Technology Transfer and Knowledge Management in Technological Innovation Center: A Case Study in Brazil

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Abstract

The purpose of this paper was to analyze the knowledge management in the process of technology transfer in a technological innovation center, known in Brazil as NIT. The used methodology included a qualitative approach. It was a case study of a Nucleus which is in a State University located in the south of Bahia state, Brazil. The results showed that this specific Nucleus presents a fine infrastructure regarding the legal regulation, based on the Federal Law of Innovation nº 10.973 and on the State of Bahia Innovation Law. Some barriers related to knowledge management were detected preventing an effective process of technology transfer.

Keywords: knowledge management, technology transfer, intellectual property, technological innovation center

1. Introduction

Due to the competitiveness generated by the opening of new markets and the increased demands for innovative products, companies have no other way except Constant search for strategic partnerships. Transfer of technology among companies and universities or research centers has always been an innovating procedure towards new processes, products and improved services. The interaction with the digital age, arising from the dissemination of new information technologies and media, significantly narrows the barriers within the markets (EVANS and WURSTER, 1997).

However, Brazil seems to be distant from this scenario. Brazilian universities do not have the process of developing and transferring technology as an essential goal. Most contacts with national companies are based on human resource improvement and researches which can produce scientific papers. In general, universities leave the process of developing and transferring technology to the market. Brazilian companies have been distant from the Academy as well. While trying to survive in such competitive environment, dealing with inflation, legal uncertainty and others, companies have relegated the introduction and development of new technologies for their products.

This mismatch between the producing sector of knowledge and potential transformers of such knowledge into innovative products has been identified as an increasingly important vulnerability of Brazil specially when taking into consideration the increasing globalization and rapid development of new knowledge and markets.

It is in this context that this paper was developed. The Research Group on Management of Technology Transfer at the Postgraduate program in Production Engineering at Federal University of Technology – Paraná (UTFPR) concerned about such situation brings into discussion reflections in order to understand better organizational knowledge management and technology transfer processes in technological innovation center (known as NIT). Many approaches do not take into consideration the specificity of each organization, neither the region where they operate nor the intrinsic relationship between the dynamic processes of innovation and contribution to organizational knowledge for transfer technology which aims the development and socialization of innovation in the productive sector.

Advances in science, technology and innovation are key factors to promote sustainable economic and social development of a country. The Ministry of Science and Technology of Brazil (MCT) released data showing that national investments in research and development (R & D), a leading indicator in Science and Technology (S & T), grew over the past years. In 2003, investments in R&D represented 0.96% of gross domestic product (GDP), increasing to 1.25% in 2010. However, this rate of investment is considerably lower than observed in other countries. Another issue is related to participation of public and private sector in these investments. In 2008, public sector responded for 53.64% of such investments, while private sector, including public enterprises, totaled 46.36%. About 30% of total spending on science and technology are made in public universities highlighting the potential of these institutions to offer new technologies and research, resulting in development of companies (MCT, 2010).

The methodology used through this research was a case study in a Nucleus which operates inside a public university in Bahia state, Brazil. The main objective of this paper is to highlight the contribution of knowledge creation to technology transfer, showing the challenges faced by the Nucleus in the diffusion of innovation in the region, as well.

The Nucleus of Technology Innovation has been considered the most appropriated bridge to enable technology transfer and development of the region where it is located. University of Santa Cruz State's Nucleus (UESC), in particular, is connected to the Dean of Higher Education Institution which aims to promote innovation, adequate protection of inventions and transfer of technology to the productive sector in order to integrate it to the community and contribute to the cultural, technological and social development of the region.

Besides historical struggle in order to recover from the crisis caused by a monoculture economy, the choice for the coastal region of southern Bahia is justified by their status of housing major companies units and industries of goods as well as several hardware companies in the Computer Center of Ilhéus (Bahia). Of course, there are still many negative effects caused by their former economic matrix, in particular the concentration of income, lacks of opportunities for technical training and difficult access to higher education. Nevertheless, development through education is a well-established goal.

