

Knowledge and Expression of Human Talents to the Process of Innovation in Technology-Based Companies

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Abstract-- This article deals with the understanding of creativity as an expression of human talent to innovation processes in technology-based companies, resulting from analyzes obtained through a study conducted in a technology-based company headquartered in the city of São José, Santa Catarina state, Brazil. The research was based on the topics of Creativity and Innovation, Organizational Knowledge, Knowledge Management, and Technology-Based Organizations, allowing better visualization of the elements inherent in the creative process in technology-based companies. In order to have a view of the perception of actors, relationships, potential, limits, among other things, semi-structured interviews were performed with employees who work directly in the departments of Research & Development (R&D). This study falls within the category of a case study with a qualitative approach, through means of bibliographic and field research, and followed up as an exploratory and descriptive study. Data analysis was performed through content analysis on a categorical non a priori system in which each category was created as it was mentioned in the speech of interviewees. It is important to highlight that central ideas were synthesized in order to enable the analysis of each participant impersonally, ultimately generating collective understanding on the approached topic. From the observation of perceptions in the interviews, it is possible to conclude that it is necessary to add spaces for processes of sharing, propagation, and use of knowledge in the company.

Index Term-- creativity, innovation, knowledge, technology-based companies.

1 INTRODUCTION

The work market today is increasingly competitive, which leads people to seek self-improvements, connecting their skills and creative possibilities to their personal and professional lives.

It is understood that to “create knowledge” is a different way of saying “to innovate”. Wiig (1997) considers that giving people access to knowledge brings continuous innovation and the ability to create and deliver products and services of the highest quality. This also requires the acquisition of effective knowledge, reusing and building on prior knowledge. Knowledge Management seeks to “create an interactive learning environment, in which people acquire, internalize, and apply knowledge to create new knowledge” (Sveiby, 2000, p.66). When the organizational environment is conducive to the development of information into knowledge, and to encourage collaborative learning among people,

aggregating value to their products and services, new knowledge will be an organic result, which will be managed so that they can continually create, validate, and apply new knowledge to their products, processes, and services through a team of highly motivated people (Bhatt, 2001).

Creativity is an inherent quality to individuals and organizations that when exercised one can enter the market with innovative products or services, as well as conquer new paths and markets, with a competitive edge. Organizations with a tripod alignment to management – people, processes, and technology – develop an environment where people can create, share, use, and spread knowledge in the organizational environment, which can subsequently be used as strategic and competitive advantage if managed efficiently. References within the universe of organizations are those related to technology-based engineering, as well as information and communication technologies.

Within this context, a study performed in a technology-based company sought to collect the perception of participants about their creative potential, and blockages that prevent them from expressing creativity in the workplace. Thus, the results obtained are the perception of researchers when observing participant statements.

2 THEORETICAL FOUNDATIONS

This section will address issues on Creativity and Innovation, Organizational Knowledge, Knowledge Management, and Technology-Based Organizations, allowing better visualization of the elements inherent in the creative process in technology-based companies.

2.1 Creativity and Innovation

Creativity was conceived in ancient times as a form of “divine inspiration”. The apparent spontaneity and irrationality has unquestionably endured during the 19th century in the belief that people kept mental creativity as a kind of emotional purge (Kneller, 1978).

Theories such as the “Componential Model of Creativity” Amabile (1996) and “Systems Perspective” by Csikzentmihalyi (1996) conceive creativity as a sociocultural phenomenon in which individuals express their creative potential from interacting with the environment, and that the possibility of developing this potential lays inherent in every

individual. To develop creative potential is to see what no one else sees, making use of strategies to learn to see and make one's rationale become visible (Michalko, 2002).

Alencar (1996), Amabile (1999), and Pasinatto (2007) have claimed that creativity is related to people who "think differently", processing thoughts associated with insight, invention, imagination, innovation, intuition, inspiration, clarity, originality, and ideas that should influence the way business is conducted through three components of creativity: expertise, intrinsic motivation, and creative reasoning.

