



## Innovation and Territorial Development: An Analysis of the Region of São José dos Campos - Brazil

Marcos Eduardo Zambanini<sup>2</sup>, Luis P. Bresciani<sup>2</sup>,  
Renata Martins Corrêa<sup>1</sup>, Thais Ettinger<sup>2</sup>,  
Arnaldo José de Hoyos Guevara<sup>1</sup>

<sup>1</sup>School of Economics and Business Administration, Pontifical  
Catholic University;

<sup>2</sup>Municipal University of São Caetano do Sul  
São Paulo, Brazil

**E-mails:** arnoldodehoyos@yahoo.com.br,  
zambanini@uol.com.br, lpbresciani@uscs.edu.br  
renatacorreaprof@gmail.com, thais.ettinger@hotmail.com

**Abstract:** This study aimed to identify and analyze the interrelations between companies, research centers, universities, government and other relevant players in the micro region of São José dos Campos, focusing on the creation and diffusion of innovations as a strategy for regional development. To this end, we made an interview with 12 regional players involved in this process. It is hoped the results expand the knowledge of regional development in technology-oriented areas, as well as the dynamics of territorial development in the micro region studied. It is an academic contribution in developing strategies for expanding competitive regions through incentives for innovation and technology transfer.

**Keywords:** Cooperation; Innovation; Micro region of São José dos Campos; Territorial and regional development

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## INTRODUCTION

The origin of this research is related to the importance of understanding the dynamics existing between companies, research centers, universities, public authorities and other local players on innovation as a strategy for territorial development. So, if on one hand there is a large and diverse literature that analyzes the processes of innovation and knowledge transfer between universities / research institutions and productive enterprises, it is still recent and incipient literature devoted to the study of cooperative processes with all involved players in the analytical sense of “innovation systems” (CASSIOLATO, BRITTO AND VARGAS, 2005), especially local or of regional nature.

The gain on competitiveness is key for a greater insertion of the Brazilian industry in an increasingly global market. From free trade and greater integration to the international economy, Brazilian companies have become more exposed to fierce competition, creating the need to search for answers to increase their competitiveness (CNI, SEBRAE, 2006).

According to Suzigan et al. (2006), in terms of technological job positions (engineers, physicists, chemists and biologists), the region with the highest density is São José dos Campos, which at the time of the survey had just over 30 technology job positions for each 1,000 jobs, followed by Osasco (27.9), São Paulo (26.6) and Campinas (25.5). In technical job positions there is a new emphasis in the region of São José dos Campos, with occupations of 43.1 for every 1,000 jobs, followed by Campinas with 35.3, Sorocaba 32.2, Piedade 32.0 Osasco with 31.9 and Jundiaí with 31.3. So, these are the regions that are characterized by concentration of technology-intensive industries and by the numbers of innovative companies, noting absolute emphasis for the region of São José dos Campos.

Lemos et al. (2005) draw on their studies four patterns of correlation between cities related to industrial production: 1) high-high (HH): cities that have high VIT (Value of Industrial Transformation) with high positive correlation with neighbors, 2) high -low (HL): high IVA with high negative correlation with neighbors, 3) low-high (LH): Low VIT with high positive correlation with neighbors; 4) low-low (LL): have low VIT with high negative correlation with neighbors (Lemos et al., 2005). Type 1 is relevant, because it expresses space correlation of two or more cities with high industrial product output, indicating the existence of space transferences and productive space linkages through regional industrial complementarities and integration. The city of São José dos Campos, main city in the region belongs to type 10.

For proper geographical delimitation boundaries, it shall be adopted specifically the list of cities belonging to the micro region of São José dos Campos, as defined by the official IBGE classification, and that includes the following cities: Cacapava, Igaratá, Jacareí, Pindamonhangaba, Santa Branca, São José dos Campos, Taubaté and Tremembé.

Thus, this research aimed to answer the question:

“What are the determining factors and essential characteristics of articulation found between companies, research centers, universities and public authorities in the micro region of São José dos Campos, taking Innovation as a regional strategy for territorial development?”

It is expected that the results obtained may contribute to enhance the level of knowledge on the micro region of São José dos Campos, about territorial innovation, seeking forms of articulation between the players involved in this process, as well as innovative efforts in the region. This study is configured as a contribution from the academy to be used as an aid in

developing strategies to increase the levels of competitiveness of territories taking into account innovation.

