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Identification of successful experiences in implementing business innovation processes

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F O R E W O R D

This document is intended, first of all, to make a critical review of the policies and programmes for Small and Medium-sized Enterprises, in order to help increase the effectiveness of investments in innovation in SMEs of the region, particularly with reference to existing companies in the industrial sector. This emphasis is justified by the worrying process of de-industrialization that has been seen in the region over the last five years, by the specific relative importance of SMEs in terms of their potential to add value through innovation, and by their offer of jobs with better pay – which is crucial for reducing the growing income inequality threatening social stability nowadays.

Secondly, the document also reviews some successful cases in business innovation in countries of the region, most of them showing incremental innovations with low impact on the competitiveness and growth of enterprises, attributable to the absence of appropriate business innovation strategies.

Methodologies to support the definition of innovation strategies in enterprises are presented as a possible initial solution to the current problems for effective innovation in industrial SMEs in the region, so as to offset the ongoing de-industrialisation process. The document also proposes that building entrepreneurial capacities through these methodologies should be the primary objective of public policies for promoting innovation in the region, as a mechanism to trigger commitment of companies with innovation, reduce the risks of the respective public and private investments and generate systemic solutions to today's global crisis.

Thirdly, this document intends to add value through the discussion of conceptual and methodological aspects of critical importance to the success of business innovation, which are absent from the previous analyses of innovation in SMEs in the region and from the context of government policies and instruments to support innovation.

As a result, this study, in its structure, makes special emphasis on conceptual and methodological aspects related to the issue of innovation in SMEs in the region, and tries not to repeat divergent statistics as regards these aspects.

Finally, the document proposes strategies and methodologies of work for fostering the processes of innovation and knowledge management in enterprises, in order to increase and sustain their growth and competitiveness.

The Permanent Secretariat of SELA expresses its gratitude and recognition to Dr. Fernando Machado for his valuable efforts as a consultant in charge of preparing this study.

EXECUTIVE SUMMARY

Countries and companies in the region have recognized the crucial importance of innovation for competitiveness, growth and survival of enterprises, for economic and social development, for the progress of civilization and for the very survival of mankind.

The context of multiple and interrelated global crises since 2008 has spurred such recognition, giving rise to a series of programmes to support business innovation in the region, particularly those oriented to SMEs, in order to sustain and increase the critical base of jobs that they offer.

Despite the increase in the contribution of resources to these programmes – mostly from the public sector – their results have been extremely scarce and ephemeral, with rare exceptions. The companies in the region that have effectively conducted innovations are still very few, putting into question the huge public investments to support business innovation.

Nevertheless, some countries, encouraged by the political acceptance of innovation as a social value, have continued to intensify such programs with allocations of increasingly significant resources. Other countries are calling for evaluating the effectiveness of such programmes and policies, and for assessing the return on the investment of resources from taxpayers in them. There is, therefore, an increased risk of fatigue in the public support for innovation in the region, at a time when it is more necessary than ever.

For this reason, this document seeks to carry out a critical review of those policies and programs, in order to make a contribution to the increase of effectiveness of investments in innovation in the SMEs of the region, with particular emphasis on the companies of the industrial sector. Such emphasis is justified by the critical process of de-industrialisation which has been seen in the region over the last five years, by the specific relative importance of SMEs in terms of their potential to add value through innovation, and by their offer of jobs with better remuneration – which is crucial for reducing the growing income inequality threatening social stability nowadays.

In the 20th century, Peter Drucker said that "**if the assumptions are wrong, nothing else matters**". This quote underscores the spirit of the proposals submitted herein relating to the valid basic concepts on business innovation, the current barriers to innovation in SMEs in the industrial sector, and the institutional mechanisms and policies for the promotion of innovation in the region.

There is concrete evidence that companies – particularly SMEs – lack the capacity to identify those innovations that could have a significant impact on the competitiveness of their businesses, and to effectively manage them.

The above leads to an inability on the part of companies to correlate their competitive strategies and strategic objectives with innovation, and to a persistent lack of commitment of SMEs with innovation processes. This is the reason for the absence of business response policies and government programs for the promotion of business innovation in the region.

This factor also makes it difficult to identify the real barriers to innovation in enterprises, since it induces distortions in the results of the respective surveys to companies. Those surveys tend to identify or overemphasize barriers which are external to companies, such as access to finance, weaknesses of the national innovation system (NIS), absence of skilled human resources, and others. While these are all important factors, an adequate treatment of the respective solutions

relies heavily on the company's ability to define those innovations that will be critical for their competitiveness and growth.

Based on the foregoing, the document also reviews successful cases in business innovation that have been reported in some countries of the region, mostly incremental innovations with low impact on competitiveness and business growth, attributable to the absence of appropriate business innovation strategies.

Policies and existing programmes to support business innovation, built on the barriers identified in the biased business surveys, can be subject to conceptual and methodological improvements.

The problems associated with the fragmentation, bias and discontinuity often reduces those policies and programs to isolated instruments which lack a vision of the future – since they do not foresee trends and possible scenarios – and are dissociated from the competitiveness policies, thus showing a conceptual confusion between innovation processes and research and development activities. The foregoing leads to confusions as regards innovation policies with science and technology policies, mistakenly assuming that those two areas share the same indicators and objectives, which skews the effectiveness of innovation policies, and evaluation and feedback processes.

Also, those policies are based on the assumption that the link between companies and a national innovation system is a prerequisite for business innovation, prefiguring the globalization of technological services, and allocate disproportionately high resources for that system. In the same way, they assume that companies know how to identify their critical innovations, that any business innovation is valid, and that any company can, therefore, innovate.

These and other assumptions are questioned by using the case of innovation policies in Brazil as an example, in view of the impossibility of making a detailed critical examination of all policies in the region.

The document also introduces some methodologies to support the definition of innovation strategies in enterprises as possible initial solutions to the current problems for effective innovation in industrial SMEs in the region, so as to offset the ongoing process of de-industrialisation. The document also proposes that building entrepreneurial capacities through these methodologies should be the primary objective of public policies for promoting innovation in the region, as a mechanism to trigger commitment of companies with innovation, reduce the risks of the respective public and private investments and generate systemic solutions to today's global crisis.

INTRODUCTION

SELA has acknowledged that SMEs of the region are increasingly forced to make innovations in their areas or business to be able to survive in an environment of quick, constant and radical changes in products, processes, equipment, business models, markets, competitors, technologies, regulations and public policies, which affect their value offers.

For this reason, the Permanent Secretariat has organized seminars in 2013, in Paramaribo, Suriname, and in Lima, Peru, to facilitate the perception of the SMEs in terms of this obligation. In Paramaribo, the importance of improving schools, programmes and existing science and technology programmes in the countries of the region was highlighted, in order to improve productivity and competitiveness of companies, and to create a legislative framework for innovation that would allow to promote alliances between the different support agents for business innovations, so that the interests of the different sectors would merge and are represented through a high-quality and secure legal framework.

The seminar in Lima conducted a review of the progress, strategies and instruments to support the process of an effective technology transfer, and at the same time there was a presentation on the main success experiences in the promotion of innovation, within the framework of the current technological revolution. Likewise, other similar subjects were tackled, related to productivity and competitiveness of companies, such as open innovation, knowledge networks, copyright, and financing of research and innovation projects.

These SELA initiatives are complemented by many other recent studies on the importance and urgency of innovation for productivity, competitiveness, growth, and survival of SMEs of the region, carried out by the World Bank, the Inter-American Development Bank (IDB), the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), and by other development institutions.

Without looking down on all these initiatives, this document tries to add value with the following differentiations.

First, it focuses on the feasibility of innovation within companies, trying not to repeat considerations on the different national interpretations of the definition of what an SME is, or of related statistics, on the number of SMEs, their sectoral or sub-sectoral distribution, their involvement in research and development activities, and others, already presented by previous studies made on the matter.

In the same manner, it is considered, for reasons detailed in this document, that the statistics available on business innovation in SMEs of the region lack reliability to be relevant elements of analysis to promote business innovation and, thus, for the formulation of national policies for the promotion of innovation. Although they allows for identifying certain common behaviour patterns, national surveys on innovation made in the productive sector, such as those conducted in Argentina, Brazil, Chile, Colombia, Mexico and Uruguay, use diverging concepts, indicators and criteria of the concepts proposed in this document. They show great sectoral heterogeneity at the level of each country, lack homogenous, comparable data at the regional level, and use national temporary series of very seldom axial coincidence. There are few real measurement indicators on innovative performance and innovation capability of companies, and thus they have a limited use for the creation of effective government policies for the promotion of business innovation.

Second, this document focuses on existing industrial SMEs and on those that lend associated services. This is not meant to look down on the value of policies intended for the promotion of new technology-based undertakings, known as startups, which have become the almost exclusive focus of the policies for the promotion of innovation in the region, which is damaging to existing SMEs.

Even though industrial SMEs of the region represent the axis with the highest potential for economic growth in the face of current global crisis – through the adoption of proper innovation processes, even for the creation or migration to new businesses and for the adoption of healthy environmental technologies – their competitiveness and survival are the most threatened by the global crisis and by the current technological revolution, as shown by the acute deindustrialization processes that have been taking place in the region during the last few years.

In the case of Brazil, particularly, the most recent trend is that industries are increasingly becoming resellers of imported products, as they cannot compete with them. Progressively, as they cannot either compete with the giants of e-commerce, such as Amazon, Wal-Mart, E-Bay and Alibaba, among others, which will undoubtedly cover industrial products as well, they are doomed to become, in the best of cases, third-party distributing companies. Thus, the employment base they offer is now in jeopardy.

On the other hand, these conditions of crisis environment and technological revolution open a myriad of new growth opportunities and entrance to new businesses for industrial SMEs, through the adoption of effective innovation processes.

The survival and development of such industrial SMEs through innovation would create not only a healthy and fast growth of economic development in the region, but also an exclusive opportunity to expand the offer of differentiated remuneration jobs, thus stimulating consumption and reducing the growing inequality of income. Also, it could cause a positive drag effect in the productive chains they operate in, as well as the opening of new areas of business, generating their own startups.

The concept that states that independent exportable services might substitute the economic contribution of industrial activity is highly debatable. According to the National Science Foundation, in the US, the total value in that country of the economic contribution of all businesses considered as high technology, including the exportable services that grow the most, was limited to 395 billion dollars in 2012.

Later on, this document tries to add value through the discussion of critically important conceptual and methodological aspects for the success of business innovation, still absent in previous works on innovation analysis in SMEs of the region, and on the context of government support policies and instruments to innovation.

As a consequence of all this, the structure of this work places a special emphasis on the conceptual and methodological aspects related to the subject of innovation in the SMEs of the region, and tries not to repeat diverging statistics of these aspects.

It starts by focusing on the reviewing of the concepts required to increase the effectiveness of the promotion of innovation towards the inside of the company, in tune with the international state of the art, with the reality of the current challenges faced by SMEs.

In the same way, it re-examines the main barriers to innovation for SMEs in the region, based on concepts different from those used by other works on the subject, highlighting the myths on business innovation that still persist when dealing with the matter.

Right after, based on the proposed concepts, the document analyzes the institutional mechanisms and government policies for the promotion of innovation of industrial SMEs, trying not to repeat the statistics that refer to mechanisms already covered by other studies. It also presents some experiences of public and private institutions in the region in the promotion of business innovation, with a particular emphasis on the case of Brazil. Because of how advanced the multiplicity of past experiences and degree of information available are, it also focuses on the cases of Argentina, Chile, Colombia, Mexico and Uruguay; which should not be interpreted as an exclusion of experiences in other countries of the region.

Lastly, the document proposes work strategies and methodologies to promote innovation and management processes of knowledge within companies, in order to increase and support their growth and competitiveness.

Likewise, it details how these methodologies can be assimilated and transferred through training programs and workshops for officials and SMEs interested in using innovation to improve their productivity and competitiveness.

I. CHARACTERIZATION OF THE INNOVATION PROCESS IN LATIN AMERICA AND THE CARIBBEAN – STRUCTURAL LIMITATIONS OF SMEs FOR THE ADOPTION OF INNOVATION PROCESSES

International experiences clearly prove that the intrinsic importance of private investment in business innovation processes is backed only by requirements of productivity, competitiveness, and survival of the companies.

Since these requirements depend directly on the environment and reality of the markets in which these companies operate, a minimum updated characterization of this environment shall become the necessary framework to examine limitations and propose incentive measures to business innovation.

II. CURRENT CONTEXT FOR INNOVATIONS IN INDUSTRIAL SMEs OF THE REGION

Regardless of the characteristics of each industrial and service subsector, certain factors of the current environment of SMEs in the region affect, to a larger or lesser extent, their competitiveness, growth capability and survival, and thus their requirements for innovation.

Some of these contextual factors are:

1. Current global economic and financial crisis, which started in 2008 and persists to this date

Beyond its negative effects on employment and productive activity, in the markets of capital and capital assets, in the reduction of credit, or on excess liquidity, in the loss of credibility of financial institutions and regulating agencies in the sector, on the dismal economic growth, and on

social and political convulsions, this crisis has originated a barrier for private investment on growth, and a dichotomy on the role of international trade as driver of growth.

On one hand, in central countries, notably in the US, the government has supported the economy during the post 2008 crisis period, with monthly purchases of private assets for 80 billion dollars by the Central Bank of the country (the Federal Reserve), corresponding to bonds of private companies. This process, called quantitative easing, has had the purpose of creating new private investments through business capitalization, in order to increase productive capability, increases in competitiveness and new businesses through investments in innovation, supporting and creating new jobs to help the economy grow.

However, private investment in the last six years has been mainly focused on mergers and acquisitions, with an emphasis on the purchase of the growth capability of third parties, and on the repurchase of shares by big companies present in the capital market, with the objective of increasing the per-share profit of investors, and thus increase their market value, which has in fact happened.

More recently, a third way, characterized by the subdivision of companies, has taken shape. With the recent high volatility of financial markets, the value created by such financial strategies has mostly disappeared, and the objectives of incentive to investment, creation of jobs and growth are compromised. As shown further in this document, such business behaviour offers a background to examine the innovation activity of SMEs in the region.

On one side, the global economic-financial crisis created barriers to international trade, with the implementation of protection mechanisms to domestic markets. On the other, it has produced extreme pressure for the opening of the markets of the region, by central countries, in line with their strategies of increasing economic growth through exports, with highly competitive industrial products and services, subsidized with devaluations of their currency, the above mentioned purchasing of private bonds by the Federal Reserve, and very low interest rates, among other mechanisms, a central factor in the deindustrialization of the region.

Moreover, the environmental crisis and of natural resources has demanded urgency in the adoption of specific sustainability patterns in the activities of companies, reduction of their environmental impact and global warming, creation of national and international regulations, and environmental restrictions set forth by national and international financing sources. Added to this context, nowadays progress in biotechnology offers sustainable technological solutions, mainly for the countries of the region whose economies depend essentially on the exploitation of natural resources.

Biotechnologies find such a large applicability in the region, that certain countries are already giving priority in their development policies to what is called Bio-economy. Chemical, food, pharmaceutical and health industries in general, the sectors of energy and information and communications technologies (ICTs), to mention just a few, may benefit in a sustainable manner in their competitiveness and growth, through innovations based on these biotechnologies. And since the border between these sectors and business areas is tending to disappear, countless opportunities are being created for new businesses and new business models.

Bio-industry has already allowed for the transformation of sugar cane by-products into PET bottles, manufacture biodegradable car covers, biosensors to monitor environmental pollution, use of new biomaterials to substitute bone tissue, development of a large number of drugs, and also offering

new microorganisms to degrade unwanted residues and generate natural agents to fight agricultural plagues. Fertilization crossed with nanotechnologies, 3D printing and new materials represent an area of extremely promising economic development, such as the clientelized production of new organs for the human body.

Today's adverse global context, characterized by multiple innovation challenges, is contrasted by the falling behind and inability of the companies of the region to innovate and seize emerging opportunities. This has led to a more acute process of loss of competitiveness of national industrial chains, with the consequent process of deindustrialization that affects SMEs of the region, which is without a doubt, critical for the most industrialized country in the region, Brazil.

Also, the discrepancy between the rate of the innovations in manufacturing activities and that of associated services, such as supply logistics, commercialization and others, that has been rapidly computerized, has contributed significantly to the deindustrialization and to the growing commercial deficits of the countries of the region, as these renewed services accelerated the distribution and commercialization of imported products that are more competitive than their national counterparts. In Brazil, for instance, according to reports of the Central Bank (Source: Economic Value – 06/29/2012) "imported products were responsible for 100% of the growth in the consumption of industrialized products in the last two years."

Additionally, when prioritizing the financing of companies of such services and commercial companies in general, including SMEs, certain support government programs for the industry, such as that of BNDES, in Brazil, have, inadvertently, promoted deindustrialization even further, and have compromised the survival of Brazil's industrial SMEs.

Lastly, it should be mentioned that this current world economic-financial crisis, along with its effects on employment and social values, generates economic systems that are radically different from those we have today.

One of them has been conceptualized as Collaborative Economy, a new economic paradigm originated from a combination of disruptive scenarios, and that constitutes a socioeconomic system built around the principle of sharing physical and human resources, prioritizing access instead of property. It is the opposite of the model of economic growth by increase in consumption.

Through the wide use of the technologies of the third industrial revolution, described below, this economic trend has already caused catastrophic effects on certain economic sectors, such as real estate, cars, transport, hospitality, and entertaining, among others. In the short term, it is expected it will an equal impact on the sectors of health, insurance, media and communications, and retail, among others. Companies that operate within its principles, such as Uber (car rental), Airbnb (hotels), and others, are already reaching market values higher than traditional companies such as Hertz, Hyatt Hotels and Wyndham Hotel Group. These companies are characterized by being fast, adaptable, flexible, with light structures, and with an excellent response capability to the challenges of its surroundings, through the application of radical innovations. It is expected that with the arrival of the Internet of all things, competitiveness of renewable energies and 3D printing, this economic trend will evolve towards one of marginal cost, which could shape a new economic system that will substitute capitalism. Involvement of SMEs of the region in this new economy demands that they build effective capabilities to make radical or breakthrough innovations.

i) **Growing scarcity of critical natural resources, including water, fossil fuels and others, with the corresponding international overvaluation**

The monumental demand of China and the rise in the price of commodities in the last few years have led regional economies to reprioritize themselves, with an emphasis on exports of primary products with no added value, which has reduced the availability for the industrial sector of the region. Likewise, the corresponding rise of prices has had a negative effect on the structure of costs of industrial activity, compromising even further the competitiveness of industrial SMEs;

ii) **Radical cultural, demographic, social and political transformations**

Everything seems to indicate that if humanity is successful in overcoming the current global crisis, in ten or fifteen years China and India will have a middle class equal to 40% of the global middle class, more representative than that of most European countries today. This new middle class would double its size and increase its consumption in 8 million dollars, with consumption patterns that would be different for current ones;

In order for this to be verified, the current deterioration of moral values that do not favour the keeping of peace and the development of civilization, as well as the fundamentalist religious conflicts affecting governability and national and international security, have to be overcome. At the same time, all this has caused operational discontinuities and also increased the operational costs of SMEs of the region;

iii) **The technological revolution with a trans-sectoral impact, characterized by technologies**

According to the renowned physicist Stephen Hawking, in the age of the steam engine, in the dawn of the first industrial revolution, the stock of humanity's knowledge doubled every 150 years. Today, 90% of the knowledge of humanity has been generated in the past 2 years, and Hawking estimates that in a little over 6 years, human knowledge wills double every 72 hours. The countries and regions whose companies manage to quickly identify, appropriate, modify and apply such knowledge into effective innovations will be the ones to achieve higher rates of economic and social growth.

2. Information and Communication Technologies (ICTs)

The ubiquity and broad multi-sector applicability of ICTs, including the industrial sector, deserve a particular mention in the current technological revolution. These ICTs not only represent innovation possibilities for existing SMEs, but also generate creation opportunities for new businesses with a great potential for growth. Its applications make possible the integration, relaxation, agility, learning and cost reduction in several dimensions of the businesses. For instance, in reference to markets, it allows for the integration and crossed fertilization of channels, as it shares information and experiences, besides the micro-segmentations, fast adaptation, and response to the changing needs of clients.

In strategic processes, ICTs facilitate competitive intelligence, trend analysis, of competitors, experiences and other critical variables.

In reference to internal organization and management, ICTs facilitate the gathering of information and knowledge required for a more effective decision making process, allows to share this knowledge throughout the organization, and to have plainer structures, with less hierarchic levels. All this adds transparency and facilitates innovation, and the acceptance of changes required to tackle the changing needs of clients in a faster manner.

At the level of the chains and suppliers, ICTs create agile and effective processes, and also reduces transaction costs and makes the processes towards the inside of the chain more flexible.

New fast evolving technologies, related to sensors, blazers, physical-cybernetic integration systems, artificial intelligence and robotics, tools to access large amounts of information and data (Big Data), added to software for advanced analysis, simulation and visualization tools, Mobile computing with storage in clouds, the internet of all things, among others, show great applicability for innovations in manufacturing activities, create new business areas and relevantly extend its markets.

Mobile computing, added to cloud storage, characterizes the new e-commerce, whether it is between companies and consumers, or between companies, which already incorporates 3 billion new clients to the market.

In the case of countries with a low intensity of land lines, as in the case of Latin America and the Caribbean, technologies associated to mobile equipment, including cloud computing, represent an important innovation opportunity for SMEs, through the linking of wide social strata in the Web. It is a practical, economic and easily scalable software infrastructure. It also has low-cost apps, flexible use billing, savings in hardware infrastructure, maintenance and updating guaranteed by the supplier, savings in equipment maintenance personnel, and company's computing applications, besides the ease of use, reduction of adoption times and personnel training costs. Computing in the cloud shall be seriously considered by SMEs of the region seeking for more competitiveness and growth.

