EXPLORATORY STUDY ON THE PROMOTION OF A CULTURE OF INNOVATION IN TECHNOLOGY PARKS: THE SOROCABA CASE

Gustavo Benevides, University Center FACENS; University Fernando Pessoa
António Cardoso, University Fernando Pessoa
Jorge Figueiredo, North Lusíada University
Isabel Oliveira, North Lusíada University
Manuel Sousa Pereira, Polytechnic Institute of Viana do Castelo

ABSTRACT

The present research aimed to analyze the process of development of innovation culture in resident enterprises in the Sorocaba Technology Park (STP). Recent studies on this issue point to the absence of a single flow to the steps of a process of innovation, everything will depend on the strategies and the culture of each organization to create its own innovation process. Therefore, it is a relevant research with respect to the advancement of literature on culture of innovation. The guiding research question was: what is the stage of development of the innovation culture of companies resident in the STP? The research methodology was developed from qualitative vision, which was exploratory. The technique used for the construction of the research and analysis was case study. Preliminary results of the research point to the need for practices that strengthen the willingness of those involved to share knowledge, error tolerance,ability to identify problems and implement new solutions. One can show that the culture of innovation is the basis for the strengthening of innovation practices and that this dynamic is in the process of development in the STP.

Keywords: Innovation, Culture of innovation, Strategy.

INTRODUCTION

With the deepening of the understanding of the technological innovation process, from the 1980s on, the expectations in relation to the innovation environments expand, seeking to capture, in addition to the objectives mentioned above, elements of intangible character. As emphasized in the World Bank report (World Bank, 1999), economies are no longer built exclusively by the physical accumulation of capital and human resources, but also rely on more intangible inputs, such as information, knowledge, learning and adaptation. In light of this perspective, new empirical studies have emerged in the international literature. Such studies focus on innovation environments as one of several key mechanisms of technological infrastructure for the dissemination of innovative activities in the productive sector in the so-called knowledge economy (Lundvall et al., 2002; Vedovello & Godinho, 2003; Zedtwitz, 2003).

The issue of innovation environments starts to be incorporated into the policy agenda in Brazil from the mid-1990s and, more strongly, from the 1995s. However, both in the international literature, as in the national one, limitations are observed regarding the approaches presented. For example, in the international literature, the European Innovation Monitoring System - EIMS (1996) observes innovation environment from the main technological characteristics of the companies they house, that is, more oriented to the interaction with

universities, or more related to regional development.

Arbix (2006) discusses that the innovation area requires more studies, because the innovation goes beyond the investment in R&D and new technologies; it is a broader and more complex process, resulting from complex interactions at local, national and global levels, among individuals, companies and other knowledge producing institutions, being necessary to evolve knowledge in this sense.

According to Bezerra (2011) an innovative organization is a dynamic organization, which has a guideline, but which is flexible as to the path to achieve it. The challenge is to overcome the dogmas, the political game, the pre-established rules and develop the ability to understand the present and think about the future, in addition, raise awareness and engage those involved in changing the stages, flows, processes and tools they use to make innovation happen. There is no single flow for the stages of an innovation process, everything will depend on the strategies and culture of each organization to create its own innovation process (Mello; Lima; Boas; Sbragia; and Marx 2008).

Given the brief exposure, this research aimed to analyze the process of development of the innovation culture in companies resident in the Sorocaba Technology Park (STP).

The guiding question of the research was: What is the stage of the development of the innovation culture of companies resident in the STP?

As object of analysis it was used the theoretical model of Martins & Martins (2002) to validate the research.

LITERATURE REVIEW

Concepts of Innovation

The concept of innovation has been known since Adam Smith in the 18th century, who studied the relationship between capital accumulation and manufacturing technology, studying concepts related to technological change, labor division and competition.

