Culture of organizational learning and innovation in business incubators: an analysis of the incubators associated with the Ceará Network of Business Incubators (RIC)

Cultura de aprendizagem organizacional e inovação em incubadoras de empresas: Uma análise das incubadoras associadas à Rede de Incubadoras do Ceará (RIC)

Daniel Paiva Mendes   Mestre em Administração. Centro Universitário Católica de Quixadá (UNICATÓLICA) – Brasil.
daniel.pamendes@gmail.com

Elda Fontinele Tahim   Doutora em Ciências Econômicas. Universidade Estadual do Ceará (UECE) – Brasil.
fontineletahim@gmail.com.

ABSTRACT

The main objective of this study is to analyze the culture of learning and innovation in the Ceará Network of Business Incubators (RIC) incubation environment, which can contribute to foster innovation in business incubators. To achieve this goal, seven incubators were analyzed, in addition to the network itself. Qualitative research of a descriptive and exploratory nature performed data collection via semi-structured interviews with open questions, following a pre-set script. After that, the interviews were analyzed with content analysis technique and adaptations for Core Analysis of the Meaning. Regarding results, it was possible to understand that the service portfolio offered to business incubators is often through the Ceará Network of Incubators, with resources coming from development lines, and the support of the incubators to incubated companies is not enough to satisfy the demands that the incubation environment needs. Five of the researched incubators are technology-based, and only four of those have adequate laboratory infrastructure for R&D activities and partnerships with researchers and *stricto sensu* graduate programs, which favor the culture of learning and innovation. We conclude, then, that the incubation environment does not often present proper infrastructure for the culture of learning and innovation to happen.

Keywords: Culture of Learning. Innovation. Network of Incubators. Incubation Environment.

RESUMO

O objetivo deste trabalho é analisar a cultura do aprendizado e da inovação no ambiente das incubadoras da Rede de Incubadoras do Ceará (RIC), que podem contribuir para fomentar a inovação nas empresas incubadas. Buscando alcançar o objetivo proposto, foram analisadas sete incubadoras associadas à RIC, além da própria Rede. A pesquisa qualitativa de cunho descritiva e exploratória teve como instrumento de coleta de dados entrevistas semiestruturadas com perguntas abertas, por meio de um roteiro preestabelecido, que, posteriormente, foram analisadas com a técnica de análise de conteúdo e com adaptações para Análise de Núcleo de Sentidos (ANS). Dos resultados, foi possível perceber que o portfólio de serviços ofertados às empresas incubadas quase sempre é através da Rede de Incubadoras do Ceará (RIC), com recursos provenientes de linhas de fomento, e que o apoio da mantenedora às incubadoras não é suficiente para atender as demandas que o ambiente de incubação necessita. Das incubadoras pesquisadas, cinco são de base tecnológica, e destas apenas quatro possuem uma infraestrutura de laboratórios adequada para as atividades de P&D e parcerias com pesquisadores e programas de pós-graduação *strictu sensu*, o que favorece a cultura de aprendizado e inovação. Conclui-se, então, que nem sempre o ambiente das incubadoras dispõe de uma infraestrutura adequada para que a cultura do aprendizado e inovação aconteça.

Palavras-chave: Cultura do Aprendizado. Inovação. Rede de Incubadoras. Ambiente de Incubação.

1 INTRODUCTION

Learning and innovation are closely related processes and are influenced by many variables, such as culture, organizational climate, leadership, management practices, information acquisition, systems sharing and organizational structures (Bates & Khasawneh, 2005). In this perspective, the innovation process depends on a favorable environment, alongside an innovation culture, which requires mechanisms of coordination, interaction (with the market and its actors) and learning, involving exchanges of information and knowledge and resources for research, among other aspects that can create opportunities for companies (Verma, Singh & Rao, 2014).

In this sense, the incubation environment is conducive to learning and innovation because it involves the exchange of knowledge through the interaction between university companies. Business incubators have continually grown in terms of quantities and new modes of operation (distance incubation and even pre-incubators), especially in developing countries, and have attracted more attention from the academia in recent years, which demonstrates their relevance to economic and social development. They are seen as interinstitutional arrangements capable of stimulating and facilitating the interaction between the productive sector and universities. They are, therefore, spaces for the dissemination of scientific knowledge generated in the most diverse areas and of learning, favoring the innovation process in incubated companies (Fang, Tsai, & Lin, 2010; Bessi, 2012; McAdam & Marlow, 2007; Anprotec, 2017).

However, when it comes to the topic of organizational learning and innovation culture, research about the incubation environment is fragmented and hardly interconnected. Some incubators associate innovation with diverse themes, such as absorptive capacity (Cassol, Zapalai & Cintra, 2017), the cooperation and interaction between company-university (Iacono & Nagano, 2014) and organizational culture (Carletti & Ari Zilber, 2016 & Bessi, 2012). Besides, such studies emphasized more the culture of inter-organizational learning in the context of incubated enterprises than the relation between learning and innovation (Fang, Tsai, & Lin, 2010).

Although the incubation environment becomes a space that can provide key elements for the creation of an organizational culture focused on innovation, Sakita (2015), Iacono & Nagano (2014, p. 296) mention that "some roles and assignments of the incubator partially meet the needs of the incubated companies".

In order to identify whether, in fact, incubators contribute to a change in the behavior of their companies regarding the culture of learning and innovation, we have the following question: How does the culture of organizational learning and innovation in the context of incubators from the network of incubators in the State of Ceará work? Thus, the objective of this work is to analyze the culture of learning and innovation in the environment of the Ceará Network of Business Incubators - RIC, which can contribute to foster innovation in incubated companies.

The paper is comprised of five sessions, including this introduction. A review of the literature, which is divided into three topics: culture of organizational learning; culture of innovation; and business incubators as a source of learning and innovation, follows it. Then, we present the methodological procedures used, the analysis of the results and the conclusion.

2 CULTURE OF ORGANIZATIONAL LEARNING

The term culture has been widely used in several situations, with different meanings, in the social sciences. For Freitas (1991, p. 74), the discussion about organizational culture follows concepts provided by cultural anthropology, in which there are several theoretical currents that privilege different aspects of the same phenomenon. For Schein (2010) and Freitas (1991), organizational culture is seen as a model of the basic assumptions that a given group has invented, discovered or developed and that have worked well enough to be considered valid and taught to new members, such as the correct way of perceiving, thinking and feeling in the learning process to deal with problems of external adaptation and internal integration.

Regarding organizational learning (OL), this topic has been researched from different perspectives. Cuffa & Steil (2019, p. 112) reviews the literature on organizational learning in public organizations and identifies that most studies describe OL "from the focus on organizational changes and identify elements that inhibit or facilitate the organizational learning process".

