquired.

- Number of employees;

The Lab Tec could count in January 2010 with 39 employees and, 02 with master level, 16 with college degree, 13 with technical degree, and 08 with middle schooling level. It also has 04 trainees enrolled in an university, 01 internal consultant and a trainee from high school, totaling 45 people directly involved in the operation.

High-involvement innovation

The market trend is to use more in-depth studies and analysis that aim cost and time reduction. In the market Waste Control it will represent a remarkable difference.

Nowadays, there is an analysis for each residue and for each Matrix (animal organ such as liver, kidney…) what brings a great difficulty. When a sample is collected, it is fragmented and after that a study is done for each of necessary analysis.

Sometimes it is necessary to send samples that will be shared among more than one Laboratory and await the outcome of each study to get the certification that complies with the necessary specifications.

Therefore, Lab Tec intends to research methodologies to study Multi-residue analysis. From this the company would be able, with only one analysis, to check the level of residues in more than one organ, or more residues in one or more organs. This study, if successfully completed will decrease significantly the time required for issuing a certificate and will also have a lower cost than the sum of all studies previously required. The company's forecast is that the market will shortly demand this technological change so gradually, in a medium-term horizon as a radical change, the uni-residues studies will have no place.

LabTec was an activity part of the company Mogiana Foods. With the opportunity arising from the PNCRC, Labtec was incorporated as a company and restructured to absorb the necessary knowledge to new areas of studies: Stability and Residue Analysis. Increased its staff with technical experts, it studied and adapted to the practice of literature studies and analysis and acquired tools.

External Focus

The company is not aware of research from universities or institutions research studies in Brazil for analysis methodologies of multi-residue. The company obtained information on literature, suppliers of instruments and also outside consultants.

The BNDES project of technological innovation

The project presented to BNDES would impact the marketing and channels of distribution used by the company.

Currently, Labtec's commercial area consists of 03 account executives that are responsible for visiting clients and seeking new customers. The Labtec pioneered this commercial structure in the industry. Previously, its competitors did not have sales structure.

With the project they should increase this number and other appropriate channels as

specialized media, conferences and exhibitions.

It is clearly perceived a growing market trend towards studies that reduce time and reduce costs in the analysis required by regulators or by "sanitary barrier" in exports. The research that LabTec aims to develop, the studies of waste product, will become a huge differentiation compared to its competitors due to the multi-residue analysis.

The technological process that is being developed, aims to establish methodologies to achieve these characteristics, at less cost and time than other processes.

Therefore, it is reasonable to say that this technology would bring to Lab Tec key factors of competitiveness such as:

- Product differentiation
- Cost leadership
- Adaptation to specific market
- Reduction of delivery time (final analysis)
- Providing customer service

The company is not aware of this kind of research in educational institutions or technologies that is currently being developed in Brazil. Thus information sources that are primarily used by Lab Tec are foreign literature, fairs and conferences, clients, contacts with governmental and private sector providers of instruments and equipment.

The growth strategy of LabTec has the following points:

1. Development of study methodologies for multi-residue analysis of pesticides and animal medicines
2. Laboratory Accreditation for issuance of Certificate Analysis of the new Waste Technology
3. Market research in order to check opportunities of development of new technologies in the market analysis and human nourishing
4. Development of new methodologies of study analysis for the above markets that present promising, that present the same features of the multi-residue research in animals: a need for new technologies, market size, absence of national players

Thus the search for new markets and diversification of the product lines are part of Labtec's growth strategy.

- Business Plan Investment in Innovation Activities

Labtec's project research is part of the market trend search for tests with less cost and less time and same performance, mostly on analysis of waste.

The methodologies currently exist for this analysis are called mono-residual, where to get the results of an analysis (which drugs are used in the material) is required to submit organ / tissue / animal products (liver, kidneys, muscles, fat, milk, eggs, etc.) to various methods, one for each type of drug that exists in this material. In order to achieve this it is necessary initially to fragment the material and apply to each fragment a single method that will appoint the existing drug.

Labtec is working to develop a new methodology that will change the way analysis are done on these materials aiming a faster, more reliable, more productive and therefore with lower cost process. It could even be adopted as standard by official

laboratories of the government as the primary means of analyzing these materials. This new approach is called Multi-waste.
This multi-residual method is to use a single fragment of animal material and submit it to a new methodology (the aim to be developed by Labtec) that will identify and / or quantify various types of drugs concurrently existing in the material, but not all drugs.
The main benefits obtained from the development of this new methodology, multi-residual, consists in the gain of time reduction for presentation of the report, price cuts of the analysis for the client, productivity gains to the laboratory without loss of quality or reliability of the reports submitted.
The strategy adopted by Labtec to develop new methodology is to assemble a team of its own, enabling current practitioners, academics and hire consultants national and foreign consultants also searching for these together with his own team, to study the existing literature and start practical tests in a research center that is being built and equipped by Labtec. After the development it is necessary to have the certifications of governmental agencies to achieve this work.
So the Innovation activity is directed initially to develop and certify a new methodology to be used in the multi-residual analysis.
The needs concerned to develop this activity are: Civil Work, Domestic and Foreign Consultants, Qualified Staff, Equipment, Materials Analysis and Certification by Governmental Bodies.
This project is an essential part of LabTec's short-term business strategy to enter the market of Residue Analysis of Contaminants Animals with innovative methodologies that provide a differential requested by the market. For its Medium-Term Plan to enter other markets (human, other reviews et), the recognition of its Innovation expertize in the market is also crucial.

Arinos Quimica

Company's description

The History of Arinos Quimica begins with its foundation in 1993, by the entrepreneur Mateos Dias Raduan, of Flexquim, a small distributor of raw materials for flexible foams industry. He began to search for product diversification and opened a branch in Recife (Brazilian city in Northeast part). In its early years the company's focus was to increase its market share and revenue.
Its first Strategic Plan encompassed the creation of Strategic Business Units - called UNES - to diversify its product mix and product performance. In 2002 opened its new headquarters of fruit expansion - where it is today - still in the city of Osasco. The "Specialty" products that are not commodities, accounted for, at the time, 10% of its business.
At that same year the company obtained ISO 9001 certification, and in 2005 was certified by PRODIR (Program Responsible Distribution).
Its current strategic plan includes the search for products of higher value-added as well as increase customer performance.
In 2007, it acquired some assets (Marco Politi, technology and equipment) company Quimpoli. This company was manufacturer of chemical components with higher

value-added. With this acquisition, the company begins to intensify its process of strengthening the business that could bring value added. It expanded and built a new laboratory that searches for opportunities in developing its market performance.
In 2009, it came the possibility of development within the UN program called the Multilateral Fund for Implementation of Montreal Protocol, of researching to develop the use of Expanding Agent Methylal in Polyurethane Systems in place to Expanding Agent HCFC 141 (causing damage to the environment).