Pope (2005) argues that creativity is also the ability to produce, make, or turn something into something else that is new and valuable, implying uncertainty and ignorance. As it generates ideas, it solves problems and enables learning through elimination and trials, allowing for identification of customer needs and new opportunities (FIALHO et al.2006).

Several scholars from different perspectives also demonstrate creativity as a phenomenon of multiple aspects, in which interact cognitive elements, personality, as well as variables of family, education, and social nature (TORRANCE & SAFTER, 1999; TORRE & VIOLANT, 2006; WECHSLER, 2009). Vanzin and Ulbricht (2010) claim that innovation only happens from creativity, being the bridge from creation to rationality, that is, when the activity of the right brain hemisphere converges in balance with the left hemisphere that innovation occurs. The formula for marketing success lies in innovation, where sets of different production systems produce the formulation of new services and products. Thus, innovation or creativity without entrepreneurial actions would be just simple "ideas" without profitable advantages.

2.2 Organizational Knowledge

Within Organization, exploring the potential of knowledge requires for several actions to be implemented, therefore developing favorable conditions and an environment to create, share, and explicitate knowledge.

According to Nonaka and Konno (1998), knowledge creation is a spiral process of interaction between tacit and

explicit knowledge. These authors contribute to the topic by introducing the concept of "ba" (place), which must be seen as a space for sharing, serving as physical or virtual base for knowledge creation. There are four types of "ba", each corresponding to one of the four stages of the knowledge conversion model called SECI (Socialization; Externalization; Combination, and Internalization).

Thus, Nonaka and Konno (1998) emphasize that the "ba" offers an integrated conceptual metaphor for the SECI model of dynamic knowledge conversions, contextualizing knowledge creation within the characteristics of the four types of "ba" (as shown in Figure 1):

- *Ba of origin* – where individuals share feelings, emotions, experiences, and mental models. It is the primary *Ba* where the process of knowledge creation begins and represents the socialization phase;
- *Ba of interaction* – where tacit knowledge becomes explicit, representing the externalization process. Dialogue is key for such conversions and the extensive use of metaphor is one of the required knowledge conversion skills;
- *Cyber Ba* –the site virtual interaction, instead of in a real space and time, representing the combination stage. The combination of explicit knowledge is most efficiently supported in collaborative environments utilizing information technologies;
- *Ba of exercise* – facilitates the conversion of explicit knowledge to tacit knowledge, enabling internalization. More than teaching based on analysis, learning by continuous refinement through OJT (On-the-Job Training). The internalization of knowledge is highlighted by the use of formal knowledge (explicit) in real life.

Each of these *Ba* provides a platform specific to each stage of the knowledge spiral process, supporting a particular conversion process, and thus accelerating knowledge creation processes.

The relationship between the *Ba* and modes of knowledge conversion is shown in Figure 1.

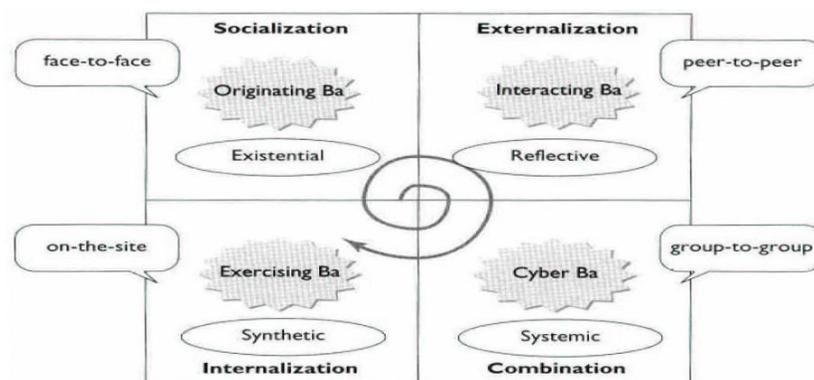


Fig. 1. The four phases of Ba
Source: Nonaka e Konno (1998)

The Japanese use the concept of *Ba* as a place to share experience and knowledge, acting as a multidimensional space and a platform on which people recognize themselves as part of the integrated whole. Participate in a *Ba* means to engage and go beyond the limited boundaries and perspectives that each individual naturally creates.

