**Subtheme: 6.1** Start-ups, spin-offs, science parks, business incubators, technology transfer offices, joint research projects, in-firm (company) universities, business acceleration centers, corporate incubation, university proof-of-concept centers, etc.

# The role of UFSC and the creation of Technological Innovation Park in Joinville and Region[1]

**Authors**

**Nubia Alves de Carvalho Ferreira**, M.Sc. PhD Student in Production Engineering, Federal University of Santa Catarina, Brazil. nubia@deps.ufsc.br

**Janaína Renata Garcia**, M.Eng. PhD Student in Production Engineering, Federal University of Santa Catarina, Brazil. janaina@deps.ufsc.br

**Álvaro Guillermo Rojas Lezana**, Dr. Eng. Professor at Federal University of Santa Catarina, Brazil, Department of Production Engineering, Academic Coordinator of the Mobility Engineering Center. lezana@deps.ufsc.br

**Keywords:** Inovaparq, Innovation, Technological Innovation Park, University, Development.

## 1. INTRODUCTION

The Neo-Schumpeterian Evolutionary theory suggests innovation as the decisive factor in the process of economic dynamics, in contrast with the neoclassical theory, which relies on a static condition and balance of the firm. Neoclassical economic theory maintains that they are exogenous to the economic system that act in the determination of the resulting innovations and technical progress. For the authors of the Neo-Schumpeterian evolutionary theory there is a dependency between technical progress achieved by the development of innovations and sectors when such innovations as well as institutional factors (VIEIRA, 2010).

For Arendt and Cário (2004) in most cases an innovation requires a new institutional form, as seen by the Neo-Schumpeterian and evolutionary analysis. However, institutions may also encourage an arrangement to innovate, as addressed by the institutionalists.

The Neo-Schumpeterian Evolutionary theory, considers the central role of innovation, and coordinate with the institutionalist theory, contribute to the discussion of the role of institutions in economic development. A University when its expansion, contributes to this.

The University is considered as playing a relevant role in the local context, as well as collaborating for the regional development due to its plural character. The Federal Universities are formal institutions that follow specific rules and regulations and are present in all Brazilian states aiming at educating professionals to meet the country's needs. Although being country-wide organizations, their action is local.

In this sense, a Federal University may be considered as a driver for local and regional development. Additionally, the institution has innovative principles and follows them, as is the case of UFSC (Universidade Federal de Santa Catarina, Federal University of Santa Catarina) campus in Joinville-SC.

It becomes necessary to consider the risk that the "local" context may present. It is not about elaborating and confining policies to that space, but joining what is interesting in the global space and society with local space needs. According to Dowbor (1999), local is the space on which it is possible to build national, regional, and local political projects from an economic and political criterion which is established by members who work at different levels.

The different members or organizations, which operate at different levels, define degrees and ways of insertion in the location and determine different results. Goulart et al (2005, p.8) state that the University can be considered an analytical case as it plays an essential role in the legitimation of the organizations and its members. They consider the university as the hub of such global/local gear.

According to Goulart et al (2005, p.10) "the assumption that universities constitute one of major institutions capable of such linking capacity originates from the nature of their essentiality comprised by their contents and ways of activity, critical and reflective capabilities." Trindade (2000) reinforces the role of the university in Brazil by stating that the institution is one of the core components in the elaboration of development guidelines, with 90% of research in science and technology being carried out by higher education public institutions.

The installation of the Federal University in Joinville-SC may be considered as a kind of intervention, since by complying with the REUNI (Reestruturação e Expansão das Universidades Federais, Federal University Restructuring and Expansion), UFSC has decentralized its operations, which up to then was restricted to Florianopolis, and allowed to gather of local forces to constitute a technological innovation park.

The objective of this paper is to discuss the creation of Technological Innovation Park in Joinville and the Region (Inovaparq) from the deployment of UFSC / CEM in Joinville-SC. The CEM insertion project in the city sought to leverage local competences, since Joinville is one of the main industrial hubs in the south of the country, besides being the biggest city in terms of Gross Domestic Product (GDP) and population in Santa Catarina.