In the area of business administration, the concept of organizational learning has spread both in research and in practice, and branched out to insights from psychology, sociology, computer science, and economics (Antonello & Godoy, 2010). Frizzo & Gomes (2017, p. 38) "seek to understand the means by which

organizations learn and how this knowledge is retained, perpetuated and understood by organizational agents." Weick & Westley (2004, p. 362) argue that OL lies in three cultural subsystems; "language, artifacts, and routines of action." As the central cultural system of any social organization, language is vital to learning and organization. For authors, a company must develop a strong and good learning culture that creates, acquires and transfers knowledge, as well as modifies people's behavior and perceptions in order to reflect on new knowledge.

A learning organization is one that constantly learns and transforms, for learning is a continuous process, strategically used, integrated and running parallel to work (Weick & Westley, 2004). This is because the identification of the learning culture in organizations needs tools that can diagnose the learning behaviors that are present in them.

Marsick & Watkins (2003) developed, as seen in Table 1, the seven dimensions of the learning organization questionnaire (DLOQ), which aims to identify how favorable a culture is for the development of organizational learning. Leal, Palácios & Nazareth (2020) use the DLOQ-A instrument, an abbreviated form, aiming to analyze the organizational learning culture of a higher education institution.

Dimension	Definition
Create continuous learning opportunities	"Learning is designed into work so that people can learn on the job; opportunities are provided for ongoing education and growth" (Marsick & Watkins, 2003, p.139).
Promote inquiry and dialogue	"People gain productive reasoning skills to express their views and the capacity to listen and inquire into the views of others; the culture is changed to support questioning, feedback, and experimentation" (Marsick & Watkins, 2003, p.139).
Encourage collaboration and team learning	"Work is designed to use groups to access different modes of thinking; groups are expected to learn together and work together; collaboration is valued by the culture and rewarded" (Marsick & Watkins, 2003, p.139).
Create systems to capture and share learning	"Both high- and low-technology systems to share learning are created and integrated with work; access is provided; systems are maintained" (Marsick & Watkins, 2003, p.139).
Empower people toward a collective vision	"People are involved in setting, owning, and implementing a joint vision; responsibility is distributed close to decision making so that people are motivated to lean toward what they are held accountable to do" (Marsick & Watkins, 2003, p.139).
Connect the organization to its environment	"People are helped to see the effect of their work on the entire enterprise; people scan the environment and use the information to adjust work practices; the organization is linked to its communities" (Marsick & Watkins, 2003, p.139).
Provide strategic leadership for learning	"Leaders model, champion, and support learning; leadership use learning strategically for business results" (Marsick & Watkins, 2003, p.139).

Table 1. Definitions of Constructs for the Dimensions of the Learning Organization Questionnaire
Source: Adapted from Carletti & Ari Zilber (2016), Marsick & Watkins (2003)

Jiménez-Jiménez & Sanz-Valle (2011) suggest that organizational learning favors innovation. In this case, the organization which hopes to improve business performance through innovation should improve its organizational learning processes. This conclusion seems to be especially important for smaller and younger firms operating in turbulent environments.

2.1 Culture of Innovation

The organizational culture that favors the development of innovation processes is known in the literature as a culture of innovation (Godoy, 2009). A culture of innovation involves behaviors that value creativity, risk tolerance, freedom, teamwork, trust, communication, and the pursuit of values and solutions geared toward quick decision-making (Dobni, 2008).

Melo, Santa Rita, Junior, Tonholo & Oliveira Sá (2020) studies the culture of innovation in industries based on four variables, namely: the planning of change, the encouragement of self-confidence, the encouragement of new ideas and the taking of risk. The results show that the studied industries indicate low

levels of execution in the variables of planning change, stimulating self-confidence and stimulating new ideas. Only the risk taking variable has an intermediate level.

A culture of innovation facilitates the development of an innovation process when shared values, beliefs, and assumptions by its members occur (Sanches, 2015). For Machado, Gomes, Trentin & Silva (2013), values, beliefs, and assumptions are predictors of a culture focused on innovation, which forms and solidifies the organization's culture and manifests itself in the context of innovation. Still, according to the authors, these predictive elements have correlations with other predicted elements of culture, such as rites, rituals and ceremonies, artifacts and symbols, stories and myths, and communication.

Machado, Carvalho & Heinzmann (2012) investigated the favorable environment for the development of an innovation and organizational culture in the textile industries of Blumenau and its surrounding region and concluded that they should withdraw the focus of innovation as a process and the emphasis on the innovation environment. In this perspective, the analysis of the innovation environment should not only focus on the process but also go beyond, evaluating the stages before and after the generation of ideas, the "relations between the individuals involved in innovation, and an environment conducive to it" (Machado, Carvalho & Heinzmann, 2012, p.716).

Bruno-Faria & Fonseca (2015, p. 59-60), based on a review of the literature on organizational culture constructs and culture of innovation, propose a theoretical model identified as Evaluation of the Culture of Innovation, comprised of five dimensions, namely: "(i) the innovation strategy; (ii) the content of the culture; (iii) the conditions of the internal context of the organization; (iv) the relationship with the external context of the organization and results; and (v) the perception of the effectiveness of innovations." This model was conceived from basic assumptions holding that, to create and maintain an innovative culture, organizations need to define "which beliefs and values they want people to share in that work context," since "the content of culture is part of the innovation strategy" (Bruno-Faria & Fonseca, 2015, p.59).

Bruno-Faria & Fonseca (2014, p.14a) affirm that evaluating the culture of innovation in organizations constitutes a high and relevant demand due to a current environment of great changes in technology, business and values, in addition to the permanent need of people to define new ways of analyzing their work environment, in light of a new perspective to manage great tensions between their "capacity for innovation and the increasing demands" they present.

Given this scenario, business incubators appear as innovation promoters in small and medium-sized enterprises, with the capacity to develop better technologies, knowledge, capital, talent and competitive differentials (Beuren & Raupp, 2010).

2.2 Incubators of Companies as a Space for Learning and Innovation

In the last decades, the organizational model of business incubators has been expanding rapidly, especially in Brazil. These structures have emerge in universities that seek an interaction with the productive sector and are also spaces for the dissemination of scientific knowledge generated in universities by researchers of the most different areas (Bessi, 2012). Pedrinho, Carvalho, Teixeira & Lezana (2020, p. 19) highlights the "commercialization of scientific knowledge beyond the limits of the university", such as the role of the entrepreneurial university, "in the creation of spin offs, startups, incubators and accelerators (...)", aiming at an adequate atmosphere so that the "University community can explore, evaluate and enhance knowledge". They are considered by several scholars as support mechanisms for entrepreneurship and innovation (Beuren & Raupp, 2010, McAdam & Marlow, 2007, Vedovello & Figueiredo, 2005).

Beuren & Raupp (2010, p. 206) hold that incubators "provide knowledge sharing" and management practices aimed at learning with the environment and the network of alliances in which they are inserted, becoming a propitious environment for the flow of pro-innovation information. The studies by Welchen, Mukendi, & Larentis (2020, p. 9) with companies graduated in a technological incubator reveal that partnerships with entities such as SENAI and SEBRAE, related to the sharing of knowledge are facilitated "when the work integrates teams, including when manage to aggregate knowledge with other external agents such as the incubator ".