In recent years, a movement to establish the importance of a close relationship between the Academy and the productive sector towards the recognition of the need to overcome this gap has begun. Some important moments could be noted as the establishment of Innovation federal and state laws which created incentives and demanded the Technological Innovation Nucleus to promote its approach and go beyond the protection of intellectual property considering the Academy and in sectors and areas under its influence. Currently, UESC counts with an institutionalized Nucleus with adopted rules based on Resolution 05/2009 of CONSEPE (Council of Superior of Education, Research and Extension) and directly linked to the Dean. The consolidation of the Nucleus as a forum for important technological innovation in the region and essential link between the academic and productive environments is not only desirable but also necessary to assure the development of southern region of Bahia state.

2. Literature Review

2.1 Creation and Knowledge Management

In the current scenario, the process of modernization in the enterprise system, linked to quality, productivity and new technology products and processes, is demanding that companies always seek for innovations in their activities in the target market. In the light of these new parameters in the business sphere, many organizations from various sectors have been involved in rethinking their old forms of production.

It is felt that these changes create a need for generation of continuous innovation best stimulated and generated by individuals in organizations, aiming to manage or keep working in the current competitive environment. Such innovations are necessary and fundamental, and can emerge from brainstorming ideas or unexpected and unpredictable, however, tacitly arising in people minds that make up the various organizations levels.

However, to convert tacit knowledge into explicit knowledge and, thereafter, be able to create innovations, individuals should be encouraged, be motivated and encouraged to participate continuously from the important processes of their work done, and most importantly, to share their tacit knowledge, in the form of experiences in the organizational environment. The creation and management of organizational knowledge is an essential tool for the generation of innovations in organizations that should be used to facilitate this dynamic, all steps in their processes, from the sharing of tacit knowledge between individuals, to the globalization of knowledge throughout the organization (NONAKA and TAKEUCHI, 1995).

According to Sveiby (1998) the conceptualization of knowledge management, appeared in the mid-90s, having as a primary objective the creation of value in the domestic enterprises, aiming at the optimization of available resources,

whether is technological, human or financial, and this being achievable through learning among individuals in the company.

Lacombe (2005) accentuate that the management of organizational knowledge within the last decades has reached an important point in business where being competitive in their market activities is essential to an excellent active creation and management of knowledge from each individual in the organization in its various forms of approaches, only by this way it can become competitive and sustainable in market.

Innovation and knowledge management processes in a company can be understood as a cluster of commitments generated by individuals aiming to create, acquire, transform, apply and subsequently protect the creation of knowledge generated by the organization in order to remain competitive in an active market (DAVENPORT and PRUSAK, 1998; FLEURY and OLIVEIRA, 2001; GOLD, MALHOTRA and SEGARS 2001).

And for the innovation become possible in the ambience of an organization, the knowledge must be nurtured and developed in all stages of management. Knowledge is understood as binding practices experienced by man, values, contextual information and generated ideas, such experiments allows the individual a framework for assessing and implementing new practices and information. Having its origin and applied in the mind of man. In business, knowledge is not restricted only in documents or guides, standards and management manuals, but is also in routines, processes and ways of conducting the work of individuals (DAVENPORT and PRUSAK, 2001; SANTIAGO Jr 2004).

On the understanding of knowledge creation and dynamics of this creation, Nonaka and Takeuchi (1995) propose a Knowledge Conversion Model. The same points are in an organizational knowledge creation defined as: spiral process, which begins at the individual level and goes up, expanding communities of interaction that cross boundaries between sections, departments, divisions and organizations.

> The organizational knowledge creation, therefore, must be understood as a process that extends "organizationally" knowledge created by individuals, crystallizes it as part of the knowledge network of an organization, this process occurs within a "community interaction" expanding that crosses boundaries and inter-organizational levels. (NONAKA AND TAKEUCHI, 1995).