## 2. STATE-OF-THE-ART

### 2.1 Development, Innovation and Schumpeterian and neo-institutionalist approaches

Though not constitute an institutionalist school, the Neo-Schumpeterian include the analysis of institutions, in an evolutionary composition, understanding that these collaborate on structural change of an economic system characterized by creativity and complexity (PONDE, 1994, apud FELIPE, 2008).

For Arend (2006) institutionalist and Neo-Schumpeterian approaches offer a varied set of theoretical principles and analytical housing, in general, findings show that the specific

realities of different types of locations. These findings underscore the differences in the paths taken in the pursuit of development.

According to the same author, it is difficult to compare countries, regions and even local "because in each country, region or place a number of factors interact in nature not only economic but also social, political and cultural, that along the time, they cast themselves in a specific and unique "(AREND, 2006 p.4).

So, for the institutionalist and Neo-Schumpeterian approaches, political, social, economic and others should be considered for evaluation in evolutionary context. The competence and capacity to innovate institutions and their constructive impact on economic performance of regions and countries (AREND, 2006).

Thus, Arend (2006), Arend and Cário (2004, p. 15) say it is possible to establish the relationship between institutions, development and innovation. According to these authors, it is possible to elucidate the occurrence of the development through the inter-relationship between institutions and innovations that have occurred and the resulting institutional changes. If for the institutionalist approach is the institutions that motivate an arrangement to innovate, to Neo-Schumpeterian evolutionary line is one that demands innovation institutional readjustment.

In this work, we adopt the theoretical basis for understanding the institutionalists and Neo-Schumpeterian analysis approaches collaborate for knowledge of the evolution of the development process of a given region or location. According Arend and Cário (2004) "Economic development can be seen as synonymous with the configuration of institutions that give sustainability, because the innovations come from certain institutional arrangements".

A relevant question in terms of innovation is the identification and analysis of the various actors of their roles in this system. The literature identified three actors: the university, industry and governments, in their various spheres. One model that explains the actions of these agents is the Triple Helix (CARVALHO, 2009) and used as the analytical focus of this work.

**2.2 Triple Helix and the establishment of technology parks**

Mello (2004) argues that the approach of Triple Helix was developed from the pioneering work of Henry Etzkowitz and Loet Leydesdorff (LEYDESDORFF AND ETZKOWITZ, 1996, 1998). According to Mello (2004, p.2), for the authors of these works, knowledge is obtained both in the inner dynamics of trade organizations and through institutional boundaries and that "wealth creation can occur through the knowledge produced by institutional arrangements between 'organizers' knowledge, such as universities, industries and government agencies."

Costa (2009), Mello (2004) state that the Triple Helix model establishes the relationships between the three actors and their respective spheres and puts the dynamics of innovation in a changing situation, in which they emerge and coexist with new and intricate relationships between these three institutional spheres.

Almeida (2004, p.3) states that

> The triple helix model points to four levels of transformations between institutions in each sphere: internal changes in the role of each; influences of the institutions of a sphere over the other as a result of existing relationships, creation of new structures due to the overlap caused by the interaction of three helices, and finally, the recursive effect of these three levels on the majority of social institutions such as the science itself.

Audy (2009, p. 150) states that these levels of transformation reported by Almeida (2004) originate in four cases, related to the type of knowledge that the Triple Helix advocates. They are:

> 1) internal changes in each helix, such as the development strategies of alliances between competing companies (cooperation) and the incorporation of social and economic development mission of the University and the role of articulating (and not a manager and controller of the relationship) of the Government;
> 2) recognition of the influence of each actor in the actions of others, such as government legislation in the areas of intellectual property, technology transfer and innovation (the Bayh-Dole Act in the United States and Innovation in Brazil);
> 3) creation of new forms of relationships between actors, networks of cooperation, strategic alliances and other forms of cooperation aimed at stimulating creativity and regional cohesion (Joint Venture Silicon Valley in the United States, Porto Alegre and Porto Digital Tecnopolo in Brazil and Bercelona Active in Spain) and creation of open innovation (Science and Technology Parks, Incubators);
> 4) generated by the recursive effect of inter-institutional networks representing academia, business and governments, increasing their shares in the society.