Similarly, Fang, Tsai and Lin (2010), Allahar & Brathwaite (2016) and Caiazza (2014) emphasize that incubation programs can be seen as learning networks for incubators and incubated companies, so that this relationship favors inter-organizational learning and the dissemination of innovation, since, in the vast majority of cases, companies are incubated when they set up in the incubator for a certain period, receive basic infrastructure, administrative and managerial support, consultants specialized in marketing plans, lectures, among other types of support.

Business incubators are important agents in the diffusion of innovation while providing to incubated companies the necessary support for the development of their business, both in terms of structure and

management. This would be facilitated by the exchange of knowledge and interaction between incubators and the educational institutions that maintain them and between the companies themselves, in the spaces of common use (Azevedo, Gaspar & Teixeira, 2016; Tumelero, Santos & Kuniyoshi, 2016; Tondolo, Borges, Pereira & Silva, 2016, Rauen, 2016, Storopoli, Binder & Maccari, 2013, Fiates, Martins, Fiates, Martignago & Santos, 2013 and Bessi, 2012).

Sá & Lee (2012) and Engelman & Fracasso (2013) understand that incubator managers can encourage the creation of cooperative networks that offer incubated companies interactive activities such as workshops, training, conferences, marketing and events to promote networking between incubated enterprises, favoring learning, transfer of knowledge and experiences. The authors believe that both internal and external networks help incubated companies to have important access to information exchange and gain know-how, which directly or indirectly helps them in the development of technologies, as well as in reducing the time and costs involved in market access. For Bergek & Norrman (2008), incubators can also provide their companies with synergies created through strategic support of technological and commercial partnerships between incubated enterprises and partner networks.

In Ceará, as in other Brazilian states, incubators are assembled in a non-profit private legal entity associated with administrative and financial autonomy, called the Ceará Network of Business Incubators - RIC. RIC aims to promote an integrated development between companies with innovative potential, through incubation programs and technological parks that work for the social and economic development of the State of Ceará (RIC, 2016).

3 METHODS

The present study, of a descriptive and exploratory nature and with a qualitative approach (Flick, 2004; Motta-Roth, 2003), had as a locus the Ceará Network of Business Incubators - RIC, which currently congregates 08 (eight) incubators of technology-based and mixed companies. Qualitative research performed data collection via semi-structured interviews with open questions, following a pre-set script, adapted from Marsick & Watkins (2003), Bruno-Faria & Fonseca (2015).

Regarding the means of investigation, the field work was carried out with the president of RIC, six coordinators (a) of the incubators of associates and a financial superintendent of the incubator designated by the coordination. The interviews were carried out at the headquarters of the incubators from November 2017 to January 2018. Only one incubator belonging to the network was not researched by the incubator at the beginning of the field incubation and saturation program. Field saturation was identified as similar cases of learning culture and innovation culture were experienced in incubation environments, whose authors were identified in the theoretical framework (Pires, 2008; Godoi & Mattos, 2006).

For methodological reasons, the interviewees' names were omitted and identified by letters and numbers; EA1, EA2, EA3, EA4, EA5, EA6, EA7, and EA8. The interviews were recorded, transcribed and later categorized, using Bardin's (1977) categorical technique of content analysis and with adaptations of the original technique for the analysis of nuclei of meaning, which "consist of discovering the nuclei of meaning that make up a communication whose presence or frequency means something to the analytical objective" (Minayo, 2004, p.209). For Mendes (2007, p.72), the analysis of nuclei of meaning is the "unfolding of the text in units, in cores of meanings formed from investigations of the preponderant themes in the discourse".

For this process of categorization, the steps proposed by Bardin (1977), Minayo (2013) & Mendes (2007) were followed, and the procedures suggested by Gomes (2013) & Mendes (2007) were adopted: (i) comprehensive reading of the material collected (interviews); (ii) exploration of the material (search for nuclei of meaning) in the categorization table; and (iii) interpretation of the nuclei of meaning in three stages. In the first stage, we performed a comprehensive reading of the excerpts selected from the interviews, with the objective of apprehending the particularities of these verbalizations. In the second stage, we set up, using Excel®, a structure for organizing the interview excerpts by themes and dimensions/categories *a priori* from Marsick & Watkins (2003), Bruno-Faria & Fonseca (2015) and emerging. The third step was comprised of articulations between the objective of the work with the theoretical basis and the empirical data of the research.

4 ANALYSIS OF RESULTS

In this section, the results obtained in the fieldwork are analyzed and discussed based on the literature. Initially, we analyzed the portfolio and characteristics of RIC's incubation system; then, the constructs of the learning culture proposed by Marsick & Watkins (2003) and Carletti & Ari Zilber (2016); finally, the dimensions of the innovation culture of Bruno-Faria & Fonseca (2015).

4.1 The Portfolio of Services and Characteristics of the Incubation System

This section analyzes the emerging categories related to the portfolio and characteristics of RIC's incubation system, namely: the types of incubators, the period of incubation, the incubated and graduated projects and companies, the infrastructure of the incubators, the portfolio of services offered by the incubators, the funding of incubation programs and the role of the incubator network.

We identified that, out of the seven incubators researched, five are technology-based and two are mixed. Two technology-based incubators are linked to universities and both have partnerships with their maintainer's *stricto sensu* graduate programs and access to their research laboratories and, consequently, to the knowledge generated in the universities. Another sector-based technology incubator is maintained by the Institute of Information and Communication Technology (ITIC). There is also an incubator belonging to the Nucleus of Industrial Technology Foundation of Ceará, NUTEC, which has been active in research and technological development in the areas of food, automation and robotics, renewable energy, biofuels, among others. And lastly, PADETEC, a technology-based incubator, is the only one among the incubators surveyed that has its own legal entity, acting mainly in the areas of chemistry, pharmaceuticals, physiotherapies, and food.

All incubators share the knowledge generated in this environment with incubated companies. Even the incubator that has its own legal entity maintains a close relationship with the universities and researchers as a way to enable its research activities, since it does not have a team of researchers working on the basis of an employment bond. For Azevedo, Gaspar and Teixeira (2016, p.79), the research process is very present in the incubation environment, from the "contribution between university and company it is possible to achieve development with greater efficiency and excellence"; so that R&D is mainly developed in universities (or other research institutions), where incubators usually have headquarters.

The incubators associated to RIC comprise a number of 39 incubated enterprises today, and the period of incubation their programs varies from two to five years, depending on the type of product. The incubators congregate from three to six companies in their incubation programs, which is a small number. Only one incubator has a larger number of incubations, a total of thirteen companies. Over the years, more than 170 companies graduated from RIC incubators. The incubator with the largest number of incubated projects has been in the market for almost 28 years. Such incubators host enterprises which can be pre-incubated, incubated residents and non-residents, associates and associate graduates. The most common form of entry into incubation programs linked to the Network is by means of a continuous flow notice.