In order we could achieve the objective of the work, semi structured interview was performed with directives coming from the extrapolation of the theory of innovative organization for innovative territory. For this, interviews were made with the on-site presence of the researcher with 12 regional players involved in innovation as a strategy for territorial development. Among these players, are those responsible for universities, technology parks, government authorities and professional entities.

## **TERRITORY AND RELATIONS OF TRUST BETWEEN PLAYERS**

Productive development does not depend only on state guidelines or results of business activities. It is a systemic function of a set of activities that society pays for, such as education, transportation, security, health, housing, urban sanitation, information, training and access to finance, among others. This system quite often goes beyond the limits of the defined geographical space, interfering in the local and regional interactions within the territory (LLorens 2001). The understanding of the relationship between these territories demonstrates that, contrary to what they make us to believe in globalization speeches, the territory gains increasingly importance (Haesbaert, 2006).

Thus, for this work, the concept of territory is used for multi-territoriality, where relationships occur either by physical means or by virtual means, beyond geographical boundaries, where there is heterogeneity and complexity of the real world, considering specific environmental characteristics, social players, access to strategic resources for productive business development, and contemplating the movement, contradictions, power relations, identities, networks of circulation and communication, etc., linked to political, economic, environmental, social and cultural dynamics.

Management of actions and programs of restorative nature along with the capacity to expand endogenous development, exploits new uses of the territory. The power related to territory came to mean relating it to the ability of players to manage, implement economic and technological policies with strategic focus on the territory, by both: nation-state as the multiple local players, in the division and participation; and management of policies by private capital and civil society groups (Becker, 1983).

To Rückert (2004), local spaces came to be understood in the new logic of articulation, taking advantage of endogenous resources to diversify growth, create employment and new forms of management, as opposed to centralized authoritarian development that had occurred before. Each region has skills that can be better used and for that, it is important that individuals involved in this process may relate, seeking for development of their skills in the territorial competences. (PIRES, 2007)

The territorial development and regional development can be understood as a process of social change of endogenous nature, capable of producing solidarity and community citizenship, and conduct in an integrated and permanent way the qualitative change and improvement of the well-being of the population of a locality or region (PIRES, 2007, p. 160). This development process is the result of an intentional collective action, locally based, that is, associated to a culture, a plan and local institutions, with the objective of improving the arrangements of social

practices. Developing territorial skills is part of a process of institutionalization of everything that is important to the development of a region / territory and, only collective actions based on individual actions can conceive this process. The planned development of these skills can lead the region to success if well elaborated, or to failure. Hence, the importance of real involvement of all regional players in relation to the elaboration of strategies, so that all may envisage the achievement of the same goal and jointly act, so that regional success becomes some sort of common agreement and understood by all. For Leite et al. (2005), the participation of society, is often seen as essential for expansion of the democratization process, ensuring greater efficiency of public policies. Hence, the importance of coordination between regional actors for achieving local success (Delgado et al., 2007).

Still for Delgado et al. (2007), the definition of who are the “players” properly said; constitutes another point to be emphasized. Some of them have visibility and indisputable importance, as they clearly assume the role of protagonists. However, there are a number of other players, not so visible, that need to be identified, as they can be strategic in several dimensions, such as financial or material support, provision of adequate communication language, which makes it possible to express local needs and enable the articulation of support networks that take experiments out of their particularities. Thus, becomes necessary the creation of spaces where there may be dialogue with the players involved, so trust can be developed.

In his study of the regions of Campanula in Italy and in the São Francisco Valley in Brazil, Locke (2001) distinguishes and discusses two large main trends of trust: first, of a sociological nature, arguing that trust is the product of historical patterns of long-term association, civic engagement and extra-family interactions. The second, of a more economic nature, emphasizing the long-term self-interest and figuring of costs and benefits by players maximizers of gains in promoting trust behavior. In other words, in economic terms, there must be a convergence of interests. The author defines that “trusting a person means believing that once offered the chance, he will not behave in a way to hurt us.” Thus, in the context of local economic development, the author states “economic players showed confidence when in situations of uncertainty and incomplete information, expose themselves to the risk of opportunistic behavior because they have reason to believe that other players will not benefit from this opportunity”.

In his work “The commitment-trust theory of relationship marketing”, Morgan and Hunt (1994) argue that trust is a strong proponent for achieving coordination and cooperation in inter-organizational relationships, and that cooperation is directly influenced by trust and commitment, for partnerships between the organization and its audience create efforts from both parties, so the relationship may last. The authors created a model called Key Mediating Variable (KMV), which has five antecedent attributes: benefits of the relationship, opportunistic behavior, communication, costs of termination of relationship and shared values. These attributes make correlations that directly influence the commitment and confidence, intensifying cooperation between the parties.