The knowledge spiral of SECI (Socialization, Externalization, Combination and Internalization), is showed in the Figure 1:

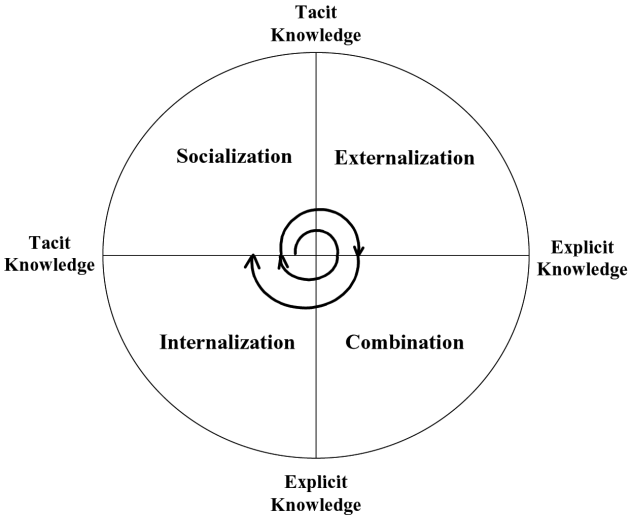

Figure 1. Spiral SECI through the knowledge conversions under different levels

Source: Nonaka & Takeuchi (1995)

According to Nonaka and Takeuchi (1995), in the process of socialization, individuals talk and pass information between them, transferring tacit knowledge from one into the tacit knowledge of another. It occurs through the sharing of experience among people, and enables the generation of tacit knowledge from the tacit. Experience is the elemental key that must be present in this conversion process, because without some form of shared experience, becomes very complicated for one person to understand the reasoning of another.

At this stage of socialization develops the so-called: shared knowledge.

In the same sense Nonaka & Takeuchi (1995) points out that in outsourcing, received tacit knowledge is transformed into explicit knowledge through concepts, that even can be documented. Whether through the spoken or written in communication, tacit knowledge can be converted into explicit knowledge through metaphors, analogies, concepts, hypotheses or models. The outsourcing process generates a kind of knowledge called: conceptual knowledge.

On the third point of the spiral of knowledge, Nonaka & Takeuchi (1995) reported on the combination, where explicit knowledge externalized are compared with other existing explicit knowledge about a certain subject, then analyzing the similarities and differences highlighted.

The combination process generates a kind of knowledge called systemic knowledge, which occurred through clustering of knowledge (classification and summarization), or processing different explicit knowledge.

And finally, Nonaka & Takeuchi (1995) points out that the new explicit knowledge generated by the combination back to tacit through internalization process, which promotes the certainty that the individual who received the new knowledge, truly learned. This process can be characterized by learning through practice.

The internalization process generates a kind of knowledge called operational knowledge, occurring through reading and individual study or viewing of documents in different formats and models, such as texts, images etc.., Individual practice, reinterpreting and re-experience, individual experiences and practices, among other points.

However, the complete layout of the spiral of knowledge conversion of this cycle of knowledge, stimulating the sure of what really effective happened for knowledge creation, and that there was indeed an appropriate and satisfactory utilization of the knowledge created which may come to promote innovations from its implementation. However, with this complete cycle, that develops knowledge management, allowing this process the dynamics of organizational innovation.

3. Technology Transfer

Technology transfer has become a very effective means for the dissemination of innovation and knowledge, being a competitive alternative for companies seeking not only for the exploitation of internal resources to use new technologies, but also for external partners to acquire the increment of new technology, the basic task of technology transfer.

According to Cysne (2005) the transfer of technology has its mark during the industrial revolution, because technologies were developed in England and soon were transferred to the industries of America, Europe, and Russia. This process of technology transfer has permeated throughout the 19th century, and its development in the 20th century was significant and also continued its expansion of activities at the beginning of this century.

The definition of technology transference can be interpreted as a process of acquisition, development and use of technological knowledge generated by individuals (LIMA, 2004). However, it is understood as a process of implementation of new technologies developed for an environment that does not have the same technologies.

Deitos (2002) presents the steps of the process of technology transfer are fairly simple and easy to understand for those involved in the process comprising six steps:

1) Selection of the technology being used by the company;
2) Selection of the technology suppliers;
3) Negotiations for the acquisition of technology;
4) Realization of the transference of technology;
5) Assimilation of transferred technology;
6) Implementation, adaptation and improvement of technology.