For interviewee EA6, the associate graduate company is needed in order for research to continue, since the incubation contract of five years is in its final phase and the incubated company still depends on ANVISA's license for the manufacture and commercialization of patented products. Interviewee EA6 also said that the incubator maintains partnerships with the graduate companies, especially when it needs a service or technology on which the graduate has expertise. Interviewee AE4 understands that "[...] non-residents [...]" see in the incubator an opportunity for "[...] access to funding...". This opportunity to access public bidding processes, with the help of the incubator, especially in the elaboration of the project, is also the object of the incubated resident, associated and pre-incubated companies. Tumelero, Santos & Kuniyoshi (2016) argued that post-incubated technology-based companies need to continuously create and develop products and services through R&D investments to offer them to customers.

In relation to support from the network incubator maintainer, it is almost always not enough. Of the seven incubators surveyed, only one has its own legal entity and does not depend directly on a maintainer for its funding, despite using university space. The interviewee EA2 uses a metaphor to describe the support of the maintainer: "... keepers do not treat incubators as a child, but as a stepchild...", so they do not give many conditions for incubators to grow. We note that the support of the maintainer is restricted to basic infrastructure, employees and some services, such as legal advice and training. The working staff that is dedicated to the incubator is insufficient to meet the demands: "[...] we are undergoing restructuring, at the moment I am alone", said interviewee EA8. "[...] There will be a need to increase the team, we now have only three members", said EA7. "[...] Here we have a reduced number of employees, I am often the coordinator and director", EA4 stated. Incubators, because they have insufficient staff, hire scholarship holders to work on certain projects.

When the project is finished and the scholarships are over, these qualified staff leaves and the incubator is left without the expertise of these collaborators. This process of discontinuity in the incubation environment impairs the learning process, the transfer of technology and, consequently, the consolidation of the culture of innovation. The results of this research resembles what Tondolo *et al.* (2016: 312) mean when

they emphasize that universities are often not providing an adequate structure for the operation of incubators, showing that financial resources, physical space, and human resources are generally lacking.

Business incubators offer a portfolio of services to incubated companies, such as consulting, courses, lectures, training, marketing advice, among others. Welchen, Mukendi, & Larentis (2020, p. 13) point out that "companies that participate in an incubation process can enjoy the entire structure of the incubator, including the partnerships and relationships that it enjoys even after graduation". Therefore, in the incubators associated with the Network, a good part of these services are offered by RIC itself, financed with funding from the Cearense Foundation for Scientific and Technological Development Support, Brazilian Service of Support to Micro and Small Enterprises, and the Funding Authority for Studies and Projects - Finep, for example. Only one out of the seven incubators surveyed has another source of funding systematized in the provision of consulting services. It is clear, therefore, that the services offered by the incubators are not systematic and continuous. In part, the results resemble the research by Tondolo *et al.* (2016), that incubators survive, in most cases, only the resources they collect from development agencies.

One of the important services offered by the incubators associated to RIC is the confirmation of projects for the companies to seek resources via open calls for research, as we identified in the interviewees' statements; "we do the projects for incubated and associated companies, which is what makes our public very loyal", said EA4. The "incubator assists in the confirmation of the grant project", said EA5. According to EA5, the "incubator does not have a portfolio of services" for incubated companies, rather "some training services are offered, such as consultancies and training, but they depend on the financing of the development projects".

For interviewee EA3, "the incubated companies have access to training, courses, and consultancies", and EA6 stated that "we bring professionals from abroad to give lectures and training". On the other hand, even if the services are offered, it is observed that some incubated companies do not show interest in participating according to EA3 "the great difficulty is the attendance/participation of incubated companies", they "are more interested in consulting than even training," said EA8. Entrepreneurs' reluctance to participate in trainings calls for the coordinators of the incubators and the president of RIC to reflect on the current management model.

Some coordinators have already questioned this model, "today there is the idea of changing the consulting model, because of a cost issue", to fit the needs of the entrepreneur, said EA7. "There are paid trainings […], but the incubated ones want to participate because they see it as an important requirement for the market", said EA4. It is worth noting that the incubation contract implies an obligation to participate in the courses and trainings offered by the incubators, with clauses that state the discontinuation of the program if the company fails to do so. For Storopoli, Binder & Maccari (2013, p. 49), the role of incubators can be improved, and their impact "increased through more effective management of the services offered."

For the president of RIC, the Network's primary role is to support associated incubators, to make them more competitive and to insert them in the market, and to foster the creation and affiliation of new incubators for regional development. For the coordinators interviewed, RIC plays an important role, but also needs to develop new strategies. The interviewee EA2 understands that "…RIC is doing what it can… we should have more (associated) incubators …we stop at a certain level…". According to him, the number of associated incubators is around eight or nine, without effective growth in the number of affiliates and projects served.

Despite some limitations, the Network plays a prominent role among its members: "… RIC is an interesting place to exchange experiences among managers and provoke a certain synergy …", claimed EA5; "… RIC is essential for the development of projects…", said EA7; "…we had a very large gain with RIC in supporting incubators…" said EA8. These results confirm the findings of Sá & Lee (2012) and Bergek & Norrman (2008) on the importance of an incubator network for the relationship between incubators and the sharing of resources and information among them. The studies by Welchen, Mukendi, & Larentis (2020, p. 8) with companies graduated in a technological incubator reveal that "cooperation between various agents in their environment, such as internally employees, externally customers, suppliers, institutions such as the incubator and entities such as SENAI and SEBRAE ", contribute to product development and to the graduate's results.

4.2 Learning Culture

This section analyzes the results of the interviews from seven *a priori* dimensions of the learning culture proposed by Marsick & Watkins (2003), Carletti & Ari Zilber (2016), namely: (i) opportunity for continuous learning; (ii) questioning and dialogue; (iii) collaboration and team learning; (iv) systems for capturing and sharing learning; (v) delegation of power and responsibility; (vi) development of the systemic vision of the organization; (vii) stimulating strategic leadership for learning.

The nuclei of meaning of the respondents' speeches point to several situations in which there are opportunities for continuous learning. Four RIC incubators are directly linked to *stricto sensu* graduate

programs and university laboratories. Interviewee EA6 said that it is in the "incubator regiment itself that any incubated company is attached to some research laboratory for graduate programs". He needs the entrepreneur to have a vision of continuous learning, because the changes are very constant, especially for those who do research. A common situation in another incubator, "... the projects are linked to the graduate programs", claimed EA5. The very formation of the incubator network that fosters the sharing of resources and services, such as consultancy, training, and courses, usual activities in the programs, are good opportunities for continuous learning, as well as the incubation environment by which companies see an opportunity of coexistence and exchange of experiences between them. The results of this first dimension of the learning culture resembled the results of studies by Carletti & Ari Zilber (2016), mainly regarding the consultancies and capacities in the management areas.