It is not false to say that entrepreneurs are driven by the opportunity to profit and loss minimization. Thus, another tool to induce joint operations is the development of strategic planning. At this stage, often the strategies of individual performance are impaired by lack of scale or size and companies begin to understand the importance of partnerships. However, they hardly materialize if there is no trust. Companies opt for change of strategy at the expense of

earnings associated with cooperative action. Trust is crucial for the coordination of networks, sometimes by replacing or complementing formal contracts between members (WOOLTHUIS, HILLEBRAND & Nootboom, 2005). Thus, understanding how the process of trust and its players occurs can strengthen the development of networks involving territorial players and the relations of cooperation, establishing supports for regional development.

## **TERRITORY: INNOVATION AND LOCAL DEVELOPMENT**

For Vargas (2002), the relevance of the territory for innovative development unfolds from three dimensions. First, the process of innovation occurs in specific social and institutional contexts, with historical dependence, in which are shared socio-cultural identities that allow greater interaction between the players. Secondly, the local productive agglomerations represent a framework that facilitates the promotion of cooperative networks that enable intensive and interactive learning processes. Lastly, the territory understood as a set of institutional and organizational configurations included in a list of interactions with different economic players, is presented as a sphere of articulation and mediation between different agents, which result in different technological paths.

With the end of protectionism and restrictions to the entry of new companies and international investment enables the territory, now as protagonists, through their differences and location advantages, to attract investment for consolidation and reconfiguration of regional development (CONTI, 2005). In this context, the success of the regions depends on their specialization and flexible skills, as well as responding to incentives for the development of effective and dynamic comparative advantages arising from the inventory of attributes and local competence to promote innovation. Which, in turn, besides entrepreneurial capability, the local capacity to cooperate and learn gains importance (Diniz and Gonçalves 2005).

Thus, the innovation “territorialization” is justified by the importance of localized knowledge of tacit type, which can be defined as knowledge originating from practical experience, dependent on socio-territorial contexts. The proximity between different players within the territory can be seen from the relations of inter-dependence that fundamentally reflect on the conditions of creation and diffusion of knowledge (Storper, 1997).

Although, by means of information and communication technologies, spatial distances between agents worldwide are declining, leading to accelerated encoding and transmission of knowledge, proximity remains extremely important to the communicative, interpretive, reflective dimensions and of coordination of transactions (MIGLINO, 2003). Many regions seek to develop ways to encourage the agglomeration of technology-based companies by promoting the emergence of new favorable spaces to the installation of high-tech industry.

Thus, territory is conceived as an organization that links companies, institutions and local population, with the objective to learn, transfer knowledge and create innovation. The interaction between these territory players results in the development of new tacit knowledge, which have specific historical and social relations, making them subject to historical dependence and local conventions. This allows responding in an “almost” proper way for the transformation of markets and techniques (Crevoisier, 2003).

In the 1990's, developing countries are challenged by the necessary modernization of their production structures and restructure of management processes. The binomial formed by technological innovation and competitiveness became strategically important for the

participation of enterprises in domestic and international market. Technology investment results from the new paradigm of the industrial sector that favors innovation as competitive advantage. Business strategies are defined by identifying opportunities and competition is critical in advantages developed in research centers, where the costs of process and supply chain start to have a relevant role. Thus, investments in Research and Development (R & D) become part of the new agenda of executives and entrepreneurs, becoming strategic the search of partners to share expenses and technological risks. New associative forms are being implemented, such as outsourcing work and professional cooperatives, in order to reduce cost of business (CASSIOLATO AND LASTRES, 2000).

Cassiolato and Lastres (2000) argue that innovation and knowledge are increasingly placed among the central elements of the dynamics and the growth of competitiveness of nations, regions, sectors, organizations and institutions, contributing to a better understanding of the innovation process that is characterized as a process of searching and learning, and is strongly influenced by institutional and organizational formats.

Belongs to the past the idea that innovation is associated exclusively to high-tech activities, or to long-term scientific research. These ideas have marked the past century and can no longer cope with the increasingly intensive activities in knowledge, activities that have pervaded, to a greater or lesser extent, all economic and social spectrums (Innovation Observatory, 2011).