Without a proper broad band infrastructure, the use and spreading of services in the cloud is limited. Likewise, the lack of trust in storing confidential data in the cloud, by fear of it been accessible to third parties or lost, is a strong deterrent of its use by companies.

As a matter of fact, cyber-security is a highly relevant subject, in virtue of the proven weakness of protection mechanisms and data safety, known as firewalls. The data of all kinds of companies and sectors has suffered violations, questioning the risks of the application of the ICTs. Very recently a security breach affecting 83 million accounts at J.P. Morgan took place. Nearly 7 million SMEs in the U.S. have suffered this type of attacks. It is expected that quantum computing, still under development, would provide solutions to the problem.

However, the continuity of computerized civilization not only depends on cyber security, but also on cosmic phenomena that today's humanity cannot control, such as the destruction of communication satellites due to the Sun's coronal mass ejections, asteroid and comet crashes, variations in the Earth's orbit, and even the risk represented the growing volume of cosmic trash orbiting the Earth.

But at this moment ICTs represent, for the SMEs of the region, important innovation opportunities to increase their competitiveness and the entering into new businesses. It is estimated that the

number of businesses made possible by these technologies will become a global market of over 10 trillion dollars in the U.S. in 5 years, more than a third of the current global GDP.

The dimensions of the businesses with significantly impacted by ICTs may be characterized as:

Big Data and advanced analytical software related to it allow revolutionizing functions, operations, new automations, better understanding of markets and consumption patterns, thus making possible micro segmentations, and also better decisions and competitive strategies. Software such as IBM's Watson, specialized on oncology, is already a mandatory reference for all MDs in the area.

Sensors such as RFID allow offering an unprecedented information service for clients, on the base of transportation, localization, status and conditions of their products. Sensor pills, such a Proteus, allow scanning the human digestive system in real time, reporting the results to the corresponding medical assistance via internet. Social network technologies allow to link employees, test new business models, incorporate clients and suppliers to the very innovation processes of the company, originating what is known as open innovation, which allows to share knowledge, preferences and joint development of innovations of products and services, thus reducing risks and the corresponding cycles of innovation, production and commercialization. It also facilitates the formulation of competitive fast answers, among other advantages.

3. 3D printers, nanotechnologies and new materials

3D printing technologies, nanotechnology and new materials also represent radical opportunities and threats for manufacturing SMEs of the region, faced with the marked deindustrialization process already mentioned. Through the expansion of its applications and the fall in their prices, these technologies will allow for the manufacturing of products close to the corresponding selling and consumption points. With the elimination of entrance obstacles, home micro-companies will be able to compete with the scale efficiencies of big production companies with high volumes, such as those from China.

Even with higher unitary costs, by eliminating transportation and maintenance of stock costs, these micro-companies would be able to compensate for their disadvantages. Also, their clientelization of products would be simplified with the elimination of the need to change tools, molds, and other traditional production supplies, as all the clientelization only requires changes in software and of raw materials for the 3D printing process.

In order to serve a specific segment of the market, their innovations would be equally made in an easier fashion. This way, 3D printing, added to nanotechnology and new materials, requires SMEs of the region to consider the implications for their production and supply chains, as well as the corresponding changes of strategies and operations.

4. Status of the incorporation of ICTs in innovations of SMEs in the region

Everything seems to indicate that the application of these information and communication technologies to the innovation processes of the SMEs of the region is still in its initial phase, characterized by the adoption of basic tools, such as personal computers, e-mail , and the use of the Internet, which has a low incidence on the increase of their competitiveness.

According to ECLAC and OECD,[1] a large part of these companies seem to be evolving towards the creation of records to speed up administrative processes, in order to make viable external transaction with governments, in compliance with regulations or in attention to demands in the purchase of services and products by these same governments.

This automation of procedures reduces transaction costs of the company with third parties, including banking and financial services. They even try to establish a narrower link with their clients and suppliers through the creation of an intranet and their own Web site.

However, due to their level of investment and complexity, ECLAC estimates that very few SMEs are currently using highly specialized computer programs in a more intensive and complex manner, such as the systems for Enterprise Resource Planning (ERP) and administration of their relations with clients and consumers. It estimates that in Argentina, 25% of the SMEs use ERP; and in Brazil its use is reported in 24% of the SMEs of the country. However, ECLAC'S study does not identify a significant number of SMEs with the capability to use ICTs as a representative factor of competitiveness, whether it is in the acceleration of its communications and decision making processes, including the design computer-assisted manufacturing, in the management of the chain of supplies, in the generation of detailed information on markets and competitors, in the optimization management processes, formulation and evaluation of competitiveness and innovation strategies, including competitive intelligence, in virtual sells through e-commerce, distribution of products or for their own innovation in business models.

A possibility for the use of ICTs that deserves mentioning, because of its relevant incidence in the success of the innovations, implies that the consumer designs a product or service they desire, co-participating in the innovation process from the beginning, which leads to a reduction of risks for the innovative SME. Other initiatives push the collaboration model all the way to the development of software and complementary services.

This process, known as open innovation and crowd sourcing, co-creation or outsourcing of innovation, represents a component of growing importance in current business models, in which clients, suppliers and other external agents are no longer passive elements in the offering of innovation, but participating actors.

The study by OECD-ECLAC points out as typical obstacles for the adoption of ICTs by SMEs the high acquisition costs for equipment and software, training and hiring of specialized personnel, and the availability of information about these technologies at a management level.

It also acknowledges that information on the access and use of ICTs by SMEs in the region is specific and hard to compare, as the basic data available in the countries focuses on the quantification of computers, internet connections, internet sells and purchases, and the availability of human resources in the area.

[1] "Latin American Economic Outlook 2013- SMEs policies for structural change" ECLAC-OECD ISBN 978-92-64-18374-2 (PDF) http-dx.doi.org-10.1787-leo- 2013-es.

However, another study drafted in March 2011 by the International Centre for Development Studies, jointly with the Inter-American Development Bank,[2] reports concrete data on the subject as a result of a long-term project carried out in the region.

According to this study, there are at least four factors that motivate SMEs to invest on ICTs: 1) perception of saving in costs and generation of benefits; 2) external pressure of competitors, clients and suppliers; 3) organization willingness; and 4) ease of use.

The study points out that not all investments in ICTs will have an impact on the growth of the company and on its business, and that, in general, it is essential that ICTs are considered not so much as a functional instrument, but rather as a strategic capability of the company that can be translated into a competitive advantage.

It also states that a factor that has accelerated the adoption of technology by SMEs, especially in developing countries, has been the migration of public services to Internet. Out of convenience or by obligation, SMEs started accessing the services more through Web sites to make procedures, tax statements, commercial registrations, customs procedures or public purchases, among others. The contact opportunities of a company with the public administration are many and, with online services, companies do not take long in identifying the advantages of using that same path for their own business management.

In some countries, governments have adopted regulations and implemented measures intended to encourage SMEs in their digitalization process. For instance, in Chile and Brazil support has been oriented towards promoting the use of electronic invoices, accounting systems and public purchases through the platforms of specific programs for public purchases.

According to the study, the adoption of ICTs by SMEs is an area in which there is not much empirical or theoretical literature, even at international level.

From the experience accumulated in the projects analyzed in that study, it turns out that the biggest incentive for the adoption proves to be the increase in sales SMEs expect to achieve, but the main effect has been an improvement in company efficiency reflected in productivity and, as a consequence, in profitability and competitive position of the company.

As can be seen, none of the studies mentioned makes reference of the fact that the motivation for the adoption of information and communication technologies, or of any other technology, through processes of innovation in each company can only result from a clear previous understanding, by those in charge of making decisions, of the impact they would generate on their competitiveness, growth and survival, which can only be achieved through the formulation of specific strategies for innovation of the company.[3]

[2] "ICTs in the development of SMEs. Some Experiences in Latin America". International Development Research Centre, jointly with the IDB, Inter-American Development Bank. Antonio Ca'Zorzi, March 2011.

[3] ICTs in the development of SMEs. Ibid.

III. NATURE OF THE INNOVATION CHALLENGE FACING SMEs AND RELATED BASIC CONCEPTS

The whole entrepreneurial context described above shows that the rapidly changing knowledge and markets shaping the SMEs in the region pose a variety of risks and innovation opportunities that are pivotal for current businesses and for accessing new businesses.

Consequently, the SMEs need to:

i. Realize both that their business conditions and environment are changing radically and that they need to anticipate market trends and technologies in order to maintain or increase their competitiveness and survive. Additionally, they need to understand that the incremental changes, which could have been satisfactory in a less dynamic past, no longer respond to the current challenges in terms of competitiveness;
ii. Understand the relative priority of their competing needs, based on their environment or context, internal capabilities and relevant projections;
iii. Carefully and promptly assess the possibility of innovation in all their assets and physical, financial, human, intellectual, social and natural capital –and even hidden capital, so to sustain or expand their competitiveness and enter new businesses. Thus, they need to consider the importance of innovation in all their activities adding value to the enterprise and its customers, not only in products or production processes;
iv. Develop innovation investment and management capacity, including appropriate concepts, strategies, tools and methods to define, implement and successfully evaluate innovation projects and processes in tune with the growing dynamics of this new reality. This amounts to building and using an organizational culture, structures, systems and enabling processes, together with an effective innovation management capacity within the enterprise, including the preparation of innovation strategies, also known as "front end innovation;"
v. In addition to the above, some basics about the meaning, degree of innovation, organizational scope, origin, and "timing" of business innovation are reassessed, in a way that suits better the challenges facing the SMEs in the region, and beyond the lingering myths about innovation.

1. In terms of meaning, what is business innovation?

- Business innovation is described as a process that begins and ends in the reality of markets and business of the enterprise. For any enterprise, innovation is investing in the right place, at the right time. Proper innovation represents a significant investment of resources, attention, effort and risk to the enterprise, competing with other short-term priorities. Like any business investment, it takes comprehensive risk assessment and effective management to ensure the desired return on capital.

- No responsible investor risks resources without first assessing the business, which is a step known as due diligence. In the case of investments in innovation, due diligence is quite more complex than for other traditional investments. It is part of the innovation strategy concepts and techniques of each business. This strategy helps choose the portfolio of relevant projects for implementing changes, either technical or otherwise, and by differentiating the activities that are valued by the company and/or by current and future customers, increase and sustain business competitiveness in existing businesses, or support the creation of new businesses.

Certainly, differentiation in enterprises' value-added offering may be based on factors other than innovation, such as privileged access to exclusive raw materials, investment in brand, positioning resulting from past decisions and actions, which created market reputation, image and confidence, contextual factors that are difficult to eliminate, such as the cost of switching suppliers, the existence of unique capabilities, among others. However, most industrial enterprises do not seem to have this kind of fortuitous differentiations and need to create and sustain them through innovation.

- Differentiations are found in the values related to the criteria to acquire the largest customers. As described below, this does not only refer to the enterprise's price levels and products or services provided. The degree of differentiation should be specific and measurable enough to allow for a clear distinction – based on customers' criteria – between the enterprise's value-added offering and that of competitors. Further, it should be difficult to imitate by competitors. In this way, the more complex the body of knowledge used for the enterprise's innovations, the less susceptible it is to imitation. This does not mean that there are not business innovations based on state-of-the-art knowledge.

  Some enterprises undertake innovations in order to generate new knowledge, promote science, such as innovations in rockets, space probes and telescopes. But these are not the vast majority of companies, and such innovations are not taken into account in this document. For enterprises, emphasizing the relative importance of the technological content of innovations, in order to achieve sustainable competitive differentiation, is critical. The innovations based on value differentiations that are easy to duplicate do not usually yield the expected results.

  Similarly, innovation by duplicating what other companies do, via technological upgrading or technological levelling with market leaders hardly generates the expected value differentiation, and often turns out a huge mistake, taking a high economic toll on the enterprise.

- This document suggests that the main obstacle to innovation in the region is the lack of entrepreneurship for defining these strategies of sustainable competitive differentiation. Definition of such strategies is pivotal for enabling innovation in SMEs in the region. Such mechanism allows entrepreneurs to match innovation with their strategic objectives and business competitiveness, thus facilitating their understanding of the benefits and risks of innovation, and cementing their commitment to innovation.

  Successful outlining and implementation of the business innovation strategy comes within the framework of a set of concepts, methods, tools, techniques and expertise called Innovation Management, which is still under development in the region and is unknown to most industrial SMEs.

  The gap between the ability of mankind to generate new knowledge and the ability of societies to innovate successfully underlies the looming global crisis today.

- Technological innovation is the most important instrument enterprises have in their hands to maintain and expand their competitiveness in a sustainable manner, or venture successfully into new businesses. Under current conditions of radical changes in the environment for SMEs in the region, as described above, justifying innovation solely as a means to improve productivity in existing businesses – which is commonly seen in many studies and

publications on business innovation – is a mistake that is often fatal. Surely, for many, measuring productivity gains is easier and more concrete than measuring improvements in competitiveness.

- The business innovation strategy, its environmental sustainability strategy and competitive strategy are inseparable; they are mutually supportive and must be defined concurrently.

- These competitive and business innovation strategies are the starting point for the definition of business growth strategies, including targets for sales, profits, market share, differentiated marketing, brand definition, operational scale and efficiency, customer loyalty, the relative strength of the chain, and the creation of entry and exit barriers for the business, among others, that will sustain and increase the enterprise's competitiveness in existing businesses or allow the creation of new businesses.

  The current turbulence surrounding the business sector threatens to grow exponentially in the future owed to the rising "tsunami" of new knowledge. In this context, innovation strategy tends to be confused with the enterprise's strategic planning or business models. More broadly, the concepts, methods and techniques for managing business innovation tend to replace those that are typical in traditional business management.

- Since the management of effective outlining and implementation of innovations is highly complex, most enterprises, and particularly the SMEs in the region, do not know how to identify the most appropriate innovations (or their strategic innovations) to increase and sustain their competitiveness. Further, they lack the capabilities to implement innovations effectively. The process of identification and assessment of all the variables involved in the outlining of the enterprises' innovation strategy, including future trends, assessment of current and prospective competitors, market developments, the life cycles of technologies and regulations, technological prospects and monitoring, the alternative technologies required for innovation, among other factors described in the final section of this paper, is the mechanism that helps clarify – in the mind of the entrepreneur – the correlation between innovation and competitiveness, growth and profits of the enterprise. In turn, this helps cement entrepreneurs' commitment to innovation and leads them to make the appropriate investment decisions, in a structured and progressive manner, with frequent feedback.

  This process is highly specialized in nature. Consequently, most enterprises lack the required capabilities to successfully start and conduct it.

- Innovation takes place only in an entrepreneurial context that brings it to the market. Therefore, the existing enterprises can and should be viewed as the main engines driving innovation in the region. This is particularly true for the new enterprises that have been established to make use of the results of Research and Development (R&D) activities in academia and research centres, which involve higher risk investments and maturation. In addition, the success of these new enterprises depends on proper synchronization of multiple external support mechanisms such as angel investors, incubators, mentors, venture capital, technology parks and others, which still are less than adequate in the region.

2. Organizational Scope – where to innovate, in what innovations to invest, and with whom?

As described above, enterprises always have multiple options for innovation, incorporation of knowledge and changes in its many activities, many more than the resources of all kinds available for investment. Also, the effect of differentiation sought in the market will vary, depending on the set of added-value activities chosen for introducing innovations. The enterprise's chain of added-value activities, as shown below, that of their customers, as well as new business opportunities, can provide the framework to conduct adequate, refined choice of the competitiveness and growth strategy of the enterprise.

This is a typical decision applying Pareto criterion, such as: What 20% of value activities may be subject to innovations that may produce 80% of the desired sustainable competitive differentiation?

As outlined in the final section of the report, it is necessary to have references about the reality of the production chain, internal and external transactions, creation of entry and exit barriers, the need to change suppliers or customers, raw materials, energy sources, how to buy or sell, the pattern of rivalry, the current business model itself, the learning process, and other responses to the competitive strategies of the enterprise.

The value chain of any enterprise, in any industry, can be understood as a set of value-creating activities, including sources of basic raw materials, suppliers of parts and components, delivery of the final product, and after-sales services. The activities creating the value chain are linked to each other, directly or indirectly.

The assessment of the value chain enables the enterprise to understand the relative contribution of each activity to its competitive advantages, so to focus innovation on the set of activities that increase the perception of higher added value in the eyes of the customer.

Some examples of the activities in the value chain of the enterprise that often serve as potential areas for innovation, beyond products, services or production processes, are listed below:

- Logistical system for inputs
- R+D+I/design – Impact of new ICTs on innovation management
- Product and its history – Organic, production chain
- Pre and post-sales services
- Manufacturing-transformation, compliance with external regulations, insurance and worker satisfaction
- Knowledge platforms
- Marketing, merchandising and sales
- Distribution logistics (for example, flexibility in delivery)
- Disposal / recycling - environmental lifecycle of product
- Emotional experience of customers using the product / service
- Meaning of life / harmony, emotions – useful business model
- Learning, knowledge management, innovation processes thereof

The value generated by the set of innovations chosen by the company must be properly spelled out and communicated to customers in every business, explaining how it meets their needs. Their access to this value should be facilitated; the nature of their experience in embracing the value and the respective consumption should also be planned in advance. All these activities, in turn, are also areas of innovation, particularly in terms of ICT applications.

As mentioned above, Internet-related ICTs, particularly social platforms, have succeeded in extending the organizational scope of the innovation process and have brought in prospective customers, important specialized partners unrelated to the enterprise and even competitors in other business areas to co-participate not only as partners of the enterprise's production and supply chains, but also as users of products and services thereof.

This inclusive and participatory process, called open innovation, has advantages such as brainstorming, reduction of the market risk and of the innovation cycle and cost, among others. However, it also has disadvantages, such as risks related to intellectual property and confidentiality.

Similarly, open innovation requires the implementation of specialized management principles. There is abundant literature on corporate experiences based on these principles, but details are beyond the scope of this document.

Within the scope of this document, noteworthy is the emphasis of open innovation on the generation of ideas for business innovation, by prioritizing the implementation of a corporate culture conducive to innovation and human resources training. This document recognizes the obvious importance of these elements, but not their prioritization, as proposed by the developers of open innovation. As detailed below and in the final section, it is considered that the process of generating ideas should take place under specific business innovation strategies, by subsidizing them.

3. Genesis of innovations – Source of knowledge for business innovation

In line with the business competitive and growth strategy, the innovation strategy defines and limits the value-added activities to be included in innovation projects and that shape the framework required for creativity, brainstorming and open consultations on the type of open innovation leading to value results.

Chart 1 below illustrates potential sources of ideas and knowledge for business innovation prioritized by innovation and competitiveness strategies. Based on the requirement to keep differentiation in innovation, the meeting point of the three circles in Chart 1 represents the specific combination of knowledge for use in innovation, thereby meeting the needs of customers or markets, and preventing imitation by competitors, which would compromise the return on investment in business innovation.

CHART 1
Sources of knowledge for innovation

Particular attention is paid now in this paper to another source of knowledge: research, development and innovation (RDI), as this is commonly mistaken as the only source of knowledge for innovation. As explained in the CEPAL document mentioned above, innovation in the vast majority of SMEs in the region shows no relation to RDE or R&D.

According to the document, innovation in SMEs in Argentina, Brazil, Chile, Colombia and Uruguay share a common feature in terms of the type of innovation and nature of the associated sources of knowledge, namely, an approach focused on technology transfers, mostly implicit, involving capital goods, or equipment and facilities, as well as unsystematic adoption of the workforce's tacit knowledge and copy or imitation of what other companies do.

Explicit technology transfer, often including the licensing of patents, is a component of the incorporation of third party knowledge that is very common in the "mix" of knowledge for business innovation. Its use also suggests that the enterprise may have planned its strategy.

The acquisition of third-party knowledge is also possible by hiring experts from other companies, mergers or acquisitions, and strategic partnerships or joint ventures, and also by using open innovation mechanisms, including consultation with customers, suppliers and experts, as detailed in the final section in this document.

Additionally, research conducted by Professor Eric Von Hippel, with the Massachusetts Institute of Technology (MIT), U.S., found that users who promote innovation in the supplier's products or services can be an important source of knowledge and ideas for innovation. Similarly, the techniques to encourage the generation of ideas for innovation, also known as creativity

techniques, such as brainstorming, TRIZ and De Bono's lateral thinking, to name a few, are increasingly popular.

The point where these different ways of acquiring knowledge overlap, as illustrated by the circles in Chart 1, indicates that business innovations usually make use of various sources of knowledge, with their final selection depending on the criteria chosen under the business innovation strategy.

In this regard, it is noteworthy that the ECLAC study characterizes innovation activities in SMEs in the region as responding primarily to informal strategies, not as a result of formal strategies. This prevents SMEs from properly shaping their processes of knowledge search and generation of ideas for innovation. Although the region appears to have finally understood the critical importance of innovation for leaving current crisis behind and resuming economic and social growth, it continues to believe that innovation and research and development are the same -a major mistake that has curbed the efforts in the region for promoting business innovation.

IV. INVESTING IN INNOVATION, RESEARCH AND DEVELOPMENT

The following analysis in based on the article "Innovation, Research and Development – A High-Price Confusion".[4]

In 2013, the famous consulting firm Booz&Co published the results of its last global survey in the thousand most innovative companies of the world. This year it focused on strategy planning of business innovation, what is called in Internet discussion groups as "front end innovation". Booz&Co has been working on this survey from 2005, to examine the correlation between the amount companies invest in R&D and their financial performance in short and long terms.