In the "questioning and dialogue" dimension, people develop productive reasoning skills to express their opinions and ability to listen and express their points of view and of others. It was identified in the interviewees' statements that not all the incubators surveyed maintain a frequent dialogue with the incubators. A specific incubator does not maintain a systematized channel of evaluation with incubated companies to receive suggestions for improvements. For the interviewee EA5, "[...] we do not have a frequent evaluation channel". In other cases, the dialogue was mainly used as a channel for suggestions and evaluation of the incubator. As reinforced by two of the interviewees, "businessmen are encouraged to give suggestions, we have regular meetings and in these meetings they participate" (AI1); "The ideal is that the incubated companies participate, give suggestions. This question of dialogue here is very open [...] it is our biggest customer (incubated companies), we have to listen to their demands and difficulties" (EA8). This environment, permeated by and open to dialogue, resembles the findings of Carletti & Ari Zilber (2016).

Collaboration and team learning are commonplace in the incubation environment, even though this collaboration often needs to be triggered. In some cases, the incubator organizes events and involves different companies in the same project, so that they share complementary skills and abilities. The incubator network plays a decisive role in the interaction and synergy between incubated companies. Often, a company has mastered a technology that can be the solution of another company belonging to the Network; then it is up to the management of the incubator to foster this interaction. Regardless of the fact that many companies share the incubator's facilities, "... everyone is focused on their business ...", said EA5. One of the fears among incubators, especially in the area of technology, is a possible appropriation of business ideas. The results show that collaboration and learning are present in the incubation environment, both in relation to incubation and incubator/incubated, which is similar to results in Carletti & Ari Zilber (2016).

The core meaning of respondents' speeches show that there is no uniform system for capturing and sharing learning. Some interviewees said that they have adopted or tried to adopt, without much success, the Reference Center for Support to New Enterprises - CERNE, a methodology from ANPROTEC (the Brazilian Association of Science Parks and Business Incubators). Its effectiveness was questioned by interviewees, highlighting a lack of resources and even the model's sustainability "between what it requires and what it delivers" (EA5). Only one of the seven incubators surveyed adopted the CERNE model as suggested by ANPROTEC, but the effectiveness of this methodology in capturing and sharing learning in the incubated companies' perception was not analyzed. These results resemble, in parts, the studies of Carletti & Ari Zilber (2016).

The dimension of delegation of power and responsibility does not seem to be ideal to evaluate the incubator relationship. According to excerpts of the interview with EA4, "there is no hierarchy between incubator and incubated", what exists is a leadership action of the incubator managers that guide the entrepreneurs who maintain a bond with the incubator to participate in trainings and qualifying courses, with the purpose of fostering the development of new skills and abilities for these individuals. The incubator "has no management", said EA5 about the activities of incubated companies. In some cases, there is a delegation of responsibility, but it is not uniform among the incubators, as is the case of the incubator that requires that the business plan is carried out by the entrepreneur, under the guidance of the consultants who provide services to the incubated. In parts, these results are similar to those of Carletti & Ari Zilber (2016), where this dimension was not evidenced in the incubators researched by the authors, nor in the incubator/incubated relationship.

The dimension of "development of a systemic view" is encouraged in the incubation environment, mainly because the success of the incubated companies reflects positively in the incubators. According to the interviewees' speech, "we all want the company to be successful, ...when the entrepreneur keeps us informed, ... look, I am on the television, I am an entrepreneurial success", is a reason for recognition for the incubator. Consulting and mentoring are also considered important for entrepreneurs to develop a systemic view of their business, even if they are part of a process to be improved.

For the interviewee EA5, with the creation of the technology park, incubated companies were offered "rounds of mutual introductions" among them, in order to develop and improve synergy and systemic vision. The same is true of other incubators, whether it is the promotion of "coffee with business" or even the support of specialized consultants. According to Carletti & Ari Zilber (2016), the development of a systemic vision of the organization is perceived in several aspects, such as cooperation and interaction among entrepreneurs, with entities and research institutions. The incubator network itself favors the development of a systemic vision in this incubation environment since the sharing of resources and competencies enables individuals to acquire new skills to operate in an increasingly competitive market.

Stimulating leadership is something that must be shared in the incubation environment. The leadership actions of the incubator coordinators can be identified in the meaning nuclei of the interviewees: "we identified the weaknesses and strengths of the project and we propose improvements" (EA5); "... the incubator organizes a coffee shop with businesses (with the companies incubated) every three months, we spend the whole morning together, and we bring a speaker to the event", (EA6). Leadership is observed in the promotion of the proximity between incubated companies, such as "coffee with business", which aims to promote networking among them. Results similar to those of Carletti & Ari Zilber (2016), where the stimulus to leadership was observed not only in the relation between incubators and incubated companies but also in the internal relations of the incubator. As for the relationship with RIC, we perceive an act of leadership that agglutinates the then president, when he says that "[...] the great role (of RIC) is to support the incubated ... to make them more competitive and insert them on the market" (EA1).

4.3 Culture of Innovation

For the innovation culture construct in the incubation environment, we use the Innovation Culture Assessment model proposed by Bruno-Faria & Fonseca (2015), with adaptations. This model is divided into four main dimensions: (i) the innovation strategy; (ii) conditions of the internal context for innovation; (iii) relations with the context external to innovation; and (iv) the results and perceptions of the effectiveness of innovations.

The "innovation strategy" dimension includes two important categories, culture content and internal, interpersonal and institutional communication systems. Analyzing the meaning nuclei of the interviewees' speeches, we noticed that business incubators have a very open communication channel with companies; mainly in the dissemination of the acceleration programs and public bids, which are sources of funding for innovation in Brazil. As far as culture content is concerned, learning and attempts to generate innovation are highly valued. Culture content represents the values and beliefs associated with innovation that must be shared (Bruno-Faria & Fonseca, 2015, p. 67) In this sense, incubators appear to play a minor role. For three interviewees, the role of the incubator is to assist in the management of incubated companies, not in the generation of the innovation itself.

The attempt to generate innovation is more conditioned to the activities of the entrepreneurs themselves. This is clear in the nuclei of meaning of the interviewees' statements: "... we do not have a clear innovation policy" (EA8); "... it is not really the role of the incubator to encourage companies in attempts to generate innovation, ...innovation is already part of them" (EA3). It can be seen in these statements that, some incubators from RIC are against what the authors say Allahar & Brathwaite (2016), Caiazza (2014), Fang, Tsai & Lin (2010), incubators play a decisive role in encouraging and developing new technologies, as the incubators' performance helps to reduce uncertainties in the development of a non-trivial technology, increasing the chances of a spin-off company surviving in a competitive market (Caiazza, 2014). Therefore, it is perceived that the managers of the incubators do not have a clear vision of the real role of the incubator in the development of innovation. It is not enough for the incubator to select projects with innovative potential, it needs to subsidize the necessary conditions for innovation to happen. However, for such, it is necessary that before and after the generation of the idea there is the involvement of the individuals with the actions of innovation, creating an environment conducive to it (Machado, Carvalho & Heinzmann, 2012).