According to Freeman and Soete (2008), innovation includes the technical project, manufacture, management of commercial activities involved in marketing a new product (or enhanced), or the first commercial use of a new (or enhanced) process or equipment. When an organization innovates, conducts creative destruction and if well accepted by the market, enters in a new level, generating excessive profits until their innovation is copied. (Shumpeter,1988). However, innovation in organizations only settles in, if encouragement is given to employees, with recognition of the achieved innovation through the sharing of gains (Dornellas, 2003).

For Mintzberg (2001) innovative organization is characterized by the situation where frequent and complex nature of innovation is inherent to the nature of the organization and to the segment in which it chooses to act, involving technologies or complex systems, under conditions of dynamic changes. These organizations do not rely on a single innovative individual, but on a multidisciplinary team of specialists working together. They promote complex innovations, and coordinate the efforts of specialists who share and negotiate leadership. Contemplate flexible forms of organization, promoting the ability of radical innovations in volatile environments, because its structure allows for rapid response to the market and the participation of the entire structure to improve product and process (LAM, 2004).

It is appropriate to highlight the concept of innovative organization, the central object of study of Tidd, Bessant and Pavitt (2008) on management of innovation, as it establishes a number of important characteristics that must be present in the investigation proposed here, such as leadership, communication, environment and learning, partially summarized in Figure 1, along with other organizational elements analyzed by the authors.

**Table 1 Components of the Innovative Organization**

Source: Tidd, Bessant and Pavitt (2008)

<b>Number</b>	<b>Component</b>	<b>Key Features</b>
1	Shared vision, leadership and desire to innovate	Sense of purpose clearly shared and articulated “commitment of top management”
2	Appropriate organizational structure	Organization project that allows creativity, learning and interaction. Not always a model of research unit and freely structured development; the key issue is to find the necessary balance between the “organic and mechanical” options for specific contingencies.
3	Key individuals	Prosecutors, defenders, gatekeepers and other functions that energize and facilitate innovation.
4	Effective teamwork	Appropriate use of teams (local level, cross-functional and inter-organizational) for troubleshooting. Requires investment in selection and training of staff
5	Continuous and comprehensive individual development	Long-term commitment to education and training to ensure high levels of competence and abilities to learn effectively.
6	Extensive communication	Within, across and beyond the organization. Internally, in three directions - upward, downward and sideways.
7	Innovation of high involvement	Participation of entire organization in continuous improvement activities
8	External focus	Orientation of external and internal customer. Extensive networking.
9	Creative environment	Positive approach to creative ideas supported by relevant motivation systems.
10	Learning organizations	High levels of involvement inside and outside the company in proactive trial, finding and solving problems, and sharing of communication of experiences and capture and dissemination of knowledge.

Thus, a theoretical and methodological contribution of this work was to seek the migration of the concept of Innovative Organization to the concept of Innovative Region, using the table above as a theoretical basis for the preparation of the interview script, whose purpose is to identify how articulation occurs between companies, research centers, universities, public authorities and other players who may appear as relevant in the micro region of São José dos Campos about Innovation as a regional strategy for territorial development.

Aydalot (1986) developed the Theory of Innovative Environment from observations in France. This theory envisions the transformation of hierarchies taking into account the

technological factor and the role of the territory in order to generate innovations. A key factor for this growth is innovation and learning. The study and a deeper look in relation to new technologies make the companies cooperate among themselves in creating strategic alliances and innovation networks. This organizational logic based on cooperation also applies to the territorial area, which used to be a barrier to market activities, i.e., technological innovation becomes an irreplaceable synergistic vector (Aydalot, 1986).

To Aydalot (1986), the assumptions indicate innovative behaviors that depend essentially on variables defined at local or regional levels. In fact, the ancient territories, their organization and the ability to generate a common project form the basis of innovation. The intensity of innovation varies with access to technological knowledge, composition of the work and to some other components of local community, like the mechanisms of articulation in the territory (BENEVIDES 2012).

For Camagni (2003), the innovation environment is a territorial set where interactions between economic agents are developed, generating specific externalities to innovation and to the convergence of learning, seeking more efficient ways of resources management.

Due to these facts, major companies drive innovation, starting an interaction with smaller companies, being in Europe the main promoting institutions of innovation networks. In the classical theory of innovation development is stated that the large company has an important role in regards to the creation / innovation process, given that usually there is its own creative department (P & D) and budget designated for this purpose. (Tidd, Bessant and Pavitt, 2008).

According to Santos (2002), the innovative environment involves the following elements: (a) a space component, with its externalities, surroundings and transportation costs, (b) a set of players aware of the economic and social reality of the place, region and the rest of the world, (c) material elements, involving business, infrastructure, standards, values, information flow, and civil society institutions, (d) a logic of interaction, regulating the behavior of players and promoting local dynamics; (e) a logical learning, producing knowledge and redefining behaviors.