Nonaka and Takeuchi (2008) consider organizational knowledge as the capacity of organizations to generate new knowledge, spread it within the company, and to incorporate them into products, services, and systems. However, Santos and Amato Neto (2008, p. 573) say that “organizational knowledge should be a purposeful construction that focuses on developing a differentiated set of skills, beliefs, values, attitudes, and behaviors”.

Organizations need to invest in the organizational environment in order to remain favorable to the creation of new knowledge. To this end, it must ensure freedom for collaborators, allowing their creativity to flourish while keeping them focused on the goals of the organization. Without freedom, knowledge workers feel constrained in their creativity, elementary criteria for organizational innovation (Feliciano, 2008). Therefore, it is important to consider the environment and technology within organizations, but especially the people as they hold the power of creation.

2.3 Knowledge Management

In order to increase competitiveness, organizations need to transform not only the structure but also the values for the creation of an environment favorable for new knowledge. Knowledge management is “a systematic and integrative process of coordinating the organization of all activities to acquire, create, store, share, develop, and implement knowledge by individuals and groups in the pursuit of organizational objectives” (Rastogi, 2000, p 40).

When considering the interaction between technology, people and techniques enables an organization to manage its knowledge effectively and creating an environment of “learning by doing”, Bhatt (2001) states that an organization can sustain its competitive advantages.

Santos and Varvakis (2010, p 70) state that: (...) the management of activities and processes that promote knowledge to increase competitiveness through better use of the creation of sources of individual and collective knowledge, therefore Knowledge Management aims to improve productivity through management processes that improve cycles of organizational knowledge.

Entrepreneurial organizations characterized by having large learning capacity favor new relationships between individuals and teams, consenting with change in the organizational culture. Knowledge Management has its practical relevance in managing the environment and personnel which are the essential elements driving innovation and the transformation of organizations (Silva, 2010).

Knowledge Management enables individuals to acquire, store, share, and apply their knowledge collectively,

solving problems and managing organizational decisions. Knowledge Management projects should be focused on strategic organizational guidelines such as:

a) *Innovation*: policies and procedures for the creation and improvement of processes, products, and services;

b) *Learning*: guidelines to support training and knowledge creation;

c) *Communication*: way to facilitate the exchange of information and conveying of meaning through an organizational structure;

d) *Organizational memory*: organizational ability to preserve information about past events, bringing them back for present decision making (Santos, 2009).

Therefore, Knowledge Management is the action that brings together the elements able to systematize and maintain knowledge within an organization. In order to create an environment conducive to knowledge, the values, culture, attitudes, and working methods in the organization must be transformed in an organizational context.

2.4 Technology-Based Organizations

Knowledge-Intensive Business Services (KIBS) offer aggregated knowledge products to the market in which they operate, classified in two ways: a) professional services, such as consulting firms and engineering organizations; b) Research and Development organizations (R&D), with high-tech industrial organizations as an example (Alvesson, 2004).

Technology-based Organizations are those related to engineering and to information and communication technologies, which business is associated with the production of solutions that involve a broad content in computing and telecommunications (Marcovitch, Santos, Dutra, 1986). These companies develop products and services through the application of high scientific knowledge (Iron, Torkomian, 1988). Corroborating such statements, Carvalho, Pizysiezniq Filho, Machado and Rabechini Junior (1998) say that technology-based organizations develop applied science and engineering products and services characterized with high technical and scientific degree.

These organizations are undergoing major challenges, face the demands of the new Knowledge Society for customized solutions to local realities, while aware that this system preconizes the survival of the fastest, not of the largest. To this end, the place all bets on innovation in their portfolio in order to retain customers or gain new customers from their competitive advantages.