Only from the work of Schumpeter (1982) was established a relationship between innovation and economic development, the so-called "Theory of Economic Development" for its theory "creative destruction" which maintains that the capitalist system progresses by constantly revolutionizing its economic structure: new firms, new technologies and new products constantly replacing the old. In simplified form, the term "Schumpeterian" innovation is used to define innovations that "destroy" the way in which a certain activity was carried out. From these first ideas, innovation consisted of the introduction of a new good or a new quality of a good or the introduction of a new production method, thus defining the opening of a new market. Innovation, thus conceptualized, could also be obtained by the conquest of a new source of supply of substitute raw material or the appearance of a new organizational structure of a sector.

Schumpeter (1991), innovation can be characterized by the development of new products or changes in the characteristics of an existing product; a new production process; the entry or creation of a new market; the development of a new source of raw material suppliers and changes in the organizational structure.

Freeman (1998) defines innovation as the field of knowledge and practice that is responsible for the dynamism of industry.

Innovation is defined by Tidd & Bessant (2009) as doing something new, which can be a product or service, a process, a technique or a new use of a product or service in order to conquer new markets and also offer new ways to act in stable and mature markets. It's all about finding new ways to do things and to obtain strategic advantages.

Mello et al (2008) defines innovation capacity as the company's ability to have a favorable organizational environment to generate innovations. Such a favorable environment is influenced by culture, resources, skills and the use of cooperation networks of the company.

The capacity for innovation, which can be understood as the company should be organized and managed in order to be able to develop products, services and processes that really offer sustainable competitive advantages over time, is a key element of the competitiveness of companies in the global context (MELLO et al., 2008).

Bessant & Tidd (2009) discuss that organizations that are having high growth rates in recent years have in common the success based on development of innovations. Although the competitive advantage may come from size or ownership of assets, etc., sustainable growth is being conquered by organizations that can mobilize knowledge, technological skills and experience to create novelty in their product and service offerings, as well as in the ways in which they create and deliver their offerings.

According to a report published by the World Bank (1999), the development of original characteristics, differentiated and unusual, incorporated into products and services, with increased value perceived by stakeholders, lead to innovation.

According to the Oslo Manual (2006) an innovation is the implementation of a new or significantly improved product or service, or a process, or a new marketing method, or a new organizational method in business practices, in the organization of the workplace or in external relations.

Damanpour (1991, p.556) "an innovation can be a new product or service, a new production process, a new administrative structure or system, or a new plan or program adapted by the organization". The adoption of innovation implies the generation, development and implementation of new ideas and behaviors, being seen as a form of change in an organization, whether in response to changes in its internal and external environments or as an action taken in an attempt to influence that same environment (Damanpour, 1991).

For Bessant and Tidd (2009) "innovation is not a unique event, it is an expanded process of search and selection of ideas for change, feasibility and implementation of them" (Damanpour, 1991).

According to Bessant and Tidd (2009) "innovation is not a unique event, it is an expanded process of search and selection of ideas for change, feasibility and implementation of them".

Benevides (2013) point out some inhibiting factors of the innovative practice, it is noticed that these factors are determinant to stimulate, inhibit or prevent the innovation process, among them are the feeling of insecurity, given the risks involved in the failure of the innovation, the financial resources spent, the limitations of the market in absorption by lack of demand, besides the lack of trained personnel. These factors combined with the lack of strategy and the very aversion to risk imposed by entrepreneurs become the main barriers to the implementation of the innovation culture.

Given the above, the authors reveal that innovation is not a novelty, however, the implementation of innovative practices has been a major challenge in the culture of organizations, which implies the exercise of activities to generate new products, processes, methods and business practices with the purpose of generating benefits continuously to customers.

Types of Innovation

Most of modern economic history - covering approximately 200 years - is associated with revolutionary inventions (tangible and intangible) made possible by advances in scientific knowledge, which have allowed companies to create and transform this knowledge into goods and services to meet the needs and desires of the market. This advance in technology has allowed the market to have remarkable experiences and, consequently, the successes of the companies that launched these inventions - which have become innovations - in the form of products and services. (Scholtissek, 2012).

