



Regional development strategy - the case of the “Scientific and Technological Park Chapecó@”

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Abstract

Agroindustry is the main production activity in the western part of Santa Catarina state, which is one of the world's most important animal protein producing regions. The economy of the city of Chapecó and the surrounding region is under transformation from an agroindustry-based economy into a service-based economy, including education and health care, which by itself already requires the organization of knowledge-based local structures. The number of higher education and technical institutions has grown significantly, with 20 institutions established in this city according to the Ministry of Education. The Parque Científico e Tecnológico Chapecó@ (Chapecó@ Science and Technology Park) was launched in 2012 as an instrument to organize and operationalize local innovation. The Technology Park began with the creation of a Network structure, with the objective of elaborating a set of linked actions that allows the functioning of the entire innovation environment. This study shows the results of the establishment of this network structure and its elements. The study introduces the offices created with this goal; in addition to the Incubadora Tecnológica (Technology Incubator) Inctech, the NITT - Núcleo de Inovação e Transferência Tecnológica (Innovation and Technology Transfer Center), and the Parque Científico e Tecnológico Chapecó@ were

also established. The results currently show an effective relationship between local companies and the Network and a significant increase of fundraising. The success of the strategy of actions towards patent filings is observed too, which by itself indicates future gains of this structure. The impact of the Network is felt by the community, which understands that this unit is its main structure to support the innovation environment in the western region of Santa Catarina.

Keywords: Innovation; Regional Development; Technology Parks.

Introduction

This article presents a proposal of structuring an innovation environment of operational units within the creation of the Parque Científico e Tecnológico Chapecó@ (Chapecó@ Scientific and Technologic Park). The implantation of the Parque Chapecó@ aimed to create conditions for the Triple Helix agents to have a single environment with several offices that provide innovation-development services. There is not a unique model to constitute innovation environments in the literature, and there are many operation proposals in different parts of the world. It is understood from the existing models that local characteristics and existing conditions interact with the proposals to structure these environments.

The first challenge was to understand how society acknowledges the importance of technological innovation as an instrument for economic growth and regional development. In addition, it was necessary to create a set of Triple Helix agents who are committed and organized to support the strategy.

Some of the results of the structuring include the promotion of partnerships between research institutions and the productive sector, the potentiation and diffusion of the role of universities and research institutes in scientific and technological cooperation activities with the public and private sectors, the divulgation of technology parks and their influence on regional economic growth, the introduction of innovation challenges and opportunities for public managers and the divulgation of public gains through the management of intellectual property.

The results of the constitution of an innovation environment are very satisfactory. The structure of the Parque Chapecó@, which was launched in 2013, utilizes existing structures and created other units that could bring integrated results. The following units were created: Escritório de Projetos e Prestação de Serviços (Projects and Services Office), Escritório dos Municípios (Municipalities Office) and Escritório de Negócios e Empreendedorismo (Business and Entrepreneurship Office). The existing structures were Incubadora Tecnológica (Inctech) (Technology Incubator) and Núcleo de Inovação e Transferência Tecnológica (Innovation and Technology Transfer Center). The results reinforce the formal structure of the organization, which provides support to knowledge management. It promotes the articulation among the agents of the productive sector, enables the raising of public and private resources and manages intellectual property issues, services and new project development.

Spolidoro and Audy (2008) define technological parks as organizations whose objective is to increase the wealth of the city where they are located through the association of companies and educational and research institutions that promote innovation and competitiveness. The authors highlight the importance of entrepreneurial culture to leverage a community; this feature becomes a differential among regions

capable of facing and overcoming challenges to accelerate innovation and development.

The triple helix model acts synergistically toward regional development

The Triple Helix term, created by Henry Etzkowitz, introduces the innovation model based on the government-university-corporate relationship. In this environment, innovation is the result of the experiences in the relationships among science, technology, research and development in universities, companies and government. The

Triple Helix then evolved from a theory to an innovation model (ETZKOWITZ, 2010). Thus, innovation is not a part of a single act, which brings the need to identify the institutional instances that are involved or may be involved in the innovative process. This organization of the agents creates an environment that promotes innovation, but it is just one of the elements that facilitates creative capacity and the planning and building of new ideas (FAGERBERG, 2004; NONAKA; TAKEUCHI, 1997).