In order to create a favorable environment for the generation of new knowledge, technology-based organizations need to wake the creative potential of their collaborators, generating organizational intellectual capital. It is important to highlight the concept by Runco (2007), who believes that every person has the potential to be creative, but not everyone realizes this potential because they lack the opportunities to develop it, due to several factors influencing the development

or inhibition of creativity, such as family, school, work environment, health, and sociocultural context.

It is important to invest in personnel, because when they move within their relationships and quotidian lives they hold the power of creation and innovation; they and are the real advantage of contemporary organizations (Silva, 2010).

3 METHOD

Research participants were employees involved with Research & Development (R&D) in a technology-based company located in the city of São José, Santa Catarina state, Brazil. This company works actively in the fields of telecommunications, networks, and electronic security department. According to Gil (2008, p 17) “research can be defined as the rational and systematic procedure that aims to provide answers to the problems proposed”.

The research process includes a set of actions that aims to collect information that confirms the validity of an observed phenomenon. Minayo (2004, p.17) considers that “we understand research as the basic scientific activity, in inquiry and construction of reality”.

Research will fall under the qualitative approach in order to meet the requirements of the studied object. Marconi and Lakatos (2009) believe that qualitative research is concerned with analyzing and interpreting profound aspects, describing the complexity of human behavior, providing more detailed analyses of habits, attitudes, trends, and other aspects involving the actors investigated.

Taylor and Bogdan (1997) consider the phenomenological perspective central to the concept of qualitative methodology. The authors affirm that in qualitative methods, researchers must be fully involved in the field of action of the participants as, in essence, this method of investigation is based primarily on talking, listening, and allowing the free expression of participants. In the same line of thought, the authors say that qualitative research implies that there is greater diversification in the methodological procedures used in research by allowing the subjectivity of researchers in pursuit of information.

Triviños (2008, p 48) emphasizes that “Phenomenology, undoubtedly, represents a philosophical trend that, among other merits, seems to have questioned the knowledge of positivism, elevating the importance of participants in the process of knowledge construction”.

Samples were intentional and participants were individually selected. Perceptions obtained by semi-structured interview were applied on sample individuals were recorded in field journals. Written materials were interpreted concurrently with their presentation, in order to provide a review of concepts or assumptions elected at research baseline.

Therefore, the study is a case study with qualitative approach, followed up as exploratory and descriptive, and characterized in relation to its means as review of literature and field research.

Data collection took place through semi-structured interviews with four (4) employees of a technology-based company, considering that 2 out of 6 invited employees could

not participate due to business traveling. Data analysis of this study aims to understand processes studied by means of content analysis, made by *a non priori* categorical system, in which each category was created as they were brought up in the interviews (Franco, 2008). When commenting on categorization, Bardin (2009, p. 145) says “there is a sorting operation of the constitutive components of a differentiation set, and later regrouping according to analogy”. Such methodological approach has enabled the organization and tabulation of qualitative data from verbal nature, obtained from open questions in participant testimonials.

Initially, for the analysis of participant statements, each interview was read and aspects of the studied objectives were underlined, being later rewritten to allow for classification. It is important to note that central ideas were synthesized, enabling sentiment analysis of each participant impersonally, with consequent collective understanding of the studied topic.

Thus, through interviews we have sought to understand the perception of participants as to their creative potential, and of blocks that prevent them from expressing creativity in the workplace, that is, the awakening of creativity as knowledge and the expression of human talents to processes of organizational innovation. It is important to mention that interview analyses of the interviews are a result of speech observation and the perception of the researchers on them. The content of their statements was set to be manifested numerically as Informants 1, 2, 3, and 4.

4 RESULTS

As described in the Method section, we shall present the research results with informant testimonials and their researcher analyses as categories and subcategories created from their answers. For the perception analysis of each participant about the possibility of releasing their creative potential, or blocks that prevent them from expressing creativity in the workplace, and subsequently the collective perception, differences and similarities in participant answers were sought within questions asked during the interviews, or that have emerged during the interview. Thus, categories created were: Creativity, Innovation, Organizational Knowledge, and Knowledge Management.