However, innovation does not apply exclusively to products and services, we have other less tangible aspects to illustrate: how a business is operated, how a company's processes are linked to each other, how sales channels are organized and explored, and how corporate cultures are determined. (Scholtissek 2012).

According to the Oslo Manual (2006), four types of innovations are defined that encompass a wide range of changes in the activities of companies, including: product innovations, process innovations, organizational innovations and marketing innovations.

Process innovations represent significant changes in production and distribution methods. They are implemented to create new products or services or to increase the speed, raise the quality and/or reduce the costs of production or services provided, such as the Ford production system, in 1908.

Organizational innovations refer to the restructuring, modification and/or implementation of new organizational methods, such as: changes in business practices, workplace organization, division of labor or external relations of the company, such as the adoption of a panel "spot management".

Marketing innovations involve the implementation of new marketing methods, including changes in product design and packaging, product promotion and placement, and pricing methods for goods and services. An example of this is the change of packaging of the product from condensed milk, from tin to tube.

A company that is copying a competitor's innovation is not innovating, but only imitating or adapting, and this practice does not mean that the company that has copied the product, process, organizational and/or marketing practices will be successful in the marketplace, this success depends - essentially - on the culture of the organization. (Scholtissek 2012).

The changes of these products, models, methods and/or organizational processes necessarily depend on resources and a favorable environment for innovation, which is related to the organizational culture, composed of factors favorable and/or limiting the innovative practice.

Organisational Culture and Culture of Innovation

Faria and Fonseca (2014) state that culture is a context that includes intention, infrastructure, value-oriented behavior, and a favorable environment for its implementation.

Organizational culture for Schein (1992) defines as a pattern of shared basic premises that the group learns as it solves its problems of adaptation and internal integration, which works well enough to be considered valid and, therefore, is taught and adopted by the new members as the correct means to perceive, think and feel and react in relation to the problems faced.

According to Dobni (2008) defines culture of innovation as the absence of behaviors, rules and environments that prevent the development of the natural impetus of people to suggest improvements and innovations, combined with a set of visions, procedures and resources that enhance these initiatives. A culture of innovation will only have fertile ground to establish aligned, focused and continuous processes if there are no internal obstacles - often hidden - that can bar the way out, fantastic ideas or sophisticated strategic visions.

Organisational change will only be successful if there is prior investigation of cultural premises. These are influenced, still by the beliefs established by the founders and/or leaders and remaining for years, even after they have left the organization (Schein, 1992).

The organizational innovations are implemented in companies with the objective of improving performance and job satisfaction, resulting in reduced costs, waste and increased commitment and competitiveness of companies (Manual de Oslo, 2006).

Therefore, before the authors presented in this chapter, the cultural factors depend essentially on: capable people, creative, able to perceive and explore the possible opportunities

and willing to dare without fear of making mistakes, being thus, determinants for the performance of the organization.

Relationship between Organisational Culture and Innovation

Organisational culture is seen as one of the determinants of innovation, as it has elements that can serve to reinforce or inhibit behaviours that contribute to innovative practice. Innovation needs to be accompanied by a context, an appropriate organizational environment (Machado, Gomes, Trentin, Silva, 2014). Culture is defined as "a set of values (knowledge, beliefs, assumptions, myths, norms, communication, among others) that help the members of the organization to understand the organizational functioning and thus guide the thought and behavior". Faria and Fonseca (2014).

According to Bessant and Tidd (2009), the environment is different from culture, since it is more visible within the organization, more superficial and susceptible to change, while culture refers to values, norms and beliefs much deeper and lasting within an organization.

The ability to innovate is associated with an organizational culture conducive to its achievement, according to Faria and Fonseca (2014) for the culture of innovation to happen is necessary that there are spaces for the creativity of people and that communication allows the sharing of ideas, information, experiences and values that have innovation as a central theme.