The institutional instances to which the authors refer are universities, companies and the government, all of which are represented in the Triple Helix model. Therefore, the Triple Helix is an important mechanism for transforming scientific knowledge produced in the academy into something that can be assimilated by the society.

Fonseca (2001) appoints the fundamental role of the government in technological innovation, which is to provide the right incentives to the development and propagation of ideas in the private sector and to articulate a political, economic and institutional environment that favors the companies' investment in science, technology and research.

In the Triple Helix model, the university transforms itself from an educational institution into an environment that joins its research resources and potentials to a new function that aims at the economic and social development of the society through the promotion of an innovative environment and the diffusion of an entrepreneurial culture. As society becomes more knowledge-based, companies change their characteristics and labor becomes more knowledge-intensive and more competitive in technological differentials (AUDY, 2006).

According to Chaimovich (1999), knowledge, innovation and global competitiveness are current concepts in Brazilian companies. The final value-adding link to the product influences the production line. Almost independently of the nature of the product, this phase is essential to the introduction of a successful new product or the modification of a traditional product. Therefore, companies are the sites of innovation.

There is no doubt that the innovation process is currently one of the more frequently used indicators to analyze competitiveness. The results are linked to the ability to follow changes to the creation, development and occupation of new markets. Therefore, the creation of an environment that enables technological innovation is fundamental to the growth of a certain region. Incubators act in this context to create conditions for small businesses to develop innovative products and services and to help them to grow in the market.

According to Carvalho (2000), an incubator provides a physical structure and technical and managerial support to consolidate new companies with associated and shared actions.

Technology parks are other organizations that are very important for the economic, social and innovative development of the regions where they are implanted. This type of organization aims to meet the demands of regional development by joining the actions of actors that integrate science, technology and innovation.

According to Anprotec (2008), "technology parks are examples of economic and technologic development that aim to promote knowledge-based economies, by integrating scientific and technologic research, businesses and companies and government organizations, in addition to providing space for knowledge-based businesses".

The International Association of Science Parks – (IASP, 2007) affirms that a technology park in a certain region/city stimulates and creates knowledge and technology in universities, research institutions, companies and markets; furthermore, it promotes the creation and improvement of innovative companies.

The development of networks and alliances is a key success factor for organizations in the current context. According to Cezar (2012), there is a consensus among researchers that the creation of partnerships within the triple alliance is the most effective way to integrate the corporate and academic worlds.

The organization of an organizational structure to support the constitution of an innovative environment

The context to generate an innovation environment refers to a structure that may offer conditions to develop an innovative project associated with entrepreneurship. The structure consists of a set of services offered by universities that collaborate in the search for competitive advantages in knowledge sharing and regional development. Management models that are old and hierarchic lose force in the new knowledge economy.

Almost all innovations require some type of collaborative arrangement for their development or marketing that is aligned with the current offer of collaboration models. Innovation networks may help companies generate new ideas and make creative combinations, in addition to promoting the opening of new productive territories that enable knowledge sharing (TIDD; BESSANT; PAVITT, 2008). Thus, it is important to have a model of network innovation management that facilitates the connection among the actors.

The Rede de Inovação (Innovation Network) promotes, coordinates and manages the interaction among the university, the business sector and the government. According to Wilkinson and Young (2006), a network structure must be composed of people recognized as experts in their areas by the organization.

The development of innovation environments has intensified in recent decades because of the need of value adding to products and processes, a fundamental factor in the knowledge economy.

This has occurred together with the participation of universities in their regions, with the support brought by the opening that came together with the legislation to incorporate mechanisms to promote and facilitate innovation.

Law 10973/2004 promoted the creation of technological innovation nuclei (TIN) within universities; these are formed by one or more science and technology institutions. Their objective is to manage innovation policy, promote research and support institutions in technology and innovation contracts, thus assuming a role of intermediators among companies, universities and the government.

TINs offer more security to contract relationships and to issues regarding property rights on innovations produced by the private sector or by universities.

Similar to universities, innovation environments have resulted in a change of the companies' concern with R&D procedures, independently of their size. According to Reis (2008, p. 139-42), companies must consistently incorporate more issues regarding innovation to adapt to market globalization. Technological knowledge is already part of the reality of small and medium companies. These companies' interest in innovation shows that they acknowledge that it is fundamental to competitiveness.