- Sectors of activity and key products / brands;

The Arinos Chemicals operates in the following sectors:

1. Manufacture of products derived from Polyurethane - The products of this area, called the market of Bed Systems Polyurethane, are represented by product formulations according to specific customer needs. It Actuates with the Arinos' own brand and also with the political framework - acquired from Quimpoli. As main applications of these products are: refrigeration industries, thermal and acoustic insulation, shoes, mattresses, pillows, automotive and construction industries;
2. Distribution of raw materials and components for food, cosmetics, paints and varnish, polyurethane in general (mattresses, refrigerators, automotive, footwear between others) and for industries such as chemical bleach, houses chemical, leather, rubber and other industries. In this area the company uses the manufacturers' brands of the products it distributes;
3. Services and Solutions - area exclusively for service, trying to absorb all the activities that could be transferred from their clients, such as filling, storage, formulations and fabrications.

Shared Vision, leadership and the will to innovate

- Innovation Corporate strategy:

The company's activity is the manufacturing of products, which are Arinos Polyurethane systems, formulated according to the needs of their customers. Polyurethane products are often processed foams for mattresses, upholstery, automobile seats, automotive steering wheels, pillows, foam insulation.
The Service area operates in activities as packaging, warehousing, storage, formulation, product packaging for delivery to end customers of its customers.
The company search for innovation can be strongly characterized by its main project of development of Agent Methylal expander for use in polyurethane systems. This project support became crucial due to the following aspects:

1. The blowing agent HCFC is the substitute of the CFC agent that had been banned worldwide. This agent is used in manufacture of foams and other products based on polyurethanes
2. The use of HCFCs agent will also be prohibited. Its banish will follow a schedule of reducing usage. The HCFC is a product less harmful to the environment than CFCs, but still cause environmental problems
3. It has been established a schedule for reducing the consumption of Agent that starts with the freeze of consumption levels in 2013, reduces 10% in 2015 and

gradually to its total extinction in 2040

4. The UN and the Brazilian government encouraged companies in countries not yet developed to develop alternatives to the use of HCFCs agents
5. So the expected change is the replacement of HCFCs Agents in the market completely by other products that present the same opportunities to use and cause no damage to the environment

Besides this important project, the company is always searching for new ideas outside its barriers. Trying to anticipate the needs of its customers, Arinos participates heavily on trade shows, conferences and other events to know in advance of market trends.

There are some important factors that support the company's success in being competitive in its market as for example product differentiation, leader in cost, suitability for specific markets, reduction of term delivery, provision of customer services, distribution channels. Considering the Agent Methylal expander's project the company has a head start with its appropriateness to the needs of the customer (the product to be developed can replace the specific formulations), the costs are compatible with the existing product.

Appropriate Structure

- Industrial units and location;

The headquarters of Arinos Quimica is located in the city of Osasco - SP. This unit is the main distribution center and industrial facilities of its plants - PU Systems House, Blends of the unit and the rooms "white" Food, Cosmetics and Cleaning Products. It is also where is situated one of its Laboratory Quality Control - analysis of the goods purchased and products sold. There are also laboratories specific and dedicated to the Development and Application Food Industry, Cosmetic and Polyurethane.

- Key aspects of organizational / managerial;

The company has 125 employees. The number of indirect employees is equivalent to direct. It is divided organizationally into business units and Divisions, broken down as follows:

- Chemicals Business Units: Polyurethanes Division, Paint Division and Industrial Division
- Business Unit Life & Science: Food Division and Cosmetics Division
- Services Business Unit: Prime Solutions and Services Division

The research project for the use of chemical molecule Methylal Polyurethane is the responsibility of the Polyurethanes Division.

Key Individuals

- Management of innovation activities

The Arinos Polyurethane Division has a technical department of development and application and it includes a lab for testing and development of new products and new formulations. There is no appropriation specific budget. As opportunities arise for development, funds are requested and resource allocations are reviewed.

This structure counts with eight people. But it does not have a formal structure dedicated exclusively to innovation activities.

Considering special projects, resources are allocated as the projects are decided, as it is the case of the Agent Methylal expander's project.

High-Involvement Innovation

- Main innovation activities in the company in the last 5 years and their results.

Arinos' developments are in mixtures and innovative formulations. It sets out principles of existing assets and development of products for pioneering applications.
In 2005 the company developed what it called "Strategic Plan Developments for the period 2006-2010. " The plan provided targeting resources and efforts for development of Arinos' new products (at that time, the company acted only as distributor). Its development policy in the first Development plan sought for the pursuit of opportunities in pioneering applications in Brazil using similar concepts of the world. In 2010, it started the development of its second Strategic Development Plan, seeking new opportunities pioneer not only in Brazil but also externally. The project it has submitted to the BNDES, was already an "anticipation" of this new guideline.
Examples of developments during the period of its first Strategic Plan Developments include:

1. Polyurethane (PU also called) has developed a PU Viscoelastic system for pillows at 2006/2007, and it has been the first Brazilian company to produce this product in market.
2. In the industrial area in 2007 it launched a lubricity additive that is incorporated into the Diesel Petrobras with a focus on reducing emission of sulfur particles through the combustion of diesel
3. In cosmetics launched "thermo-ball" which is innovative property assets include the role of functional and facilitate their use in products. These beads are part of cosmetic formulations such as liquid soaps. When soaps come in contact with skin, such spheres are open and release the assets to their functions (without it, these assets lose their effects)
4. Recently it had the launch of the product line "Beauty In "in the food. It is developed with the formulation of liquid Phytosmart (Phyto Sterols of the active principle). These are products for the prevention of hair loss and strengthen nails. Arinos is innovator and pioneer of this concept in Brazil.
5. It has some development projects to be searched for its next Strategic Plan as the use of polyurethane Manufacturing of manhole covers in rosettes Lines and electricity poles.

Innovation Audit

Regarding the company's answers of the strategy's aspects, the company gave the maximum score to the issues related to the company holding forecasting tools and techniques and imagining future threats and opportunities. And it gave also the top score affirming that the top management is committed to innovation support.
However, the company gave a low score comparing to the other scores given to the eight questions of this topic, to the question covering the aspect of shared vision of the top team how the company will develop through innovation.
The overall answers related to the topic process did not present any answer that has a

particular interest. Nevertheless, the company presented rather lower scores for this topic.
The organization matter when covered faced a low score at the questions concerning that people can work well together across departmental boundaries, and that people are involved in suggesting ideas for improvements to products or processes.
The feature of linkage presented the lowest score compared to the other four topics. Especially the questions regarding if they work together with universities or other research centers, and the one if they work closely with local education system. Nonetheless, the company disclosed a strong commitment with the development of people.
The learning theme presented a question that stood out with the highest score related to the company's behavior of learning with mistakes.