According to Bezerra (2011) the success of the company is in its ability to differentiate itself. And to innovate it needs to create the environment and culture that inspire people. Also according to Faria and Fonseca (2014) for the development of the culture of innovation, organizations must attract innovative people, so that - through stimulation, encouragement and empowerment - they leverage competitive advantages, without discouraging employees.

According to Rodrigues and Santos (2001), empowerment is a work project approach that aims at delegating decision-making power, autonomy and participation of employees in the administration of companies.

To innovate Bezerra (2011) suggests that a company needs to create a right environment, a right culture to inspire people and empower their minds to reach their full potential. It is no use buying machines, processes, systems and not working the individual. This is one of the most important tasks for leaders, because there are no formulas before creating the innovations, but rather, it is necessary to create the innovators.

Determinants of Organisational Culture that Influence Creativity and Innovation

The human factor is important, however it is not the only one, according to Faria and Fonseca (2014), among the factors pointed out as determinants that influence creativity and innovation in companies stand out: Strategy, structure, support mechanisms, behavior, communication and leadership.

Strategy: a set of great choices that guides the management of the present and the construction of the future in a long-term horizon and under conditions of uncertainty. A strategy oriented to creativity and innovation must be described in its mission. Ex 3M: "To be recognized as a provider of innovative solutions by all our clients".

Structure: Flexibility and empowerment stand out in this item. Flexibility occurs through the organization's capacity to adapt to the different and frequent changes imposed by the environment (internal and external) without losing its strategy. Empowerment is based on the delegation of decision-making powers, autonomy and participation of employees in the administration of companies.

Support Mechanisms: To recognise and reward initiatives by means of knowledge oriented towards innovative ideas and practices, with availability of resources (people,

technology, time) capable of offering the necessary support for their implementation through the so-called innovation environments.

Behavior that encourages innovation: Creation of values that support and encourage the team to offer ideas and take risks in the search for solutions, in addition to developing knowledge from the experiences and shared experiences.

Communication: Interactive and integrated behavior, where people feel safe and encouraged to take the initiative and express ideas, opinions and interests.

Leadership: Leadership is fundamental for the implementation of innovative practices, aligned with the strategy oriented to the type of innovation (product, process, organizational, marketing) with the use of available resources.

According to Faria and Fonseca (2014), it is noted that in micro and small companies the leadership factor stands out, given the importance of those who occupy this position, considering their broad role of decision and guidance in achieving the objectives. However, the innovation process does not take place in a calm, linear manner, it is part of new strategies and depends fundamentally on the will of the leadership.

Therefore, based on the literature review, the research elaborated the categories of analysis: Categories of analysis: Factors that affect the culture of innovation (Table 1).

Table 1

Determinants of a culture of innovation	Significate
Strategy	A strategy that leads to creativity and innovation in an organization is described in the vision and mission as a customer-focused marketing orientation. It also includes active research on the needs of existing and potential customers with a vision to promote creativity and innovation.
Strategy	Employees should understand that vision and mission influence implementation, as they should mention creativity and innovation. Objectives should be direct, quantitative and time-related for creative products and services.
Intentionalities (purposefulness)	Managers and employees should maintain open communication with each other. People need to feel emotionally secure. There must be support for change through behaviors that encourage innovation. There must be flexibility in the way things are done at work.
Relationship of confidence	Creation of values that support risk-taking, the encouragement of ideas, the initiative to seek new
Behaviour that encourages innovation and the working environment	solutions to problems and decision making. And the work environment.
Manager support	Open communication between managers and employees and between employees, availability of equipment and resources dependent on the support of the manager. Managers' tolerance to employees' mistakes. The support of managers in the adaptation of rules and regulations..

Source: Adapted from studies by Martins, E., & Martins, N. (2002).