During the process of technology transfer various information techniques are involved, since the process of developing products and processes, markets, suppliers, use of technologies as well as the methodology for each stage of implementation of new technology by the organization. The methodology can be understood by the environment in which technology will be transferred to the end user, developing it so that its implementation is accomplished by ensuring the full transmission of knowledge between those involved (ESCORSIM, 2006).

Peoples involved in the transfer of new technologies, should implement a natural and direct methodology, observing control points and their proper monitoring (ROMANENKO, SANTOS and AFONSO, 2007).

Moreover, the correct would be that these same people involved in the implementation of new technologies aligned with the needs of the organization's strategies, not in structural and operational capacities, minimizing costs and ensuring the correct execution of the operation (BROWN, BLACKMON and SQUIRE, 2007; SILVA et al 2012a; SILVIA et al 2012b).

By the view of Bozarth (2006), when making a transfer and implementation of technologies in the organization, a thorough monitoring of all stages is necessary so that everything goes as planned. For this end, the activities of media ensure that technology transfer occurs successfully and is really effective.

According to Niedergassel and Leker (2010) the cooperation between universities and industry can thus help in the search for new inventions which brings important stimulus for the development of innovations and technology transfer.

4. Methodology

The research was qualitative with a descriptive nature as described by Hart & Bervian (1996), Marconi & Lakatos (1996) and Perin et al. (2002). The used method was a case study (GIL, 2002; TRINITY, 2003).

First, the research consisted of a literature review taking national and international papers, books, resolutions, laws, etc. as sources. Then the references were analyzed in order to gather enough background for the six month observation period. During this time, the planning and execution of activities of the Technological Innovation Nucleus of University of Santa Cruz State were observed. Moreover, relationship among internal members and other university departments, strategic actions of its committees were observed as well. Of course, emphasis was given to the technology transfer committee.

During the time of the research, the Nucleus had thirty-two people involved in its activities, including two managers, one general coordinator and a vice-coordinator, seven scholars on productivity with scholarships provided by CNPq (National Council of Research and Development) and FAPESB (Foundation of Support to Research in Bahia State), three representatives of the committees (Technology Transfer, Intellectual Property and Technological information), and twenty representatives of university departments. Each department has a primary representative and one as a supplement, as established in 2009 Resolution 05 of CONSEPE.

The ten departments are: Department of Sciences and Technology (DCET), Department of Agricultural and Environmental Sciences (DCAA), Department of Business Administration and Accounting (DCAC), Department of Biological Sciences (DCB), Department of Economics (DCEC), Department of Educational Sciences (DCIE), Department of Health Sciences (DCS), Department of Legal Sciences (DCIJUR), Department of Philosophy and Humanities (DFCH), Department of Arts and Letters (DLA).

After this period of observation, an interview plan was developed, comprising five key questions related to the main purpose of this research. For this stage, people with strategic positions were selected for interviewing. The highest positions were chosen because the wanted information could be classified, so unrestricted access to such data was relevant. So, especially managers and some other people involved with the process of technology transfer were interviewed. Such procedure allowed greater authenticity of the data collected in the real scenario and its analysis since it was done a non-probabilistic intentional sample. Summarizing, the process involved the overall coordination of the Nucleus, two administrative members who were scholars in productivity, plus two members of the committee for technology transfer, totalizing five surveyed participants.

With an unstructured (open) plan, the interviews happened during one week in the Department of Postgraduate (UESC) where the head-office of the Nucleus is located.

The plan interview contemplated the following questions:

1). What kind of infrastructure is available in order to meet the aimed standard for innovation and technology transfer?

2). What are the expansion plans for the transfer of technology between universities and the productive sector of the region?

3). Which are the partnerships and inter-institutional articulation in order to accomplish a greater process of transfer of technology?

4). How are forms of knowledge creation planned and executed regarding transfer of technology?

5). What are the actions and how many contracts of technology transfer were hired by the National Institute of Industrial Property?

After the questionnaire application, data was analyzed separately according to the respondents' answers; later the main ideas of each response were grouped into a single response.