The BNDES project of technological innovation

The objective of the BNDES's project is to develop, optimize, validate and disseminate the use of Agent Expander Methylal in several Polyurethane systems to replace HCFC 141B Expanding Agent.
Agent Methylal Expander is a product of existing property of the Belgian company Lambiotte & Cie. However, their use is co-expanding agent mixed with Foaming Agents HCFCs. The Arinos development is in making this Expanding Agent as a single agent in the manufacture of polyurethanes.
The relevance of the project is related to the Montreal Protocol that established a schedule for eliminating the use of HCFCs Foaming Agents. The United Nations - UN - has established a program incentive to develop alternatives to its use. In Brazil the Ministry of Environment is a "participant" in this program and it created the Brazilian Program for the Elimination of HCFCs - PBH. This Program is of responsibility of the Coordination Layer Protection Ozone in the Department's Climate Change Secretariat Climate Change and Environmental Quality.
This project is considered as a pioneering development and it has not been made in another Brazilian company, with the route technology that the company is developing that explains the importance of these investments to the business strategy. Arinos has an excellent commercial reputation in its main activity - distribution of specialty chemicals, food and cosmetic and this project is a milestone in the company due to its looks Innovatively.
Investments in the project will put Arinos in another market: that of commercialization of pioneering products and technology developed internally and with high added value. Its main activity is distribution of specialty chemicals and with this development it will significantly increase its performance in the industrial activity.
This project was also seen as a form of "starting point" for a strategic planning of R & D. Arinos believes in the success of the research and will be a "detonator" of internal actions that the activities of R & D to become not only a focus of Arinos as it is today, but also an autonomous activity with its own business unit.

Poly Easy

Company's description

Poly Easy was founded in 1996, taking advantage of the partners' expertise in industrial areas of pipes and fittings for infrastructure markets (gas distribution, and industrial sanitation facilities in general).

From their expertize, the partners started the activities of Poly Easy, initially to resell connections and weld compression machines imported facing the sanitation sector. In 1997, the company became a provider of installation services and it added resale of electro-fusion connections and valves for the sector of natural gas distribution, becoming a major supplier of these materials of the largest gas distribution companies in the country.

High Involvement with Innovation

In 1999, it commenced manufacturing activities, aiming the nationalization of imported products and also, the development of its own products, such as the connections "Easy ® Extension", for building connections of water.

Line Extension Easy ®, developed and patented by Poly Easy, is a response to the huge problem of water losses in the sanitation sector, it became a new paradigm to this market.

The loss of water companies through leakage, linked to clandestine sub-measurements is estimated by an amount to over 50% on average in Brazil.

And most of those losses are physical losses – more incidence of leaks in the building connections, which applies to online Easy Extension ®.

Paradoxically, the development of product line, which now represents over one third of the revenues of Poly Easy, first brought major financial difficulties for the company. The dealers, almost all public companies, hire companies using bidding system, which take into account the criterion of lowest price for acquisition. The Easy Extension ® product, technologically superior and cost-benefit most advantageous, had, however, higher manufacturing cost than other competing solutions of the market, forcing the company to embark on a true cross-cultural change. This effort consumed a large amount of resources and time (about three years) causing frustration in sales expected in early years.

The facts described above, coupled with the cyclical economic crises, occurred in 2001 and 2002 (strong devaluation of the Real and blackout energy) caused a period of great hardship for the company, causing revenue fell from R$ 5.7 million in 2000 to R$ 2.8 million in 2002 (nominal values of the time).

In 2002, it was created the Poly Easy Commercial, in order to differentiate the performance in the market.

Despite the difficulties faced in this period, the company sought to maintain its technical group intact, and never left aside the minimum investment needed to upgrade its production lines and its products.

The recovery took place only after 2003 with the economic stabilization of the

country coupled with the consolidation of its products on the market, especially Easy Line Extension ®. The approval and adoption of this line was an important milestone, as this company became a leader and educator opinion in its segment, thereby facilitating penetration of its products in other companies' sanitation utilities.

External Focus

It was also extremely relevant for the recovery, the maintenance of strong partnerships with foreign supplier companies, who have maintained their full credit lines even in difficult times. Among these partnerships, it stands out the Georg Fischer (Switzerland) alliance, which are exclusive distributors of fittings and valves for the gas market, and also the group Nupigeco (Italy), who eventually set up a joint venture in the end of 2005, resulting in the NUPI Brazil Industry and Trade Plastic Pipe and Fittings Ltda.

The NUPI Brazil, is a 50/50 association between the company NUPI Spa Manufacturer Italian and Poly Easy Brazil Industry and Trade Ltd., it began operations in 2006, its overall performance was started with a contract signed between NUPI Spa and Chevron Texaco, for supplying pipe (line Smartflex) for its gas stations in Brazil. In 2007 it developed complementary a line of products to meet the other companies distributors. In 2008, increasing its performance, it added his line of products at BR Distribuidora, the segment leader, and conducted its first export to Argentina. Thus, beginning a significant increase in its revenues this year.

The export efforts of Poly Easy have been started from 2004, considering its own line of products for the Latin Americans, such as Chile, Peru, Colombia, Uruguay, Argentina. Among these markets, it is important to highlight the increased sales of Easy online branch mainly for the Chilean market.

Poly Easy obtained in June 2008, the ISO 9001:2000 certification by SGS, accredited by both the INMETRO in Brazil and by UKAS to the international market.

- Range of products / brands;

- Tubes: Own production in diameters from 20mm to 125mm

Brand Poly Easy: Polyethylene and Polypropylene

Brand NUPI Brazil: Co-extruded polyethylene inner lining - lines and Smartfex Oiltech, Random polypropylene (PP-R) - online Poly-system

- Connections and Accessories

- Brand Poly Easy: Extension Family Easy ®, Adapters and union compression, Connections transition and risers.
- Brand NUPI: Roto-moldes (chambers of containment), Metal hose, Castings (chamber of sidewalk), Valves, metal
- Downloaded (Georg Fischer and brands Nupigeco): Connections electrofusion, Solder connections end (spigot) injected, Compression connections, Flanged connections, Connections special transition, valves for gas and water

- Tools:

- Own production. Beveller pipe, Aligners electro-fusion welding pipes, Choke tubes (squeezer), Easy Key Extension, Hand scraper for PE pipes, Rounder tubes
- Imported (brands Georg Fischer, PF and Schweisstechnologie Nupigeco):

Pipe-wrench, rotary cutter , Scrapers tubes, Choke tubes (squeezer), Extractor internal weld bead, Extractor external weld bead

- Welding and installation services
    - Renting of machinery, tools and skilled labor (Welders and welding inspectors) for installation services and welding, the only company certified by BVQI (Bureau Veritas Quality International), within the program's quality ABPE (Brazilian Association of Polyolefin Pipe and Systems).
- Laboratory tests
    - The quality control laboratory, qualified by BVQI, provide services inside the Poly Easy, also runs to third parties, tests for pipes and fittings of polyethylene and polypropylene

Poly Easy's main operating sectors and Poly Easy NUPI Brazil, is formed by products used in the following sectors:

1-Drainage

The current focus of investment by companies in the sanitation sector is focused on combating the loss of water, which as noted earlier, the national average exceeds 50%, and the extension of sewage systems. For these purposes polyethylene presents itself as an excellent solution, both technically as economic

2 - Natural Gas

This market is already using polyethylene in their distribution networks as standard. Poly Easy in partnership with Georg Fischer has contracts with the four largest companies in the country: CEG and CEG-Rio, Comgas and Natural Gas, and it regularly supplies to other companies throughout the Brazilian states, which gives it a leadership position in providing fittings and valves.

3 - Industrial

The use of polypropylene and polyethylene tubes in the industry in general is intended for various applications, such as: conveying water, gas, compressed air, chemicals, effluents and fire fighting systems (underground networks). The main industrial sectors of activity of Poly Easy are Food and Beverage, Automotive, Chemical and Petrochemical, Steel and Mining.