4.1 Differences

Creativity:

Subcategories identified in the statements of informants refer to: Freedom, Motivation, and Standards.

Informant 1 – “Yes, in the industry and the companies in general. I am charged for it. I’m marketer for the product, right, I have an obligation to always be innovating, so... creativity and innovation, let’s say that’s not a plus, I’m charged for it, I have an obligation to develop more on these characteristics”.

Informant 2 – “... So I guess it’s no use to fly to a place that, where there isn’t... is not helpful, our creativity has to be directed to something that is useful”.

Informant 3 – “I have complete freedom for creativity”.

Informant 4 – “I have a reasonable amount of freedom... you are free to be creative, but the company has standards that have no way, right? I cannot be creative on the company brand logo, so I have a certain limitation due to the company's history and behavior standards, but creativity in creating tools, creating products, and in how to lead my team, then I'm totally free to make these decisions”.

It was observed that for informants creativity is closely linked to freedom, which in turn demonstrates differences in their perceptions of actions and organizational purposes. It is interesting to note that some statements appear to mention total freedom for creation; however, it is evident that the standards established in the organizational structure are a limiting factor for new ideas to aggregate value in the organization.

Innovation:

Subcategories identified were: New Ideas, Product Development, and Trend Follower.

Informant 1 - “... so I have freedom to do what I want, but I have to convince people to follow through, I have to have their permission, in that sense”.

Informant 2 – “... I can propose new ideas, not just of products, but of the form of labor, use of new technologies, especially in the technology part or on how to develop a product - I have complete freedom”.

Informant 3 – “I think that from the activities that we develop here, I think we don't need to develop other things”.

Informant 4 – “... my team is innovative. It's very following; we're at a time, today, on August 19, in a very promising moment with new products that would theoretically be reportedly, 'hey, everyone has it', but we always try to release these products with a different perspective. What my product will have more and our product has much more than the competition, let's say, than what the common product has, than what everyone knows - and my segment has been extremely innovative.” “My company is reportedly not a creative company, it does not create technology, even by his follower design – that is, it picks up and applies existing technologies into its products – it is not the profile of a company that creates new products. But it's a follower of world trends, so it goes out, brings innovations, brings products, and develops products here, but on this basis, it brings to Brazil one case of external success, it will not... for example Apple developed the first touch screen phone, a new totally innovative concept that revolutionized the market. It does not have this profile, in this regard of technology, innovation, and creativity”.

It was observed that the issue of innovation is unclear for employees of a technology-based company, showing significant differences in their accounts, demonstrating they can propose new ideas at times but later that they do not need to create new things. The attention of researchers was directed to the little understanding or lacking consensus on

organization goals as an innovative company in the market. This fact was confirmed when Informant 4 reports that the team is innovative, although the company is not, being merely a trend follower.

Organizational Knowledge:

Subcategories identified were Relationship Between Sectors, Internal and External Training, and Leadership.

Informant 1 – “Today, our department, all the people in my department in Image Management, in our segment everybody knows what's going on, everyone knows what our main competitors are, the prices of our competitors, what we want to do... Everyone knows what they're doing, and I think this is very good for us to work on a single goal. So, this is how that happens: you have several people, Product Marketing, Project Manager, Manager, the R&D staff – when one item in a department drops, for example, Product Marketing, when they sign off, the department has to keep flowing, you see, they have to follow through towards that goal”.

Informant 2 – “The interaction between people is regular. Culture... people have a good personal relationship, but has difficulty speaking professionally. In the headquarters, we talked about work and did not have an intense friendly relationship; people here have an intense friendly relationship and do not talk much about work. So I don't know if it's the lack of intensive meetings or if the fact that the personal relationship is more intense and that just diminishes work talk... skill and service training is underinvested in”.