5. Description of the Researched Nucleus (NIT-UESC)

The researched Nucleus is located at the State University of Santa Cruz. It was structured to meet the demands of the local university and of the productive sector, based on the Laws of Innovation, both federal (Law No. 10.973) and state (Law No. 11.174).

The State University of Santa Cruz (UESC) has institutionalized the Technological Innovation Center since May 2009 (Resolution 05 of CONSEPE). It is connected with the Rectory and its board consists of one representative from each department, plus a representative of PROPP (Dean of Graduation and Research). These eleven representatives are divided into a few functions: vice coordinator, members of the committees of Intellectual Property (IP), Technology Transfer (TT), and Information Technology (IT). The UESC also has four Junior Enterprises in the areas of Computer Science, Production Engineering, Administration and Foreign Languages Applied to International Negotiations, the incubator and incubator for agribusiness ventures in addition to supportive alumni working in the incubator CEPEDI (Center of Technological Research and Development in Informatics and Electronics from Ilhéus), and the INETI (National Institute of Engineering, Technology and Innovation).

The State University of Santa Cruz is located in the city of Ilhéus, in the southeast of Bahia State and it is the only public institution of higher education in this region which is composed of the economic parts of the South Coast with fifty-three municipalities and of the Far South with twenty-one municipalities. This area possesses 53.931 km2, equivalent to 9.61% of the state and encompasses an estimated population of 2.450.000 habitants, representing 19.5% of the entire population of Bahia State. According to the Foundation for Research Support in Bahia (FAPESB), economically, this region has been responsible for almost 15% of the final Gross Domestic Product (GDP) of the state.

The university is located in one of the most extensive areas of preserved Atlantic Forest in Northeast Brazil. It has a distinctive environment: agricultural region - the land of cocoa with an area of 600.000 hectares of cocoa plantations in a secular system of production that allowed the preservation of the upper strata of the forest formations, and kept a genetic heritage of unmatched value, giving the characteristic of a high diversity in flora and fauna. The region, which also has food processing companies and textiles, should hold in the coming years, new off shore export harbor, international airport, a complex multimodal completed by the East-West railway, which will bring up the products from Tocantins to Ilhéus, passing in areas for farming and mining in the interior of Bahia state. The GASENE (gas pipeline that will lead from the northeast to the southeast) had its first distribution center in Itabuna newly installed, 15 km from UESC.

6. Results and Data Analysis

The following is a narrative analysis about the outcome results. The analysis include: infrastructure available to meet the local systems of innovation and capacity for innovation, science technology (ICT) for the transfer of technology; expansion plan for the transfer of technology between universities and the productive sector, inter-institutional partnerships for the transfer of technology, creation of knowledge for the transfer of technology, and technology transfer contracts.

6.1 Available Infrastructure to Attend the Local Systems of Innovation and Capacity of Innovation, Science and Technology (ICT) Aiming Technology Transfer

Taking into consideration the responses obtained at the interviews, it is correct to acknowledge that the existing research programs are able to stimulate the development of new technologies to ensure that new innovations and future technology transfer processes with the productive sector.

The UESC has a total of 98 research groups certified and registered by the CNPq Institution, divided into various areas of knowledge, highlighting the biological and agricultural. As part of research and graduation program, the Institutional Planning of UESC adopted as strategies to improve the quality of postgraduate courses ensuring connection between teaching, research and extension, the interaction of education with the coverage area of UESC in order to promote the integration between graduate and undergraduate level, with the implementation and consolidation of interdisciplinary research groups.

The consolidation of post-graduate courses boosts the infrastructure of knowledge production (laboratories, libraries and Data Processing Center). The Center for Technological Innovation (UESC) possesses a room equipped with five

computers, data-show, digital camera, various books, notebooks and three multifunction printers. It also has video conferencing equipment, including codec, camera, 42"display and an audio conferencing device.

6.2 Expansion Plan Aiming Technology Transfer between Productive Sector and University

As results point out, the major expansion plan for the NIT-UESC regarding transfer of technology is linked to the creation of the Technological Park. This Technology Park, once established, should work in two main areas: Information and Communication Technologies and Biotechnology. Since there is a consolidated ICT industrial sector, this aspect should be deployed first and the deployment of Biotechnology is part of studies and will appear in a supplementary document.