For the markets mentioned above the company provides connections, pipes, tools and services.

4 - Fuel Stations

Products supplied to this segment are manufactured by NUPI Brazil and marketed under the brand Smartflex, known worldwide and it has operations in five continents. In addition to the pipes and fittings manufactured by the company, it was developed a line to perform the complete containment system leakage that is under the analysis to be certified by Bauer Falcon / INMETRO.

5-Oil

Poly Easy is developing at the moment an application solutions technology for usage in polyethylene insulated Heat oil for transportation, used by Petrobras. Petrobras participates with financial support for the construction and prototype tests applied to curved sections of pipes and joints field, while the Poly Easy actuates in the total development of prototypes, and testing. Once this technology is qualified, Petrobras

has the intention of using it in their future ventures.
Derivations of such technologies are already being applied in other uses, such as in recovery of maintenance of drilling rigs and oil production. Similarly, it will also be used for field joints of pipelines transportation of oil and hydrocarbons in general (without coating thermal), thus opening up enormous possibilities and perpetuation of supplies by Poly Easy in Brazil and abroad.
The NUPI Brazil is also introducing in the oil system Oiltech, composed of pipes and fittings with polyethylene lining of polyamide for conducting oil and hydrocarbons in general.
In the oil sector resides the largest development perspective of Poly Easy group's future. It is known that the thermally insulated for transportation of heavy oil represents 3% to 4% of the total network of pipelines of Petrobras, and it is responsible for about 48% of the leaks.
These products use plastic materials such as polyurethane and coat protection in its polyethylene insulated. Taking into account that Poly Easy holds technology applicable to these materials, the company was sought to carry out work of recovery of about 2km of this type of product, in 2006. For that application, Poly Easy has developed a new process, using electro-fusion welding system, which also has been the subject of a patent application in the PTO. Since then other developments are being performed to build new ducts, being subject to the Terms of cooperation mentioned above.

Appropriate Structure

- Industrial units and their location;

The headquarters, offices and industrial units are situated in the city of Barueri, São Paulo, in four leased properties at Brooklyn. The strategic planning for the next five years includes the construction of a plant at a new location because of the prospect growth of its traditional market segments, as well as its introduction in the oil sector, are predicting the need for expanded industrial facilities.
The degree of technological training is one of the factors that allowed Poly Easy to beat the odds that it has found at the beginning of its activities, and it started to conquer the place in the national market. Since its establishment, the shareholder Aldo Batista knew that in order to Poly Easy become a prominent supplier of fittings and other products, it should invest in technology to produce a differential competitive product.
One reason for the entry of partner Jose Roberto Danieletto in the society was his deep knowledge of technical products and processes involved in the development and the production of polyethylene pipes and fittings and polypropylene.
The partners knew that the higher incidence of loss of water occur in building connections. They have decided then to develop a solution to this purpose. Easy ® branch was the first product of this kind in the world and it was subject of granted patent

- Number of employees

Poly Easy Ind. e Com has 47 employees, Poly Easy Commercial counts with 16 employees, totaling 63, plus 3 members. NUPI Brazil has 15 employees.

Key Individuals

The partner Aldo Batista is a mechanical engineer and lawyer with postgraduate in business administration, with further specialization (Harvard Business School - Advanced Management Program).

The partner Jose Roberto Bertoncello Danieletto is an electronic engineer graduated by Maua Engineering School. He was technical director of the company Dutoflex, Manufacturer of PE and PP pipes.

The partner Renato Solomon is a mining and Technical Accountant and Director of Commercial Poly Easy. He was a manager of the Metals supplies Goias S / A, where he held various positions for 16 years.

The company has no formal structure dedicated exclusively to Innovation. It is a goal, but should occur only in the medium term. The Innovation activity has as its main responsible, three directors and president's adviser, Bruno Batista. The industrial director is more directly linked to the development activity, but he receives constantly feedback from the marketing director, president director and the commercial director.

Innovation Audit

The company's answers of the subject related to strategy, presented the maximum score to the question covering the company's personnel knowledge about the company's distinctive competence. And it provided also the top score stating that the company's innovation projects are linked with the overall strategy of the business.

Still, the company gave a rather low score (3) to the question about if the company has tools or techniques of forecast.

There are two answers related to the topic process that presented a particular interest. The one asking about the continuous search for new product ideas and the other one about having flexibility for product development in order to allow small fast-track projects.

The organization matter was the lowest average score, specially the question about the company's reward system of innovation support.

The topic of linkage presented high score for the questions about external network building and work with lead-users developing innovative new products.

The learning theme presented a rather low score to the question about meeting with other companies to share experiences and learning. However, it provided the highest scores to the questions about understanding the customers and end-users. As well as, the question concerned with the usage of measurement to identify where and when they can improvement their innovation management.

The BNDES project of technological innovation

The project objectives are:

1. Entry in the segment of products for the oil industry
2. Vertical and optimizing current production capacity, and as the introduction of new lines
3. Implementation of Corporate Governance with a view to opening capital

The company is facing a rapidly expanding market. Poly Easy has the ability to develop innovation, as it did in Easy Extension ®, and it has deals of technological

developments (Terms Cooperation) with Petrobras, and association with the group Nupigeco Italian multinational. Therefore, it has favorable conditions to take advantage of expanding markets in which it operates and to stand out even more in these segments. The project includes the development of new products for the oil industry, nationalization of products today imported into the sanitation sector and gas and capacity expansion production. The company founded by former executives of companies multinational, used all its capacity investment in implementation, development of product lines and sustainability of the company until now, and it has no breath to finance the achievement of new goals, so the collaboration of the loans importance to the company performance of its goals.

- Major improvements in quality and productivity to be obtained with the completion of the project;

Poly Easy already produces with quality levels expected by businesses segments of its operations and is recognized as an innovator and reliable, and its management systems certified according to ISO 9001/2000. With increased production and the development of real new products, along with this type of investment, the company expects gains of productivity and cost reduction.

- Technological innovations to be incorporated;

This is one of the attractive factors of the project. With the implementation of new units and production lines in the project, Poly Easy / NUPI Brazil will gain more agility, versatility and features for the development and improvement of products, which under current conditions has to be done on premises by third parties.

The Terms of Cooperation signed with Petrobras for development of products and solutions aiming the oil transportation heavy pipeline will bring a technological gain for the company, and it contributes to solve a serious environmental problem of Petrobras. The expectation is that these development projects become the beginning of further developments of innovative products.

- Direct and indirect jobs to be generated by the project;

With the introduction of new units, expanding the range of products, as well as increasing the number of production shifts, it is envisaged the creation about 30 new direct jobs in the years 2008-2009, and estimated is that the number of indirect jobs is at least equivalent to the direct.

- Social impacts from the project;

The main social impacts of the project will increase the generation of employment and vocational training of new employees. The company must invest in qualified staff at the growth of its production, using the availability of technical courses and the Senai and other institutions in the region.

Also expected to conclude agreements with universities and / or institutions research centers.

- Other issues deemed relevant by the company.