Reis (2008, p. 142) highlights that universities, as actors that have educational structures and that promote innovation, must commit to the country's economic development process without putting aside teaching and research.

Regarding the government, it is observed that innovation is present in all areas of the economy, including services provided by the government, for example, education and health care. The Oslo Manual (2005, p. 16) notes that this is a little explored issue and that "innovation is important for the government too". Cruz (2000, p. 11) affirms that the country must advance in applied research because it is extremely important to its competitiveness; this must be a government's concern as well.

Carlos (2014, p. 66) affirms that no economic activity is unrelated to innovation anymore. Therefore, organizational structures must be rethought to create an environment that promotes continuous innovation.

Organization of a structure for the parque científico e tecnológico Chapecó@ (Chapecó@ Science and Technology Park)

Agroindustry is the main productive matrix of the western region of the state of Santa Catarina, which is one of the world's most important animal protein production regions; this area mainly produces pork and poultry. Currently, the Chapecó region has undergone a transformation from an agroindustry-based economy to a service-based economy, with a focus on education and health care, which requires the organization of local knowledge-based structures. With the objective of maintaining and increasing the knowledge potential and the competitive capacity of the region, it was sought to establish an environment that favors innovation from the strategy established by the Universidade Comunitária da Região de Chapecó (Community University of the Chapecó Region) with the participation of local Triple Helix agents.

To promote interaction among the local agents, the Triple Helix concept was applied in the network, which resulted in the creation of the Parque Científico e Tecnológico Chapecó@.

The structure was constituted in 2013, and it was planned in a way to support knowledge management, to articulate the productive sector agents, to support the raising of public and private resources for academic activities and to develop new products and production processes.

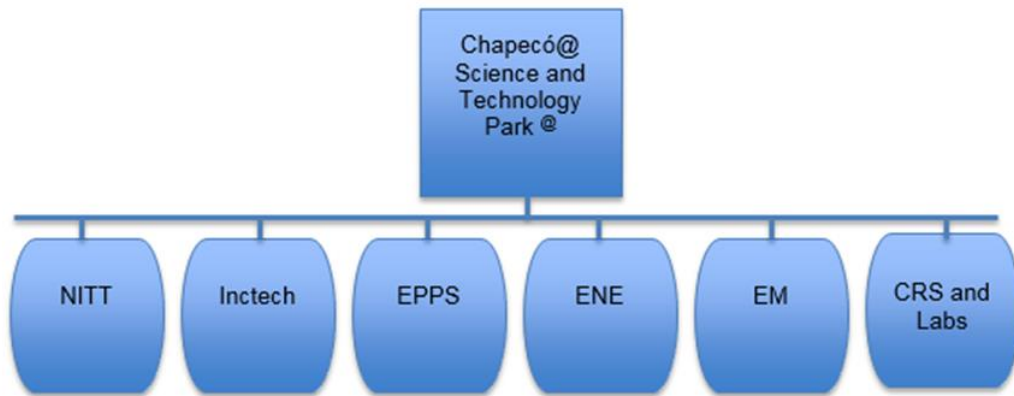


Figure 1 – Chapecó@ Science and Technology Park - Network structure

Source: By the authors

The innovation network of Parque Chapecó@ was created to promote the articulation among the Triple Helix agents for innovation, which generated results such as regional development. Its objectives are to strengthen the academic production of solutions for the community, the creation of a structure for new masters and PhD programs, the development of productive activities based on innovation, the strengthening of technology-based companies with high value added products, and the promotion of entrepreneurship and innovation as the main regional development instrument.

The Parque Científico e Tecnológico Chapecó@ is completely integrated with the university, with a highly qualified operational structure that forms a large cooperation network. This network is composed of a set of services that approach the university and the community and promote regional development through access to public resources that are invested in innovative processes for the improvement of processes, products, marketing and organizational systems. The following entities are part of the network:

- Parque Científico e Tecnológico CHAPECÓ@ (Chapecó@ Science and Technology Park);
- Escritório de Projetos e Prestação de Serviços – EPPS (Projects and Services Office);
- Escritório de Negócios e Empreendedorismo – ENE (Business and Entrepreneurship Office);
- Escritório dos Municípios – EM (Municipalities Office);
- Núcleo de Inovação e Transferência Tecnológica – NITT (Innovation and Technology Transfer Center);
- Incubadora Tecnológica – INCTECh (Technology Incubator);
- Centro de Residência de Software – CRS (Software Residence Center);
- Specialized laboratories.