According to Steiner et al (2008, p. 9), Technology Parks allying themselves with these new forms of innovation are supportive mechanisms which have already been established worldwide as a platform for development of science, technology and innovation (ST & I) and innovative companies. It involves geographic agglutinations and functional mechanisms of cooperation between the academic and productive sector, increasing the transfer and the investments in knowledge.

The basic statements involved in the creation of this Park of Technology are the companies in the Pole, represented by their union (SINEC), the government and major institutions of Science and Technology (ICT) in the region with a history of partnership with these same companies, the CEPEDI and UESC.

These two entities have acted together as academic institutions and partner companies near the Pole and this proximity characterizes the initiative to set up a Technology Park site as timely and urgent.

The Union of Electrical Appliance Industries, Electronics, Computers and Information and Related Issues located in the cities of Ilhéus and Itabuna (SINEC) has represented companies in the region since November 1998. It emerged with the aim to represent and fight for the interests of entrepreneurs, which ones believe in the economic potential of the sector. Throughout these years, SINEC is seeking to develop new proposals for the Computing Center Pole, such as improving the physical infrastructure and increasing the supply of skilled labor, which would contribute in the process of absorbing the work of local professionals. For the establishment of the Park, it is essential to create an instance of shared management among local public administration (municipal and state government), academy and business, with specialized staff.

The cooperation established between university and industry can thus help in the search for new inventions which could bring important stimulus for the development of innovations (NIEDERGASSEL and LEKER. 2010).

Cooperation among university and companies usually happens because of specific objectives, often in the short to medium term, thank to physical training activities and key stakeholders on both sides.

The terms and themes of the actions of specific cooperation between companies and individual researchers or groups may even be subjected to secrecy. Likewise, action plans and growth in research groups and academic departments may not necessarily involve social demands and companies. On the other hand, university and industry not only can but also must find vast areas of cooperation. Decisions of the two segments can only be positively affected if there is continued awareness of the needs and capabilities of both sides. The particularity of each specific entity does not preclude actions and collective demands, but it leads to structural and convergence of actions.

In this sense, it is important to have a forum for information exchange about the strategic opportunities that the state can be mobilized to act as a facilitator of these partnerships.

6.3 Inter-institutional Partnerships and Articulation Aiming Technology Transference

According to the responses, UESC has partnerships in innovation projects with companies located in the region and some are located outside the state. There are several listed companies, especially in the Pole of Informatics (BITWAY, NORTCOM, ECLIPSE, IBRACOMP, ACCEPT), the food industry (more cocoa), rubber (MICHELIN), among many others which are active or under development. There are also contacts and agreements with local governments in developing actions to provide extension and innovation, and several academic institutions in research in the state, nationally and internationally. Based on regional partnerships, particularly with CEPEDI and companies in the Pole and its representation (the SINEC union represents these companies), contacts were initiated, involving the Department of Industry, Commerce and Mining for planning a future Technology Park site. This project has not gotten a set schedule yet and its definition will be part of this project team activities.

The NIT-UESC has acted in partnership with NITs from other universities in state of Bahia, especially Federal University of Bahia (UFBA) regarding the actions of staff training coordinated by the Office of Innovation (FAPESB). It has also grown up with the other instances of promoting innovation in ICTs, in particular through the

network and the NIT-Northeast from the National Forum of Innovation and Technology Transference Managers (FORTEC).Locally, there are partnerships being developed in the city of Ilhéus and Itabuna for a number of issues. There are also technical collaborations and cooperation with the Union of Industries of Electrical Appliances, Electronics, Computers, Information and Related from Ilhéus and Itabuna (SINEC).

The NIT-UESC has sought to align itself with the productive sector and major organs linked to economic activity in the southern region of Bahia, aiming to establish university-enterprise cooperation. Relying on this line of thought, Debackere and Veugelers (2005) emphasizes that the development of an appropriate structure for university-enterprise cooperation demands a special attention on the interests of the university and especially in business.