Informant 3 – “... within the segment that I work there are several sub-segments; that's a normal thing here in the company because every company has an entire R&D to work with all product lines. Here we have our product line, but the R&D team is divided by product family, so we can focus more on ideas, development, and small differences in development mean to divide and conquer”.

Informant 4 – “... we work in a system of self-managed teams, so product marketing decisions can be often made by the team on behalf of the team to which I am inserted, in case of absence...” “It invests in training. It has a pro-education program that invests for you to do training, lectures, graduate courses, language courses, and such, but then I have a kind of personal opinion that I never made it, but I think that is just for show, but there are many people who are benefited by the programs where the company has skill research and development.”

We have observed that relationship problems between people and segments of the company do not happen in a globalized way, a key feature for knowledge-making companies (individual, group, organizational, and inter-organizational). It is noticeable that work processes being developed by self-managing teams must have a leader that channels the goals of the company as a whole, providing an environment of unity, aggregation of values, and direction towards the company goals – consequently generating organizational knowledge. Differences in perception of interaction and development of work have been noticed in

participant answers, because what is important for some to have independence in actions, for others there is a lack of investment in human capital procedures, including training to develop skills and services, as well as the interpersonal relationship between teams. This difference is also shown in the statements of Informants 2 and 4 in the category of Training.

Knowledge Management:

Regarding the category of Knowledge Management, the subcategories identified were: Information Seeking, Knowledge, and Communication.

Informant 1 – *“We promote self-knowledge, helping and encouraging the development of all employees, if they want it. It depends more on the collaborator than on the company. The company has a very wide range of incentives for self-improvement, promotion, knowledge for all of its employees; they should just want to... we have a physical space for socializing, recreation, and exchange of information and knowledge for employees, that is, we have an association for that.”*

Informant 2 – *“...who will develop the product will go after information, but there isn't anything formal. Here, for example, since the teams are in the same environment they talk in the hallway to see if I'm on a project like this, like that – communication by word-of-mouth is done to know what technology each one is working with, if someone will develop some similar they should get that information there... this interaction practically does not exist and communication is impaired... if the person is not comfortable to share, nobody learns anything... the team communicates too little... the issue of physical space isn't appropriate and they are building a new one... I know all segments of the company and I can't say for the others. In my perception, I don't believe so.”*

Informant 3 – *“There are different norms in the company ... processes are prescriptive because R&D allows you that, as other areas do not. You can try to improve the processes, but it's more tied up, more stuck... The most successful experiences I think are not transferred to other team members. The staff knows about it, but these things are hallway conversation, I think there is no such disclosure.”*

Informant 4 – *“The proliferation of knowledge is very encouraged from our HR and Personnel Management here, encouraging the self-management team to work on it. Like I said, if someone leaves here, someone else has to be able to continue, because this person's knowledge has to be shared – we encourage that. If someone works with one type of equipment, they'll participate in the meeting of the others so they know or at least have a notion of what that equipment is about.”*

It is demonstrable in the speech of participants that managing, sharing, and spreading knowledge does not happen seamlessly. For knowledge creation in an organization, it is necessary that processes and technologies are appropriate and effective.

4.2 Similarities

Just as some divergence was observed in the speech of participants on the topics of Creativity, Innovation, Organizational Knowledge, and Knowledge Management, we have also noticed similarities in the perceptions in certain situations, generating categories as follows:

Creativity:

Informant 1 – *“I always liked the novelty of new things... you have to make it clear to your team and say, 'look, people, this is our goal this month and everyone has to walk along'. Then you work with more motivation when the people know why they're working”.*

Informant 2 – *“I've always sought knowledge a lot. If everyone were in a higher level of development, work will come out better, regardless of the interaction you have with me; if the people who interact with me have a faster response, more ideas, my work will also flow better”.*

Informant 3 – *“I've always liked to tinker with new things. People have to be motivated in what they do; if they're motivated, they develop more easily and by developing themselves, it helps me meet the objective”.*

Informant 4 – *“I never liked the ordinary.” “It will improve this, this, and that, it will sell because of this, this and that, it makes people more motivated to work... and then things start to work better”.*

It is observed that participants consider that they have creative potential, as they are unanimous in saying that the search for new things is part of their lives, but motivation is a major factor for creation processes to happen in the work environment. Therefore, they consider that not only the will to innovate is sufficient, but they need to be motivated in the organizational environment.