In this sense, the creation of a technological park is a new form of relationship between actors in the process as outlined in paragraph 3 above, which points to the creation of new forms of relationship and innovation environments. For Audy (2009, p.154), technological parks seem to be "some of the significant responses that have been structured, internationally, by the universities to the challenges posed by globalization of the economy - and problems - in recent decades, in the bulge Knowledge Society".

Audy (2009) says there is no consensus regarding the concept of a technological park in the world, and for the ANPROTEC (Associação Nacional de Entidades Promotoras de Tecnologias Avançadas; National Association of Institutions Promoting Advanced Technologies) occur two understandings. In the first understanding Technological Park is like "an industrial complex based scientific-technological plan, the formal character, focused and cooperative, which aggregates companies whose production is based on technological research developed in the centers of R & D related to the park" (AUDY, 2009, p.155).

Also according Audy (2009), the second view considers a technological park action that promotes a culture of innovation, competitiveness and growth of the business sector through its

training and supported both in the transfer of technology and knowledge, and with the objective of increase the generation of wealth.

The Ministry of Science and Technology (MCT) defines technological parks as complex economic and technological development aimed at fostering and promoting synergies in scientific research, technology and innovation between business and science and technology institutions, public and private, with strong institutional and financial support among federal, state and municipal governments, local communities and private sector.

The technological park concept refers to the installation of networks, similar to industrial districts, but to specialize in high technology. In practice, it corresponds to the junction, in the same region of various types of information, services and technology infrastructure, including software, for "obtaining products with high technological content - such as computers, biotechnology products, etc" (BRITO, 2002, p.376).

Spolidoro (2010) finds that for planning purposes, a technological park is formed by the combination of three bases (physical, functional and viability) that emerge from a Conceptual Framework. To Spolidoro (2010, p.2) this Conceptual Framework

> consists of aspects such as origins and motivations of the enterprise; political, economic and cultural territory in which it stands and their natural resources, energy sources, climate, location and geographic features, and trends and prospective studies on issues that affect destinations in the technology park.

The Physical Basis consists of physical components and infrastructure used by the institutions or technology park associated with the venture. Base Functional already covers governance, involving objectives, instruments, procedures and networks of relationships of the technology park. The base is composed of the feasibility set of conditions which ensure the existence of the technology park, and cover the institutional, political, technical, financial and economic among others (SPOLIDORO, 2010).

Concerning what Spolidoro (2010) and Audy (2009) says this kind of structure typically occurs close to locals that have the both infrastructure, scientific and technological, established and supported by universities and research centers. In this way, technological parks to take advantage of scientific advances achieved by these institutions and absorb some of the skilled labor developed by them (BRITO, 2002).

In this sense, UFSC / CEM collaborated to form the foundations of a technological park, the Inovaparq in Joinville, as entered in the regional new course format and enlisted forces for their implementation, as one of the co-authors of this Technological Park.

## 3.METHODOLOGY

This article presents a qualitative approach, since "qualitative studies can describe the complexity of a given problem and the interaction of certain variables (DIEHL and TATIM, 2004). This approach does not require a rigid sequence of quantitative research and how "it all

depends, ultimately, the manner in which the data are analyzed, and the source of the data" (SILVERMAN, 2010, 83).

According to Martins (2010) qualitative research tends to be less structured to be capable of realizing the understandings and interpretations of respondents, and this does not mean less accuracy, but the control of the research should be more critical. To the author's emphasis is on qualitative approach to understanding the process, how it came to performance and not only in the results.

With regard to technical procedures, data collection was done through research literature and documents. The literature gives support and theoretical as well as documentary research (CAUCHICK MIGUEL, 2010).