Therefore, this environment of innovation is understood as a structuring place of research and dissemination of knowledge. Nevertheless, this concept should include the local dynamics and provide answers to the technological needs of the companies sheltered in the territory, in relevant segments for the industrial policy of the State, in partnership with universities and research centers, creating potential innovation poles.

To address the concept of innovation poles, it is necessary to return to the beginning of this topic, called poles of growth and development. Perroux developed in the mid-1950's the theory of poles of growth (theory of polarization). The study of this theory helps to understand the transformations that Brazil has passed since the 1960's with regard to the distribution of economic activities.

For Souza (2005) poles of growth have a strong geographical identification, because it is the product of agglomeration of economies generated by industrial complexes, which are led by the main industries. An industrial complex is a set of activities linked by input-output relations. It forms a pole of growth when one leads it or more driving industries, and it will become a hub of development when causing structural changes and expanding output and employment in the area where it is inserted.

The theory of the poles has points of contact with Schumpeterian approach of development. It is based on the dynamism of the driving industry, innovative activity and of great dimension, which exercises important chaining effects in the interior of the pole. According to Schumpeter, innovative activity breaks the stationary circular flow and promotes the growth of its own operation and leads other companies to innovate in a process of imitation. Companies that do not adapt disappear (creative destruction), freeing productive factors to be used by innovative companies. (SOUZA, 2005)

The innovation poles are formed from the strengthening of the regional innovation system. It in turn, is anchored by the national innovation system, which has the mission to spread to regional innovation system through efficient channels of diffusion of technological knowledge. The key word of the concept of regional innovation system is interaction, which occurs between companies and research and support institutions, as well in social organization to promote innovation and economic development. From this perspective, the regional innovation systems would consist of two subsystems: one for creation and dissemination of knowledge (institutions of R & D, technical schools, universities, technology centers), other application and exploitation of knowledge (businesses, industries, commerce and service providers, especially of small and medium dimension) (Diniz, et al, 2004).

## **METHODOLOGICAL PROCEDURES**

The literature on organizational innovation was first used in order to make a survey of the aspects considered of key importance to innovative organizations. Thus, the 10 components of innovative organizations described by Tidd, Bessant and Pavitt (2008), and presented succinctly in Figure 1 of this work, were the basis for the elaboration and extrapolation of these components and the consequent creation of 6 dimensions necessary for innovative territories. Figure 2 shows this extrapolation.

These dimensions were the basis for the construction of the first version of the interview. This empirical survey is characterized as a qualitative research focused on the study of territory with multiple data sources and players, for explanatory purposes, with an interdisciplinary approach involving organizational, sociological and economic aspects related to innovation as a regional strategy for territorial development (GIL, 2006).

In order to pre-test the script, it was presented to players who belong to the universe of the research, with the presence in loco of the researcher to verify the existence of difficulties in interpretation, suggestions for modifications and instrument validation. After this pre-test and eventual change, data collecting started, noting that all survey was done by the researcher in loco at companies and other selected players, between June and October 2012.

The research population was consisted of representatives and officials of companies, research centers, universities, public authorities and other players who have emerged as relevant in the micro region of São José dos Campos to the study of Innovation and regional strategy for territorial development. Some of these players have emerged as important during the search. Then was made the transcription of data, identification of significant assertions, the formulation of meanings, the organization of these meanings in sets of themes and finally, a description of each subject was taken, allowing to achieve the proposed objectives.



Figure 2 Dimensions Innovative Territories x Components of Innovative Organizations

Source: Prepared by the author (2013)

After the interviews and tabulation of the data, it was possible to create two other dimensions:

1. Dimension 7 - Transference to Cities of the Region;
2. Dimension 8 - Innovation as regional culture;

The collaboration of this work takes place with the objective of broadening our understanding of the micro-region of São José dos Campos, given their economic and technological relevance to the state of São Paulo and Brazil, and the possibility of creating an instrument for measuring the innovative efforts of the regions, from a perspective of 8 dimensions.

## TERRITORY UNDER STUDY: THE TRANSFORMATION OF SAN JOSE CAMPOS IN A HISTORICAL PERSPECTIVE

The city of São José dos Campos is located in the state of São Paulo, about 100 km east of the city of São Paulo. According to the Brazilian Institute of Geography and Statistics (IBGE), in 2011 the city population was 629,921 inhabitants, being the seventh most populated city in the state and the most populated of the micro region of São José dos Campos. It has a Human Development Index (HDI) of 0.849, which is considered high by the United Nations Development Program (UNDP).