Scientific and Technological Park Chapecó®

The project of the Parque Científico e Tecnológico Chapecó® was developed to transform the region with the aim of becoming an economic and scientific development reference. Because of the strong dominance of a single productive chain, the meat industry, the need to create an innovation environment to diversify the production activities and potentiate knowledge production and diffusion was reinforced. This would add value to the local production and qualify local labor, with a focus on innovation and technology. The Parque Científico e Tecnológico Chapecó® is divided into four nuclei that constitute its operational structure.

Chapecó@bio: The environmental center that aggregates projects to develop environmental solutions to recover, monitor and preserve ecosystems, including fauna and flora. It includes projects for families and organic farming, as well as technologies for small farms.

Chapecó@saúde: In the health care area, the Parque Científico e Tecnológico Chapecó® will have programs and projects that promote prevention awareness, with the development of studies on effective processes and methods to promote health and to prevent and treat diseases.

Chapecó@social: Projects for social inclusion, training, jobs and income generation. The INCTECh - UnoChapecó Technology Incubator and ITCP – Incubator of Popular Cooperatives are examples that contribute to the development of the region.

Chapecó@tic: The focus of this center is technological innovation and the development and implementation of innovative projects that promote entrepreneurship and solutions for society.

Office of Projects and Services – EPPS

EPPS is responsible for planning and controlling fundraising projects. It supports researchers through the use of adequate tools to elaborate and manage projects that contribute to the development of the western region of the state of Santa Catarina.

Its mission is to integrate best practices of project elaboration and the management of scientific knowledge and to offer techniques to elaborate, manage and orientate projects to optimize and centralize project management and services provision. Some of the services provided are:

- mapping of tenders by the main regional, national and international agencies, both governmental and private, to identify opportunities for projects and studies developed in the institution;
- consulting and providing support to elaborate projects for those tenders, with follow-up, analysis and bids submission;
- consulting and providing support for fundraising regarding the best ways and means to obtain resources and establish partnerships;
- providing support to project management and control as well as accountability orientations and help.

Other support activities include technology consulting to small companies, farmers and individual entrepreneurs.

Figure 2 shows the significant results regarding fundraising to support the development of an innovation environment since the implementation of EEPS.

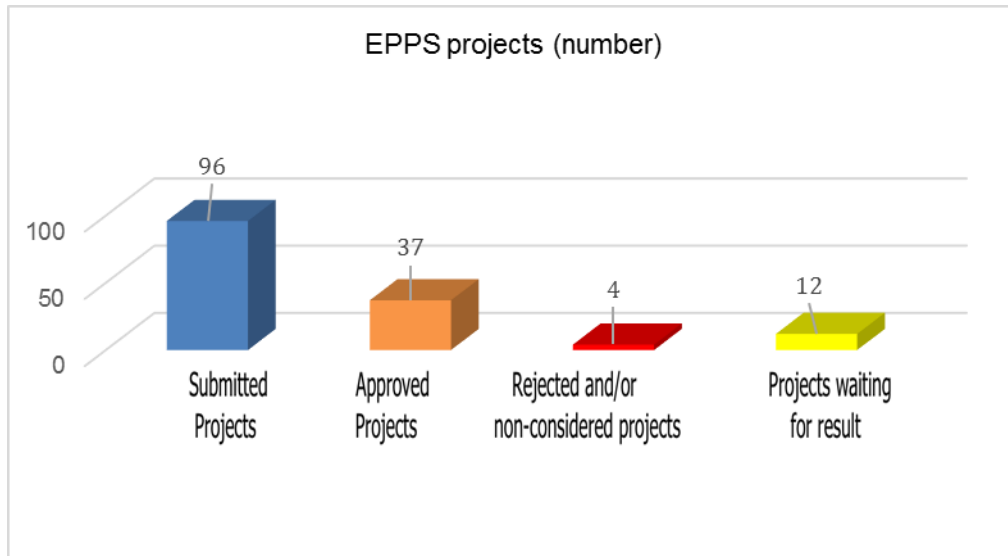


Figure 2 – Chapecó@ Science and Technology Park - Network structure

Source: By the authors

The amount of resources raised from promotion agencies is also significant. This is directly related to the strategy and is an indicator of the effectivity of innovation actions, as shown in the figure below:

Figure 3 – Amount of resources after the establishment of the Projects Office/Innovation Network

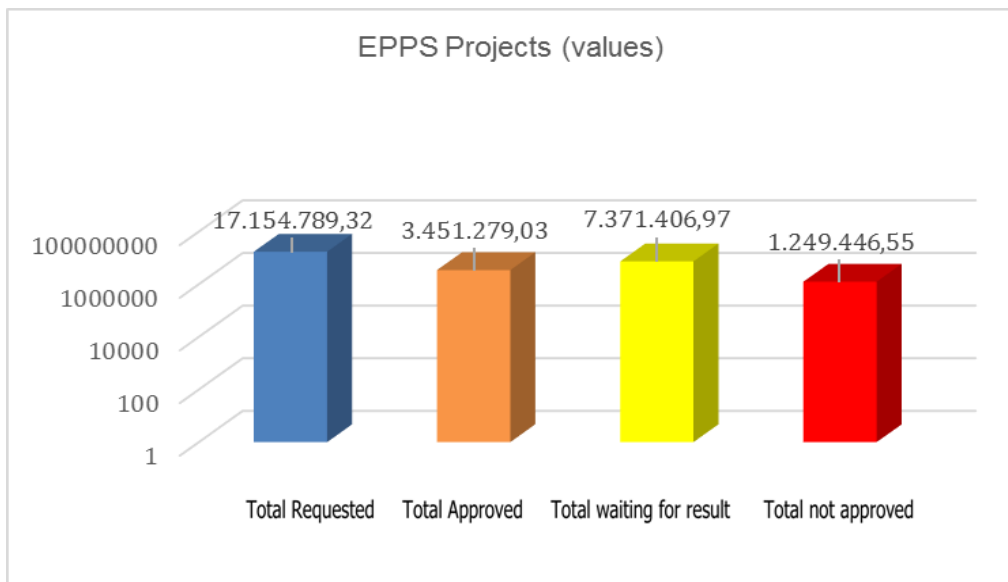


Figure 3 – Chapecó@ Science and Technology Park - Network structure

Source: By the authors

Office of Business and Entrepreneurship – ENE

ENE is the support office for companies in the community in general and an academic laboratory for entrepreneurship promotion in the region and in the scientific community. New projects generated in the University are sent to ENE for feasibility analysis and for assistance to elaborate and implant the business plan; thus, the project is strengthened from its creation. The activities of ENE are as follows:

- stimulate entrepreneurship;
- organize consulting for companies and university projects;
- provide assistance to incorporate new companies, with financial consulting for new businesses;
- provide support to structure small companies;
- conduct market surveys in cases of consolidation or business restructuring;
- elaborate projects for implantation and fundraising.

Office of Municipalities – EM

EM was created to collaborate with state secretaries, city halls and other entities that promote regional development, thus providing technical and scientific assistance in a way to enable a good relationship between the university and different government spheres.

The office surveys the needs of technical and scientific consulting studies and the development of training programs for the government where the innovation network of Unochapecó may act directly or indirectly. Thus, the university extends its actions to the cities in the region through the following main activities:

- Management of partnerships of Unochapecó with regional government entities to promote sustainable development in the region.
- integration of best practices in the management of government projects, together with scientific knowledge produced in Unochapecó, for the social and economic development of the region;
- Monitoring of tenders, public calls, subsidized funding and other sources of resources to develop projects of technical-scientific consulting and training of government managers;
 - Consulting to elaborate and manage projects;
 - Conducting studies and providing technical consulting to city halls to formulate and evaluate policies in general and to elaborate master plans, local development plans, etc.;
 - Organization and coordination of training programs for government officers.

Center for Innovation and Technology Transfer – NITT

NITT is the office responsible for the management of the production and technology transfer of scientific knowledge as well as for the management of the intellectual property developed in Unochapecó. Furthermore, it aims to strengthen the Uni-

chapecó's relationship with the community through the involvement of government entities, companies and other organizations, considering that knowledge production and transfer for the scientific, technological, economic, environmental and sustainable development of the region is a strategy of the university.