Year after year, results highlight the conclusion of this correlation as being non-existent. More R&D investment does not translate, necessarily, into bigger success in business innovation. Additionally, focus on R&D demands more attention from the organization, which hinders adequate assessment over the company the innovation should be constituted. The absence of planning abilities in the innovation amplifies this huge disadvantage.

The survey made in 2013 (Booz&Co, 2012 Global Innovation 1000-autores B. Jaruzelski, J. Loher, R. Holman) points at some significant differences between the performance of top tem most innovative companies and the top ten that mostly invest in R&D. Three financial measures were taken into consideration: sales or income growth, market value growth or capitalization and EBITDA (Earnings before interest, taxes, depreciation, and amortization), as percentage of incomes.

The following comparative tables portray the differences in performance

[4] Inovação e Pesquisa e Desenvolvimento – Uma Confusao de alto custo". Fernando M. Machado, Tribuna da Bahia, Carta do IMIC, 18-12-201.

TABLE 1
The 10 most innovative enterprises between 2010 and 2012

Ranking	2010	2011	2012
1	APPLE	APPLE	APPLE
2	GOOGLE	GOOGLE	GOOGLE
3	3M	3M	3M
4	GE	GE	SAMSUNG
5	TOYOTA	MICROSOFT	GE
6	MICROSOFT	IBM	MICROSOFT
7	P&G	SAMSUNG	TOYOTA
8	IBM	P&G	P&G
9	SAMSUNG	TOYOTA	IBM
10	INTEL	FACEBOOK	AMAZON

TABLE 2
The 10 enterprises with the largest investments in Research, Development and Innovation (R-D-I) in 2012

1	TOYOTA
2	NOVARTIS
3	ROCHE HOLDING
4	PFIZER
5	MICROSOFT
6	SAMSUNG
7	MERCK
8	INTEL
9	GM
10	NOKIA

As can be seen, just three of the biggest investors in R&D – Samsung, Toyota and Microsoft – were among the top ten most innovative companies in the last three years, but are out of this last ranking. Also, none of the four first companies in these years – Apple, Google, 3M and GE – are

among the top investors in R&D. On the other hand, three out of the four main investors in R&D – Novartis, Roche Holdings and Pfizer– are not included in the 10 most innovative companies.

In fact, in their mix of knowledge and technology required to differentiate and support their innovations, companies such as General Electric-GE, do not commonly use more than 15% or 20% of the knowledge generated by R&D. Other mechanisms presented in Chart 1 provide most of the knowledge and technology incorporated to their innovations. With the current disruptions in business contexts, the increasing importance of innovation in business models, as shown by Chinese company Alibaba, do not require R&D activities.

Out of the 25 most innovative companies from another survey in 2013, Boston Consulting Group (BCG), 14 are innovators of business models, such as Apple, Google, and Netflix. The latter reinvented video business without opening any video shop.

Without disregarding the relative importance of R&D as a mechanism of generation for new knowledge for innovations, it is necessary to conclude that successful innovation and good financial and market performance of innovative companies does not correlate with their investment in R&D, they correlate instead with their capacity to define and apply adequate innovation strategies, with effective management by the company.

Considering all of the above, the absence of this capacity seems to be business innovation greatest problem, the origin of the main obstacle for business innovation.

Almost half of the thousand companies in Booz&Co survey have admitted that their organizations are barely marginally effective in generating ideas and transform them into successful innovations. The correlation between entrepreneurial success in the first stage of the innovation process (front end innovation) and superior financial performance, which is relatively low in the thousand most innovative companies of the world, represents a window of competitiveness opportunities unique for regional companies, including SMEs, once the costs related to the development of this business ability are vastly lower than those related to R&D investment.

1. Timing in business innovation

The critical importance of defining a certain moment for introducing an innovation into the market cannot be dodged. Multiple companies ceased to exist because they introduced an innovation into the market in the wrong time, it could have been anticipated or late. Innovative companies that controlled their businesses, such as Kodak, NEC, Sharpe, Comodote, Grundig, Nakamichi, Newsweek or Polaroid, had plenty of R&D resources, the best trained employees and great knowledge of the market, but they have closed down due to mistakes in nature, type and period of introduction of their innovations.

As a critical component in the business innovation of the company, the definition of the introduction moment requires to take into account aspects such as the S-curve stage related to technology life cycle, expectations, relative importance, added value perception according to the market; partners and competitors activities, former and new; and even their reaction towards innovation; delay costs; evolution of legal aspects and correlated regulations of the financial-economic context; costs variation and profitability of the innovation according to its introduction period, among others.

The existing literature presents the speed between the conception and introduction of an innovation as an absolute advantage, particularly with new products. In reality, for every innovation success depends more on providing the exact value, using the right solution, for the right clients, in the true moment for solving a true problem, with the best business model.

2. Typology of entrepreneurial, incremental and disruptive or radical innovations

Certainly, the typology of innovations can be presented under several dimensions. Literature on the topic emphasizes, for example, typologies such as Top-Bottom ones, which place innovation as something that originates from the management of the company to their employees; or Bottom-Up typologies, in which innovations are generated by the operating staff of the company.

In fact, the effective management of innovations integrates these dichotomies. When it comes down to the degree of the impact of innovation in the company's competitiveness and growth capacity, incremental and disruptive or radical innovations are the categories that must be taken into account.

2.1. Incremental or gradual innovations

Most of the innovations carried out in the region, in companies of all sizes and sectors, including SMEs, are incremental

Among the valuable activities in a company that are subject of innovation, as the ones mentioned before, incremental innovation is usually limited to production processes, products, organizational structure and other aspects, all of them easily imitable by competitors.

They are constituted mainly by changes oriented towards the company's operational productivity, maximizing profit on investments already made. When turned to the elimination of costs and loss in existing business, techniques such as Total Quality and Just in Time, the application of ICTs and the imitation of best practices in the sector or sub-sector.

These innovations are based on current organizational culture, on consultations exclusively with current clients, on small changes in the products or services attributes, on internal reorganizations to "serve clients or market in a better way", on alignment of abilities and other minor changes.

These incremental innovations have the advantage of demystifying innovation processes for the staff, hence motivating them, and even experiencing productivity and competitiveness temporary increases.

In certain sectors, such as finances, incremental innovations are equally useful in competitive battles in customer service. Companies want to show they are innovative, so that investors trust in their potential of growth, in order to raise their stocks price in the capital market. Popularity among incremental innovations has its logic.

The prevalence of incremental innovations is equally derived from the natural compulsion of leading companies in the market, in this sense all possible benefits derive from "cash cow" business and from keeping their leadership through changes that use familiar indicators, such as return on assets, net present value and others and also which do not produce mayor alterations in the successful factors of leadership.

The proliferation of graduate and postgraduate programmes in business administration in the region, all of them emphasizing accountancy, finances, cost management and supply chains, besides other topics easy to teach and with a tendency to be oriented towards the analysis of historical data have contributed to constitute a mental model with concepts and techniques of "how to do things better". Including how to calculate costs and operations to improve continuously the results of a company and hence increase it value in the market. This has translated into companies focusing mostly on incremental innovations.

Disruptive innovations represent a threat to their current businesses; they involve change based on risky suppositions still to be tested. However, as Peter Drucker said, "Get the assumptions wrong, and nothing else matters".

When markets and economic, social, technological tendencies change, no incremental innovation matters. Sears and McDonalds did not check the assumptions that were profitable a decade ago, and these no longer work. It does not matter if operational improvement and cost cutting measures were taken; the shift of the current customer loss is accelerating.

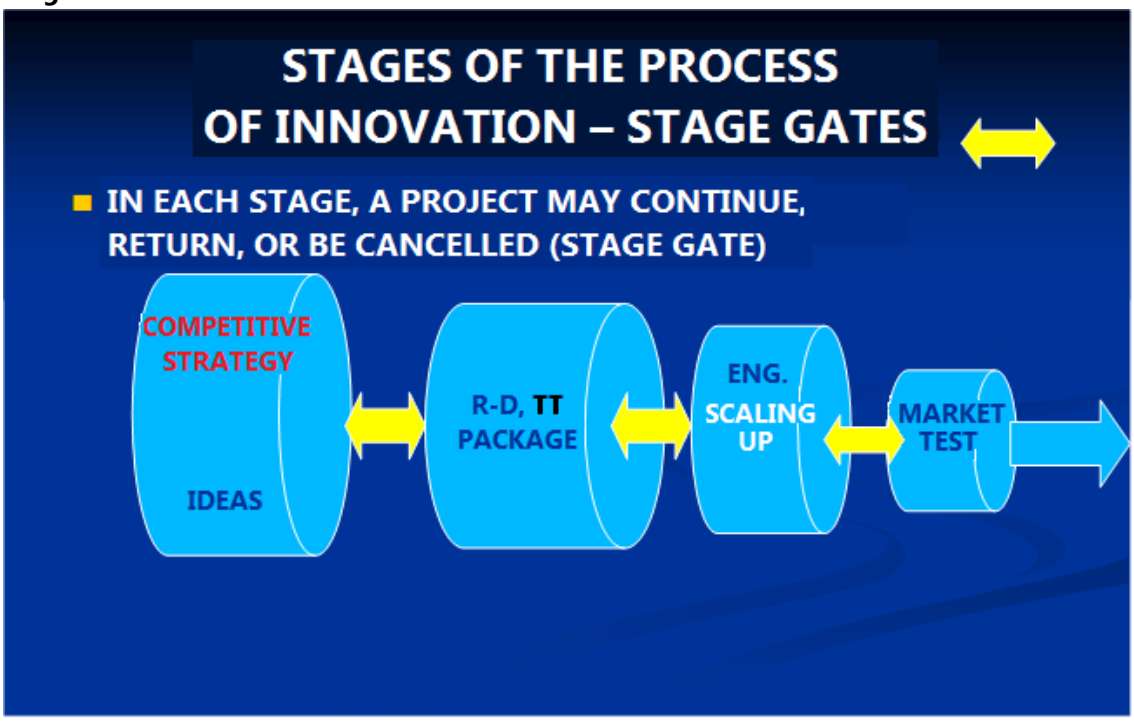
Applicability of incremental innovations is justified mainly in oligopolies or monopolies, or similar – characteristics that are less and less frequent in current contexts.

Additionally, the way disruptive innovations are presented – in a portfolio of technological innovation projects, responding and merging with competitiveness of a company – is a difficult goal to achieve in the region.

Despite their low complexity and technical risk, these innovations require certain level of immersion, attention and effort from the organization.

Chart 2 below shows the investment of efforts of the company in managing incremental innovation projects, through a controlled steps process known as Stage Gate.

CHART 2
Stages of the Incremental Innovation Process



With higher control and investment, the stages mentioned before, fed back constantly, define the progression of the project in every stage of its life, based on specific criteria related to partial goals, to the evaluation of costs evolution, to budgets, deadlines, technical, economic and regulation risks, market shifts and competitors activities, among others.

In incremental innovations, these stages start with the generation of ideas, generally unrelated to a competitiveness and innovation strategy. It continues with the process of learning and obtaining the necessary information to make the innovation, including RDI and the scaffolding of production processes, then markets tests and finally the introduction of the innovation in the market. As shown before, every stage has a committee deciding if the project continues, goes back to improve it progress or if it is definitively cancelled.

Because of the following reasons, this management method is barely applicable in case of disruptive innovations. Therefore, incremental innovations are fed from the popularity and processes of the generation of ideas.

For example, 3M is one of the most innovative companies in the world; it expects its employees to employ 15% of their working time to create personal new projects. Google expects a 20%. Big companies in the region have similar expectations. This is a regular bottom-up process making everybody feel as a participant in the innovation and therefore special. However, this process is inefficient, it wastes resources without limit in a huge amount of small projects which very low impact and poorly sustainable in the company's competitiveness.

This analysis at a management level, to decide which innovations are really valuable, requires great effort and time from the company's management office, despite the use of software similar to those in innovative companies in the region.

With the purpose of getting over these obstacles and better linking ideas and results, some US companies, such as iron producer NUCOR, give financial incentives to employees who bring their new ideas to increase productive efficiency. Some other, such as Deere and Co, a rural machinery producer, created a detailed manual on how to project tractors so as to canalize in a practical way the ideas of their employees.

All these represent great incremental innovations but their use is uncertain and surely limited, to maintain competitiveness in the company and new opportunities for high growth business are not in the horizon.

Strategic innovation is not a natural process in current industrial companies, their traditional administration focuses on operational productivity, based on estimation and repetition of tasks, responsibilities and results' pay off.

Gradual or incremental innovation is highly compatible with this. And the company's operational units will prefer it instead of more radical innovations, with a higher risks and degree of uncertainty.

The biggest disadvantage of current incremental innovations relays upon its implicit relation with the changing reality of business, in the best of cases. And also its disassociation from competitive and innovation strategies in the company, which would turn its relation with business context an explicit one. For this reason, and because of the effort needed, gradual innovations produce a certain organizational blindness towards the need for more radical and disruptive innovations, required by the context of the company. After considering the business context, the multiple global crises and the technological revolution happening nowadays, as said before, this blindness over bankruptcy risk of the company can be fatal.

A few years ago, when covering the fall of NEC, in the electronic sector, famous publication "The Economist" mentioned that "NEC produces little that other firms don't make as well" and suggests that other giants such as Sharp, Panasonic, Toshiba and Hitachi may be in the same category.

All these companies were already the centre of attention thanks to their great disruptive innovations. Today, they fail precisely being victims of their success. While they grew and became a world class, operational excellence started to be considered as critical to keep their success. As a consequence, the emphasis was made on incremental innovations.

The jail of success changed their mental focus, affecting their progress, choice criteria, organizational systems and their business context sensors. The most important thing was increasing or keeping their level of market capitalization, reaching their quarterly quantitative results projections in the market. The arrival of problems emphasised costs optimization, which took them to true business blindness and to the biggest risk of all, being irrelevant.

If this is happening at a global level, what is the risk for SMEs in the region, which operate in a business context already complicated and which use almost exclusively incremental innovations?

Despite this context, regional companies innovate even less now than before crisis. For example, the results of the last survey about technological innovation in Brazil (PINTEC), carried out by the Geography and Statistic Brazilian Institute (IBGE) covering 2009-2011, shows that, in comparison with the previous survey, from 2006-2010, innovation in the country has been reduced.

The number of companies that has invested in innovation has dropped from 38.1% to 35.7%, despite taxes reduction and assignments in payrolls, enough and cheap loans and other incentive policies from the government, besides inclusion, for the first time in these surveys, of sectors such as electricity, gas and other services. The industry has invested 2.37% of their 2010 sales net income, the lowest percentage in the last 10 years, when the IBGE calculation was created.

Out of that percentage, almost half of it, 1.1%, corresponded to machinery and equipment purchases, which is not necessarily innovation, much less sustainable. Even more disconcerting, the IBGE survey classifies as innovative any company with at least one innovation made in the period, without knowledge of the results or impact in competitiveness in the company. Everything points at most of these innovation being incremental, unlikely sustainable and with little impact in the competitiveness of the companies involved.

2.2. Radical, disruptive or ground-breaking innovations

Because of its growing relevance in the context of business, these innovations are the centre of debates and contributions related to the introduction of innovations in industrial companies, to increase and maintain their competitiveness. Radical innovations are not only the main element in competitive differentiation but also the main element of civilization progress.

According to Steve Balmer, Microsoft's former CEO, "*innovation's main challenge isn't generating or implementing new ideas but identifying competitive opportunities for growth, finding the necessary knowledge to take advantage of it, evaluating and managing it correctly, in the scope of an effective innovation strategy".* The more disruptive innovations are, the less likely it is to have them identified as priority in market research and more likely to be against current mental models in the company.

Here lies the difficulty of management offices in companies when selecting disruptive innovations, without the adequate instruments to introduce the selection, which would allow the balance between uncertainty and flexible management discipline. However, the consequences of not doing so are fatal. For example, four years ago, Blackberry had 53% of market share of mobile phones. Today it holds 3% and its loss goes up to one thousand million dollars in 2013.

As a consequence of their intolerance to uncertainty, companies around the world have even reduced their radical innovations, in a context and moment in which innovations transform the reality of the market.

A 2012 study of the Product Development and Management Association (PDMA), on 400 innovative companies in the USA, found that, at present, disruptive innovations have only a 10% share in the portfolio of innovative companies in the country. In 1990 the percentage was 21%.

The goal of disruptive innovations is to create new businesses and redefining markets: without necessarily having any relation with the present ones, tuned in with turbulent business context, through new business models, taking advantage of market and tech discontinuity, trough the fast use of new knowledge for the production of offers with a new and different value, for disregarded market niches and for solving the problems of non-consumers who become new clients. These innovations use business best practices as a starting point to change rivalry patterns, or competitiveness, and other existent paradigms in current business. The Stage Gate method is

inadequate to manage this kind of innovations because of their lineal focus when predicting results and their limitations to consider multiple options.

In general, it is more effective to outsource innovation (expensive) and also what is now called intra-entrepreneurship, as shown by the development of personal computers in IBM or iTunes and iPod by Apple.

In the case of iTunes, Apple management created a group of six highly specialized experts, focused exclusively on how to better capture music and Internet business from Napster. This group, led by Tony Farrel, the group had limits with Apple's formal organization so as to preserve their autonomy when making decisions and their operational independence.

Among their initial approaches, as proposed by Clayton Christensen:[5] (1) They evaluate the satiation of the market in relation to products and services with excessive performance over the average user needs, this excess in usually created by the compulsion of making incremental innovations by market leaders. (2) They break the existing rules in the way of shaping the business. (3) They focus the characteristics and functionality of the offer towards the clients, mainly based on simplicity, affordability, convenience and personalization, to fully meet their clients' needs.

On the other hand, over 15 years of experience in research in disruptive innovations, Harvard University has just baptized a new kind of radical innovation as Big Bang Disruption.[6] It has shaken all current businesses and services; it is capable of making leader companies in all activity sectors disappear in an instant.

The management principles for traditional disruptive innovation, created more than ten years ago, are just being spread in the region, where the few entrepreneurial innovations there are, are mostly incremental, with a limited effect and short-lived in competitiveness.

These traditional radical innovations made by new competitors are characterized by the introduction of substitute products and services at a lower price compared to those from the leading company, in market segments that are less important for competitors, and by the capture of new segments that were unattractive and waited to be served. Progressively, the new competitor starts attacking the business segments that belong to the leading company and then directly competes with it.

Until that moment, the leading company has been able to identify the first actions of this new competitor and has also useful time to define and apply defensive strategies. These could be the implementation of a new business based on competitive technology, choosing commercialization channels or buying the new competitor. However, Big Bang Innovations present totally different characteristics and degrees. They are not generated by same sector or area competitors, or similar business models. Present companies are not necessarily the target of these innovations.

Additionally, they are not trying to better satisfy the leading companies market clients needs. The destruction of these companies is just collateral damage. In most cases, those who introduce Big Bang innovations barely intend creating a new business, totally different from the current one.

[5] "Big Bang Disruption". Harvard Business Review, Larry Downes & Paul F. Nunes, March 2013.

[6] "O Dilema da Inovacao" C.M. Christensen, Harvard Business Review Press, M books do Brasil, 2012, ISBN 978-85-7680-128-3.

Traditional disruptive dynamics are not verified, from the starting point in low priority segments or the climb into higher priority segments; as described before, existent companies have no useful time to react.

Besides lower costs, new products and services offered by competitors present different degrees of novelty, incorporated value, and integration with other products and complementary services.

Many of these innovations exploit the increasing access from the users to information about products and the possibility of co-participating in their development. After easily detecting the new added value, clients and users of all segments follow instantly the new competitor. This immediate adoption originates in almost perfect market information.

Wherever they are, mobile services allows users to quickly find an ample variety of specialised information sources, for free, such as Yelp, TripAdisor, Buscape, Amazon, Alibaba and others to compare prices, quality, performance of products and services. In a world connected via Twitter, Facebook, LinkedIn, Tumblr and other social networks, new products and services are know in the entire planet in just a few hours. Complete lines of products or markets are easily created or destroyed this way.

Perfectly tuned with Collaborative Economy, Big Bang Innovations are not restricted to sectors such as photography, education, entertainment, health, telecommunications, hotel industry and automobile industry. Neither obey the segmentation model of the market that establishes that companies monitor the progressive adoption of innovations by the market, until most of it accepts it, to then define when and how will they react.

With innovations such as Big Bang, typical comparative advantages of financial power, brand and channel are cancelled. Entrepreneurial competitiveness strategies characterised as quick follow-ups are then useless. New business strategies to face these Big Bang innovations are then, urgent and essential to the regional companies' survival. All this, in a context of general lack of abilities from the companies to define and apply success fully these strategies.

In the ERRC Grid or Matrix (Eliminate-Reduce-Raise-Create) there are analysis guidelines to do this, and to define the possible disruptive innovations by regional companies. This can also be found in the Technology and Market real trends examination in the final chapter of this document. This and further related analysis are part of a group of concepts and tools used in the creation of company innovation strategies, related to competitiveness strategies, also shown in the same chapter.

V. BARRIERS TO INNOVATION IN SMES OF THE REGION

The previously mentioned ECLAC-OECD study of 2013, similarly as with other studies carried out on the subject, indicates the main barriers to innovation of SMEs in the region as being:

1. High costs and high risks of innovation are the main factors that inhibit this activity among SMEs

Financing continues to be one of the main difficulties for innovation and development of micro, small and medium enterprises in the region in terms of development and financial depth, in spite of recorded advancements over recent years. Many of these companies do not have access to formal credit conditions due to the high interest rates, high collaterals and complicated technical and bureaucratic requirements, as well as asymmetric information problems. This forces them to

use their own funds or funds from their suppliers, even though they may not have the tools or deadlines to meet their needs, despite efforts by the development bank in the region. Such limitations are even more acute when compared to conditions faced by large companies that benefit from greater and better access to commercial credit.