The technological project of São José dos Campos was the result of an industrial decentralization process of São Paulo and a state policy process geared towards the creation of a technological complex in the aeronautical, war, space and advanced electronics areas, whose foundation was based on the issue of National Security. Clement and Higachi (2000) identify transportation and labor as the most important factors to explain the location of firms between regions. The decision to locate a business facility becomes relevant because the location needs to be adequate.

This path continued to be drawn with the creation of Embraer (Empresa Brasileira de Aeronautica) by initiative of the Federal Government. According to Bernardes (1999, 2001) and Bernardes et al. (2002), the company had strong state support, unprecedented in the history of technological and industrial development of the country, either through tax incentives and benefits or government purchasing policies. According to the author, this experiment was also made possible through the support of the Aeronautics Technological Center (CTA) and the Technological Institute of Aeronautics (ITA). Bernardes (1999, 2001) and Bernardes et al. (2002) also claim this was the way that Embraer began a path of autonomy and technological innovation for success, based on the learning of key technologies for its manufacturing strategy and the planned conquering of domestic and world market niches of mid-range aircrafts.

According to Santos et al. (2009) there were three phases of migration to the city of São José dos Campos, all due to the industrialization process. The first phase occurred in the 20's, with the installation of the first industries in the city, attracted by tax benefits. The second with the creation of the CTA at the end of the 40's, and more intensely from the 50's, when it attracted differentiated profile of immigrants, teachers, students and military. The third with production in the aerospace industry in the 60's, intensified in the 70's.

It is possible to highlight other milestones for this process of territorial innovation as the creation of APL Aerospace of the Technological Park (PQTEC) and UNIVAP Technological Park (Universidade do Vale do Paraíba), and the creation of CECOMPI (Center for Competitiveness and Innovation of Leste Paulista Cone).

Today major companies are installed, such as Panasonic, Johnson & Johnson, General Motors of Brazil (GMB), Petrobras, Embraer (Headquarters), among others. Has important centers of teaching and research, such as the Department of Aerospace Science and Technology (DCTA), the National Institute for Space Research (INPE), the Institute of Advanced Studies (IEAv), the Institute of Aeronautics and Space (IAE), Technological Institute of Aeronautics (ITA) and the Institute for Research & Development (IP & D), being an important technology pole of military equipment, metallurgical products and home of the largest aerospace complex in Latin America, making it the largest center of high technology oriented research, development and aerospace production in Brazil. In the tertiary sector, it is highlighted major universities (UNIVAP and UNIFESP, among others), and other centers and research institutes (BRAZIL, 2011).

The city also has its technological parks, which concentrates various official bodies that are also dedicated to promoting science and the technology sector. The UNIVAP Technology Park has partnership of companies in the areas of Aeronautics and Space Engineering Projects, Health, Biotechnology and Medical Hospital Products, Information Technology and Software Development, Geo-processing and Satellite and Radar Remote Sensor and Support Services. The Technology Park of São José dos Campos has centers of technological development in the

areas of aerospace power, health, water and environmental sanitation, and features a business center with companies operating in the sectors of information technology and communication, electronic instrumentation, Geo-processing, aeronautics and biomedicine.

The micro region of São José dos Campos, as defined by the Brazilian Institute of Geography and Statistics - IBGE is formed by the cities of Cacapava, Igaratá, Jacarei, Pindamonhangaba, Santa Branca, São José dos Campos, Taubaté and Tremembé. It is highlighted by several factors, including the technology, especially considering the expenditures in Research and Development. For this research, the object of this study is this micro region.

This micro region has in São José dos Campos its main urban area, being this city the regional center of the region. The predominant industrial structure is capital and technology intensive. Large units were installed, especially related to petrochemicals, automotive, chemical, military, pharmaceutical, veterinary, telecommunications and especially aerospace industries. This last includes, besides Empresa Brasileira de Aeronáutica (EMBRAER), the entire aviation and aerospace manufacturing arrangement with a significant contribution to the exports of the country. The transportation equipment industry, linked to the automotive and aerospace complex ranks first on regional importance (BRAZIL, 2011).

According to the IBGE data of 2011, the micro-region of São José dos Campos has the following characteristics: (1) Area 4,046,423 Km<sup>2</sup>, (2) Population 1,415,146 inhabitants. And (3) Density 349.7 inhabitants / km<sup>2</sup>; (4) GDP: R \$ 29,782,690.00; (5) GDP per capita: R\$ 26,646.00.