6.4 Creation of Knowledge Aiming Technology Transfer

According to the obtained responses, the researched NIT-UESC regarding socialization, externalization, combination and internalization of organizational knowledge (NONAKA and TAKEUCHI, 1995) has not achieved an ideal. There is little systematic use of the mentioned steps although it has been trying to provide members with the necessary information about the internal and external activities of the NIT.

One of the major barriers to effective organizational knowledge creation, quoted by them, is not having a permanent staff of employees in the NIT. There is only stock, as the Law provided for innovation, and has relied primarily on the recruitment of fellows through offered bids.

Scholars are trained in courses, lectures, workshops, workshops related to innovation, both in Bahia and in other states, but when the same research project come to an end, all the knowledge acquired is taken with him, and when others come to occupy its place it has to go through every stage of the mentioned initial training.

The NIT-UESC has an institutional homepage and also a blog, with opportunities in bulletin printed fortnightly. It is intended to create, in the medium term, portal of innovation with abundant material and mechanism to facilitate the interconnection between the demands and offers of innovation, mapping internal skills, connections and partnerships, as well as explanation of the mechanisms for facilitating or funding for these partnerships.

Interviewers have pointed out that a major responsibility of the state government would be supplying regulations of the Law of Innovation of Bahia related to the implementation of cargo and functions for the nucleus, so it would not rely only on scholars.

6.5 Technology Transference Contracts

Currently the NIT-UESC has not deposited any technology transfer in agreement with INPI, since its inception in 2009 (Resolution 05 of CONSEPE). But interviews show that they are seeking for mechanisms that can be truly effective.

7. Conclusions

The companies are not unrelated to the changes that are occurring in the current competitive scenario, however, managers have not given proper treatment for issues related to the specificities of each organization and individuals to promote knowledge creation, dynamic process of innovation and technology transfer.

In order to face this new challenge, they need to be constantly innovating and successively acquiring new knowledge organization through strategic partnerships so they can be always presenting a competitive posture, which is complex for countries in development like Brazil. These challenges over time are difficult to combat due to the lack of awareness of entrepreneurs for innovation and protection of generated intellectual property, and by the absence of incentives for teachers and doctors in the industry as well (FREEMAN, 1991; BRITO-CRUZ, 1999; SUTZ, 2000; EDLER, KRAHMER, and REGER, 2002; FLEURY, 1999; SEGATTO-MENDES, 2002; MOTOHASHI, 2005; CASSIOLATO and LASTRES, 2005).

Therefore, it is necessary that the Nuclei create a conductive environment to organizational learning which should be flexible and not rigid with hierarchical structures. This can be an excellent alternative for companies in the diffusion of innovation to ensure the protection of generated knowledge and the effectiveness of technology transfer at the INPI and the productive sector. The creation of the State Innovation Law allowed greater structuring of the centers of technological innovation.

The NIT-UESC, since 2009, has sought good strategic actions, with excellent structure, but no technology transfer agreement was filed with the INPI. It is observed that the creation and knowledge management, as proposed by the studied experts on the subject, does not happen. There is not an effective system of creation and knowledge management, making it impossible in many instances to accomplish actions taken by the nucleus that could be better worked with involved members and departments in the university and industry.

The lack of a framework of knowledge creation, directly impacted by the diffusion of innovation within the university and the productive sector regional actions aimed to prevent the transfer of technology, either through patent licensing, provision of technical and scientific, or supply of technology.

Despite the researched Nucleus was founded in 2009, in Brazil Innovation Act provided the ICT to create their nuclei after its approval in 2005. In Northeastern Brazil, most of the NITs were created in 2008.

The absence of an effective framework in NIT was the main barrier that managers face in planning and executing activities in the nucleus, which has relied primarily on hiring scholars.

In this sense, it is noteworthy that there is no single model for creating and managing organizational knowledge to all organizations that seek transfer technology, as each organization has its characteristics and a different culture from one another. Facing these challenges, NITs must continuously innovate their processes and acquire new organizational knowledge in order to achieve an entrepreneurial and innovative approach with the productive sector. Implementation, maintenance and expansion of these actions became central to the further strengthening of the NITs in the State of Bahia.

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