Besides consolidating and expanding its position in its traditional markets,

Easy insertion of Poly in the oil industry brings an enhancement to your sustainable business model by adding new lines products and businesses, located in a segment where it provides massive investments in coming decades. Certainly the addition of these new product lines meet the expectations of Petrobras and the market in general

with respect to the increase of national content, as well as bring solutions to environmental problems that exist today.
The growth prospects with the results of developments being made in cooperation with Petrobras and other opportunities that will open up to the company, present a picture revenue and profitability that will enable attractiveness opening of their capital

BNDES Bank

The Brazilian financial support system is strongly represented by the bank BNDES. Innovation is considered a strategic priority by the BNDES, mainly due to its fundamental nature in raising the productivity and competitiveness of companies and in creating wealth for Brazil. The BNDES' goal is to contribute to the increase in innovation activities in the country and to their systematic implementation. For this, the Bank seeks to finance investment projects associated with building skills and innovative environments, so that Brazilian companies can achieve a better competitive position. (BNDES , 2010).
In the appendix it is presented the BNDES funds that exist and their characteristics.

Chapter 5: Analysis

This section entails the analysis of the empirical findings with the theoretical framework presented in chapter 2 as supporting arguments.

Shared Vision, leadership and the will to innovate

The top management commitment could be seen in all three companies. As SMEs the founders are not merely shareholders, they really participate in the company's activities and inspire the company's employees. They also perform the role of leaders that put innovative ideas forward, and empower other players to search for new ideas.
The BNDE's financial aid has not a direct impact on these leaders' attitude, however the moment that a project "dream" become true due to the grant concession, the pursue of innovation by the top management gains power and more energy.
Considering that all three companies clearly presented a picture of the corporate strategy going towards an innovative approach, it could be said that the three companies hold strategic decisions embedded into their daily activities seeking innovative ideas and solutions.
The aspect cited on the theoretical framework related to the need of long-term vision, as often innovation projects don't give results in a short-term horizon could be seen in the company Poly Easy. The company faced a severe downfall in its trajectory, however its founder belief and perseverance made the company rebuilt and continue its innovation history.
The risk acceptance attitude and learning from failures could not be verified in neither of the companies, not meaning that there is a lack of them, however there was no empirical data that could support these approaches.
The BNDES grant impacted in an indirect way in this case. It did not build leaders nor helped to disseminate an innovative vision throughout the company. However as said previously, the project ideal and even the innovative project itself when it is feasible

due to the financial aid, the grant has a secondary impact in willingness of the company's innovation. There is an "energy boost" that invades the enterprises with the funding.

In terms of the companies' impact individually, Labtec with the BNDES funds could enter in a new market besides and strengths competitive factors, keeping the objective of innovation alive in the company.

Regarding Arinos, the grant made feasible the pursue of researching a new chemical agent that would have not been possible without the BNDES's funding. Therefore, the financial support gave breath to the company's innovative strategy.

In the PolyEasy situation, when receiving the funds the company could strength its relations with Petrobras and chase an enormous new market – oil industry. It led to the governance corporative directive, what showed an impact on the company's vision of management.

The table bellow depicts a summary of the companies' innovation management towards the aspect: shared vision, leadership and will to innovate.

Company	Shared Vision, leadership and will to innovate
LabTec	Partners created the company according to testing needs of other companies from the group Entered in a new market to the group
Arinos Quimica	Will to develop new solutions to answer customer demands
PolyEasy	Perseverance of the leaders

Appropriate structure

It could be verified that the companies have devoted attention to organizational structure fitting innovation pursue. As it can be seen at the table bellow:

Company	Appropriate Structure
LabTec	Owned laboratory Financial services outsourced to other group's company Few personnel with master degree
Arinos Quimica	Main distribution center for different business Focus in chemical solutions
PolyEasy	4 Buildings Technological Training New partner with technological background Specialized in a water waste solution Patent Product

Specially Labtec that created its own laboratory in order to certify its products following a demand of its growing structure needs, even before the BNDES grant. But the finnacial support alowed the company to invest in hiring technical personnel to form its employee's chart.

Poly Easy has also presented an example of structure fit, it has invested in technical training in order to follow the market changes.
The BNDE's funding severily influence this component of all three firms as the funds could enable the companies to invest in amplification of their working sites, as well as the possibility to hire new personnel that have skills to improve the company's knowledge base.
Labtect has invested in amplifying its commercial area with the BNDES project by finding appropriate channels.
Regarding Arinos, the company used BNDES support to boost it own research and development activities.
And Poly Easy with the BNDES support implemented new product lines gaining agilit and versatility.

Key Individuals

The presence of key individuals was more visible in Poly Easy. The three main founders have solid technical background and perform as motors to innovation. The president's adviser has also an important role in the company's innovation awareness. And with his position can influence and can be part of strategic decisions.
None of the three companies have formal personnel dedicated to innovation, nor a department exclusively responsible for it.
It was not verified that the BNDES financial grant has an impact on this component.

High involvement in innovation

The companies have processes that deal with innovation in their daily bases. However, Arinos Quimica more lucidly behaves with the concept of continuous improvement alive. The company has commented on a strategic plan for developments. In addition to that, the company had the initiative to obtain certification "stamps" as ISO 90001, showing an improvement driven strategy linked to the theory presented of "kaizen" continuous improvement.
The table bellow presents the analysis of this component of all three companies:

Company	High involvement in innovation
LabTec	Development of new solution of testing procedures – time and cost reduction
Arinos Quimica	Development of products for pioneering applications Strategic Plan Developments
PolyEasy	Development of its own Products

The theory states that the high involvement in innovation encompasses the concepts of searching for innovative processes throughout the organization, as well as the process of learning and managing the intellectual capital of the personnel to ensure an innovative pursue in daily bases.
In this sense, the BNDES financial support influences the companies in their pursue of innovation. As small and medium companies the financing issue is vital for their investment in innovative projects. Therefore, through grant the companies are able to

invest in their personnel with training. And also have their activities in charge of innovation to deal with the project financed by the BNDES grant.

External Focus

Arinos Quimica has explicitly presented its attention to customer needs and formulating its strategy to answer market demands.

Poly Easy has undertaken a strategic alliance with Petrobras an expressive Brazilian oil company that could not only open doors to a new emergent market to the company but as Petrobras is know from its extensive researches investments, this partnership could enable Poly Easy to gain and share knowledge from a strong and powerful player.

The innovation audit aspect linkage that could be represented also by the component external focus, covers the aspect of companies' link with universities, research centers and local educational systems. Through the analysis of this topic it is detected, that unfortunately the three companies have not been able to develop or be part of academic researches. They have not informed any kind of relationship to universities.

However the theory presents also as part of external factors the alliance and partnership with other actors, and for this part the BNDES's grant project influenced mostly Poly Easy that expressed its openness to work with partners due to innovative project presented to BNDES.

Innovation Audit

The answers collected from the company PolyEasy showed that the company has a better feeling about their innovation management than the company Arinos. The latter expressed a lower score, especially in the Linkage processes, what could be verified by the data collected from the company. PolyEasy answered in a more moderate way indicating room for improvement in all five areas, with a little more room in the organization processes. As seen with the other data collected the company has a stronger management of the linkage processes comparing to Arinos Company, what can be proved with the alliances with Petrobras.