In spite the most recent input from guarantee schemes, the lack of access to credit under equal conditions has become another source of inequality and structural heterogeneity for the productive sector in the region, representing a major obstacle to the development of SMEs.

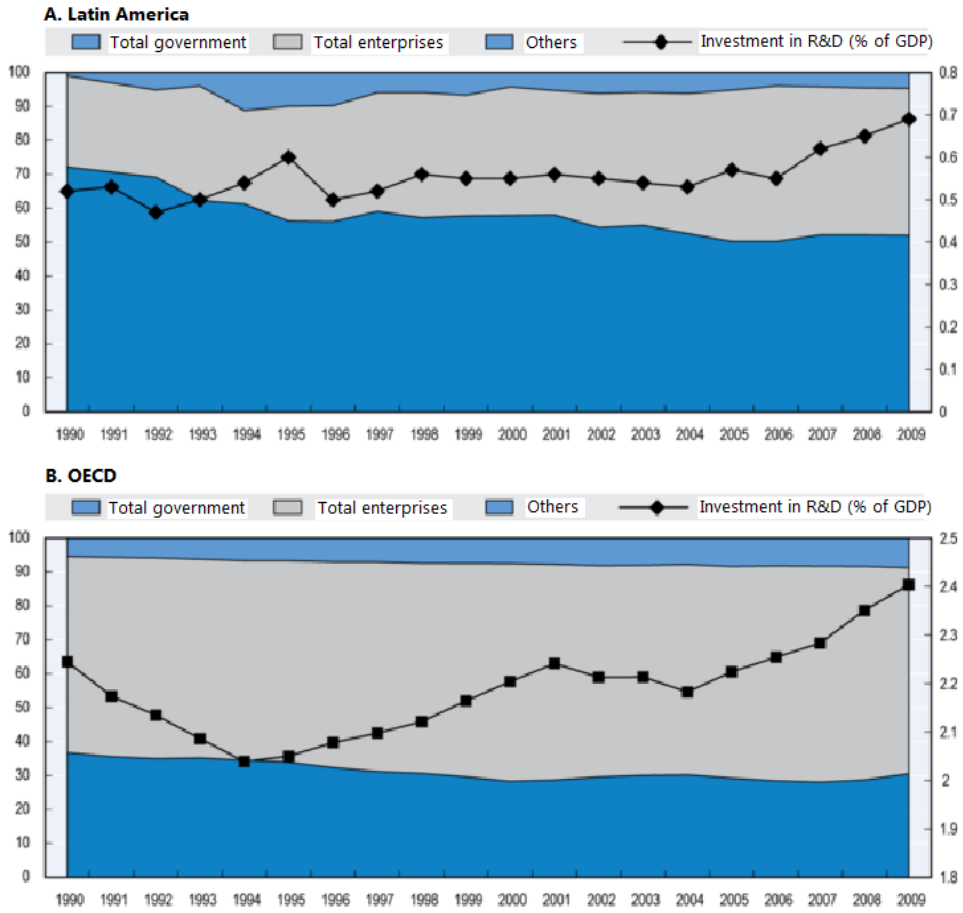
2. Low investment in research and development (R&D) (or RDI)

Restrictions on access to financing have directly impacted investment in R&D required by the innovation processes in SMEs.

In 2009, the OECD economies invested 2.4% of gross domestic product (GDP) in R&D, whilst those of Latin America did not reach one-third of that percentage (0.7% of GDP). Development over the last decades shows persistence of this gap. Also, there are great differences among countries: for example, in 2009, Brazil invested 1.2% of GDP in R&D, whilst Bolivia assigned less than 0.2%. Likewise, to date, there is a reduction of investments in R&D as is the case of Brazil.

Chart 3 shows the development of investments in R&D in the region, comparative with OECD countries, according to the financial source from 1990 to 2009. Also, it is important to note that participation of funds from private companies in these innovations has been remarkably poor.

CHART 3
Evolution of investments in R&D in the region compared to OECD countries, by origin of financing, 1990 to 2009



Source: Statlink: http://dx.doi.org/10.1787/888932719276.

3. The poor connection and cooperation between companies and partners of the National Innovation Systems (NIS)

Innovation processes occur through complex social interactions that do not simply happen spontaneously but instead are the cause and result of knowledge flows and interaction between partners of NIS.

Public research centres and universities are a fundamental support for the development of technology and innovations for the SMEs. The existing poor connection and cooperation is an obstacle for the transfer of technology and knowledge, for the innovation processes and for communication between the productive sector and the academy. These difficulties are emphasized as the size of the company is reduced.

Innovation processes are associated with the generation and accumulation of technological capabilities of organization and marketing of companies, as well as knowledge flows, factors that have a significant impact on the results of the innovation activities and which, at the same time, are affected by them. The learning process and accumulation of knowledge in the SMEs are essential for the development of their skills and capabilities to innovate. The experience of SMEs and the

interaction process, both with other companies as well as with the NIS partners, influence their learning.

The NIS of the region face restrictions in the capabilities of their components, and their weaknesses make it more difficult for SMEs to have the skills to compete in an environment of rapid technological progress and increasing specialization. The skills required by the SMEs to innovate can only be fully developed in networks where there is a flow of information, knowledge and technology between companies and the NIS.

4. The shortage of qualified staff

The existence of qualified human resources (learning capability, absorption) is a necessary condition for improving the companies' innovating capability of products and processes. Some sectors are more prone to innovate, more often because of their higher capacity to accumulate knowledge. At the companies' level, their internal capabilities and efforts are decisive. In this effort, the learning and knowledge accumulation processes generated in the company itself and in its interrelation with other NIS partners are important. The innovation processes are not isolated and spontaneous but instead they are the cause and result of knowledge flows and of the interrelation between partners of the national innovation systems.

5. Microeconomic, sectoral and macroeconomic determinant factors of innovation

The differences in size among companies directly affect their capacity to innovate. They affect both the decision to innovate as well as the strength and quality. Large companies can benefit from the increasing returns on research and development activities, while SMEs face severe restrictions due to their smaller size. At the same time, innovation requires economies of scale and scope, making it difficult for SMEs to engage in this activity. Large enterprises are better positioned to take high innovation associated risks and seize their returns.

Compared to the larger enterprises, the SMEs face great restrictions to innovate. "The innovation process in the SMEs of the region is explained both by the characteristics of the companies as well as the macroeconomic environment and socioeconomic characteristics that define the national innovation system in which they are established. From a general perspective, the institutional environment in which they are inserted impacts their innovative behaviour. Those SMEs that focus on the international market have greater capacity to innovate and, indeed, innovate more, especially when placed in sectors where dynamic efficiencies predominate. Access to international markets requires technologies and encourages progress in technological skills as well as improvement of the companies' organizational and business models, which increases their chances to innovate".

"In sectoral terms, the specifics of intrinsic business activities and their links to actors and agents of the national innovation system (companies, universities, technology centres, consultants, government institutions, NGOs and civil society) are important. Among other factors, four determine the innovating capability of the companies: their knowledge absorbing potential, number of workers, business sector and framework in which they operate. The main ones are access to credit and qualified human resources. But the lower exporting trend, the lower ability to interact with other companies and institutions for training human resources and research, and limited network membership are equally important barriers".

6. Most of the SMEs in the region operate in industries with low levels of knowledge and technology

In general, SMEs focus their efforts on informal and incremental innovation activities, investing little in innovation activities of radical nature, such as investment in research and development. Therefore, non expansion of the definition of innovation would underestimate the innovative capacity of the SMEs and of the low-technology sectors.

The measurement of innovation processes in companies constitutes a recent effort in the region, brought about by national innovation surveys.

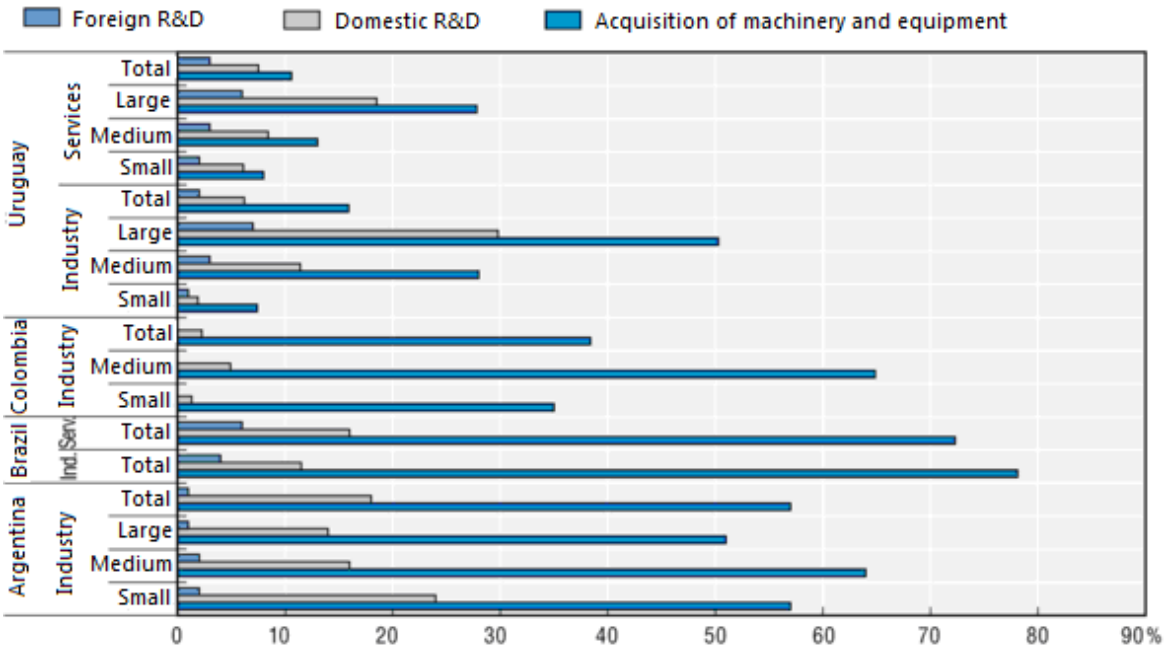
The following analyses and characterizes the main activities of innovation and technological diffusion of Latin American companies, based on surveys carried out in five countries (Argentina, Brazil, Chile, Columbia and Uruguay). However, it should be noted that the region is still far from achieving homogeneous and comparable survey data to generate real measures on technological and organizational capabilities as well as business absorption and connectivity.

It is necessary to improve its design and focus of the data gathered to capture capabilities, efforts and obstacles in terms of innovation. This would allow these surveys and other instruments to obtain information to become useful tools in the formulation and evaluation of public policies for innovation and technological development.

The data from these surveys provides a partial view of the companies' innovation activities, especially in the SMEs. While a thorough analysis of the region and of the different aspects of scientific and technological development at company level cannot be done, innovation surveys of these countries permit identification of certain common features of its innovative capabilities, as well as the main results of these activities and the obstacles they face.

The main innovation activities of Latin American SMEs are focused on technological transfer and imitation. This is reflected in its high percentage of investment in machinery and equipment, in contrast to the lower weight of investments in radical innovations, e.g. in R&D. Furthermore, as presented in Chart 4 below, the size of the company and the business sector have played a key role in determining the type of innovation activity.

CHART 4
Modalities of Business Innovation in the region (percentage of enterprises)



Source: Surveys in the countries, as presented in the ECLAC-OECD study.[1]
[1] ECLAC-OECD Ibid.

As can be noted, the composition of the innovation modalities in industrial SMEs of the region differs between countries. It emphasizes that the R&D element closest to 5% is verified in the case of Brazil.

Table 3 below shows the order of the three (3) main barriers to innovations in SMEs in the region, by country, taken from the ECLAC-OECD study.

TABLE 3
The three main barriers to innovation in companies of the region, reported order of priority

BARRIERS-COUNTRY	URUGUAY	COLOMBIA	BRAZIL	ARGENTINA
Cost-risk of innovations	2	1	1	2
Size of domestic market	1	3		
Shortage of skilled human resources	3	2	2	3
Financial restrictions		4		1
Difficulties for cooperation – NIS			3	

Source: ECLAC-OECD. Ibid.

According to the results of the innovation activities in the countries mentioned, the companies mainly did incremental innovations in products and processes, aimed at the productive unit itself or the local market. Concentration on marginal innovations in products, processes and incremental innovation activities produce little or no impact on the possibilities to access international markets.

The sectoral determinant is also fundamental. For example, the sectors with a higher proportion of innovative companies in the Argentinean industry are those that are intensive in the engineering and automotive sector, while informatics services stand out in services. In Columbia, there is also a large intersectoral heterogeneity of the industry. On one hand, the machinery and electronic appliances manufacturing SMEs are the most innovating in product. On the other, the SMEs in the automobile, trailer and semitrailer manufacturing sector are the ones that are most innovative in processes. Similar dynamics exist in Brazil and Uruguay.

As mentioned before, the activity sector is crucial to the result of innovation in SMEs. In Argentina, the automotive industry and intensive engineering companies lead innovation; in Colombia, for example, SMEs that manufacture machinery, electronic equipment, automobiles, trailers and semi trailers, are the innovation leaders.

7. The informality of their innovation strategies

Compared to larger companies, SMEs in the region often respond to informal strategies, which are not the result of planning. These differences also exist between small and medium companies as well as among different economic sectors. The strategies and innovation activities of companies operating in sectors of intensive use of knowledge show a higher level of formality, plus a higher and more stable level of investment in R&D over time.

SMEs can access formal innovation strategies through its relationship with other economic partners, such as large companies that do not face restriction levels. It is therefore necessary that the financial assistance to SMEs is accompanied by technical support policies.

VI. CRITICAL REVIEW OF THE STATE OF THE ART OF BARRIERS TO INNOVATION IN SMEs IN THE REGION – REAL LIMITATIONS

Based on all the conceptual description presented herein, the following questions should be made regarding the state of the art of the barriers to innovation in SMEs in the region, constant of the ECLAC-OECD study and other recent work, for the purpose of refining and updating government policies to promote business innovation in the region.

1. If business innovation is to invest in the right place, at the right time, focusing this investment exclusively as cost has no parallel in the activity or mentality of the business, since the associated investment costs and risks should always be evaluated in relation to the expected investment returns.

   Also, risk assessment is part of daily business activities. Both aspects, innovation returns and associated risks assessment, are issues thoroughly addressed by the concepts and techniques of effective innovation management, particularly in the field of formulation and implementation of competitive and innovation strategies by the company.

   The application of the concepts and techniques related to the above, as outlined in the final section of this document, not only clarifies costs, returns and risks of the innovations, but also the cost and risk of not doing so. As a result, the correlation between these innovations and the strategic objectives of growth and profitability of the company become clear to the decision makers, bringing about the company's commitment to innovations, including

financial commitment in the respective investments, first and mandatory factor so that it innovates effectively.

Apart from the valid reported difficulties to access financing, it is estimated that the asymmetry of information and other problems associated with financing the innovations of SMEs is significantly simplified with the employer's commitment and clarity on the investment risks, which focuses its attention and also facilitates the associated risk assessment process itself with regards to the respective loan on the part of the financing agencies.

On the other hand, as shown in Tables 1 and 2, the innovations, radical innovations in particular, cannot be confused with research and development activities. It is merely one of the sources of knowledge used in innovations, despite its importance in the generation of new knowledge.

The company Alibaba, for example, has recently broken the record of Initial Public Offerings (IPOs) in the United States with a sale of shares, in one day, in the amount of 25 billion dollars. Founded in 1999, this company, which is represented by another one, based in the Cayman Islands, operates e-commerce businesses that include those offered by Amazon and E-Bay. It has never performed any R&D activity. Its innovation has focused exclusively on the business model that it generated.

Thus, statistics on R&D, or RDI, are useless indicators of innovative activity or capacity, whether countries or companies. This is one of the most averse myths of innovation, whose origin could be attributed to the needs of finance for academic research activities and the relevant "lobby".

2. Believing that knowledge flows and business innovations exclusively or mainly depend on the links and interactions between the company and the national innovation system (NIS) means disregarding the reality of the present, well oriented business framework, in an elevated virtual global society, the flow of knowledge is immediate.

Open innovation is irrefutable evidence of this. However, without accurate strategy for competitiveness and innovation of the company, its representatives are unable to define and report to others the innovation priorities of the organization. In this way, all the support that may be received would be, in the best instance, average solutions in search of problems.

As the logic of business innovation is not necessarily related to the incorporation of "state of the art" knowledge and technologies, but with a "mix" of technologies that enables increase and sustenance of its competitiveness in its specific business context, the NIS agents cannot suggest to the company what their innovation strategies should be.

Thus, it is useless to expect the SMEs in the region to define their innovation strategies through interactions with NIS institutions or with other companies, as suggested by the ECLAC-OECD study.

Actually, the ability to independently define their innovation strategy, with or without specialized external support, is an essential precondition that would enable the SME to set any effective relationship with NIS institutions or other countries.

It is important to note that, in a globalized world with easy, speedy and effective communications, supported by dynamic ICTs, as described, once their innovation strategies are identified, SMEs can perfectly seek the best supplier of knowledge required for their innovations in any institution or company on the planet. In this way, they are not limited to the support from the institutions of a national innovation system. If, as mentioned in the ECLAC study, SNI institutions do not have the desired quality, the SMEs, aware of their innovation priorities, can always seek support from institutions in other countries.

This does not mean that when institutions across the street also offer appropriate and effective support, at a lower cost, they should not be given the opportunity to cooperate.

However, what has been seen in the region is that, when present, institutions of excellence in supporting business innovations, such as R&D centres, built with scarce public resources, their capacity is filled by companies from other regions or countries, in constant search of low-cost talent.

These international companies benefit from social grants invested in these NIS institutions and use innovations supported by them to better compete in markets across the country that created and supports them, displacing from this market the local companies that do not even know how to articulate their innovation strategies and priorities, much less compete for the installed capacities and services from institutions of excellence in the country.

However, in order to have connection with any kind of external support, the companies would have to know what their innovation priorities are and be able to depend on their partners, before seeking the most appropriate support for their projects.

3. With respect to the conditional sectoral specificity of innovation, mentioned in the ECLAC-OECD study, it should be noted that, in the past, they used to classify industries as low, medium and high technology. Footwear, food and textiles accounted for the first, metalworking or steel for the second, and aeronautics, fine chemicals and computers, as high technology. With the arrival of generic technologies with multisectoral impact, such as ICTs, Robotics, Biotechnology, Nanotechnology and new engineering materials, such classification has lost practical validity as there are no low-tech sectors and company sizes suitable for innovation. A tennis shoes today incorporates numerous advanced technologies of new materials, orthopaedic designs and other own sectors, as an instrument of analysis and also validity, as the products incorporate a multiplicity of different technologies that obscure sectoral boundaries. Added to the collaborative economy, radical innovations continually create new multisectoral businesses.

4. Likewise, verification that the SMEs international market participants show more propensity to innovate, has lost validity, particularly for the formulation of innovation promoting policies in the region, in view of globalization, the regional trade agreements and the current economic-financial crisis. Certainly, exporting SMEs are differentiated by having to maintain their competitiveness against other international companies and the white market in the past. However, at present, two other phenomena, interrelated, oblige all the SMEs to become more competitive. On the one hand, globalization and trade agreements forge them to maintain their competitiveness to void loss of its domestic market. On the other, with the economic-financial crisis, international markets became even more difficult to penetrate, while attacks on national markets in the region intensified, since the main countries try to make their ailing economies grow, by export of products and services.

5. With regard to the lack of capacity of human resources in the SMEs, the approach should transferred from the absorption of technological knowledge -what can be done initially by partnerships with NIS institutions- to concepts and techniques of technological innovation management. Among them, those related to the ability to formulate and implement innovation strategies in the company, in an integrated and concurrent manner with their competitive strategies, it is particularly crucial, as mentioned previously, since it is responsible for the proper initiation of innovation processes in the company.

The ECLAC-OECD report identifies the incapability of the SMEs in the region to define formal and explicit strategies within the company's innovation, and suggests that these specific strategies should be developed in association with major companies, presumably their own clients. This suggestion needs to be reviewed, even in the field of SME supplier development programs, in the sense that all recent surveys carried out in large innovative companies, such as those conducted by McKinsey, Booz & Co and the Boston Consulting Group (BCG), reveal that neither does the majority (65%-70%) of large companies know how to formulate, effectively, their innovation strategies. In the absence of these strategies, the ECLAC-OECD study establishes an overwhelming majority of incremental type innovations in products and processes, carried out by SMEs in the region by imitating what other companies do, primarily involving purchase of equipment and cosmetic changes in products; therefore, without significant consequence to their competitiveness and growth. This also masks the results of surveys in the SMEs as to what would be the barriers to innovation, and leaves them out the real context of their business.

On one hand, the SMEs without commitment to innovation tend to find barriers outside the scope of their responsibilities, mainly pointing out problems with government policies, lack of NIS capacity and other exogenous issues. On the other, those SMEs that perform some innovation, though imitative and incremental, point out barriers such as innovation cost and risk, access to financing, lack of qualified human resources, NIS weaknesses and the size of the domestic market (Table 3) supposedly of those innovations that could not be carried out, because of these barriers. But, which innovations, if these companies do not have the slightest idea of what they should be, since they lack the capacity to formulate effective innovation strategies, enabling them to identify these innovations, which they did not perform.