## **INNOVATION AND TERRITORIAL DEVELOPMENT IN THE MICRO REGION OF SAN JOSE CAMPOS: ANALYSIS OF RESULTS**

This chapter is divided into six sections, which each represent one of the dimensions stated above as a result of extrapolation of innovative organization for innovative territory.

**STRATEGY AND LEADERSHIP: INDIVIDUALS AND INSTITUTIONS:** This item was designed with data collected in the interviews using the answers to the question “Innovation is a central theme in the strategy of your region, city or company? Who are the main leaders compromised with this attitude? Can you cite examples?”, Making a parallel with the components “Shared vision, leadership and desire to innovate”, “Adequate Organizational Structure”, “Key Individuals” and “Innovation of High Involvement” from the components of the innovative organization (Figure 1 of this document). Through the data, we observed that the aerospace sector is indicated as largely responsible for changing the trajectory of the city of São José dos Campos, first with the creation of CTA in the region, after ITA and Embraer. Throughout this period, local or federal public sector articulated in such a way to create and promote tools for regional development with innovation as a strategy. This is a long-term process, which often becomes difficult because government officials prefer investments with returned results in the short term run. The players perceived the importance of two relatively recent local initiatives: the inauguration of the technology park, and the creation of CECOMPI, which became an important regional articulator between the various players. Another point to be noted is that all actions are solely for the city of São José dos Campos, with little or no transference to other cities, which is perhaps, the greatest regional challenge. Other cities perceive as peripheral the role they play to regional development, and tend to think exclusively in city development, not regional.

**INTER-PLAYERS RELATIONS:** This item was designed with the data collected during the interviews using the answers to the question “Is it possible to identify relationships of trust and cooperation between enterprises, public institutions and / or other agents so that innovations be effective? Can you cite examples?”, Making a parallel with the components “Adequate Organizational Structure” and “Effective team work” from the components of innovative organization (Figure 1 of this document), It was observed almost unanimously the need for progress on trust and cooperation. Something worth pointing out is the position of the players, who says that there is only cooperation when there is convergence of interests. The players themselves do not usually take such initiatives. Isolated cases have been mentioned, but still far from a cultural transformation. It was noticed that the main players have a high degree of interpersonal relationships among themselves. Thus, the consideration for the individual, not for corporate or institutional need, is one of the factors that lead to cooperation. There is awareness about this need, causing the public sector to do some projects, including CECOMPI, which becomes the mediator of conflicts and needs, leading companies and other entities, even unconsciously, to cooperation. As the culture of having innovation as a pillar for regional development, this paradigm shift needs some time to mature so that entities can see that together they can soar to greater heights than individually.

**COMMUNICATION AND DISSEMINATION OF INNOVATION:** This item was elaborated with the data collected in the interviews using the answers to the question “Is it possible to identify whether communication, transparency and diffusion of innovations occur in your region, city or company? Can you mention examples?”, Making a parallel with the components “effective team work” and “extensive communication” of the components of innovative organization (Figure 1 of this document). Unfortunately, the strategy adopted by anchor companies meets with the objectives of regional development. As mentioned by some respondents, large companies prefer to import solutions instead of assisting in local development. In the short term, it seems the best strategy, for the speed of imports is infinitely superior compared to local development. However, this can cause dependence on international companies and be subject to exchange rates, and do not contribute to regional development and a strong supply chain, as mentioned occurring in other developed countries. It is necessary the development of strategies, including from public authorities, for the large companies become not competitive if they have to invest in innovation on small companies of supply chain. The question is what strategy to adopt to remain competitive, replacing imports of products with high technology and added value for the production of these items locally.

**LEARNING:** This item was elaborated with the data collected in the interviews using the answers to the question “How innovations promoted in your region, city or company create learning? Can you cite examples?”, Making a parallel with the components “continuous and comprehensive individual development” and “creative environment” of components of innovative organization (Figure 1 of this document). In this respect there is an important point, which differs from most Brazilian regions: the proximity and influence of the productive sector in technical and higher education. Often, the curriculum of these institutions are submitted for the assessment of the companies. In others, educational institutions create courses to offer manpower that companies demand at that moment. In other cases, the inter-relationships are even greater, as in the case of ITA’s Masters Degree course, where there is a supervisor of ITA and

another from the company where the student will maintain a tie upon completion of the course, such as Embraer and Vale Soluções em Energia. This creates synergy in the research and training efforts for the formation of manpower between the productive sector and institutes of education and research. CECOMPI appears as an articulator for this process, and again stands out as an important regional player.