Innovation:

Informant 1- *“leaders have an obligation to innovate, so I have an obligation (to continue leading) to always do it, to always be at the forefront, to have a new idea, to put a new function on the product, and obviously this whole context that I already had in my professional past, that encourages and influences on decisions.”*

Informant 2- *“If the people who interact with me have a faster response and more ideas, my work will also flow better.”*

Informant 3- *“If the company does not develop I cannot also develop myself to grow within the company; the company needs to grow as well... I think that, with innovation, you end up gaining new markets that you didn't... act before.”*

Informant 4 – *“To do what you planned with your director and manager, and with them, you have to work in order to involve them in this process; I don't know, to be innovative, creative, and to always develop more tools. If the tools that exist now are not enough, you have to make it happen.”*

In relation to Innovation, it is noticeable in the speeches of all participants how important the involvement of leaders is to facilitate the integration of individual and

organizational goals, generating new ideas, new processes, and new markets.

Organizational Knowledge:

Informant 1 – *“the concept of self-managed team works very well, our people were trying to implement it, for example, in a particular department inside the firm due to people’s resistance or due to characteristics of collaborators; we weren’t as successful as we have here in Image Management”.*

Informant 2 – *“The R&D teams are formed by self-manageable teams, but every team reports to a segment manager – it has a certain direction...”*

Informant 3 – *“We have no leader; our team is self-managed by our staff. We don’t have a direct leader or a supervisor there at R&D. We have a team manager that is responsible for project management and not personnel management, and our supervisor is the segment manager”.*

Informant 4 – *“We work in a self-management system, so marketing product decisions can often be made by the team on behalf of the team where I am inserted, in case of absence”. “...I also try to involve the R&D people, so there are events I’ll attend, or events where I say, ‘I’m staying – you go and develop’, because the person gets in there and it makes the presentation”.*

It was observed that participants have coherence in R&D team structures, that is, in this setting the model of self-managed team is applied to the R&D departments, with good results. Attempts to take this model to another department of the company, did not have the same results, due to resistance or characteristics of the people involved. It is noteworthy that R&D departments are structured by people in intensive Knowledge.

Knowledge Management: 3 categories: Information Seeking, Knowledge, and Communication.

Informant 1 – *“what we can improve in work situations, I think the environment, and obviously interactivity, the way we communicate with people. The company provides information technology tools such as database, intranet, internet, collaborator gateways, such as support for research and knowledge sharing of our work”.*

Informant 2 – *“Even with separate teams, communication is a process that’s a bit more difficult”.*

Informant 3 – *“Communication is usually more informal, you go there and talk to the person, you say what you need to do, then when you need to formalize something you send an e-mail... Yes... the company offers information technology tools for our information”.*

Informant 4 – *“I think the possibility of being creative in a company is... if there is a routine, if there is a standard, you already start to limit that creativity. Often, your best ideas are not within a corporate environment, so there would have to be a form of external communication ... Yes... the company makes information technology tools available to us”.*

It was observed that participants share the same perception, that even with the organization offering information technology tools, communication between people is a process that requires attention in order to bring improvements in the work environment, enabling creative development of professionals.

Still analyzing participant responses, it is possible to list their suggested changes in actions, due to factors limiting the expression of creativity within their companies. Therefore, they consider the suitability of an environment conducive to creative processes in an organizational context:

- To provide adequate work space for processes of sharing, spread, and use of knowledge within the company;
- To provide training to develop skills and services;
- To stimulate communication between managers and collaborators in company segments;
- To give creative freedom without attachments to institutional norms and procedures.