This puts into question all the barriers that existing studies on innovation in the SMEs have, particularly as input for the formulation of government policies to support innovation in the region. Construction of the capacity required for the formulation of innovation strategies in the company must become the highest priority issue for innovation promoting policies in the SMEs.

VII. CRITICAL REVIEW OF THE POLICIES AND INSTITUTIONAL MECHANISMS DEVELOPED BY THE GOVERNMENTS OF THE REGION TO SUPPORT INNOVATION IN SMEs

In 2014, World Bank (WB) economists released a report entitled "Entrepreneurship in Latin America. Many businesses and little innovation",[7] which indicates that this region has the highest rate of businesspeople from all continents, but with increasingly lower entrepreneurs' figures, resulting in a deficit in innovation and creation of new patents that give rise to better productivity.

[7] El emprendimiento en América Latina. Muchas empresas y poca innovación, Samuel Pienknagura et all, World Bank, 2014.

"The business reality in the region is hindered by low innovation; in order to combat this problem, the World Bank recommends governments in the region to promote policies that encourage small and medium enterprises and create legislation that forces the entrepreneurial sector to develop projects supporting innovation and entrepreneurship." The report explores the challenges faced by entrepreneurs and businesses with growth potential in Latin America and the Caribbean, with a thorough analysis of why those responsible for public policies in these countries should pay attention and render service to this sector. According to this document, some of the challenges that countries in the region face to increase productivity are:

- to improve the quality of human capital through education,
- to encourage competition,
- to create the infrastructure that promotes the export of products and
- to take advantage of opportunities for integration into the global market, and invest in programs to support research and development of new patents.

As we can see, these recommendations to guide government policies to support innovation in the region are opposed to the concepts and critical reasoning of the barriers encountered in the studies conducted in the region, already described herein. These WB recommendations lack focus in relation to which human resource capabilities should be developed. They also emphasize the export and integration to global markets in the current context of market closure and market war, due the current economic crisis, and confuse the metric of innovation with the metric of research and patents. For its part, the ECLAC-OECD study, based on innovation surveys conducted in the region, states that "public policies to support innovation in the region are very heterogeneous. While progress has been made in several countries, obstacles and restrictions remain for SMEs to access government policies and programs".

To the obstacles mentioned, factors specific to each country are added. Furthermore, there are also considerations regarding the low level of knowledge and use, by companies of the countries of the region, of the programs of public support to innovation, the low linkages with SNI agents, radical innovations confused with investment in R&D, and also speak for the low qualification of SMEs' human resources.

Based on these findings, it acknowledges the need to strengthen and broaden public policies to promote and support SMEs, as these, by themselves, have failed to engage in complex and far-reaching innovative activities. The ECLAC-OECD study suggests that "these policies should take into account the specific characteristics of SMEs, promote complementarity among SNIs agents and facilitate links of SMEs with the rest of the production and innovation system to smooth out their access to new technologies and increase their ability to innovate".

Policies should assist these companies overcome the barriers they face, expand the spillover effects to other sectors and foster productive linkages backwards and forwards. Thus, SMEs' added value would grow and their income and wages and the economy as a whole would improve. In general, national plans for science, technology and innovation in Latin American countries have incorporated an explicit reference to SMEs, but this is not reflected in tools and actions to overcome its backwardness in technology and innovation.

The institutional framework is very complex, with entities interlinked to the issue, reinforcing the presence of the private sector in coordination with the public sector. An essential feature – which largely explains the high complexity of the institutional fabric – is the lack of institutions devoted exclusively to the promotion and funding of innovation in SMEs.

In some countries, this responsibility falls upon the institutions or entities promoting innovation, such as the Financier of Studies and Projects (FINEP) in Brazil, or the National Agency for Research and Innovation (ANII) in Uruguay, while in other cases it falls on productive development entities, as in Chile, with the Corporation for the Promotion of Production (CORFO).

Furthermore, in countries of the region, the institutions responsible for the policies to support SMEs and innovation are of little importance in the government structure and exhibit shortcomings such as lack of resources for the proper management of the programs. Part of the funding comes from international cooperation, which in many cases translates into a challenge to the sustainability of public policies. Other problems are the lack of human resources and the weaknesses of the training system.

These programs are usually determined by governments for its period of validity only, and real state policies in the field are missing. The budget of Science, Technology and Innovation policies have increased in several countries in the region such as Brazil and Uruguay, the funds assigned specifically to this activity in the SMEs, which is hard to quantify and seems not to have gone through major changes.

The study continues to propose dimensions of policies and mechanisms related to the barriers encountered in surveys of business innovation in the region, mostly with reference to the improvement of business environment for SMEs, technologies associated factors and characteristics of the companies, such as:

- The resolution of the persistent problems related to coverage, costs and quality of services of some important support infrastructures such as quality labs, public research centres, broadband services and other, as regulations that foster competition among suppliers, tariff and pricing policies.
- The training of human resources in areas related to production processes and management and business techniques and business to facilitate the use of new technologies in innovations.
- To establish specific programs to support innovation in the SMEs, including the use of ICTs.
- To create indirect support instruments such as export promotion, consumer protection and increased welfare.
- To define mechanisms for the ample dissemination of policies and instruments, in addition to indicators to further the issues that best represent the complexity of innovation processes and the impact of innovation on the performance of companies.

Table 4 illustrates the mechanisms of the innovation support policy of Argentina, Brazil, Chile, Colombia, Mexico and Uruguay, all subject to improvements based on the concepts detailed in this document.

TABLE 4
Policy mechanisms to support innovation in the region

Country	Institution	Depends on	Nature of the Institution	Purpose of the Programme/Fund to promote Innovation in SMEs							Promotion of innovation	Modality of financing
				Offer	Demand					Articulation / Links / Cooperation		
				Human Resources	Innovation	Equipment	Improve productivity/ competitiveness of enterprises	Technology Transfer	R&D	Articulation / Links / Cooperation		
Argentina	National Agency for Scientific and Technological Promotion	Ministry of Science, Technology and Productive Innovation (MINCyT)	Institution for ICT promotion				Argentine Technological Fund (FONTAR) Argentine Sectoral Fund (FONARSEC)				Direct	Credits, fiscal incentives and subsidies
	National Council for Scientific and Technical Research (CONICET) through the Direction for Technological Linkage	MINCyT	Institution for ICT promotion	Scholarships, in-company researchers					In-company researchers	Advisory and consultancy, agreements	Direct and indirect	Credits and subsidies
	National Institute of Agriculture and Livestock Technologies (INTA)	Ministry of Agriculture, Livestock and Fisheries	Institution for promotion of innovation in the agricultural and livestock sectors					Technology transfer agreements	R&D Agreements	Agreements on technological links through specialized technical assistance agreements	Direct	Credits and subsidies
	National Institute of Industrial Technology (INTI)	Ministry of Industry	Ministry	Training and capacity-building of human resources						Technical services, technical assistance	Indirect	Subsidies
	Secretariat of Small and Medium-sized Enterprises and Regional Development (SEPYME)	Ministry of Industry	Institution for promotion of SMEs	Experts in SMEs			Program on access to credits and competitiveness (PACC)-Enterprises National Fund for Development of Micro, Small and Medium-sized Enterprises (FONAPYME)				Direct and indirect	Credits and subsidies
Brazil*	Funding Authority for Studies and Projects (FINEP)	Ministry of ICTs	Promotion entity		Economic Subsidy Program, COUNTRY****		Innova Brasil, Economic Subsidy Program		Innova Brasil	Innova Brasil	Direct	Credits and subsidies
	Brazilian Development Bank (BNDES)		National Development Bank			BNDES Card					Indirect	Credits

	Ministry of Science, Technology and Productive Innovation (CTI)	CTI Ministry	Ministry	Human resource training for innovation	SIBRATEC*****		SIBRATEC		SIBRATEC, Financial support to RDI activities	SIBRATEC, Pro Innova	Direct and Indirect	Credits and Subsidies
Chile	Corporation for Promotion of Production (CORFO)	Ministry of Economy	Institution for productive promotion	Innovation Management	Program on hi-tech business innovation, InnovaChile	CORFO credits for micro and small-sized enterprises	InnovaChile	Technological Dissemination Program		Nodes for Innovation, trarsitory basal funding for technological consortiums	Direct and Indirect	Credits, fiscal incentives and subsidies
	National Commission for Research, Science and Technology (CONICYT)	Ministry of Education	Institution for CTI promotion				Fund to promote Scientific and Technological Development (FONDEF)				Direct	Subsidies
	Foundation for Agricultural Innovation (FIA)	Ministry of Agriculture Livestock and Fishing	Agency for promotion of Innovation in the agri-food and forestry sectors		National Innovation Projects					Consultancy	Direct and Indirect	Credits and Subsidies
	Innova Bio Bio				Business Innovation	Technological equipment for SMEs		Technology transfer centres		Advisory and technological missions	Direct and Indirect	Credits and Subsidies
Colombia	Fund for Modernization and Innovation of Micro, Small & Medium-sized Enterprises (FOMIPYME)	Ministry of Trade, Industry and Tourism	Ministry	Innova Prize	INNpulsa MIPYME***		INNpulsa MIPYME***			Innova Prize	Direct and Indirect	Subsidies
Mexico*	National Council of Science and Technology (CONACYT)	Ministry of Education	Institution for CTI promotion		INNOVAPYME**		INNOVAPYME**, INNOVATEC** Technological Innovation Fund			INNOVAPYME, PROINNOVA**, AERIS	Direct	Subsidies
Uruguay	National Agency for Research and Innovation (ANII)	Ministerial Cabinet for Innovation (GMI)	Institution to promote innovation	Qualified human resources for enterprises	Innovation projects with broad coverage; innovation projects with high impact; projects to support prototypes with potential for innovation		Projects for certifications and new export markets			Projects to encourage demand for technology; experts from enterprises; program to develop suppliers	Direct	Subsidies
	National Direction for Handicrafts, Small and Medium-sized Enterprises (DINAPYME)	Ministry of Industry, Energy and Mining (MIEM)	Institution to promote SMEs	Human Resource Training and Capacity Building							Indirect	Subsidies

Note: FONTAR and FONARSEC are Funds.
Note*: Funds and programs at the national level are taken into account, not at the federal or state level.
Note**: These are the three modalities of the of the Program to Encourage Innovation.
Note***: INNpulsa MIPYMES replaces the Fund of Modernization and Innovation for MSMEs. It is administered by BANCOLDEX.
Note****: Program to support innovation in the energy and chemical sectors. Joint Program FINEP-BNDES.
Note*****: Brazilian System of Technology. Joint Program FINEP-MCTI.

Source: Prepared by the author on the basis of official data from each institution, Dini and Stumpo (2011), and Ferraro and Stumpo (2010).

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The ECLAC-OECD study notes that Table 4 does not claim to become the full reality of the region, but that it is significant in relation to the shortage of instruments and mechanisms of direct support to innovation in SMEs in the region.

Thus, it does not point out to, for example, the specific programs to support innovation by FAPESP, of the State of Sao Paulo, those supporting the micro and small enterprises SEBRAE, or of the SENAI, all from Brazil. The analysis of Brazilian policies reveals important subsidies for the critical review of the current government policies to support business innovation in the region.

The case of SEBRAE is illustrative, since it is an organization created specifically to support the competitiveness of micro and small enterprises and entrepreneurship.

According to the organization itself in 2010 it supported 40,135 companies with innovative solutions, in 2011, 59,295 and in 2012, 109,737. It points out to several factors as responsible for the growth in demand, as the needs of business survival in ever competitive markets, the overwhelming influx of imported products, the behaviour of the consumer itself and the increasing demands of large enterprises in their process of selection of suppliers of certified quality. It also states that the changes required by them involve not only product innovation but also the business management and the adoption of sustainable practices.

Under the universal recognition of innovation as the most critical factor for the competitiveness of enterprises, it is worth noting that the SEBRAE has adopted an internal directive to devote at least 20% of its resources to its programs to support innovation in the companies it serves. In 2012, it spent only 28% of these resources.

By adopting two themes as the guides to its action in promoting innovation, the "culturization for innovation" and the "innovative practice", the organization recognizes that their main difficulty is how to operationalize business innovations. For this reason, is associated with other institutions such as the National Confederation of Industries (CNI), and its state chambers, the FINEP, the Ministry of Science, Technology and Innovation, the National Association of Entities that Promote Innovative Enterprises (ANPEI), ABNT and others to, for example, extend the number of companies making use of technical standards as "innovation factor".

As the national institution responsible for stimulating the competitiveness of micro and small enterprises and entrepreneurship, SEBRAE created in 2013 a program baptized SEBRAETEC, with an allocation of resources for innovation, until 2016, in the order of one billion reales.

The SEBRAETEC program has served 57,000 consultations in 2012, four times more than in 2010. Focused on increasing the competitiveness of enterprises, it intends to support companies in reducing losses, increase productivity, and investments in adapting products to compete in domestic and foreign markets. The cost of the respective projects is subsidized up to 80% of the total. These projects are selected by SEBRAE consultants visit to the company, to verify their needs for improvement.

In partnership with SEBRAETEC, the organization carries out the Local Innovation Agents Program (ALI) with junior consultants, earning monthly salaries of around 3000 real, visiting companies to identify their innovation needs. In other words, to support the definition of the innovation strategy of the company, the ALI Program has more than a thousand agents in virtually the entire country, visiting industrial SMEs to collect data and define the diagnosis of their competitiveness. Each agent performs measurements of progress every four months, in each of the 50 companies under

their responsibility, for two years. The expectation is that at least 50,000 companies in Brazil participate.

In light of the impossibility of carrying out the program, agents are mainly engaged in promoting the services of the SEBRAE, who also participates, in association with other agents, of programs for promoting Local Productive Arrangements (APLs), as we detail below. However, their approach to business innovation remains the same.

In view of the above, SEBRAE presents itself, in the region, as possibly the most representative promoter of incremental innovation in the SMEs, precisely those innovations that contribute very little to the competitiveness of companies and that, as already described, cause entrepreneurial blindness regarding the innovations needed to survive and growDue to the anaemic results in the promotion of business innovations with real competitive value, the organization has turned to the development of entrepreneurship, by supporting the development of the ecosystem of digital startups, based on three lines of action ; training, for the dissemination of specific skills; innovation actions, to potentiate the methodologies and adapt business models; and market actions. Likewise, it is one of the partner institutions of the Brazil Startup Program, mentioned below.

SEBRAE, together with its partners, promotes specific programs of innovation management in enterprises. Axial, in cooperation with the National Service for Industrial Learning (SENAI) and the System of Federation of Industries of the State of Mato Grosso, has created the State Mobilization program for managing innovation, in order to implement individual plans for innovation in companies through mobilization actions, training and consulting for companies in the sectors of furniture, food, clothing, and others.

The total investment per company, for the training and consulting actions required to define their innovation strategy, is 4,000 Brazilian reales (US$ 1,600), while the participation of each company in this cost is of only 900 Brazilian reales (US$ 360). This value shows ignorance of the nature of the activities needed to define, with a minimum of seriousness, the innovation strategy of the company, as described in the final chapter of this document.

Still referring to the case of Brazil, there is a recent initiative by the SENAI, which deserves mention in regards to SNI. The SENAI has established cooperation with the Fraunhofer Institute in Germany for the creation of 23 similar institutes in Brazil. The value of the respective investments amounts to R 3 billion in 2015. The Senai Institutes of Innovation (SISs) shall operate based on the Fraunhofer model, which involves functioning as a channel of communication between the university and the productive sector, in which researchers of technological centres receive the demands of the industrial sector to support them in regard to the creation of new technologies, new processes and products. With about 60 units distributed throughout Germany, the Fraunhofer is recognized as an effective mechanism to support innovations in the country, both for companies such as Volkswagen, Siemens and Bosch, as for small and medium enterprises.

However, in the business Forum "Innovate to Compete" held in June 2013, sponsored by one of the two main newspapers of the State of Sao Paulo, politicians and business leaders from Brazil acknowledged that "policies to promote innovation in Brazil have not left significant results".

Most companies do not innovate – only two thousand companies in the country do regularly – and business investment in innovation has fallen from 0.5% of GDP in 2000 to 0.45% in 2012. Most companies believe that they do not have the material and financial conditions for innovation and doubt that innovations can solve the problems for their survival or ensure their competitiveness,

already compromised by the high systemic costs, the economic and political instability, which at times promotes the internationalization, to then prioritize import substitution. Thus, companies prefer to adopt a defensive position, adjust margins, find specific benefits to offset the high costs, manipulate marketing, exert pressure on the government for more protection against imports, request more incentives and subsidies, even knowing these are temporary roads towards survival.

Natura, one of the most innovative companies in the country, present at the Forum, compared innovation in Brazil to a ship with a huge hole in its bow, which does not sink because passengers drain some of the water inside with cups of coffee, therefore they believe that the innovation policy of the country has been to distribute more cups of coffee without worrying about repairing the hole. In recent years, the main attempts to create a national innovation policy in Brazil occurred in the sole context of Industrial Policies, always with weak and scarce results.

At first, there is was what was done in 2004, the PITCE – Technological Industrial and Foreign Trade Policy –, seeking to add value to exports of capital intensive sectors, semiconductors and software, as means of driving the rest of the industry sector. The overwhelming increase in commodity prices, which led to higher trade costs later the same year, destroyed the logic of PITCE. Besides creating some institutional base for the SNI, financial and tax incentives for innovation, many subject to the budget restrictions, the program did not produce anything else.

It was replaced by the "Policy of Productive Development (PDP)" in 2008, born to leverage investments that the country, devoted to strengthen the competitiveness of 25 productive sectors, taking advantage of the boom in commodities, of capitalized companies, of sufficient credit, of the vibrant capital market, of the valued currency, jobs and rising wages. However, the global crisis of 2008 swept the PDP, which thus also failed to produce significant results.

In 2009, the First Innovative Company (PRIME) program was created, with 1.4 billion Brazilian reales, with the aim of investing in new innovative businesses. In practice, its budget implementation did not reach 12% of the expected, having applied only 160 million Brazilian reales, and the program was cancelled in its first year of implementation.

The program of economic subsidy, which since 2006 offered innovative companies from R 400 to R 500 million per year, of non-refundable resources, was eliminated in 2012, despite the high demand from large companies. It was replaced by the Tecnova program with exclusive focus on small businesses.

In 2011, the Financier of Studies and Projects (FIEP) stated in its management report that it dedicated R 3 billion to innovation. Of this amount, R 1.7 billion were used on loans for R&D in enterprises and R 1.1 billion in science and technology institutions of SNI. The balance of R 200 million was donated as repayable grant to companies for R&D.

In turn, the 2012 report of the National Bank of Development e Social Affairs (BNDES) indicates a contribution of R 2.2 billion for companies in the same year, through various funding lines.

Other funding mechanisms for innovation in Brazil are found in sectoral programs. (Law on Informatics - ICTs, regulatory agencies like the Aneel, in the electricity sector, Innovar Auto for the automotive industry and regulation of the ANP for the oil and gas sector), according to which companies of strategic areas are legally forced to devote minimum percentages to R&D. Together, these sectors account for nearly R 3.5 billion annually. Through the Lei do Bem, in 2011 the industrial sector could use about 1.4 billion of tax incentives for R&D. However, the total value of

investments in R&D has dropped 20% between 2010 and 2011, and there has been no growth since 2008.

In 2012, the government launched the "Plano Brasil Maior (PBM)", which is still in force, and complemented it with the Program Innova Empresa Program, in the same year.

The PBM was launched clearly oriented on domestic defence market, seeking to recover or offset structural conditions for the competitiveness of industrial sectors, particularly in the automotive industry, in light of the exponential increase in foreign competition in domestic and foreign markets, as a result of the continuity of the 2008 crisis.

Thus, the PBM is mainly oriented to the cost-country forming factors in high unemployment risk and strong lobby areas, and not to the support of innovation strategies and sectoral structuring actions.

The "Innova Empresa Program", newly-released, with a budget of 32.9 billion Brazilian reales, should be able to reverse, at least in part, the omissions made to innovation in the PBM.

The item in reference shows that the national policies of "innovation" in Brazil in the last 9 years were, at best, an aggregate of second or third line in the country's macroeconomic policies, divorced from ambiguous multisectoral competitiveness policies, lacking competent sponsorship and devoid of elements of future. All were also victimized by accidents in progress, which does not necessarily implied they had to be postponed or eliminated. Their omission during prosperity or neglect in crisis, equates to ignoring the historical lessons of the critical and perennial role of innovations. Extensively recognized as crucial for the economic and social development, the absence of a national policy of innovation and competitiveness of Brazil is being replaced by "ad-hoc" actions, characterized by being faulty in their contextualization, of precarious conceptualization, fixed on the rear-view mirror, always short-termed, bureaucratic, casuistic, and fragmented and without continuity.

VIII. PRODUCTIVE ARTICULATION PROGRAMS

Another important aspect, in relation to the policies of competitiveness and innovation for SMEs in the region, lies the issue of partnership between companies. These are associative modalities that seek to enhance interactions, linkages and synergies between SMEs and the institutions that support them. In practice, depending on their specific cooperation agreements, there is already a variety of concepts and experiences, ranging from business networks to production clusters, industrial districts, supplier development programs, main companies, chains production and global value chains.

As of the middle of last decade, productive articulation programs have been widely tested in the countries of the region, on the initiative of governments and the private sector, with support from international agencies to assist in these types of initiatives.

We could mention the experiences of business linkages as the Associative Development Projects (PROFO, Chile), the Business Development Centres (Argentina and El Salvador), the outsourcing pools (Argentina, Brazil, Colombia and Mexico), the Supplier Development Programs (Argentina, Brazil, Chile, Mexico) the Horizontal Network Programs (Honduras), conglomerate and productive chains (Peru) Clusters (El Salvador, Nicaragua, Uruguay) and export consortia (El Salvador, Uruguay).