NITT's mission is to provide support for development and management and to contact promotion agencies; it also establishes actions founded on technological innovation in all science and technology segments. NITT manages cooperation agreements in technological research and development with institutions and companies.

Some of the main NITT objectives and activities are:

- spreading the intellectual property (IP) culture;
- managing rights and duties associated with the protection of the IP developed in Unichapecó;
- preparing and assisting with patents filings as well as their maintenance;
- promoting technical-scientific partnerships with the productive sector and educational institutions;
- proposing, updating and applying Unochapecó's IP policy;
- promoting research and innovation in the institution and in the region; and
- promoting events to integrate the community, companies, scientific community and science institutions to debate the importance and the consequences of innovation in the local, regional, national and international spheres.

Concepts of innovation Incubadora Tecnológica – INCTECh

INCTECh is a promotion program for newborn companies that supports new locally developed technology businesses; it also provides a mechanism to transfer the innovation technology of research projects developed in the university.

Inctech promotes and supports local social and economic development through the creation of innovative companies and acts as a catalyst of actions developed by the Triple Helix.

Its main activities include:

- supporting and developing business plans of the new companies;
- promoting of the new companies' technical capabilities;
- elaborating on fundraising projects;
- analysis and follow-up of the new businesses;
- consulting in the legal, technologic, financial, accounting, software and marketing areas; and
- providing the physical structure to install the new enterprises.

Software Residence – CRS

The Centro de Residence am Software is a software development academic laboratory. It was created to provide researchers an environment closer to the professional reality, in addition to a place for internships.

Its main objectives are: to develop state-of-the-art software; to provide researchers an opportunity to interact with the main software development stages; to consolidate and strengthen the area of software tests and quality through the enlargement of the PAF-ECF program and to strengthen and enlarge existing partnerships with technology companies.

CRS is comprised of the software development, software test and software engineering laboratories, and it has developed the following projects since its implantation: the Odontology clinic control system (SCO), the Instrumentation management system (SGI), the Teeth bank system (SBD), the Space management system (SGE), the Maintenance control system (SCM) and INFOHAB+10 Portal.

Specialized Laboratories

Laboratory of Software Tests – LTS

LTS was created to connect academic knowledge in information technology that is applicable in software engineering and tests to software development companies.

LTS was certified to test Electronic Invoicing Applications (Programas Aplicativos Fiscais Emissores de Cupons Fiscais – PAF-ECF) that were developed by software companies. After certification, LTS began to issue digital technical reports of commercial PAF-ECF systems that must meet legal requirements defined by the states' Treasury Departments (SEFAZ) and specified in the COTEPE acts of the National Council of Treasury Policy (CONFAZ). LTS serves an average of 45 companies per year.

Laboratory of Food Analysis – LAA

LAA was initially implanted to provide analyses to the region's family farms. Today, it performs quality control and process monitoring of microbiological analyses in food and water according to current laws and regulations for all the industries in the region. In addition, LAA also trains small companies' workers.

In 2015, LAA was included in the certification process at INMETRO to perform microbiological analyses according to Standard ABNT ISO/IEC 17025:2005.

Performance analysis of the Scientific and Technological Park Chapecó® and the Network innovation

The results of the structuring of an innovation environment by the Parque Científico e Tecnológico Chapecó® and the Rede de Inovação demonstrate the viability of the proposal and its success. In a short time, it has made a difference in the region.

Scientific and Technological Park Chapecó@

The construction of the Parque Científico e Tecnológico Chapecó@ is in its final phase; therefore, there are no numeric results yet. However, contracts with the companies that will occupy the space, as well as the internal regulations and the documentation of the administrative acts, are already being formalized. The initial structure will consist of a 4-storey building with more than 3,700 square meters, jointly funded by the government of the state of Santa Catarina and the city of Chapecó.

Office of Projects and Services – EPPS

EPPS was responsible for submitting 94 projects until the end of 2014. Thirty-four proposals were approved, and eighteen other projects are still awaiting approval. Approximately R\$ 3.4 million was raised. In addition, approximately R\$ 375,000 was obtained in technology services projects.