**PUBLIC POLICIES TO ENCOURAGE INNOVATION:** This item was elaborated with the data collected in the interviews using the answers to the question “What are the incentive Laws of innovation adopted by companies in your region? What are the advantages and limitations of these laws?”, Making a parallel with the components “external focus” and “Learning organizations” from the components of the innovative organization (Figure 1 of this document). The players interviewed primarily focused in talking about the incentives from local government. Clearly, there is the concern of this government on fostering innovation, with direct investments in building structures to facilitate the process, as the case of technological facilities, as well as the donation of physical spaces for universities and educational institutes. But few are aware of federal laws of incentive for innovation and those that are mention there is great difficulty to access these incentives. They say it is not feasible due to the high level of requirements of the projects and that micro and small businesses does not have the financial means to afford. The CECOMPI initiated a project to assist firms in this access, but still is of limited reach. Because it is a region with companies of high level of technology and even then, they still have difficulties accessing these incentives, making us to understand that these public policies need to be reconsidered in favor of regional and national development.

**CHALLENGES AND BARRIERS:** This item was elaborated with the data collected in interviews using the responses to the question “What are the main difficulties and barriers encountered in your region, city or company to promote innovations?”

When observed the answers to this question, it can be seen different ideas about the difficulties. It is worth mentioning a few:

- 1) Again cited the difficulty of access to federal laws of incentive to innovation;
- 2) The need to increase the complicity of local players;
- 3) The Brazil cost, which makes it difficult to have international competitiveness;
- 4) An academic bias for publications rather than practical solutions for businesses;
- 5) Difficult of access to the latest generation of equipment;
- 6) The need for inclusion of all of the players in the regional development strategy, not only just a few;
- 7) The needs for promotion of the entire supply chain, and not search solutions outside the country. It is a slow and costly process, but necessary for regional development;
- 8) The lack of credit and investments given by companies to research and development.

## **CONCLUSIONS**

The Information obtained through the interviews with selected players show that São José dos Campos has innovation as one of the main strategies of regional development. This strategy began in 1946 with the installation of CTA (Aerospace Technical Center) in the city of São José dos Campos, and the subsequent installation of ITA (Institute of Aeronautical Technology) in 1950. In 1969 was created Embraer (Empresa Brasileira da Aeronáutica), appropriating knowledge and

specialized manpower coming from the two previous entities. Thereafter, the city of São José dos Campos created a culture of innovation, where strategies for development and learning began to be prepared for that.

From the study carried out in this step can be noted preliminarily that:

1) In order for the territory to have innovation as a fundamental strategy of its development, it is necessary that this consciousness be culturally constructed and not simply imposed.

2) Often several years are needed for the region to establish this culture of innovation, configured as a process of medium and long-term, where at first the results may seem less concrete.

3) It is necessary that public policies be created for the promotion of innovation and facilitating the transfer of knowledge. The creation of CECOMPI is a demonstration of these policies.

4) The existence of an articulating entity of interests, demands, offers and public policies is needed. In the case of São José dos Campos micro region, CECOMPI makes this role. The importance of this player is evident in the interviews, where virtually all players interviewed cite this entity.

5) Public investments are needed. In the micro region of São José dos Campos, this investment is evident with the creation of CECOMPI and Technology Park, as well as the promotion of the aerospace industry over many years.

6) It is of utmost importance the communication between local players, so that strategies are aligned. This becomes evident when changing the curriculum grid or creation of courses by local universities using the demands of companies. In São José dos Campos CECOMPI is the articulator for alignment of these ideas and needs.

7) It is necessary to realize that it is essential that the entire production chain may have conditions for technological improvement in order to have a strong and competitive industry. Unfortunately, the Brazilian reality escapes to this awareness, where companies prefer to buy outside rather than develop internally.

8) Even in regions that use innovation as a development strategy, access to public funding for innovation is low. The players bring it up that the speed of needs is greater than the speed of offers. Thus, it is evident the need to restructure the supply of credit from federal entities.

In the case of the micro region of São José dos Campos, it became evident that there is little transference of innovation and alignment of strategies with the nearby cities. The city of São José dos Campos is where it is found the biggest innovative and technological concentration, giving little opportunity for neighboring cities. Considering the concept of Innovative Region, this is the aspect that still has deficiency. The alignment of public policy and regional development strategies along with leaders of other cities will surely transform the region as a whole, not just its epicenter.

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