Some of these programs were discontinued and others were transformed into new configurations, such as agglomerations or local productive arrangements (APLs, Brazil), production chains and main companies in Mexico, in addition to the Development Centres of Micro and Small Enterprises (CDMYPE, El Salvador) and others.

By encouraging greater private sector participation in the design and implementation of related policies and their instruments, provide a perspective for generating externalities in the process of modernizing SMEs – important source of productive employment –, distribution of responsibilities and greater interconnectivity in the corresponding actions, the productive articulation programs found wide acceptance by the governments in the region.

Furthermore, in the regional context of considerable financial constraints, limiting the scope of action for public policies, incorporating programs of productive articulation would enable lower operating costs of implementing these policies, since the fixed cost of the same is shared among a larger number of beneficiaries, increasing its efficiency and coverage.

The main objectives of productive articulation programs for SMEs in the region have focused on developing processes of exchange and complementation of resources, knowledge and skills, as well as the consolidation of a foundation of trust that facilitates dialogue among the participating companies and their supporting institutions.

The experiences of the region have faced similar challenges to the ones of the construction of change processes and the introduction of new practices, which involve removing ingrained routines and behaviours and generating intangible capital for the joint work. The evidence shows that the different experiences in the region have similar objectives and challenges, basically adopting three modes of articulation: networks, clusters and territorial development programs.

According to ECLAC-OECD study, the main instruments used to promote productive articulation in the region were as follows:

- Subsidies through non-reimbursable resources, to finance collective actions in improving the competitiveness of enterprises, as in the case of the PROFO and the development of suppliers (Chile), the programs for export consortia (Argentina, Uruguay) and the programs led by agencies and technology funds (Argentina, Chile).
- Technical assistance to support the generation and implementation of joint projects.
- Support of tax incentives associated to the development of collective projects.
- Credits on special conditions for accessing the incorporation or development of shared use assets (such as wastewater treatment plants and joint purchase of machinery).

While most programs have received support from more than one instrument, subsidies and technical assistance have been the most used. Beyond the differences between the programs, there sources used by these instruments have had a limited scope, for they just covered a small percentage of the expenditures and served for an equally limited period.

Likewise, suitable conditions to the success of the productive articulation programs in the region, mentioned below, have not been given satisfactorily:

i) Integration of these mechanisms the industrial policy and national development strategy.

ii) Operational decentralization of the instruments to improve the efficiency of its reception, by the beneficiary, in different territories and
iii) The availability of all stakeholders, especially those of the public sector, to implement participative processes to define consensual action plans with short, medium and long term goals.

There have been difficulties in achieving all these conditions, in the absence of appropriate mechanisms for promoting valuable innovations, the success of which would have cemented these associations. However, according to another study by ECLAC, there is evidence of some positive experiences of productive articulation in the region. Results from more than a dozen productive articulation projects were analyzed to improve the competitiveness of SMEs operating in various sectors in 10 countries in the region (Argentina, Brazil, Colombia, Ecuador, Guatemala, Mexico, Nicaragua, Peru, the Dominican Republic and Uruguay). From this analysis, it is stated that these projects achieved results in two areas of relevance to the design of policies: the promotion of innovation and the access to more demanding markets.

These experiences have different characteristics in terms of the activity sectors focused on, ranging from primary production (chains of goats in Cordoba, Argentina, and grape Isabela in the Valle de Cauca, Colombia), the agribusiness chains (dairy in Nicaragua and agribusiness in Guatemala), the traditional manufacturing sectors (clothing and furniture in Brazil, Ecuador and the Dominican Republic), extractive industries (Brazil), tanneries (Mexico) and handicrafts (Guatemala, Honduras and Nicaragua), to technologies information and communication (Argentina). The results suggest that associative experiences can achieve qualitative and quantitative goals. Results are reported in innovation of products and processes, creating new functions in the production chains and even institutional innovation and new coordinating bodies.

With regard to market access, the study reports that economies of scale and scope were generated by creating new marketing and negotiation skills of small producers, enabling them to formalize relationships with their clients and intermediaries and access more demanding markets. The study suggests that all of these capabilities have significant positive externalities over the production of SMEs.

The analysis has also tested out the difficulties linked to the sustainability of the initiatives, in order to provide continuity to the activities, beyond the term of operation of each project. At this point, the results are diverse as a function of the strategic approach of each one of them (networks, clusters or territorial development). Generally, the period to guaranty the sustainability of a project expands beyond a period of four years.

Three types of articulation were identified:

- Networks (collective actions among companies).
- Clusters (collective actions among companies of the same productive sector in which supporting institutions participate) and
- Territorial development programs (collective actions among different agents, companies and public and private institutions centred on the territory).

According to the analysis, depending on the emphasis placed on each of these types of articulation, different results are obtained with respect to maturation times, stakeholders involved, governance mechanisms, suitability of results and generation of externalities.

According to the study by ECLAC, the policy of local productive agglomerations (APL) in Brazil is the most important case of promotion of productive articulation in Latin America.

The APLs are the Brazilian version that brings together industrial districts and clusters, and represents an adaptation of these concepts to the culture and production conditions of the country, as well as the historical and institutional characteristics of different places and subnational realities.

Under the coordination of the MDIC (the Ministry of Development, Industry and Foreign Trade), and with the participation of the SEBRAE, agglomerations of economic, political and social agents in a territory in which specific productive activities are articulately and independently performed were created.

They are characterized by the presence of companies belonging to the same productive sector and a large participation of SMEs. In APLs public and private institutions have also participated, which support productive development and conduct training activities and training of human resources, financing and technical assistance for partnership activities, as well as suppliers of raw materials, supplies and services associated with the production of the companies involved.

Unfortunately, to date, the Brazilian experience of APLs cannot be characterized as a complete success. While some competitive advantages of unknown sustainability, have been generated in some of them, there is no evidence of proper management, in terms of achieving competitiveness and innovation strategies of the participating companies. Thus, if they become, as stated by the ECLAC study, the most important case of promoting the productive articulation in Latin America, it would be necessary to infer, until proven otherwise, that neither the innovations reported in the analysis of articulation experiences, considered positive in the region, described above, differ from the incremental innovations that constitute the pattern of business innovation, evident in other configurations of the policies of the countries involved.

IX. STARTUPS, THE PROMOTION OF THE NEW COMPETITIVE COMPANIES

Encouraging the founding of new companies based on new knowledge bringing about innovations and creating more business has become a hope for the nations of the region. It has an impact on the competitiveness of existing firms making partnerships with them; it also represents the latest component of the local innovation promoting policies. With the formal market protection under continuing pressure in the region, these companies need to be competitive from their very start.

Because of the amazing success of new technology firms such as Amazon, Alibaba, E-Bay, Facebook, Twiter and some others, along with the difficulties that SMEs are facing with innovation, the tendency of the current policies in the region is to offer a privileged support to startups rather than the operating SMEs. In some countries, the phenomenon of startups is wrongly considered synonym with innovation, just as the ICTs have been considered synonym with technology.

This mistake is said to have serious implications, as it hides the enormous difference between the loss of employment caused by the closure of SMEs and the number of new ones created by the few cases of successful startups, with the negative impact it has on the economic growth of the region. Additionally, various studies on the creation of new technology-based firms show evidence

that the rate of success in such process surrounds 25%. This emphasis of the policies ignores the high potential of synergy that startups and SMEs could enjoy.

The advantage of those SMEs is that they operate within a certain business context to which the innovation policies should be oriented. They are registered with the fiscal authorities, and possess organization, human capital, culture, system, processes and leadership for the effective management of their resources. In other words, they have a platform adjusted to the context of market realities. Although not all of them fit into this description, they can and must be the main engine of innovation in the region, particularly the new companies formed to exploit the results of research and development activities in the academy and research and development centres; those are investments with a higher risk and maturation and offer success rates that are still low, and require the support of external mechanisms such as incubators, mentors, risk capital, tech parks and so on, which still show reach a reduced effectiveness in the region.

The initiatives for supporting the startups in the region are numerous; so are their results. The region is still far from finding a successful incubator such as Y Combinator, from the United States. In the case of Brazil and Chile, a similar design platform for the promotion of startups may be found.

Brazil's Startup Program contributes individual supports of 200,000 reales for up to 12 months, with federal government resources for the development of new businesses in informatics, information and communication technologies, along with a variable volume of investments in the company accelerator. It covers exclusively Brazilian initiatives, and the goal is to have 300 ICT startups associated to the program by the end of 2015.

The success rate of the startups, both at home and abroad, is known to be extremely low. It is usually 25% in the United States, where 75% of the risk capital of the world is received, and between 15% and 20% in the limited experience of Brazil. In comparative terms, the Chilean Startup Program has been operative for three years and includes 7,200 ICT entrepreneurs, with 50 different nationalities. Startup Chile has attractive follow-up mechanisms, such as the days of mandatory external assessment of the progress of each company (which must be demonstrated by the supported companies themselves), interfaces with world leaders, specific legislation for the online inclusion of companies (without any cost and in 24 hours), and so on. Mexico is another referential country in the field of entrepreneurship and promotion in the region, with the pioneer programs and initiatives in the National Institute for Entrepreneurs.

As explained above, ICT-based innovations show a wide range of possible applications, as they all the economic and social sectors. Therefore, the priorities of the Brazilian Startup Program should be integrated, expressed and optimized in the field of the National Integral Innovation and Competitiveness Policy.

In absence of such a policy, the explicit priorities in the program – that is, the petroleum and gas sectors – do not include synergies with many other present priorities and other opportunities for the leverage of the economic and social growth of the country.

The evident and numerous possible applications of the ICTs in health, education, infrastructure and government services are good examples.

A national innovation and competitiveness program (or even the Innova Empresa Program) would open up the possibility not only of a technological transformation of the businesses of the existing

companies, making them more competitive and facilitating the contact between them and the new ICT startups. it might also stimulate the participation of the existing companies in the funding of new high technology firms as spinoff of their current businesses, promote and methodologically orient their radical innovations or make them become new "angels" of other high technology companies of interest, competitive complementation chains or in the innovation through new mergers and acquisitions.

Such a configuration might also be of extreme usefulness for the financing of the following stage of growth of the ICT companies that enjoy success in the Brazilian Startup Program, as it will require significant investments in hardware, marketing activities, market studies and tests, and other activities required for implementing the needed innovations.

In view of all this and considering the known national weakness on availability and access to risk capital, this link between the two programs gains a specific importance. Other bridges could be systematically built in the field of the national innovation and competitiveness policy, among the various programs for the stimulation of the innovation in the country, including SEBRAE, SENAI, BNDES, and FINEP, to obtain adequate support for the final stages of the development of high technology companies included in the Brazilian Startup Program.

Thus, since 2013 FINEP, the Ministry of Science and the Technology and the International Endeavour Program are supporting 60 Brazilian companies with a high potential through seminars and specific training programs, through the Endeavour Innovation Program (EIP), so that they widen their capacities of innovation and their knowledge on the management of business innovation. In fact, the training programs are mainly oriented to intra-entrepreneurship. The Program is focused on SMEs with en annual income ranging between 10 million and 200 million reales and wanting to create or maintain their competitive capacity through innovation.

In the style of the ones made for Brazil, the specific considerations on the policies and innovation promotion programs for the SMEs could be made for the rest of the countries of the region.

In sum, the following would need to be taken in consideration:

- Lack of effective policies for the competiveness and innovation in most of the countries of the region. In addition to the factors mentioned above, the government programs supporting competitiveness in Colombia and Ecuador are based on the factors used by international surveys to rank countries according to their competitiveness, but they do not still adopt effective strategies for the promotion of innovation in the SMEs of the productive sector. Since they concentrate in sectoral diagnosis, without the needed effort to analyze the future and define the path, these initiatives are limited to the creation of financial and fiscal instruments. In most countries, the promotion of innovation is inadequately included among the technological science policies.

- In the context of free trade agreements, the set de tariff exemptions for agreed-upon products claim for specific competitiveness and innovation policies. Such policies should have precise application periods so that the involved local companies do not disappear, with the consequent loss of employments.

- Even in the countries with very fragmented and case-based innovation promotion policies, these are conceived as by-products of the economic, industrial or farming policies; they lack

an appropriate concept that makes them effective, and are limited to supporting financial and tax instruments. Additionally, as it happens in Brazil, for instance, investment in technological innovation has been traditionally seen as a by-product of economic growth and macroeconomic policies rather than as a requirement for the economic and social development of the country.

- The science, technology and innovation policies have been putting business innovation in the background while privileging investment in the infrastructure of NIS institutions and associated research and development projects. This is the result of pressures made by a better organized academic community and the mistaken conceptions on business innovation (which confuses innovation with investments in research and development or with a registry of patents). At the same time, they ignore that, except for the startups, the local NIS only exist based on the demand of the companies; and when needed, the companies have the option of looking for NIS abroad, as a result of the globalization of technological services.

- Similarly, these policies give an unproportionate importance to supporting startups, ignoring the critical importance of privileging innovation in the existing companies, not only for their importance for their social and economic importance and their offer of employment but for the fact that their innovations imply a lesser risk for public investment. Such companies show contextualized platforms for innovation, that is, registry, human resources, operating experience and tactic knowledge, markets systems, processes, leadership, and management capacity (although they could be further improved).

- Clarity on the nature of the innovations critical to competitiveness (through the application of methodologies described in the last section of this document) would lead to aligning all the resources in the concretion of effective innovation for survival and growth.

- In the best of cases, the policies conceived for trying to overcome the tariff barriers to business innovation, such as those identified by the study of CEPAL-OECD, do not respond to the main barrier, which is the lack of knowledge that the companies have on the relationship between their competitiveness and strategic objectives and innovation.

- The science, technology and innovation policies in place at the moment could pave the way for the competitiveness and innovation policies by reducing the emphasis on the infrastructure of the sector, material and human resources, published and catalogued scientific articles or research and development projects. They could also privilege the dissemination of state-of-the-art and tendencies of technologies of crucial importance for the each country, supporting the processes of definition of innovation strategies in the companies. They should as well privilege the construction of business capacities in innovation management, promoting the formation of a critical mass on the issue.

- The science and technology policies should also be developed following the idea that this process is as important as the final result. Through this process, the competitiveness and innovation policies should be equally integrated, aligned and linked to the macroeconomic and foreign trade policies of each country of the region. This would lead to a variety of interfaces between the policies.

- Finally, the implementation of these policies requires the same effort and dedication as their definition, with a continued funding for success and together with the pertinent mechanisms for assessment, learning and feedback.

1. Successful cases of adoption of innovation processes reported by companies

The number of successful cases of company innovations reported in the region is high. They are reported in various studies and have been awarded prizes at domestic and regional levels. Significantly, it includes both existing companies and startups.

Naturally, there is markedly heterogeneous information on the specific innovations in each case, both at the domestic and intra-regional levels.

Some of them are subsidiaries of international firms with a renowned capacity for innovation and have implemented domestic innovations in the countries of the region.

These are some examples:

1.1. Cases in the region

Four companies from Brazil, two from Uruguay and another four from Argentina are included in list of the 10 most innovative firms from South America in the 2013 ranking of the US publication *Fast Company*.[8]

The list of the 10 most innovative companies in South America is headed by Brazil's Enalta. According to *Fast Company*, this firm is notorious for offering a solution to the ailing industry of ethanol in Brazil. Enalta provides it with a software and GPS equipment for monitoring sowing y irrigation, improving the results of Enalta's harvests (the sugar cane used to produce ethanol). Enalta is, incidentally, the only South American company in the world ranking. In the group of the first 50 companies, it occupies the 43rd position.

The second position belongs to Mercado Libre Argentina, the company that created Latin America's E-Bay style auction Web site, with operations in 13 countries. According to The Nielsen Company, more than 130,000 people in the region obtain a large part of their income through this platform.

Another Argentine company is Globant, software provider for the biggest ICT firms worldwide and with stocks in the New York Stock Exchange.

In the third place is the Uruguayan company Prosperitas Capital Partners. According to *Fast Company*, Prosperitas has catalyzed the scene of the startups in the second smallest country in South America. The company has invested US$ 11 million in domestic ICT projects, consumption webs and mobile applications, some of them successful.

Other companies in the ranking include Brazil's Braskem, for its innovation in the production of ethane using ethanol obtained from sugar cane; Magazine Luiza, for the innovation in its commercialization system in the least favoured classes of Brazil; Tatil Design, and so on.

See a complete list of the firms classified by *Fast Company* on the magazine's Web site.[9]

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[8] http://www.fastcompany.com/welcome.html?destination=http://www.fastcompany.com/3026319/most-innovative-companies-2014/the-worlds-top-10-most-innovative-companies-in-south-america.

[9] http://www.fastcompany.com/welcome.html.

Fast Company says: "Brazil has a great development in information and biotechnology, and Argentina has many creatives, quite a number of networks and a reputation of creating important firms in new issues". Chile has been advancing; it in fact appears on the top positions of the region in a number of studies.

1.2. Specific cases in Chile

According to the Innova CI Web site (no author mentioned):[10]

In order to acknowledge the companies that have adopted innovation as a focus of development, the Chilean government created the **Pyme Innovadora Award**, a public recognition to the constant work developed by the entrepreneurs in all the regions of the country.

The award **distinguishes the company, project and entrepreneur who has had a wider impact with their innovation and could become an example to their peers**. Contestants have to present a product or service with differentiated (innovative) elements and the capacity to cause an impact on the community, and thus being a model for the entrepreneurial spirit.

The most innovative Chilean SMEs in 2013 were:

Eduardo Alvarez Callejas, from the Arica and Parinacota region, for his contribution to the use of solar and air energy in their Pampa Camarones mining camp.

Iquique Televisión, from the Tarapacá region, a family company that is searching for a fully local identity through the screens. At present, it operates in a high-definition digital format, but their signal can be caught in the cable and cellular telephones with an HD reception. This makes them the first channel with this type of broadcasting in the region.

Holón-Systems & Consulting, from the Antofagasta region, a firm working with electronic appliances that offers solutions to the mining industry. Juan Carlos Mackay, owner of the company, said: "I wanted to create electronic equipment to find solutions to the problems of the mining industry; for example, a system of computer tests for the power links of mining trucks, others for a main generator and, [since] 2012, with funds from Secotec, I am developing a product to monitor the failures of high-cost equipment online." The challenges of the firm include building products with a wider reach and making products locally and associate them to imported technologies that work with renewable energy.

Isabel Pereira, from the Atacama region. Pereira is a businesswoman from the Huasco province with a constant concern for the environment. She found new uses for the large amount of clothes that the people throw away in her community. She now makes carpets and cushions out of them. In addition, she transforms the bottles and plastic products into new pieces.

Lifeware, from the Valparaiso region. This firm has goals like the applied technology and the distribution of integral computer systems that help the people with physical and cognitive discapacity through programs that allow them to use the computer without hands. This technology, new in Chile and Latin America, helps social and labour integration of disabled people as it offers access and mobility in the digital world, increasing their quality of life.

[10] (http://www.innovacion.cl/reportaje/las-pymes-mas-innovadoras-de-chile/empchileinnovation.cl).

Dayenú Ltda., from the Libertador General Bernardo O'Higgins region. Their prognostic model for the Pronofrut harvest was possible thanks to a business innovation prototype program by CORFO.

Arte Sur, from the Maule region. Teresa Arenas makes fibreglass that are now exhibited in the Condorito route to Rio Claro.

Héctor Aguayo, from the Bío Bío region. A young man from Concepcion who dared create a unique ball mill system for the mining, cement and iron production. It is about to receive the innovation patent.

Trum Handcycles, from the La Auracanía region. It is a manual traction, mechanic device that couples and uncouples the wheel chair in a simple manner, which allows the user to reduce the time and physical effort required to go from one place to another. It also gives them the freedom to go through irregular terrains and take part in recreational, sports and social activities.

Innovaldivia, from Los Ríos region, was founded by Andrea Gidi Campos; it is dedicated to developing selected products associated to the rescue of patrimony, defensive towers and regional identity. The firm's goal is to make the history of Valdivia known to tourists and help develop the region. "I am very excited about this award; it's very important to acknowledge the work I do, this helps me continue with more strength", Gidi Campos said.

La Picá de la Abeja, from Puerto Varas, Los Lagos region, company that elaborates honey products with added value.

Revista Coyhaique Datos, from the Aysen region. Community service Web sites where classified ads, service guide, labour exchange, and advertising are hosted.

Kayak, from the Magallanes region. Led by Claudio Saa Tapia, this is the first adventure tourist company to open sailing routes from Punta Arenas to the end of the American continent, positioning tourist and historic resources.

Milkeeper, from the Metropolitana region. Diego Belmar, Nicolás Ferreira and Hans Pieringer developed a food product for calves which is able to naturally eliminate the diarrhea affecting these animals in the two first months of their lives – it is attacked with antibiotics at the moment. Milkeeper is then solving a global problem by increasing the productivity of a herd of cows and eliminating a practice that uses chemical and antibiotics to attack infections. Additionally, it is being used in 6,000 calves in Chile.

The successful cases reported clearly include a combination of startup and mostly gradual innovations in the existing companies. There is almost no specific reference to any competitive impact of innovation, the duration of that impact or a mention to the return over investment. A few cases certainly have differentiated competitive effects, though. The time of duration of the startups and their destiny after the successful launching are not explained either.

Innovation is not always characterized by originality and an offer of new benefits for the client. It needs to present a minimum profitability rate, with the capacity to compete with other strategic applications of capital in the company. Either the client or the market need to acknowledge the value of innovation, that is, to be willing to pay more for it.