Office of Business and Entrepreneurship – ENE

Last year's results include the development of internal policies, the development of the "Projeto de Software de Plano de Negócio Institucional" (Project of Institutional Business Plan Software) – a software to facilitate internal paperwork, support and participation in events of the Rede de Inovação and entrepreneurship promotion activities such as Maratona da Inovação (Innovation Marathon), Startup Day and Startup Weekend, the preparation of business plans, the reception of projects to be absorbed by the innovation network and planned with the use of CANVAS and tools to structure business plans.

Office of Municipalities – EM

The Office of Municipalities approached the Municipalities Associations of the western region of the state of Santa Catarina in 2014. It established relationships with mayors and secretaries in the region to present the university and its services and to offer training courses in health care and education, which are the areas identified as the most interesting for the public administration.

Center for Innovation and Technology Transfer – NITT

In 2014, the NITT formalized contracts of technical and scientific cooperation with companies and institutions in the region and organized the II Congresso Internacional de Inovação Aberta na Indústria de Alimentos e Bebidas (II International Congress of Open Innovation in the Food and Beverage Industry) and the III Seminário Sul Brasileiro de Inovação (III Southern-Brazilian Innovation Seminar). In addition, NITT

filed the first two patent requests in the history of the university (a demonstration of the importance of the Rede de Inovação) and negotiated other cases that may generate intellectual protection.

Technology incubator – Inctech

The results of the Inctech Incubator have a social and economic characteristic, such as the promotion of entrepreneurship that has reached more than 5,000 people in the last three years. This was achieved through the participation in trade shows and exhibitions, the support of the Programa Sinapse da Inovação (Innovation Synapsis Program), the organization of the Maratona da Inovação (Innovation Marathon), and the divulgation in the academic community and in specific extension courses. Inctech is responsible for twenty-three formalized projects, of which eight have graduated, and it currently is responsible for eighteen newborn companies.

Board 1 – Innovation Network and its main results

Innovation Network Unit	Main Results
<i>Parque Científico e Tecnológico Chapecó</i> [@]	Investment of approximately R\$ 7.3 million with the participation of the government of the state of Santa Catarina and the city of Chapecó;
<i>Escritório de Projetos e Prestação de Serviços</i>	R\$ 3.4 million project fundraising from promotion agencies and private companies;
<i>Escritório de Negócios e Empreendedorismo</i>	Responsible for the <i>Maratona de Inovação</i> (in its third edition), <i>Startup Day</i> and <i>Startup Weekend</i> , among others;
<i>Núcleo de Inovação e Transferência Tecnológica</i>	Two patent filings at INPI and three more under analysis;
<i>Escritório dos Municípios</i>	Formalization of agreements with Associations and City Halls and with FECAM (Santa Catarina Federation of Municipalities);
<i>Incubadora Tecnológica INCTECH</i>	Twenty-three formalized projects, eight of which have graduated, and support to eighteen newborn companies.

Source: By the Authors

In summary, the effectiveness of the strategy of creating an innovation environment to promote a sustainable regional development is demonstrated.

Results and discussion

The results show that the creation of a network of management units to help build an innovation environment is effective. Since it launched in November 2013, in less than two years, it has provided the elements required for an innovation environ-

ment in a joint and networked action that has generated significant results. These results would have not been achieved if this organized structure had not existed.

The main difficulties present include the existing organizational culture of hierarchic decision-making that must be changed in this network model. In many occasions, the Rede de Inovação was forced to address uncertainties in the attribution of responsibilities. A significant improvement is presently observed because any demand in the network follows its track considering that it is received by the organization as a project that will involve all of the necessary network's units.

The results currently achieved corroborate the strategy to develop an innovation environment. Approximately R\$ 3.4 million was raised for the innovative environment, not including the R\$ 7.3 million that was raised to build the Parque Chapecó@ itself. In addition, the proactivity of this environment enabled the possibility to file two patents and to elaborate R&D projects for three more patents, which demonstrates that soon it will be possible to transfer technology because of this action.

The authors also highlight the possibility of changing a commodity-based economy into a knowledge-based productive matrix that adds value to local products. This would also result in more technological diversity to be applied in a new knowledge-based economy.

Together with the results shown in this study, an innovation culture for this environment is being established through a series of events, which are changing the local comprehension and are enabling the western region of Santa Catarina to engage in sustainable development from the incorporation of an innovative culture.

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