Based on the theoretical framework of this study and the analysis of the interviews, obstacles for the development of creativity and innovation in technology-based companies were observed. The people who “think differently”, processing thoughts associated with insight, invention, imagination, innovation, intuition, inspiration, enlightenment, originality, and ideas should be encouraged to conduct personal and professional goals (Alencar, 1996; Amabile, 1999; Pasinato, 2007).

Technology-based organizations are placing all bets on innovation in their portfolios, either to keep clients or to gain new ones from their competitive edge; therefore, they need to awaken the creative potential of their employees, considering that every person has the potential to be creative, but not all realize this potential because they lack opportunities to develop it (Runco, 2007).

The study has revealed that Knowledge Management tools and techniques in creative processes in the workplace deserve unity, as highlighted by Sveiby (2000, p.66), who says that Knowledge Management seeks to “create an interactive learning environment, in which people transfer, internalize, and apply information to create new knowledge”.

It was evident that the lack of physical space for the creation, validation, presentation, distribution, and application of knowledge hinders the implementation of Knowledge Management in organizational processes. There must be a space for sharing, serving as a physical or virtual space for knowledge creation (Nonaka and Konno, 1998).

Knowledge Management as a process consisting of these five stages allows the organization to learn, reflect, unlearn, and relearn; this is considered essential for the construction, maintenance, and restoration of essential skills (Bhatt, 2001). Thus, the need of a tripod model of people, skills, and technology was observed in order to develop an environment where employees are encouraged to create, learn,

and share; increasing company competitiveness through better use of knowledge-creation sources of individual and collective knowledge (Bhatt, 2001; Santos and Varvakis, 2009).

It was also observed that motivated employees will perform their creative process. Motivation is not something implanted permanently in the individual, but rather an ongoing process in which factors of various natures act, from the realization of people's desires, fulfillment of their goals, to the meeting of their expectations (Santos and Amato Neto, 2008).

This study presents a reflection on the possibilities and blocks of the creative awakening of employees in technology-based companies. It is therefore considered that when employees feel that they are interacting with "others", with skills, productivity, valuing, motivation, and freedom, they can express their knowledge and talents without feeling hampered in their freedoms (Feliciano, 2008).

Given these considerations, we conclude that adequate spaces for processes of sharing, spreading, and use knowledge in companies is necessary, as well as giving flexibility in rules and organizational standards, in order to promote collaborative creation processes for innovation.

5 FINAL REMARKS

Technology-based companies are constituted as Knowledge Intensive Organizations that invariably innovate in their products and services, in their customization to fit the needs of customers or markets where they operate. For innovation processes, to invest in human capital is critical to their survival and competitive edge.

Entrepreneurial success is related to how companies allow their employees to interact with each other and the effectiveness in their organizational performance outcomes will be proportional to how effectively people can create new knowledge, share knowledge within the organization, and use it effectively. Therefore, there is need for investment in organizational knowledge where managers provide suitable communication and interaction channels, ensuring the achievement of organizational goals while maintaining a good atmosphere among the people who live out their practices in the workplace.

The study results, based on content analyses under the aforementioned theoretical foundation has provided an understanding of the practices of employees in technology-based companies active in the areas of telecommunications, networks, and electronic security. Results have also observed the perception of respondents regarding their creative potential and blocks that prevent them from expressing them in the context of their organizations.

In order for collaborators to interact, strategies and more systematic tools are needed to capture individual experience in their tacit and explicit forms, transforming them into institutional assets through the diffusion of lessons learned, as well as converting them into effective actions in the pursuit of new solutions.

The research provided results of relevance to the studied area, since knowing problems and difficulties, can make room for process realignment, resulting in an

organizational model that enables a comprehensive and integrated view of the workflow, enabling the creative awakening of collaborators while expressing their talent for innovation processed within the organization. It is necessary that the areas of Research & Development have a systemic view of the entire process of delivering value propositions, in order to synchronize communication about it.

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