Much of the mistaken vision of innovation has probably been influenced by the 1997 edition of Frascati Manual. This material is the conceptual base, used even today in the region, to demystify business innovation. However, it has at the same time trivialized it, by accepting mere changes in the structure of the organizations or in their trading systems as innovations; this is disconnected from the ultimate goal of the process of innovation: Its impact on the competitiveness of the company.

Billions of dollars have been spent in promoting gradual business innovations in the region.

At the same time, as it is reasonable in the business environment, the verification of the success of any strategy or action is inevitably associated to an objective or goal that has previously been qualified and quantified. The investment of resources, time and effort of the company in innovation does not have to be different.

In the cases reported, there is not even the most remote reference to the existence of those objectives of goals. In some cases, they might have existed, but their absence could be, as mentioned above and described below, a result of the lack of the specific capacity of most companies to properly define their innovation strategies, together with their competitiveness and growth strategies.

X. STRATEGIES FOR INNOVATION OF SMEs IN THE REGION

The definition of business innovation strategy, the decision on which innovation projects should be invested in, among multiple alternatives, is the initial stage of innovation, which allows to spot business investments and includes investment due diligence. Such strategies characterize the stage of innovation called “front end innovation.” Numerous chat groups can be found in this regard in LinkedIn, on the Internet. Such groups have been established in the past couple of years, in view of the growing recognition of the critical importance of the topic for business innovation.

Unfortunately, in the region, such front end innovation as part of the innovation strategy is usually mixed up with mere creation of ideas, either inside businesses, with suggestion boxes, or by means of the so-called open innovation. Such confusion emerges, on the one hand, from lack of knowledge of concepts and techniques required for the adequate management of decision making related to the setting of business innovation strategies. On the other hand, it emerges from the growing popularization of the mechanisms for the incorporation of new e-businesses, technology entrepreneurship, which promotes intra-entrepreneurship apart from business core activities so as to prevent internal resistance to innovation.

Examples of successful entrepreneurship in start-ups including businesses, such as Amazon, Apple, Microsoft, Twitter, Facebook, Alibaba, and E-Bay, among others, are extremely powerful and tend to overshadow comprehension of other ways of management for innovation in existing businesses. Even training in entrepreneurship has become synonym with training in innovation management. This is the case of Brazil, regarding the aforementioned agreement between FINEP and the Endeavour program, another critical confusion.

Processes linked to intra-entrepreneurship are advised to take place once the business innovation strategy is set, that is in the strategy implementation stage. This does not mean avoiding the involvement of intra-entrepreneurs in setting the strategy, or the suggestion of specific radical

innovations, or disregard of the feedback between implementation and potential requirements to correct the direction of the strategy.

Likewise, these strategies should become the baseline for creation of ideas and open innovation. Based on an article released in newspaper *A Tribuna*[11], the following shows the businesses inability to set their innovation strategies and the wrong practice of mixing up creation of ideas for innovation with the business innovation strategy.

Three recent case studies of trusted consulting firms – McKinsey, Booz&Co and the Canada-IDC Products Development Institute – clearly show the above-mentioned wrong practice through practical pieces of evidence on creation of ideas for business innovation and its conversion into economic results in the market, mainly focusing front end innovation, which is the source of the innovation projects in which businesses should invest.

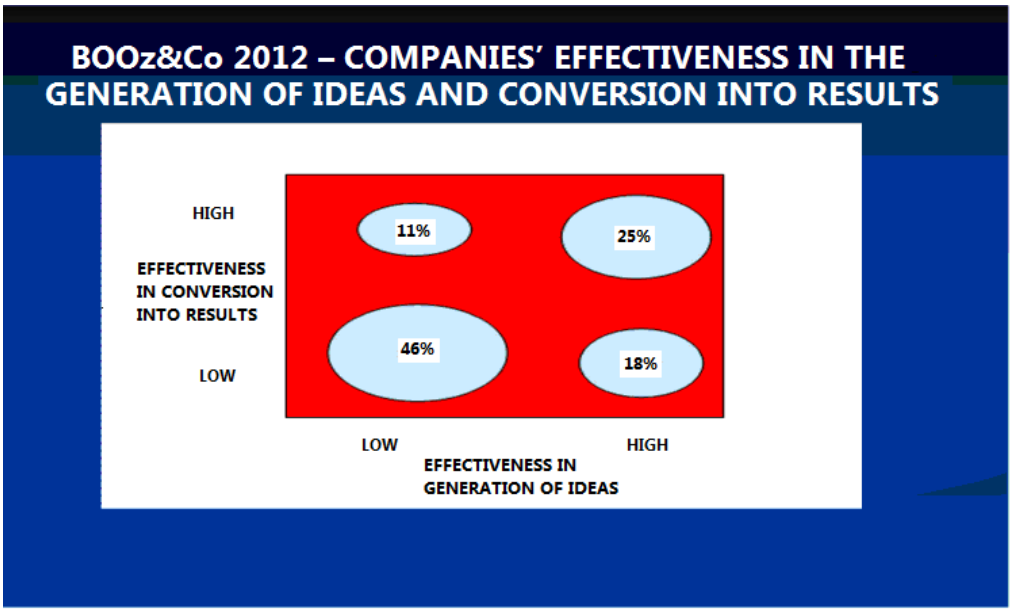
A survey conducted by consultant McKinsey in 2011 among 2,240 businesses in the United States – the world Mecca of innovation – found that only 30% of the interviewees have a well-defined portfolio of strategic innovation priorities at the corporate and business units' levels. Moreover, the findings of the latest survey among the 1,000 top innovative businesses in the world conducted by Booz&Co – an international consulting firm focused on finding evidence of business competition in creation of ideas and subsequent implementation – found that only 25% of the participants regard as effective the creation of ideas and turning it into market economic results.

This survey also showed that effective businesses in front end innovation achieved a clearly superior financial performance compared with other participating businesses. Such performance is measured by income growth, value market growth (capitalization) and EBITDAs (Earnings before Interest, Taxes, Depreciation and Amortization) as % of the income. The ratio of financial performance to business effectiveness in front end innovation confirms the critical importance of setting business innovation strategies. Surprisingly for Booz&Co, a large number of innovative businesses conceded to be ineffective, both in setting innovation strategies and related creation of ideas.

Chart 5, below, displays the findings of the Booz&Co survey of the 1,000 top innovative businesses in the world. Note that only 18% of the businesses deem themselves as effective in creation of ideas for innovation, whereas 46% conceded to be hardly effective both in creation of ideas and its conversion into market results.

11 A estratégia de inovação e a geração de ideias para a inovação nas empresas- a evidencia pratica. Fernando M. Machado, Tribuna da Bahia, April 2013.

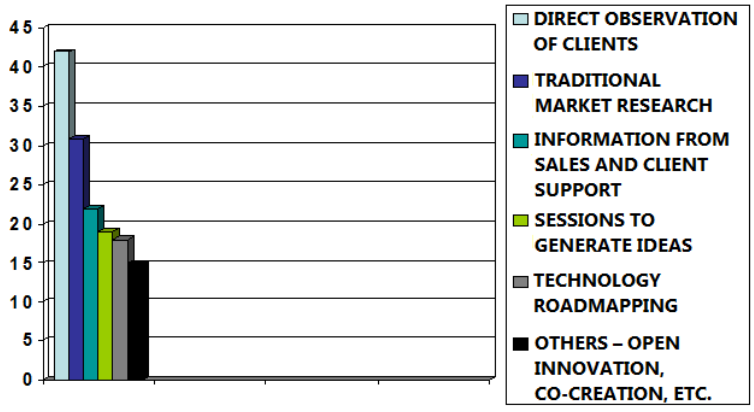
CHART 5
Companies' effectiveness in the generation of ideas and conversion into results



Note also that these numbers refer to the 1,000 businesses regarded as the most innovative in the world. Only 25% of the 1,000 top innovative businesses in the world deem themselves as effective in creation of ideas and its conversion into innovations with a high-competitive impact. Strategic inability to outline a portfolio of business critical innovation is, therefore, global.

Chart 6, below, depicts the findings of the Booz&Co survey on mechanisms and tools used by participating businesses in creation of ideas for innovation.

CHART 6
Mechanisms and tools used to generate ideas for innovations – Booz&Co 2012



For its part, the Product Development Institute of Canada (PDI) recently released the findings of a survey on creation of ideas for innovation in Canada. The poll was conducted among 160 businesses from several sectors and varied seizes, including 67.8% of B2B businesses, 26.6% of consumer businesses and 5.6% of both.

The survey makes two references to business strategies – formal and informal – in addition to creation of ideas without going in depth.

Table 5, below, collects the findings of the PDI and Booz&Co polls. The latter is referred only as appropriate to the specific category.

TABLE 5
Mechanisms to generate ideas for business innovation
PDI - PRODUCT DEVELOPMENT INSTITUTE
BOOZ&Co

VOICE OF THE CUSTOMER (VOC)	POPULARITY % USERS	EFFECTIVITY - RANK (1-10)	(1-18)	Direct observation of clients 42%
Ethnographic research	12.9	6.8	1	
Visits to clients	30.0	6.6	4	
Client Focus Groups	25.5	6.4	3	
Analysis of Leading Users	24.0	6.4	3	
Co-Creation by clients – users	17.4	6.0	5	
Client Brainstorming	17.4	5.9	6	
Client Consultative Council	17.6	5.7	8	
Community of enthusiasts	8.0	5.6	9	
OPEN INNOVATION				
Consultations with Partners and Suppliers	22.1	5.4	11	22%
Requests to scientific and technological communities	19.5	4.9	14	
Scanning of Start-ups	11.9	4.9	15	
Requests to users for new products	2.0	4.8	16	
Competitions and requests for external ideas	... .4.0 7.9....	4.3 4.5	18 17	
Exploratory research - $				< 15%
Traditional market research				31%
Insertion in social networks				<10%
OTHER SOURCES				
Internal generation of ideas	37.4	5.3	12	19%
Peripheral Vision - Informal Strategy	33.1	5.8	7	
Breakthrough Technologies – Formal Strategy - Technology. Roadmapping	21.6	5.5	10	18 %
Patent Mining	32.7	5.3	12	

Some reflections can be made from the analysis of Table 5.

Firstly, in reference to the PDI survey, findings seem to show that, like in the Bozz&Co poll,

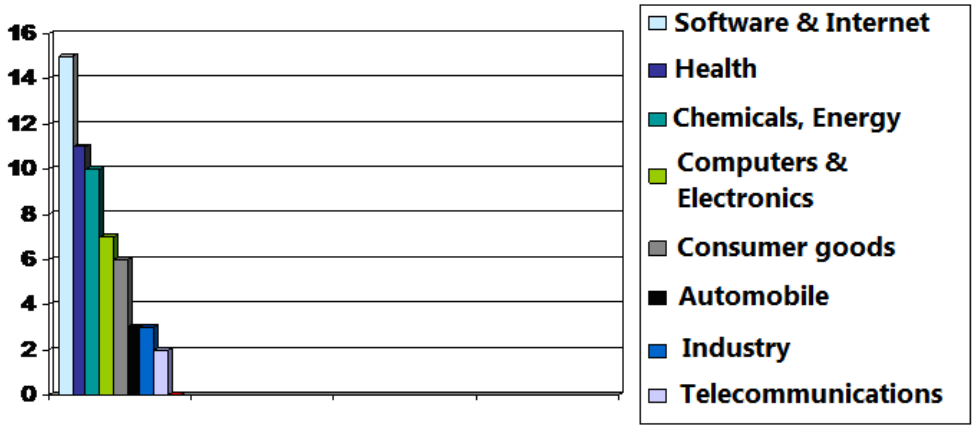
- There is no evidence of business effectiveness in creation of ideas among the 160 studied businesses, given the low percentage of use of formal innovation strategies (21.6% in Other Sources), compared with 33.1% of informal strategies. It could be concluded that the registration of patents (32.7%) generates information on future technology trends that should apply to formal business innovation strategies. However, it seems that this is true only for 21.6% of the businesses involved in such registration of patents.
  The survey does not provide information on the accumulated use of mechanisms by one business. This, if confirmed, could help believe in a somewhat brighter perspective.

Secondly, with regard to *per se* creation of ideas of the two case studies summarized in Table 5, note the following:

- The businesses that took part in both surveys would rather have creation of ideas from direct contact with their customers. In this way, the poll by Booz&Co shows, without further detail, that 42% of businesses engage in direct observation of customers, whereas the poll by PDI itemizes the businesses as part of the "Customer's Voce." There is no evidence of customer-customer contact in the sense of perceiving needs throughout the production chain onwards.
  The saying that customers know what they want, but also want what they do not know, which is very true in a current context of radical changes of knowledge, does not find, therefore, backup in the results of the two case studies.
- The survey by Booz&Co, as a preference following the customers' direct observation, suggests that 31% of businesses use the standard market research for creation of ideas. Interestingly, they seem to do it apart from consultations with partners and suppliers. Perhaps because of the survey design there was no evidence in this regard in the PDI survey. In any case, PDI findings do not even mention such mechanism.
- The significant percentage (31%) of businesses that use such mechanism gives the impression that most innovations by these means are of an incremental nature, generally of an ephemeral impact on business competitiveness.
- Both case studies confirm the extensive use of consultations with partners and suppliers at the same percentage (22%). This means capturing some visions and needs in the production and supply chain. The finding, however, reiterates the assumption of preference for incremental innovations.
- There is no evidence of the use of incentives to creativity more effective that creation of ideas, such as TRIZ, Lateral Thinking, DeBono, and other methods.
- Except for consultations with partners and suppliers, at 22% in both surveys, the surprisingly low use of outstanding mechanisms in the current literature of innovation management, that is: open innovation, is noticeable. The use of social networks is lower than 10%, and external contests of ideas are lower than 8%. This is an admonishment about the widespread open innovation and its constraints outside the context of innovation business strategies. Nevertheless, its use should grow in certain business areas.

Chart 7, below, itemizes the businesses where the use of social networks is one of the two most important mechanisms for creation of ideas in Bosco's survey. The Chart notes the sectors of software & internet (15%), health (11%), and chemical products and energy (10%), all of them with needs of steadily open communication channels with consumers.

CHART 7
Use of social networks in the two priority mechanisms, detailed by sector – Booz&Co 2012



Importantly, the survey conducted by Booz&Co includes an attempt at placing creation of ideas within a framework of innovation strategies as the first step in front end business innovation.

Such framework, used by Booz&Co in its probe into the top 1,000 innovative businesses in the past five years, proposes three fundamental models for innovation business strategy, based on the approach adopted by a business: "need seekers, market readers and technology drivers."

The main characteristic feature of need seekers includes the customer involvement in the creation of ideas for business innovation, in order to get an insight into the needs of final users, both known and unknown needs. This strategy uses, for creation of ideas, preferably mechanisms such as internal and external brainstorming and focus groups.

For their part, market readers preferably use consultations with partners, suppliers, sales teams and customer support, in addition to standard market research.

Technology drivers are characterized by using mechanisms, such as request for external backup from science and technology communities and technology road mapping. The latter focused on product innovation and comes from the "house of quality" technique, in the area of expertise known as "total quality".

The research conducted in the past five years by Booz&Co reveals that participating businesses that adopt the need-seeker model are more effective in the creation of ideas and its conversion into innovations.

Fifty percent of the participating businesses which use the above-mentioned innovation strategy will be regarded as highly effective in the creation of ideas and its subsequent conversion into innovations; whereas only 20% out of technology drivers and 12% out of market readers conceded to be effective in both activities.

The research conducted by Booz&Co includes a final remark: a business may be successful in the creation and implementation of innovative ideas, no matter the adopted strategy. The research also noted that most critical in the implementation of any of the three strategies is the alignment

between the adopted business strategy and the general business strategy and between the corporate culture, front end processes and business capabilities and resources. Such final remark is the core of the issue of business innovation strategies and mechanisms of creation of ideas that should be used as baseline.

Such disclaimer at the end of the research conducted by Booz&Co into the strategy methods provided by the survey reveals, on the one hand, acknowledgment of the advisable correlation between business innovation strategies and business competition and cooperation strategies. On the other hand, it shows a conceptual lack of knowledge about the nature of such correlation. As a matter of fact, the scope of the definition of standard business innovation strategies could have a one-dimension approach as the source or origin of the knowledge to be used; research and development; technology transfer; assignment of third-party patents; strategic partnerships; joint ventures, or procurement of businesses owners of the knowledge needed for innovation. Likewise, there are one-dimension strategies related to the timing for implementing the innovation in the market – pioneer businesses, fast followers or loggards – or to the very mechanism of creation of ideas for business innovation, such as those included in the research conducted by Booz&Co (need seekers, market readers and technology drivers).

With no exception, business innovation strategies based on such one-dimension criteria have proved to be unable to cope with a complex innovation process that cannot be detached from the corporate competition and cooperation strategy in a context of highly complex and volatile businesses as the current and foreseeable ones.

1. Methodologies to support the definition of a business innovation strategy

It is worth mentioning that these methodologies form part of the set of concepts, methods and techniques in the field of expertise known as innovation management, which encompasses not only technology management, the source of it, but also knowledge management, born more recently. The description of all these concepts, methods and techniques of innovation management, also known as technology innovation management, are beyond the scope of this paper.

Note that some contributions have been made in the region to put such concepts and techniques of innovation management on the level of SMEs. A specific contribution has been proposed by the technology and innovation network of the State of Río de Janeiro (REDETEC) in Brazil,[12] entitled "Manual de Gestao para a MPE innovadora", and commented below.

Note also that the methodologies presented hereinafter should be completed inside the business with other technologies which contribute to the corporate innovative success. Some endeavours in certain countries should be recognized with regard to training and technical advice on innovation management. In the region, the Latin American Association for Technology Innovation (ALTEC) has played a relevant role in the dissemination of concepts, methods and academic experiences in innovation management.

In Brazil, for instance, FINEP has funded for decades the PACTO Programme, of Sao Paulo University (USP). Unfortunately, despite its high quality, the programme could not spread and multiply over the country. Similar initiatives have been implemented elsewhere in the region,

12 Manual de Gestao para a MPE inovadora" REDETEC, Ada Gonçalves et al, Coordinadores Armando Clemente y Paula Gonzaga, SEBRAE RJ, 2011- ISBN 978-85-85620-14-1 **http www.redetec.org.br.**

namely: Argentina, Chile, Colombia, Mexico and Venezuela. Sadly, some initiatives have vanished because of financial constraints.

The methodologies described below and their implementation conform a very recent practice, even in the world and major countries. This is understandable because of the growing global business need of successful innovation, as already said, and because of the confirmation of the troubles faced by businesses in this regard.

2. "Front end innovation" or formulation of a business innovation strategy

Some related methodologies have been implemented. Road mapping is the most traditional one. It comes from the House of Quality technique, which forms part of the arsenal of total quality, very popular in the 20th Century. Such technique has three major shortcomings. Firstly, it focuses only on products innovation, leaving aside other activities in the business value chain.

Secondly, it fails to cover some considerations which are important in defining the business innovation portfolio, such as various trends and scenarios, including the analysis of S curves in the technology useful life; technology prospects; systematic data search of the technology state of the art by means of records in data bases of patents and other means; in addition to in-depth analysis of competitors. Nor does it take them into account in sequential decision making and feedback, as necessary.

Lastly, its graphic description has been regarded by many businesses as extremely confusing to be implemented.

In its chapter on business innovation strategies, the above-mentioned innovation management handbook includes relevant considerations on some of the techniques needed in the formulation of the business innovation strategy, such as the five driving forces of M. Porter; SWOT analysis; internal analysis of central skills; vision based on resources (VBR); analysis of the portfolio of products and business with matrixes such as BCG and GE; dimensions of the standard business planning strategy, and the balanced score card (BSC) used in the implementation of the strategies.

However, perhaps because of the scope, it fails to mention some other techniques, such as the techniques used to identify needs and innovation opportunities, or those related to competitive intelligence. It also fails to suggest the way of implementing such techniques to form a viable and practical methodology in the formulation of the business innovation strategy.

Through consultancy on the design of business innovation strategies by Professor Eduardo Vasconcellos, from the original group of the PACTO Programme of Sao Paulo University (USP), a methodology has been implemented and accepted to a certain extent by Brazilian businesses.