PolyEasy's answer concerning the link between the innovation projects that they are involved and their business strategy, supported the argument that the company's strategy is strongly influences by innovativeness focus. Giving the feeling that the BNDES financial grant was a strategic decision to boost the company's future perspectives in entering in a promising new market.

Arinos had the lowest score given to two questions related to the linkage with universities, research centers and local educational system, having an average score of the topic linkages as the lowest. It indicates that the BNDES financial grant has missed an important opportunity to support the involvement of the companies with universities, establishing also a bridge connecting the private sector and local educational systems.

Government Role

The main governmental instrument represented in this study was the financial support granted by BNDES bank. These financing instruments are in line with the theory that gives importance to the existence of support to small and medium companies due to

their higher risk exposure, as these companies has a smaller portfolio of activities to spread their risk.
In this sense, the government role here was fulfilled as the three companies granted with the financial support had the benefit to pursue an innovation project.
The theory also points the government role regarding the support related to other financial instruments besides financial grant or non-financial instruments, as patents, copyrights support, tax regulations and incentives in research and development.
It could not be verified with the empirical data reduced regulation policies, as none of the companies are situated in areas that are benefited with tax reduction clusters nor industry clusters where the Brazilian government stimulates with expertize educational training available to institutions in specific areas.
Neither the aspects of supporting privacy regulations with patents and copyrights agreement were verified.
Nevertheless, the government actions in the past years to improve the financing lines with subsidized interest rates for innovation actions has been appreciated by the private sector as a determinant to innovative projects that before were not even feasible due to financing constraints.
The BNDES bank that is a governmental bank has increased its financial lines in the past years and even put the innovation focus as a priority sector at the bank studies.
Thus, the financial support present in the theory was verified with the present study.

Analysis summary

Summing up, the following analysis is relevant to the three companies.

- Organizational structure / strategy

There was no significant change in the organizational structure of the companies. But the strategy has been impacted. The funding has performed as a "detonator" of innovation initiatives. All companies are dedicated to researching new opportunities for development and how it could leverage their business. They all think in re-access the BNDES.

- Employees

There was a low increase of staff resources devoted to research in the three companies. Actually very low - one employee in each company, but either way, there was job generation. There was a more significant increase in staff due to the operational developments

- Link with other companies / universities / Convention related to innovation activity

Unfortunately it did not occur in any case. And the BNDES project did not support any kind of relation between university and company.

- Innovation environment

It is difficult to specifically pinpoint but it somehow occurred. The fact that they focused on testing new opportunities, demonstrates this. With the expected results of

innovations in terms of sales, is very possible that this environment begins to be more apparent in the coming years.

The striking points of BNDES financing are:

1. The ability to develop innovation, without the resources that would not be possible, or at least would be much more lengthy
2. The increase in R & D at the companies
3. The delay in the release of funds brings frustrating feeling. It creates an expectation of receiving the funds that does not occur within the time expected. Moreover, the delay makes you miss an ideal sequence in the research process.

Chapter 6: Conclusion

Research Question

The study had as purpose to investigate the question: "***How do government grants stimulate the development of innovation in SMEs in Brazil***?" The importance of the SMEs in the development of the economy has been discussed in the literature. Their role in developing countries could be stressed with their capacity of generating employment. Furthermore, the innovation theme that influences the global economy, had brought together the subject of SMEs dealing with innovation management.

The study was performed through the analysis of three companies as case studies, in order to explore the innovative organizational management structure. An innovation audit report was made in order to deliver companies' diagnosis, in order to understand the important components of the innovative activities and the environment. This report led the direction of the understanding of the components that were directly or indirectly impacted by the BNDES financial grant support.

The table bellow depicts the main characteristics analyzed for each component of the innovation management organizational structure of the three companies. In addition to that, a comparative between the companies and the main BNDES's impacts are also shown:

Components	Key Characteristics	Company	Grant Impact
Shared Vision, leadership and the will to innovate	Shared goals and clearly articulated Broad strategic intent Top management commitment	Poly Easy	Boost top management
Appropriate Structure	Organizational plan that fosters creativity, learning and interaction	Labtec , PolyEasy	Impact in new constructions Employees hiring
Key Individuals	Roles that give vitality and promote innovation	PolyEasy	Not verified
High Involvement in innovation	Broad participation in the organization and activity of continuous improvement	Arinos Quimica	Innovation Project
External Focus	Guidance through internal and external customer	PolyEasy	Facilitate alliances

From this table there are points of conclusion that can be said: the company PolyEasy has a strong development on the shared vision, leadership and will to innovate component compared to the other two, that could be seen specially through the strong commitment of its leaders with innovation, they were able to support and develop further the company even under financial distress.

The BNDES financial grant impacted indirectly this component, in the sense that it gave significant boost to the leaders to continue their commitment with innovation processes. The innovation project that was doable due to the financial support granted by BNDES, led the company to enter in the oil segment. The company developed this project with the alliance of the Brazilian oil company Petrobras, which is a source of knowledge sharing and gathering.

The companies Labtec and PolyEasy had a severe influence on the component of appropriate structure as the grant gave support to the companies to invest in the construction of new facilities as well as in hiring new skilled personnel.

Poly Easy has its leaders as important key individuals that have supported the company's existence through rough financial difficulties; with their persistence and perseverance the company has built a successful path with innovative ideas. But, the BNDES financial support influence could not be verified in neither of the companies over the topic key individuals.

Arinos stood out in terms of the component high involvement in innovation. The company's projects towards innovation are present throughout the company's history and its attention to fulfill the clients' needs. The point that called the attention was the strategic plan of development managed by the company. The BNDES financial grant supported the research of a new chemical agent; the financing part was a crucial matter to this innovation project.

PolyEasy had the most meaningful results related to the external focus due to its partnership with the company Petrobras. The BNDES financial aid supported the project that it was done in conjunction with Petrobras.

Regarding the results obtained from the innovation audit performed, there are points that stood out. For example, concerning the linkage aspect, it was identified room for improvement. Especially the company Arinos, that it could be seen that it did not develop any kind of linkage with universities nor local educational systems.

In addition to that, in the area of learning both of the companies that have answered the audit, Arinos and PolyEasy, expressed their will to share knowledge more intensively with other companies but that they were still not active on this practice. Even the BNDES bank did not support further alliances with other companies.

Recommendation

The analysis led to the conclusion that the great merit of the BNDES's financing lines is allocating resources with subsidized interest rates for businesses. The fact that they are financing lines, meaning recoverable funding not donations, oddly enough, it is beneficial, it requires a greater commitment of the companies with the outcome of the projects. The company has substantial aid for research but that same research has to generate outcomes that were previously presented to the bank when submitting the funding project

BNDES also has a policy to monitor the resource's use of the project outcome, what reduces the possibility of misuse of resources. Each funding is released in installments. The release of each installment requires proof of good usage of the resources of the previous installment.

A reflection that could be made is related to the excessive delay in the analysis of the projects. The BNDES bank takes several months to analyze the project's business plan presented by the company when submitting to the financial grant and in consequence to give the answer to the company. And also, the fact that the same financing line could be used by any company, regardless of its size, brings an "unfair" competition: a large company can more quickly and more easily meet the requirements for the funding.