METHODOLOGY

The present article was developed using the qualitative approach, because it is appropriate to examine the capacity and diffusion of the innovation culture of organizations in in-depth studies, where there is the possibility of extracting details and variables not perceived in

positivist studies (quantitative). The research method contemplated a semi-structured interview script, whose main objective was to understand how the capacity and culture of innovation is diffused in the Sorocaba Technological Park (STP). The interviewees were the companies that operate in the STP, as well as the directors of the Innovation Agency of Sorocaba (INOVA), the Universities and Research Centers.

Considering that a data collection for a study of this nature cannot be made based on only one visit to the studied organization, regardless of the number of interviewees (Figueiredo, 2004), the collection of empirical evidence to substantiate this study involved a process that was developed over four stages of interaction with the target audience of the research, on different occasions (May/2018 to August/2018), namely:

1) Interview conducted at INOVA Sorocaba, with one of the leaders of the Sorocaba Innovation Agency;

2) Collective and individual interviews, conducted with leaders of companies resident in the Sorocaba Technology Park (STP);

3) Individual interviews with project leaders and researchers from Universities and research centers present in the STP, followed by visits to the facilities and laboratories.

The case study method was used (Yin, 2010), which allows the examination of an environment that promotes innovation with an adequate level of depth and detail. Therefore, the interest is to contribute to expand the understanding of the concepts of capacity and culture of innovation.

DISCUSSION AND ANALYSIS OF RESULTS

In this section the focus is on the presentation of the results of the field research, as well as the discussion in light of the theory.

The first dimension analyzed consists of the extent to which innovation is treated as a strategy of the organization. To this end, those responsible for the companies belonging to the STP were interviewed, and the result was that 25% of the companies declared in their mission the theme innovation as a strategic target. However, when asked: a) Is there a clear alignment between mission, vision, objectives and organizational goals? b) Are the innovation strategies aligned with the strategic direction of the organization? The answers converged to the yes (87%). Only 13% of the interviewed companies said no. Therefore, it can be evidenced that the innovation strategy is diffused in the individual of each organization.

The second dimension analyzed was the intentionality, since it should mention creativity and innovation, from the work team. To verify this dimension, two questions were asked: 1) How are the work teams formed? 2) Do these work teams include internal collaborators from different areas and external collaborators such as customers and suppliers?

It can be seen that the teams are formed according to the type of activity and by areas of activity within the company. For 87% of the respondents states that there is a strong interaction with suppliers, considering that they are part of the process of creating the company's products. But in the view of the interviewees it is necessary more and more the narrowing with the client.

Regarding the organization of the workplace, the respondents converge their answers to: "The space is organized in such a way that the entire environment is shared with experimental tables and benches... It is necessary to improve the sharing of interdepartmental knowledge".

To evaluate the development of the innovation culture it was necessary to investigate how the organization delegates power, autonomy and responsibility to the employees for the solution of problems and creation of innovations. And this approach should permeate all organizational levels, because it establishes the relationship of trust (third dimension of analysis).

The results for this clash were significant, since 40% of the interviewed companies fully delegate all value creation processes to employees, and also integrate the responsibility of

solving problems to partners / supporters of the business (suppliers, research centers and universities). And for 60% of the organizations interviewed, the results present a structure for decision making and delegation / autonomy closed at a well-defined hierarchical level, and formalized in command line, along the traditional lines of the 2nd Industrial Revolution.

The fourth dimension of analysis refers to the behavior of employees, as well as their routines in the work environment. When asked about the relevance (or not) of holding informal meetings, brainstorming sessions and/or use of other tools for the creative solution of problems and generation of new ideas, 63% of respondents point to the need to intensify this practice, and 37% answered that the organization is vertical and these actions do not happen as they should. It is then a point of discussion, because it is expected that in environments that foster innovation and creativity more flexible organizational structures and individual behaviors more autonomous and creative, since this behavior encourages innovation.