A sample of such methodology can be found in the publication mentioned below.[13] Moreover, a consultancy firm of Colorado, USA, managed by Richard Lee, has outlined a methodology called "Value Innovation Process," published in the book "Value Innovation."[14] It includes examples of

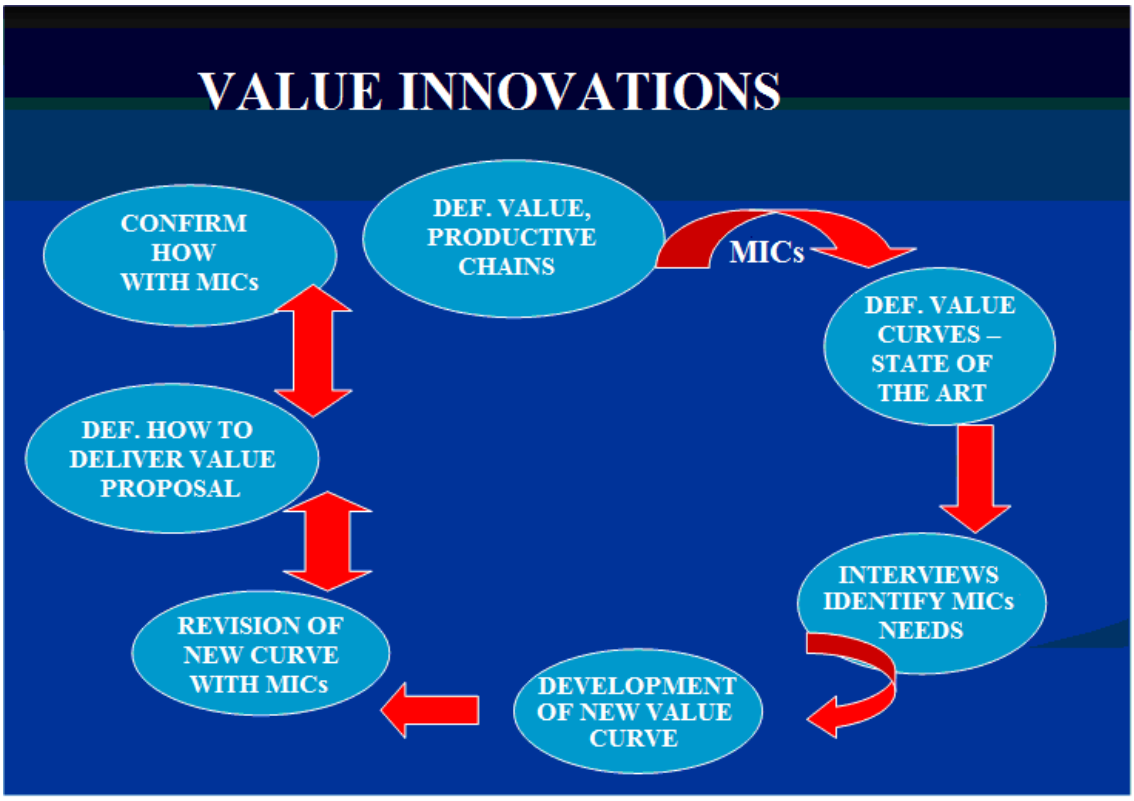
[13] Technological threats and opportunities: identification and technological roadmap as tools to improve the portfolio of technological projects. E. Vasconcellos, D. Whaler et al. International J. Automotive Technology and Management. 2014

[14] Value Innovation Works Richard K. Lee, Lin Lee et all, Amazon Books, 5-2012

implementation of the proposed methodology in some businesses, such as Apple, Samsung, Procter & Gamble, Cargill, and Virgin Mobile, among others.
This is a comprehensive and simple methodology that can be used in SMEs.

Chart 8, below, summarizes this methodology.

CHART 8
Process to identify value innovations



Source: Value Innovation Works.

This methodology is primarily based on the identification of value gaps for customers. Such gaps are verified by means of consultation with the most important customers (MICs) in the production chain, following a specific technique to identify the MICs. The methodology also includes a certain component on customer value delivery and matches the assumptions adopted in its final stage with the business contextual conditions and potential development before plotting the specific project portfolio of the business innovation strategy.

The stages depicted in Chart 8 are as follows: MICs and value chains are tracked through the identification of each business, organization or individual involved in the buy, sale or any other deal between the business and the final user. The definition of the value chain in the methodology begins with the business product or service and ends with the use of the product of final service.

The components of Table 6, below, have been used to refine such definition.

TABLE 6
Identification of MICs – Respond to:

	WHO SOLVES PROBLEMS	WHO CAN SUFFER FINANCIAL LOSSES	WHO GETS THE PROPOSED VALUE
VALUE CHAIN 1			
VALUE CHAIN 2			
VALUE CHAIN 3			
VALUE CHAIN 4			
VALUE CHAIN 5			

The definition of the state of the art of the performance components of the business products or services and their indicators is made by several means – from the analysis of world leading businesses, to consultations with experts, to the record of information in data bases of patents.

Subsequent development of the curve of value allows making the initial questions on the size of the performance components in order to establish a dialogue on needs and added value with MICs. This relies on contextualized interviews, the structure of which is exemplified in Table 7.

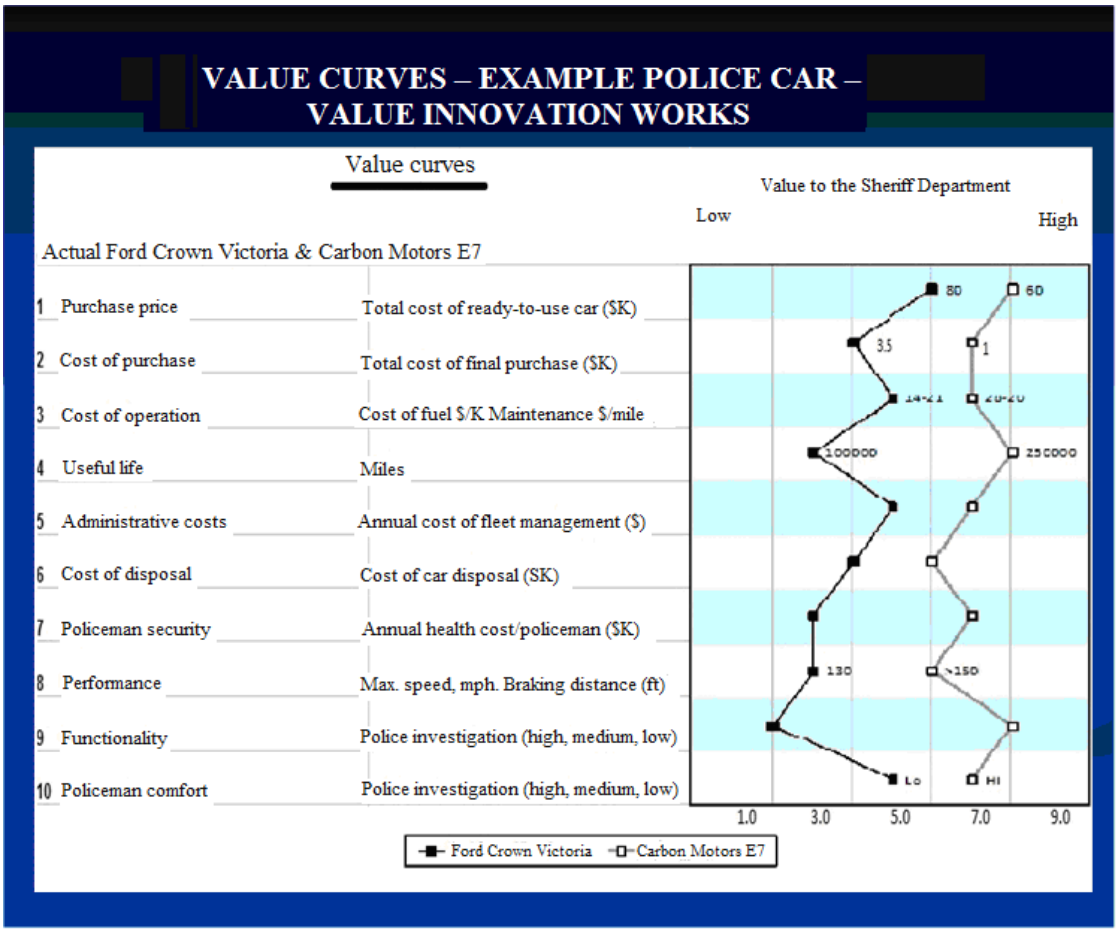
TABLE 7
Identification of unmet critical needs of MICs and not yet articulated – Three surveys

FOCUS	OBJECTIVE
DIVERGENT LISTENING	IDENTIFICATION OF THE CRITICAL CHALLENGES AND NEEDS OF MICs
CONVERGENT EDUCATION	REVIEW OF THE VALUE CURVE AND INDICATORS, CURRENT AND IDEAL
CONVERGENT DEFINITION	DEFINITION OF SPECIFIC DIMENSIONS OF THE ELEMENTS, HOW THEY MUST BE PRODUCED AND DELIVERED

Next, the curves of value identified and discussed with MICs are formed, based on performance indicators.

Chart 9, below, exemplifies the appearance and components included in said curves of value, including their respective indicators.

CHART 9
Value curves – Actual x Projected

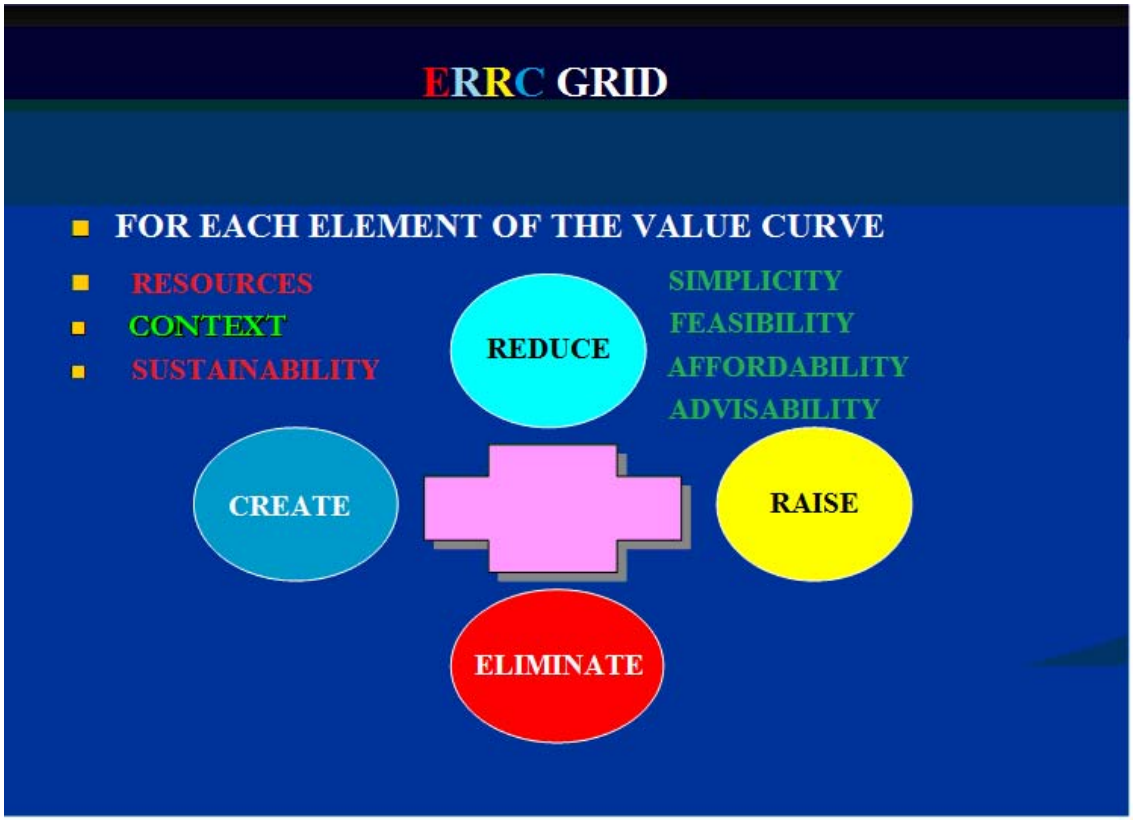


Ten critical components were identified as attributes. Each of them includes its respective metrics, as specified in Chart 9, besides each component. The first curve represents the value of the components for each option of the car. The second curve of value represents the other option, following a consultation with the appropriate MIC, that is: the Sheriff Department. Next, the proposed curve of value is defined, in consultation with the MIC. Note that the proposed curve may contain more or fewer metrics compared with the existing components, as well as new components.

The proposals on value, new curves and business models are checked again with MICs, as well as the feasibility and means to attain the specified value via innovation, namely: definition of modalities mix; R&D; technology transfer; patents licensing; hiring of experts; open innovation, and others, as described elsewhere in this paper.

Chart 10, below, shows a matrix intended to back the definition of the new metrics of the components involved in the curve of value. It is called ERRC Grid or Matrix due to the alternative actions for each performance indicator.

CHART 10
ERRC Grid: Eliminate-Reduce-Raise-Create



Source: Value Innovation Works.

The implementation of this matrix enables businesses not only to consider the options of reducing, increasing, removing and creating, in reference to the numbers required for the components of the new curve of value, but also to check the extent of satiation, simplicity, convenience and affordability, as proposed by C.M. Christensen, in addition to feasibility and sustainability of such measures for MICs. All of this backs feedback throughout the process.

Such exercise results in the portfolio of projects to be implemented by the business so as to attain a new curve and value and properly deliver it to MICs. This portfolio, and each of its incremental and radical projects, is subject to checks of context development; technology; political, social and economic scenarios, and the implementation of creativity techniques and other methodology techniques.

Following are examples of innovations which rely on this matrix. Such innovations, many of them of a radical nature in terms of business models, break new ground in several sectors with a proposal of high competitive value.

2.1. Low-cost airlines

Traditional airlines have been replaced in several parts of the world with an innovative business model. Low-cost airlines have managed to cut the airfare by 50%-90%, resulting in increasing demand of new customers. This was made as follows:

- **Elimination.** Airliners virtually removed on-board services included in the airfare, as well as first-class seats in order to make room for tourist-class seats. Likewise, the standard sales offices were removed and all tickets are sold on their Web sites.

- **Reduction.** The reduced number of second airports and shrinkage of the airfare is a value proposal appreciated in the market. Luggage restrictions and the removal of first-class seats supported lower prices.

- **Increase.** The use of second airports in major cities around the world has increased. This is because low-cost airlines use them in order to cut taxes and costs. Furthermore, low-cost airliners increased connections between second cities, thus expanding the supply in cities which virtually had no air traffic.

- **Creation.** Low-cost airlines created a business model to travel with the speed of a plane at the price of a bus. As a result, the demand increased and the absolute success was replicated by several companies in several countries.

2.2. The US$ 150 washing machine

In emerging economies, such as China or India, firms of household appliances found the need to offer big markets with scanty resources a low-cost washing machine of US$ 150. This has been a stunning success in Asia based on the following strategy.

- **Elimination.** Certain parts which made the product expensive were removed. Also, the shelf life of the product was shortened.
- **Reduction.** The storage capacity and seize were diminished. Also, the elimination of some parts resulted in a low-quality, low cost washing machine.
- **Creation.** A cheap product for low-income market segments in China and India produced a high volume of sales for millions of people who otherwise could not own a washing machine.

2.3. E-offices[15]

E-offices have recently emerged in several cities, focused on a market of free-lance executive officers who do not need or cannot afford paying a full-time office. By offering a much lower price for an office with all the components required to make deals and take care of customers, this business innovation has captured a latent demand by means of the following strategy.

- **Elimination.** No burdensome investment in rent of real estate or buy of equipment or hiring clerks is needed to start a new business. Payment is limited to the necessary time of use of the offered facilities and services.
- **Reduction.** The time of use of the facilities and the risk of starting a new business are lowered. In this way, the service is very attractive for entrepreneurs.
- **Increase.** The variety of office services has been enlarged, and everything necessary is included in the service tag: a clerk who receives messages and answers telephone calls; a tax domicile; furniture; front desk; work station; meeting room and cafeteria. Likewise, there are increasing opportunities of professional interaction with other users of such facilities.

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[15] http//ciberopolis.com/2011/07/25/8-ejemplos-e-ideas-de-innovacion-que-son-un-exito-primera-parte/

- **Creation.** Selected items demanded by users have been produced.

Although this methodology is attractive and relatively simple, it could be argued, as appears from the above description, that an excessive emphasis is made on innovations of products and services. This is not necessarily so, as any activity in the business value chain could be a performance indicator to be included in the value curves.

The criticism most difficult to refute regards the little reference to contextual and future components – trends, scenarios, prospects and technology surveillance, among others – at the beginning of the methodology. Such omission prevents a better preparation of contextualized interviews which could lower the risk of poor interpretation of such components by MICs. Another criticism is related to the early identification of the competitive context and business opportunities, mainly in new markets.

Chart 11, below, based on a publication,[16] is an attempt at correcting such aspects.

CHART 11
Process to define the business innovation strategy

This methodology alternative, which could be combined with some components of the previous methodology, proposes a concomitant analysis of current and future customers' needs; present and potential competitors, and economic, social, environmental, regulatory, political, geopolitical, and technology trends in potential scenarios and their respective alternatives for value identification.

The meeting point of the findings of such analyses and the respective innovation strategies able to satisfy the creation of significant value for customers should be also differentiated to sustain and expand the business competitiveness. In addition, it should fit in the context of the opportunities arising from the contextual trends of the respective businesses.

16 El "X Factor" de la Innovación Empresarial. Fernando M. Machado, 2013.

Likewise, alternative strategies will have to be validated based on the feasibility of the internal or external resources available to businesses and the implementation of the resource-based vision (RBV), including considerations on the environmental impact in the useful life of the new products.

Each continued aspect in Chart 11 implies the use of specific concepts and techniques. This is one of the reasons why businesses, particularly SMEs in the region, are unable to set their innovation strategies.

In view of fast-paced and intensive changes in the business context now and in the near future, it should be noted that the effectiveness of the above-mentioned process will depend on continued monitoring, flexibility and adaptability to make any changes in the chosen strategies.

Likewise, the identification of innovation strategies is pivotal in involving businesses in innovation processes. However, the successful implementation of innovation strategies requires the use of other innovation management capabilities. Businesses are advised to have their own corporate culture – values, beliefs, leadership –; in addition to systems, structure and processes amenable to innovation.

Several studies even consider an alignment among the innovation strategy, the competitive strategy and the corporate culture as the main factor of success for business innovation.

Again, the cost of external support in building such capabilities in SMEs is significantly lower than the cost of R&D. Nevertheless, such support is not covered in the business promotion policies in the region.

As for SMEs, the implementation of such methodologies intended to set an innovation strategy should follow the same way of management training, according to the kind of corporation. The great experience in this regard in the region, such as CORFO in Chile, should be utilized. Variability takes place according to horizontal or vertical partnerships, in the context of the production chain.

In vertical partnerships at the level of the production chain, big businesses acting as SMEs' customers and suppliers could support SMEs' innovation processes within suppliers' or customer development programmes. Under these circumstances, according to this paper, automatically assuming that big businesses are aware of the strategic innovations needed by them and their production chain means taking on a significant risk.

At the level of sectoral policy or management of the production chain, selecting the most appropriate link to introduce innovations is advisable. Such innovations should make a domino effect on the whole chain. This could take place in any business of any size with the best conditions for successful innovation; in any business which gives an opportunity to introduce cutting-edge technologies, or in any business closer to the final market, among others.

As regards horizontal partnerships, which usually occur in networks, territorial clusters or APLs, innovation promotion could pursue a cascade effect. In cooperation with the respective governance of such partnerships, the initiative of methodological support on innovation strategies could be initially oriented to leading businesses with the most appropriate conditions for successful innovation and owners of an experience able to be replicated or imitated by other SMEs, including its demonstrative and multiplying effect.

SMEs' awareness of the topic in the context of current training programs and governance of networks and APLs; support of thematic networks, competitiveness, and business plans, and identification of structuring projects should be added to the methodologies aimed at setting the above-mentioned business innovation strategies.

It is known that the binding agent that produces the current partnership experiences basically depends on the convergence of needs, identity of values and effectiveness of communication and negotiation processes inside the partnership. As appears from the reports authored by ECLAC-OECD, a four-year term is needed to consolidate such partnerships. It is an excessively long period of time. Therefore, it should be reduced, mostly depending on the positive, concrete results for partners.

In the absence of such factors and results, most of the SMEs that have been fostered in the region so far lose as soon as businesses no more envisage the provision of significant funds from the government or international organizations.

This problem could be mostly resolved by setting and implementing competitive and innovative strategies, viewed by businesses as able to satisfy their needs of competition and growth; spelling out common values in the appropriate innovations, and making the respective communication processes easier, based on language, concepts, methods and strides properly shared by the partners.

CONCLUSIONS

Based on the evidence presented herein, the main conclusion of this study is that the promotion of innovation in the SMEs of the region can be subject to significant improvements, within a window of opportunity in which the competitiveness of these companies could make a quantum leap in comparison with international competition in other regions. Therefore, there is an opportunity to increase the competitiveness and capacity for survival of industrial SMEs in the region.

The critical importance of public policies that provide priority support to the formulation of appropriate innovation strategies within the existing SMEs, inseparably linked to competitive strategies, as opposed to the current priority support to start-ups, is justified by a disparity in the supply of jobs and, consequently, by a boost to economic growth in the region, vis-à-vis the challenges of the multiple global crises being faced today.

Structural unemployment arising from crises and changes of paradigm is also the result of struggles of existing companies to survive and grow, precisely because of their inability to innovate effectively. In no country in the world, at no time, the resulting loss of jobs has been compensated, in the short and medium terms, by the offer of jobs in start-ups. The two approaches must be complemented.

For that purpose, it is necessary to recognize, as demonstrated in this document, that the respective policies of the governments in the region should go through substantive changes, since nowadays they are based on wrong concepts and assumptions about the ability of companies – large, medium, small or micro – to identify innovations that are critical to sustain and increase their competitiveness.

They are also based on other myths about innovation, including the belief that investment in research and development and patenting are effective measures to evaluate innovation; and that innovation can be achieved only through a connection with institutions of the national innovation system. The critical importance of enhancing innovation management capabilities within companies is unknown and barriers to innovation are identified through surveys to companies that ignore what innovations are key to increase their competitiveness.

In addition, it is imperative to adopt new contexts, scenarios, concepts and methods of business innovation management, as detailed herein, linking them with competitive strategies, integrating them within the scope of national policies for innovation and competitiveness, which should include all sectors of the economy. The preparation and dissemination of a minimum content for these policies would extremely useful to provide guidelines to national governments.

The current unwillingness to take the risk of investing in innovations, in view of the global economic-financial crisis and the lack of suitable mechanisms for evaluating such risk through effective business innovation strategies, as explained herein, leads to financial applications excessively focused on certain sectors or on high-risk speculation, which stimulate the current high volatility in capital markets.