In addition to that, it is questionable whether such financing would be essential for the innovation project execution of a large company, on the other hand to a medium company the innovation project is carried out only if the BNDES financing funds happen. The funds for a large company could end up being just a way of cost reduction. And this "unfair" competition may take up to even a small or medium company not obtain the financing.

The components of shared vision, leadership and will to innovate are indirectly impacted by the grant. However the BNDES financial aid actuates as a "dream maker" to the leaders. These leaders are often the founders of the small and medium companies; therefore they get a new breath with the funds, as they see coming to live their ideas.

In terms of structure and key individuals the grant can sustain financially with the funding of new facilities, hiring of skilled personnel. These actions can promote the development of new innovative activities and researches.

The component of high involvement in innovation has also an impact from BNDES that could be measured by the insertion in new markets by the companies with the funds support.

However a point that is missed by the BNDES support, as seen by empirical findings of the linkage component, is the focus on improving the link between academia and the private sector, representing a lack of visionary strategy like other countries' policies, like Korea that have well improved this area.

BNDES as a governmental structure could facilitate alliances between companies in private sector that are part of the innovation support funds and universities. The alliances could be in terms of joint research; the universities could provide skilled and technical people that would be working together with the private sector to develop researches that the companies alone are not able to perform or not in doable time frame.

The companies on the other hand, could also investigate with BNDES the possibility of strategic alliances with other companies that the bank could have in their extended portfolio. The bank has access to sensitive information about companies that the private sector doesn't therefore this contact with the bank through the financial grant could also be the used as a bridge to access strategic partners that are not even known by the companies.

Further research

The main research question in exploring the governmental financial aid in supporting innovation in SME enterprises was depicted with these three case studies, however there are some other questions that have arisen throughout the process that could lead to further researches.

An interesting further study that could be drawn is analyzing small and medium Brazilian companies that have successfully implemented innovation processes and activities without the support of financial grants.

This study would give possible comparison between components that are influenced by culture aspects, environmental circumstances or even other governmental support as tax reduction and industry clusters that have important influence on innovation management.

There are components that are part of innovation management that were not depicted in this study due to difficulties to analyze the financial impact on them. However with this non-financial focus of a further research would give room to these other components also vital for innovation management.

Bibliography

Arinos Quimica Ltda. (2010). *Arinos Quimica Ltda*. Retrieved 2010 - December from http://www.arinos.com.br/

Ayyagari, M., Beck, T., & Demirguc-Kunt, A. (2007). Small and Medium Enterprises Across the Globe. *Small Business Economics , 29*, 415-434.

Baumol, W. (2002). *The Free-Market Innovation Machine: Analysing the Growth Miracle of Capitalism*. Princeton: Princeton University Press.

BNDES (2010). *BNDES*. Retrieved November 2010, from http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt

Bryman, A., & Bell, E. (2007). *Business Research Methods* (2nd Edition ed.). Oxford: Oxford University Press.

Chiesa, V., Coughlan, P., & Voss, C. (1996). Development of a Technical Innovation Audit . *Journal of Product Innovation Management , 13* (2), 105–136.

Coral, E., Ogliari, A., & Abreu, A. (2009). *Gestao Integrada da Inovacao*. Sao Paulo: Editora Atlas.

Essmann, H., & Preez, N. d. (2009). An Innovation Capability Maturity Model - Development and initial application. *World Academy of Science, Engineering and Techonology* (53), 435-446.

Fleury, M. (2002). *Desafios e impasses na formação do gestor inovador*. Petrópolis: Vozes.

Grande, I., Geus, L., & Geus, A. (2007). Micro, pequenas e médias empresas: competitividade e inovação. *Terceiro Encontro de Engenharia e tecnologia dos Campos Gerais*.

Guabi, G. (2005). Retrieved 2011, from http://www.guabi.com.br

Hadjimanolis, A. (2000). An investigation of innovation antecedents in small firms in the context of a small developing country. *R&D Management , 30* (3), 235-245.

Hagedoorn, J., & Duysters, G. (2002). External sources of innovative capabilities: the preference for stratecic alliances or mercers and acquisitions. *Journal of Management Studies , 39* (2), 167-188.

Hayes, R., Pisano, G., Upton, D., & Wheelwright. (2005). *Operations, Strategy, and Technology - Pursuing the Competitive Edge*. NJ: John Wiley & Sons, Inc.

Howell, J., & Higgins, C. (1990). Champions of Technological Innovation. *Administrative Science Quarterly , 35*.

Hull, R., Coombs, R., & Peltu, M. (2000). Knowledge management practices for innovation: an audit tool for improvement. *International Journal of Technology Management , 20* (5-8), 633 - 656.

INSEAD. (2010). *Global Innovation Index 2009/10*. Insead.

Janszen, F. (2000). *The age of innovation making business creativity a competence, not a coincidence*. Financial Times/Prentice Hall.

Leifer, R., O'Connor, G., & Rice, M. (2002, june). A implementação de inovação radical em empresas maduras. *Revista de Administração de Empresas , 42* (2), pp. 17-30.
Lorange, P., & Roos, J. (1992). *Strategic alliances: formulation, implementation and evolution*. Oxford: Blackwell.
Luecke, R. (2009). *Innovator's Toolkit*. Bosyon, Massachusetts: Harvard Business School Publishing Corporation.
Mani, S. (2004). Government, innovation and technology policy: an international comparative analysis. *Int. J. Technology and Globalisation , 1* (1), 29-44.
Mckinsey. (oct. 2007). *How companies approach innovation: A McKinsey Global Survey*. The McKinsey Quarterly.
Morais, J. (2007). *Políticas de apoio financeiro à inovação tecnológica: avaliação dos programas mct/finep para empresas de pequeno porte*. Brasilia: IPEA.
OECD, Eurostat. (2005). *Oslo Manual: guidelines for collecting and interpreting innovation data*. OECD and Eurostat.
Poly Easy do Brasil Ltda. (2007). *PE Poly Easy*. Retrieved 2010 йил 7-December from http://www.polyeasy.com.br/
Rothwell, R. (1994). Towards the Fifth-generation Innovation Process. *International Marketing Review , 11* (1), 7-31.
Senge, P. (1990). *A quinta disciplina*. São Paulo: Best Seller.
Sharzynski, P., & Gibson, R. (2008). *Innovation to the Core*. Boston: Harvard Business Press.
Statistics Canada. (2006). *Labour Force Survey*. Otawa: Statistics Canada.
Taylor, W., & LaBarre, P. (2008). *Mavericks at Work*. (I. Costa, Trans.) Rio de Janeiro: Sextante.
Tidd, J., & Bessant, J. (2009). *Managing Innovation: Integrating Technological, Market and Organizational Change* (4th Edition ed.). West Sussex: John Wiley & Sons Ltd.
Verhaeghe, A., & Kfir, R. (2002). Managing Innovation in a Knowledge Intensive Technology Organisation (KITO). *R&D Management , 32*, 409-417.