The conditions of the internal context for generating innovation involve the characteristics and actions of leadership, the involvement of individuals with the activity of innovation, the infrastructure for innovation and the regulations and flexible rules. These leadership actions of the incubator coordinators are identified in the promotion and incentive in the participation of events, workshops, and business presentation rounds, whose purpose is to promote networking among the companies that coexist in the incubation environment. For Bruno-Faria & Fonseca (2014b), the role of leaders exerts a great influence in the selection and implementation of new ideas, in setting challenging goals that favor creativity and innovation among those involved.

Regarding the involvement of individuals with innovation activities, we noticed that in at least four technology-based incubators there is a synergy between researchers, incubator coordinators, and entrepreneurs. According to Bessi (2012), the interaction between individuals (entrepreneurs and collaborators) allows the practices of cooperation and knowledge sharing to be established and to enable innovation to be consolidated as a routine. In a specific incubator, all entrepreneurs who have incubated businesses are university researchers, although in some cases they have already obtained outside investors. This situation is very similar in another incubator, about which EA5 said that "it is often the researcher or group of researchers that has the initiative to undertake and incubate". Other incubators, two of the mixed type and one technology-based, appear to play a more discreet role in encouraging research and development - technological R&D. This may be explained by the low number of researchers directly linked to incubation programs, or even by the incubator's own culture of supporting projects that do not have this R&D propensity. According to the Oslo Manual, cooperation between companies, universities and research institutions is important for the development of technological innovation (OCDE, 2005).

Infrastructure for incubator innovation is offered by the incubator or partner institutions of the incubation program. Two incubators of the mixed type do not have adequate infrastructure for innovation to happen. In these two incubators, we did not observe a greater intensity in the involvement of personnel with R&D activity, nor with innovation itself. Regarding personnel dedicated to innovation activities, the other incubators were also not satisfactory. Typically, researchers linked to incubators are fellows, with the exception of incubators that have partnerships with *stricto sensu* graduate programs. Bruno-Faria & Fonseca (2015, 2014a) and Dobni (2008) had already pointed out that infrastructure for innovation involves the use of material and financial resources, time, information and people needed to implement and support innovation activities. In at least four out of the seven incubators surveyed, the incubated companies have access to the laboratories of the *stricto sensu* graduate programs and university researchers. According to interviewee EA5, "graduate programs are of great importance in supporting incubators, especially when companies need to develop a product or services associated with non-trivial technology.

In turn, flexibility of rules and regulations is common in the incubation environment. For the interviewee EA6, they do not "flexibilize what the law does not allow", only. Likewise, interviewee EA4 states that: "we are flexible, we have a formal contract with companies that there are some pre-established rules, but nothing that prevents the incubator from having a conversation to make it more flexible. However, this flexibilization does not seem to be specifically directed towards a culture of innovation. Machado, Lehmann & Araújo (2008) understand that, in a culture of innovation, written rules are intended to direct people's behavior towards innovation. In this sense, no written rules have been identified in the incubation environment that direct the behavior of those involved (coordinators, entrepreneurs and collaborators) to innovation itself.

The relationship with the external context of innovation involves the relationship with customers, suppliers, and other organizations, with the competitive market, legal incentives, technology and the demographic environment. The relationship between clients and partner organizations seems to be a common practice in the incubation environment. In the nuclei of meaning of the interviewees' statements, the importance of fostering this relationship between incubated companies is almost unanimous. For incubator coordinators, this relationship with the external environment fosters a culture of learning and innovation among the incubated companies, as they interact with each other and with the consumer market. An experimental project spawned out of the incubation environment, in the area of renewable energies, as a result of a partnership between an incubator, an associated company and the postgraduate program in applied physical sciences.

Some services offered by incubators, such as lectures, consultancy, workshops, and networking, enhance market knowledge and favor incubated companies in a competitive market. Engelman & Fracasso (2013) emphasize that the courses, training, and consultancy offered by incubators influence the internationalization of companies, as well as the relationship networks of the incubators themselves. This relationship with the market is something valued among incubators. Some incubated enterprises are already gaining international market, which is an important indicator of competitiveness. For Fiates *et al.* (2013), the incubator environment favors the formation of relationship networks that stimulate innovation and interaction with other authors that can foster the internationalization process. Regarding this demographic environment, a direct influence on the incubator environment was not perceived.

The laws of incentives to innovation in our country affect business incubators in different ways. The incubators linked to the State University and the Federal Institute of Education see the new legal framework of innovation (Law nº 13.243/2016) with more optimism regarding the benefits they can bring to the incubators. But for the respondent EA4, "laws to encourage innovation need to have more impact," they are still shy about the complexity of generating innovation in that country. Rauen (2016) understands that even

with advances in reducing legal uncertainty, science and technology institutions still face constant questions, such as researchers' dedication to innovative activities and the way they receive counterparts.

Regarding the perception of innovation results in the incubation environment, predicted by Bruno-Faria & Fonseca (2015), we identify intellectual property (software, trademark and patent registration) as an important indicator. In some incubators, intellectual property registration practices are more common. Other incubators, which have characteristics of the mixed or sectoral type, in the area of information and communication technology, records occur, but less frequently. According to the Oslo Manual, statistics on the registration of intellectual property, more specifically patent registration, are increasingly used as innovation measures from research activities, which may reflect on the technological dynamism of organizations (OCDE, 2005). The intellectual property registries are carried out in the partner of the incubators associated to RIC with the Network of Technological Innovation Centers of Ceará - REDENIT. This partnership is responsible for the registration of patents developed in the incubators researched.

5 CONCLUSION

In the seven incubators surveyed, and in the Network itself, it was observed that the portfolio of services offered by the incubators associated with RIC is very similar, and they are offered and financed by RIC with funding. The study indicates that the sponsoring institutions do not invest enough resources to maintain the activities of the incubators and do not provide sufficient staff to support them; also, the team is largely made up of fellows/trainees, which hampers the learning process and technology transfer. With regard to the learning culture in the incubation environment, five out of the seven dimensions proposed by Marsick & Watkins (2003) are present in the incubators. With the exception of the "system to capture and share learning" dimension, no uniform methodology for this purpose has been identified, as well as in the "delegation of power and responsibility", which does not appear to be adequate to evaluate the incubator/incubated by the very characteristic of interdependence between the parties.

For the dimensions "opportunity for continuous learning" and "collaboration and team learning", the incubation environment was favorable for both, mainly because of the synergy that the environment provides for incubated companies in the exchange of experiences and networking, as well as the opportunity to be linked to researchers and *stricto sensu* graduate programs. The dimension of "questioning and dialogue" in the incubation environment is common. In general, incubators have very open communication with incubated companies, which favors the exchange of experiences and suggestions for improvements, even if, in some cases, the need for such a suggestion is recognized and cannot be met. For the dimension "developing a systemic view of the organization" is also something valued in incubators. Incubators promote skills, events and networking opportunities that encourage entrepreneurs to develop a more holistic view of their business. Incubator managers play the role of "stimulating strategic leadership for learning," as they demonstrate some leadership traits in fostering multiple collaborative events among incubated companies.