Sets up a case study because it analyzes a set of data showing the object of research, in this case the deployment of Technological Innovation Park in Joinville and Region (Inovaparq). Yin (2001) states that the case study is suitable for the analysis of contemporary issues and aims to explain different phenomena. It also addresses what happens to their greater use in explaining the causes real-life situations, especially in interventions in route and involves many variables of interest.

## 4.FINDINGS AND INTERPRETATION

The technological Innovation Park in Joinville and Region (Inovaparq) is the first project in Brazil with shared management of higher education institutions. This is a partnership between UFSC, UDESC (Universidade do Estado de Santa Catarina; State University of Santa Catarina), UNIVILLE (Universidade da Região de Joinville; University of Joinville Region) Catholic Institute of Santa Catarina (Instituto Católico de Santa Catarina) , linked to the PUC / PR, FAPESC (Fundação de Apoio à Pesquisa Científica e Tecnológica do Estado de Santa Catarina; Foundation for Support of Scientific and Technological Research of the State of Santa Catarina and SDR Joinville (Secretaria de Desenvolvimento Regional; Department of Regional Development).

The Inovaparq aims: to provide the necessary support to companies with technological potential, willing to turn ideas into products, processes and services with high added value, encourage and support entrepreneurial activities through access its physical infrastructure and operational stimulate the creation, development and consolidation of new businesses that are based on advanced technologies and innovative platforms in biotechnology, environment, engineering, chemical pharmaceutical, design, materials and information technology and communication, and promote the transfer of applied research and technology generated at the partner institutions to society.

The Inovaparq have a board consisting of representatives of the academic segments, business and government, and a director and four managers with management rotate among the participating universities. The total area for installation of the park has over 200 thousand square meters. Currently in place are installed and the Convention Center Events, laboratories

Mechanical Engineering course, the UNIVILLE gymnasium and also the unit UFSC / CEM, provisionally, pending the construction of the campus in the city of Joinville.

With a total investment estimated at $ 30 million and building area of 63,000 m2 park will act in its initial phase, in such areas as information technology, biotechnology, chemical, pharmaceutical, environment, design and materials. There are seven steps to be followed. The first step is the installation of IBT (Incubadora de Base Tecnológica; Incubator Technology Based) in August 2010. The second stage includes the construction of modules for incubators, laboratories and enterprises. For the third step is estimated the construction of the main entrance portico, one-story building next to the access and parking area. In the remaining steps will be made available spaces to build environments for companies interested in lending arrangements.

In total, following the steps completed, are planned installation of 84 companies, of which 20 will be incubated and other pre-incubated. Among the pre-incubation, it is expected technology transfer agencies, to provide services, offices and other development agencies (BISU, 2010a).

For the installation of IBT, the Inovaparq has made public the opening of the Notice 01/2010, from August 2010 to Selection Process and Entry of New Technology Based Business Projects, in the actual form, this incubator. This process comprised four phases of elimination (INOVAPARQ, 2010).

The first phase was the pre-selection when the team resumes were analyzed (or bidder) and the pre-project team responsible for Project Selection Process. The second phase was the analysis of projects, with evaluation of business plans by consultants appointed by the Committee team responsible for the process. The third stage was the oral presentation and defense of business plans before the Committee of consultants and the last phase was the selection of specific projects, to fill vacancies for this step, six in number and, according to the criteria established by edict. Companies selected to join the IBT were Eco-Tec Inc. Babitonga; the Silicotex Ltd., the Innovative Tec; Minera Data Mining Solutions; SC Coating and Sofitam Software S.A. (INOVAPARQ, 2010).

It has been proposed to change the culture of entrepreneurship and innovation in universities, promoting greater interaction with businesses through joint development projects for Research, Development and Innovation (R & D & I) and qualified services. The Inovaparq aims to be a landmark in science, research and innovation in the region, with an important role in sustainable development and quality of life, and to promote the interface between knowledge generation and the productive sector (UNIVILLE, 2010).