Regarding the fifth dimension - manager support, the research findings are relevant with regard to the need to strengthen knowledge, dissemination of practices that support the professional growth of employees and tolerance to error, that is, how does the organization deal with experimentation, tolerance to errors, creative potential, pro-activity, willingness to share knowledge, ability to identify problems, create and implement new solutions?

In the view of 76% of respondents "Error is a way to make adjustments and achieve success, to err can be by excitement or by situations not previously contemplated, economic scenario for example. However, it is necessary to manage the errors, because it is possible to learn a lot from them".

Other research findings can be highlighted, such as: a) There is a need to use the Technology, Information and Communication (ICT) systems, to involve/integrate their network of skills to generate ideas and suggestions for the development processes of improvements and/or innovations; b) development of awards for results achieved; c) Encourage intra-entrepreneurship, providing the time and human, technological and financial resources necessary for employees who wish to develop solutions in innovative projects; and d) free access to information and knowledge they need to promote improvements / innovations.

Conceptual criticisms to the process of establishing a culture of innovation

As there is resistance to change, the whole process is often a huge challenge. In this sense, Frost (1995) recalls that new ideas and inventions need answers from the organisation to help them move through terrains that are not prepared to recognise and appreciate something new. This author even considers that "creative acts are acts of courage. First, because the creator of a technical or social innovation is entering unknown waters and is likely to receive conflicting comments about the value of the new idea; second, because the creator will encounter opposition or hostility when the idea is presented and introduced into the system; third, because along the way, for a possible acceptance of the idea, the creator will have to invent a great personal energy in the process of having the innovation accepted; fourth, because creative acts can fail and sometimes threaten the career of their leaders.

CONCLUSIONS

The final considerations of this study point to the relevance of the innovation culture for the promotion of new practices and value creation for the STP organization. And the assumed premise is that culture is a cumulative process of knowledge and the use of it provides man with possibilities of adaptation to his environment.

It could be evidenced, from the analysis of the concepts present in the literature, that the culture of innovation is considered as something desired in organizations for the improvement

of their performance and their competitive advantage. In this sense, the research corroborates this association.

This article pointed to the complexity of factors that involve the culture of innovation and what is its stage in the STP. In the view of the authors (references of this study) point to the culture of innovation as being part of the larger culture of an organization, for it to develop, it is necessary to deal with aspects restrictive to culture in this context, such as control, centralization of decisions, intolerance to error, distance to power and dissemination of knowledge.

Regarding the theoretical model of Martins and Martins (2002), the dimensions: Strategy, Intentionality (purposefulness), Relationship of trust, Behavior that encourages innovation, Work environment, and Support of the manager, provide a holistic approach that allows the investigation of the interdependence, interaction and interrelation of different subsystems and elements of organizational culture in an organization. Such notes reinforce the importance of the holistic approach to innovation, which is a structuring that facilitates the process of development and strengthening of innovation.

In order to establish a culture of innovation, the organisation needs to choose its own balance between the "old" and the "new" culture. The managerial style, the contributions that individuals must make to the organization and the way in which businesses are carried out indicate a new way of expressing their values. However, it can be seen that in the STP there is a concentration on traditional practices. It is worth mentioning that the executives who work in the technological park of Sorocaba, lack training and vision that aligns the objectives of the organization with the necessary practices to implement the culture of innovation. The characteristics of an innovative culture are: decentralization of responsibility; reduce its hierarchical levels; change its managerial style, making it easier and non-controlling; disseminate through its human resources; use efficient forms of communication, whether formal or informal.

The results of the research point to the need for practices that strengthen the willingness of those involved to share knowledge, tolerance to errors, ability to identify problems and implement new solutions. It can be evidenced that the culture of innovation is the basis for the strengthening of innovation practices and that this dynamic was found at the initial stage in resident companies and in the Sorocaba Technology Park (STP) complex.

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