For the culture of innovation proposed by Bruno-Faria & Fonseca (2015), the incubation environment meets, in part, the proposed dimensions. The "innovation strategy" dimension is partially met in the study. Some incubators, even those labeled as technology-based, do not have a clear innovation policy. The role of the incubator seems secondary in the development of innovation itself. The focus of the incubators associated with the Network is more in support of the management of the incubated enterprises. This position on the part of some incubator managers contradicts the literature since incubators play a decisive role in stimulating and developing new technologies and help reduce uncertainties in the development of non-trivial technology.

For the "internal context conditions for innovation" dimension, the actions of the leadership of incubator managers are not specifically for innovation activities. They are more focused on developing the skills and abilities of entrepreneurs to manage their business. Only four out of the seven incubators surveyed, linked to *stricto sensu* graduate programs, have an infrastructure that is more focused on research and development of products and services. The dimension "relationship with the context external to innovation" is partially met in incubators associated with the Network. It has been identified that there is an approximation between the associated incubators, even if, in some moments, this synergy must be provoked. The legal incentives for incubators and, consequently, for companies, according to the interviewees, are still very timid and need to be more effective. Finally, there is the dimension "perception of the effectiveness of innovation". In this dimension, four out of the seven incubators show more effective results.

It is understood that the study presents theoretical-empirical contributions that are relevant to the culture of learning and culture of innovation in business incubators, especially for researchers studying this phenomenon, as well as incubator managers and entrepreneurs interested in participating in incubation programs.

Despite the empirical evidence of this research, there are limitations. Therefore, we suggest the extension of this study to incubator networks in other regions of the country and the companies participating in incubation programs as incubated companies and graduation programs in order to analyze the effectiveness of the culture of organizational learning and innovation in the incubation environment.

REFERENCES

Allahar, H., & Brathwaite, C. (2016). Business Incubation as an Instrument of Innovation: The Experience of South America and the Caribbean. *International Journal of Innovation (IJI Journal)*, 4(2), 71-85. doi:dx.doi.org/10.5585/iji.v4i2.107.

Antonello, C. S., & Godoy, A. S. (2010). A encruzilhada da aprendizagem organizacional: uma visão multiparadigmática. *Revista de Administração Contemporânea*, 14(2), 310-332.

Associação Nacional de Entidades Promotoras de Empreendimentos Inovadores – ANPROTEC (2017). *Perguntas e Respostas.* Disponível em http://www.anprotec.org.br/infoe/publicacao.php?idpublicacao=117.

Azevedo, I. S. C., Gaspar, J. V., & Teixeira, C. S. (2017). Análise característica das Incubadoras de Base Tecnológica. *REAVI-Revista Eletrônica do Alto Vale do Itajaí*, 5(8), 72-81. doi: 10.5965/2316419005082016072.

Bardin, L. (1977). *Análise de conteúdo.* Lisboa: Edições 70.

Bates, R., & Khasawneh, S. (2005). Organizational learning culture, learning transfer climate and perceived innovation in Jordanian organizations. *International journal of training and development*, 9(2), 96-109.

Beuren, I. M., & Raupp, F. M. (2010). Gestão do conhecimento em incubadoras Brasileiras. *Future Studies Research Journal: Trends and Strategy*, 2(2), 186-211.

Bergek, A., & Norrman, C. (2008). Incubator best practice: A framework. *Technovation*, 28, 20-28. doi:10.1016/j.technovation.2007.07.008.

Bessi, V. G. (2012). Inovação e cultura organizacional em incubadoras de empresas: uma reflexão teórica. *Gestão Contemporânea*, (1).

Bruno-Faria, M. F, & Fonseca, M. V. A. (2015). Medida da cultura de inovação: uma abordagem sistêmica e estratégica com foco na efetividade da inovação. *RAI-Revista de Administração e Inovação*, 12(3), 56-81.

Bruno-Faria, M. F, & Fonseca, M. V. A. (2014a). Medidas de cultura de inovação e de cultura organizacional para análise da associação com inovação. *RAI-Revista de Administração e Inovação*, 11(3), 30-55.

Bruno-Faria, M. F, & Fonseca, M. V. A.. (2014b). Cultura de inovação: conceitos e modelos teóricos. *RAC-Revista de Administração Contemporânea*,18(4),372-396. doi:dx.doi.org/10.1590/1982-7849rac20141025.

Caiazza, R. (2014). Benchmarking of business incubators. Benchmarking: *An International Journal*, 21(6), 1062-1069. doi.org/10.1108/BIJ-01-2013-0011.

Carletti, R. M., Ari Zilber. M. (2016). A cultura de aprendizagem em incubadoras e startups. *XIII Congresso Online - Administração: Empreendedorismo e Inovação.*

Cassol, A., Zapalai, J., & Cintra, R. F. (2017). Capacidade absortiva como propulsora da inovação em empresas incubadas de Santa Catarina. *Revista Ciências Administrativas*, 23(1), 9-41. doi: dx.doi.org/10.5020/2318-0722.23.1.9-41.

Cuffa, D., & Steil, A. V. (2019). Organizational learning in public organizations: an integrative review. *Navus-Revista de Gestão e Tecnologia*, 9(3), 112-123. DOI: dx.doi.org/10.22279/navus.2019.v9n3.p112-123.875 .

Dobni, C. B. (2008). Measuring innovation culture in organizations: The development of a generalized innovation culture construct using exploratory factor analysis. *European Journal of Innovation Management*, 11(4), 539-559. doi.org/10.1108/14601060810911156.

Engelman, R.; Fracasso, E. M. (2013) Contribuição das incubadoras tecnológicas na internacionalização das empresas incubadas. *Revista de Administração*, 48 (1), 165-178. doi: dx.doi.org/10.5700/rausp1080.

Fang, S. C., Tsai, F. S., & Lin, J. L. (2010). Leveraging tenant-incubator social capital for organizational learning and performance in incubation programme. *International Small Business Journal*, 28(1), 90-113. doi: doi.org/10.1177/0266242609350853.

Fiates, G. G. S., Martins, C., Fiates, J. E. A., Martignago, G., & dos Santos, N. (2013). Análise do papel da incubadora na internacionalização de empresas de base tecnológica, incubadas e graduadas. *Revista Eletrônica de Estratégia & Negócios*, 6(1), 252-274.

Flick, U. (2004). *Introdução à Pesquisa em Administração*. Porto Alegre: Bookman.

Freitas, M. E. D. (1991). Cultura organizacional grandes temas em debate. *Revista de Administração de empresas*, 31(3), 73-82. doi: dx.doi.org/10.1590/S0034-75901991000300007 .

Frizzo, P., & Gomes, G. (2017). Influência da aprendizagem organizacional e da inovação no desempenho organizacional de empresas do setor vinícola. *Revista Ibero Americana de Estratégia*, 16(2), 35-50. doi:10.5585/riae.v16i2.2429.