Accordingly, the Triple Helix is used as a model for interaction between companies, universities (UFSC / UDESC / UNIVILLE / PUC-PR), with the encouragement of the state government (FAPESC / SDR), because, as stated by Etzkowitz (2009), the Triple Helix is a platform for "training institutions", the creation of new organizational formats that promote innovation, such as the Inovaparq.

The format of Inovaparq resembles the formation of a Triple Helix, along the lines that Amaral et al (2009) express. For these authors, one of the main pillars of the Triple Helix model of institutional integration is seen as a spiral process developed out of negotiations and interactions arising from the reflective overlay.

According to Etzkowitz (2009), these interactions may be more complex, especially when they enter the government. The three spheres and actors that build connections and beyond, each assumes the other; universities become entrepreneurial functions, creating the foundation for companies such as management contracts with companies (ABDALLA et al, 2009) while companies are in charge of academic activities such as sharing knowledge with others and train their own employees.

The Inovaparq presents some results in this first year of operation. A key outcome is an agreement with the Parc cientific Barcelona (PCB) of Spain, one of the most important innovation parks in Europe, which has three research institutes, 75 companies, an incubator for biotechnology companies, more than 70 groups research and about 2,200 professionals. The agreement provides for transfer of knowledge and technology, collaborative projects in research and innovation and joint support for entrepreneurship, incubation, the generation of spin-offs and startups, and enterprise mobility interparques (BISU, 2010b).

The success of the incubated companies in Inovaparq are also an important outcome of this venture. The company Ecobabitonga was one of three companies chosen to participate in the largest gathering of innovation in the world, the Global Forum on Technological Innovation and Entrepreneurship, sponsored by infoDev in partnership with the World Bank. Only 50 companies in the world are invited to the biennial meeting, where companies are selected for innovation projects. The Ecobabitonga developed a prototype of a device capable of doing water analysis in real time, the NG-tox (BISU, 2011a).

Another result obtained by Inovaparq was the choice of two projects in the park were incubated under the program Synapse Innovation (BISU, 2011b). This program aims to expand the emergence of innovative ventures and strengthen the culture of innovative entrepreneurship in a region. The selected projects will receive $ 50,000 to develop the proposed idea.

## 5. CONCLUSIONS

As a point institutionalist and Neo-Schumpeterian approaches, innovation plays an important role for economic development of cities, regions and countries. For the institutionalist approach, institutions can encourage an arrangement to innovate and provide an environment for innovation. The creation of new forms of relationships between the actors involved - university, government and industry - along the lines of a Triple Helix contributes and stimulates regional development.

In this sense, the deployment of UFSC / CEM in the city of Joinville-SC, in August 2009, contributed to the establishment of a Technological Innovation Park in Joinville and Region

(Inovaparq), the first in Brazil with shared management of educational institutions the upper part of the constitution the foundations of this park.

The Inovaparq want to create an environment among universities, companies and governments to respond to the challenges faced by Joinville and region in order to promote sustainable regional development. The areas are defined vocation Information Technology, biotechnology, chemical, pharmaceutical, environment, design and materials, but the ultimate purpose is to act in all areas of knowledge from universities, thereby offering a wide range of services to companies located in Park.

The very form of management Inovaparq proves the proposition and the basis of this work is that the Triple Helix. There is interaction between the three helices, and the creation of organizational innovations, such as the organizational format adopted for this park.

Some results of Inovaparq can be presented. In August 2010, IBT which is the first step in the deployment of the park, was inaugurated. Were selected, initially, six companies to join the IBT. They are: Eco-Tec Inc. Babitonga; Silicotex Ltda; Innovative Tec; Minera Data Mining Solutions; SC Coating and Sofitam Software SA. Eco-Babitonga The company was chosen as one of the 50 best performing companies, by InfoDev Top 50, which is a partnership program of the World Bank to accelerate the growth of small and medium enterprises (SMEs) innovative, creating opportunities for business expansion internationally (ANPROTEC, 2011).

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