Appendix:

Audit Questionnaire:

1 People have a clear idea of how innovation can help us compete
2 We have processes in place to help us manage new product development effectively from idea to launch
3 Our organization structure does not stifle innovation but helps it to happen
4 There is a strong commitment to training and development of people
5 We have good 'win-win' relationships with our suppliers
6 Our innovation strategy is clearly communicated so everyone knows the targets for improvement
7 Our innovation projects are usually completed on time and within budget
8 People work well together across departmental boundaries
9 We take time to review our projects to improve our projects to improve our performance next time
10 We are good at understanding the needs of our customers/end-users
11 People know what our distinctive competence is what gives us a competitive edge
12 We have effective mechanisms to make sure everyone (not just marketing) understands customer needs
13 People are involved in suggesting ideas for improvements to products or processes
14 We work well with universities and other research centers to help us develop our knowledge
15 We learn from our mistakes
16 We look ahead in a structured way (using forecasting tools and techniques) to try and imagine future threats and opportunities
17 We have effective mechanisms for managing process change from idea through to successful implementation
18 Our structure helps us to take decisions rapidly
19 We work closely with our customers in exploring and developing new concepts
20 We systematically compare our products and processes with other firms
21 Our top team has a shared vision of how the company will develop through innovation
22 We systematically search for new product ideas
23 Communication is effective and works top-down, bottom-up and across the organization
24 We collaborate with other firms to develop new products or processes
25 We meet and share experiences with other firms to help us learn
26 There is top management commitment and support for innovation
27 We have mechanisms in place to ensure early involvement of all departments in developing new products/processes
28 Our reward and recognition system supports innovation

29 We try to develop external networks of people who can help us – for example, with specialist knowledge
30 We are good at capturing what we have learned so that others in the organization can make use of it
31 We have processes in place to review new technological or market developments and what they mean for our firm's strategy
32 We have a clear system for choosing innovation projects
33 We have a supportive climate for new ideas – people don't have to leave the organization to make them happen
34 We work closely with the local and national education system to communicate our needs for skills
35 We are good at learning from other organizations
36 There is a clear link between the innovation projects we carry out and the overall strategy of the business
37 There is sufficient flexibility in our system for product development to allow small 'fast-track' projects to happen
38 We work well in teams
39 We work closely with 'lead users' develop innovative new products and services
40 We use measurements to help identify where and when we can improve our innovation management

Company's answers:

Strategy		Process		Organization		Linkages		Learning	
Q N.	Score	Q N.	Score	Q N.	Score	Q N.	Score	Q N.	Score
1	5	2	5	3	5	4	5	5	6
6	5	7	5	8	6	9	6	10	7
11	7	12	5	13	5	14	4	15	5
16	3	17	5	18	5	19	6	20	6
21	6	22	7	23	5	24	5	25	3
26	6	27	4	28	4	29	7	30	6
31	6	32	6	33	6	34	4	35	5
36	7	37	7	38	6	39	7	40	7
TT points	45		44		42		44		45
Score	5,6		5,5		5,3		5,5		5,6

Source: PolyEasy audit questionnaire

Strategy		Process		Organization		Linkages		Learning	
Q N.	Score	Q N.	Score	Q N.	Score	Q N.	Score	Q N.	Score
1	5	2	5	3	5	4	7	5	6
6	5	7	5	8	4	9	4	10	6
11	6	12	5	13	4	14	1	15	7
16	7	17	4	18	6	19	5	20	5
21	4	22	5	23	5	24	4	25	3
26	7	27	4	28	5	29	5	30	4
31	5	32	4	33	5	34	1	35	5
36	5	37	5	38	5	39	5	40	4

TT Points	44	37	39	32	40
Score	5,5	4,6	4,9	4	5

Source: Arinos audit questionnaire

Interview Guide

1. Characterization Of Company / Group (Summary)
    a. The company's business strategy
    b. Corporate strategy
    c. What are the main products and services of the company?
2. Market Of The Company:
    a. What are the key factors of success for the company to stay competitive in your market? Eg: product differentiation, cost leadership, fitness for specific markets, delivery time reduction, delivery and customer service, distribution channels
    b. Is it expected some technological change over the next five years that may generate impacts on the technology being developed? What kind? If the company can monitor and respond to this change?
3. Management Of Innovation Activities
    a. The company has formal structure (department or area) dedicated exclusively to innovation activities? If yes:
        • Who is responsible for the management of this structure?
        • Is there a specific budget allocation for these activities? What is the percentage share in the company's revenues?
        • How many top-level professionals are located in this structure?
    b. Are the resources (financial or human) allocated for innovation outside the structure considered in section 3.a?
    c. Describe briefly the main innovations introduced by the company over the past 5 years and their results.
4. The Project Of Technological Innovation

    This item should be described and presented the design object of the election of BNDES resources, including key objectives, the relevance of the project for the company and this consistency with corporate strategy.
    a. Describe briefly the (s) object (s) of the resource request to BNDES
    b. What has been developed from the project presented? Explain how and where this development occurred, talking about third-party participation in the project.
    c. What steps are needed for the effective development of the project? Is there anticipated participation of third parties?
    d. Is there Technological Risk involved? Specify. In what moment of development it can be identified? How the company intends to deal with this issue?
    e. What is the differential of the product or process disclosed in relation to existing market (or have it been already applied by the company)? What will add in terms of technological innovation?
    f. Has the company been aware of any similar project being developed by the competition? Is there any technological alternative route?

g. How occurs the specific management of this project within the company? Also point to the need and availability of physical inputs and human resources (skills and competencies).
h. Which market opportunities does the company envision after the implementation of this project?
i. How the planned investments change the competitive positioning of the company? By what actions the company will seek to preserve the expected returns of innovation in medium and long term?
j. What is the company's strategy for the protection and ownership of the technology being developed in this project?

BNDES financial support tools:

BNDES presents long-term financing, securities underwriting and providing security, acting through products and funds, according to the modality and characteristics of the operation. The three support mechanisms (finance, securities and guarantees) can be combined for a single financial transaction.

Some products fall into the BNDES financing lines, with specific goals and financial conditions. At the discretion of the Bank, an investment project can benefit from a combination of Credit Lines of the same or different products, according to the segment, the purpose of the project and the items to be supported. Following are the main mechanisms of the Bank for supporting Innovation:

- BNDES Finem: Financing the projects for implementation, expansion and modernization of enterprises. The minimum supported by BNDES Finem - usually from R$ 10 million - can be reduced to R$ 1 million in credit lines targeted for investment in innovation, which are:
    - The Innovative Capital Line (Focus on Business): It supports enterprises in developing capacity to undertake innovative activities in a systematic character, through investments in both capital and intangible in tangible ways, including the implementation of research and development centers.
    - The Innovation Production Line: It supports research and development of innovation that have proven market opportunity or investment projects aimed at modernization of productive capacity needed to absorb the results of the research and development or innovation. The minimum amount of support for this line is R$ 3 million.
    - The Technological Innovation line (Project Focus): It supports innovation projects of technological nature that seeks to develop products or processes new or significantly improved (at least for the market) and involving technological risk and market opportunities.

BNDES can also support innovation through the following funds, which are not considered financing lines. They support institutions and researches:

- Technology Fund - BNDES Funtec: It is designed to support technological institutions, aims to support research projects, development and innovation in

the following areas: energy, environment, health, electronics, new materials, chemistry, transport and oil and gas.

- FUNTTEL - Fund for the Technological Development of Telecommunications: It support actions aimed at increasing the competitiveness of the Brazilian telecommunications industry.