Leal, E. S. P., Palácios, F. A. C., & Nazareth, P. H. M. (2020). Cultura de Aprendizagem Organizacional e Adoção de Novas Tecnologias Educacionais em uma Instituição de Ensino Superior em Castanhal-Pará, Brasil. *Navus-Revista de Gestão e Tecnologia*, 10, 01-18. DOI: doi.org/10.22279/navus.2020.v10.p01-18.1281 .

Godoi, C. K., & Mattos, P. L. C. L. (2006). Entrevista qualitativa: Instrumento de pesquisa e evento diálogo. In. Godoi, C.K., Melo, R.B. & Silva, A.B. (org.). *Pesquisa Qualitativa em Estudos Organizacionais – Paradigmas, Estratégias e Métodos*. São Paulo: Saraiva. pp.301-323,

Godoy, R., S., P. (2009). *Relações entre cultura organizacional e processos de inovação em empresas de base tecnológica*. 202 f. Dissertação (mestrado em Engenharia de Produção) - Escola de Engenharia de São Carlos. Universidade de São Paulo.

Gomes, R. (2013). Análise e interpretação de dados de pesquisa qualitativa. *In* M. C. S. Minayo, S. F. Deslandes, & R. Gomes (orgs.). *Pesquisa social: teoria, método e criatividade*. 33. ed. Petrópolis, RJ: Editora Vozes. pp.79-108.

Iacono, A., & Nagano, M. S. (2014). Gestão da inovação em empresas nascentes de base tecnológica: evidências em uma incubadora de empresas no Brasil. *Interciencia*, 39(5), 296-306.

Jiménez-Jiménez, D., & Sanz-Valle, R. (2011). Innovation, organizational learning, and performance. *Journal of business research*, 64(4), 408-417. doi: doi.org/10.1016/j.jbusres.2010.09.010.

Machado, D. D. P. N., Gomes, G., Trentin, G. N. S., & Silva, A. (2013). Cultura de inovação: elementos da cultura que facilitam a criação de um ambiente inovador. *RAI Revista de Administração e Inovação*, 10(4), 164-182.

Machado, D. D. P. N., Carvalho, L. & Heinzmann, L. M. (2012). Ambiente favorável ao desenvolvimento de inovações e cultura organizacional: integração de duas perspectivas de análise. *Revista de Administração-RAUSP*, 47(4), 715-729. doi: doi.org/10.5700/rausp1069.

Machado, D. D. P. N., de Araújo, B., & Lehmann, C. A. (2008). Organização e cultura de inovação: elementos concretos e fatores percebidos. *Revista Alcance*, 15(2), 152-168.

Marsick, V. J., & Watkins, K. E. (2003). Demonstrating the value of an organization's learning culture: the dimensions of the learning organization questionnaire. *Advances in developing human resources*, 5(2), 132-151. doi.org/10.1177/1523422303005002002 .

McAdam, M., & Marlow, S. (2007). Building futures or stealing secrets? Entrepreneurial cooperation and conflict within business incubators. *International Small Business Journal*, 25(4), 361-382. doi.org/10.1177/0266242607078563.

Melo, D. F., Santa Rita, L. P., Junior, R. R. F., Tonholo, J., & de Oliveira Sá, E. M. (2020). Políticas públicas para inovação: um estudo da metodologia de gestão da inovação na indústria em Alagoas. *Navus-Revista de Gestão e Tecnologia*, *10*, 01-20. DOI: doi.org/10.22279/navus.2020.v10.p01-20.1152 .

Mendes, A. M. (2007). Pesquisa em psicodinâmica: a clínica do trabalho. *In* A. M. Mendes (org). *Psicodinâmica do trabalho: Teoria, método e pesquisas* (pp.65-87). São Paulo: Casa do Psicólogo.

Minayo, M. C. S. (2013) Análise e interpretação de dados de pesquisa qualitativa. In: M. C. S. Minayo, S. F. Deslandes, & R. Gomes (org.). *Pesquisa social: teoria, método e criatividade*. 33. ed. (pp. 08-28), Petrópolis, RJ; Editora Vozes.

MInayo, M. C. S. (2004). *O desafio do conhecimento: pesquisa qualitativa em saúde*. 8. ed. São Paulo: Hucitec.

Motta-Roth, D. (2003). *Redação acadêmica: princípios básicos*. Santa Maria, RS: Universidade Federal de Santa Maria, Imprensa Universitária.

Organização para Cooperação e Desenvolvimento Econômico - OCDE. (2005). *Manual de Oslo*: Diretrizes para coleta e interpretação de dados sobre inovação. 3. ed. São Paulo: FINEP.

Pires, A. P. (2008). Amostragem e pesquisa qualitativa: ensaio teórico e metodológico. Poupart, J,. Deslauriers J. P,. Groulx, L. H,. Lapemère A,. Mayer R,. & Pires A. P, (org). *A pesquisa qualitativa: enfoques epistemológicos e metodológicos* (pp.154-211). Petrópolis: Editora Vozes.

Pedrinho, G. C., de Carvalho, D. N., Teixeira, C. S., & Lezana, Á. G. R. (2020). Universidade e o ecossistema de inovação: revisão estruturada de literatura. *Navus-Revista de Gestão e Tecnologia*, *10*, 01-23. DOI: dx.doi.org/10.22279/navus.2020.v10.p01-23.955 .

Rauen, C. V. (2016). O Novo Marco Legal da Inovação no Brasil: o que muda na relação ICT - empresa? *Radar: tecnologia, produção e comércio exterior*. 43(1), 21-35.

Rede de Incubadoras de Empresas do Ceará – RIC. (2016). *Estatuto Social*. Disponível em http://rededeincubadoras.wixsite.com/rede

Sá, C., & Lee, H. (2012). Science, business, and innovation: understanding networks in technology-based incubators. *R&D Management*, 42(3), 243-253. doi.org/10.1111/j.1467-9310.2012.00681.x .

Sakita, D. Z. (2015). *Inovação em serviços e desempenho organizacional*: estudo de empresas graduadas pela Incubadora de Base Tecnológica da Universidade de Brasília. Dissertação (Mestrado - Mestrado Profissional em Administração) - Universidade de Brasília.

Sanches, D. C. M. (2015). *Cultura de Inovação e sua influência na Ecoinovação*: um estudo em empresas da indústria têxtil. 2015. 122f. Dissertação (Mestrado em Administração) – Programa de Pós-Graduação em Administração da Universidade de Blumenau – FURB, Blumenau, 2015.

Schein, E. H. (2010). *Organizational culture and leadership*. San Francisco, USA: Jessey.

Storopoli, J. E., Binder, M. P., & Maccari, E. A. (2013). Incubadoras de empresas e o desenvolvimento de capacidades em empresas incubadas. *Revista de Ciências da Administração*, 15(35), 36-51. doi.org/10.5007/2175-8077.2013v15n35p36.

Tondolo, L. P., Borges, C., Pereira, B. A., & Silva, R. P., (2016). Incubadoras de empresas: Muitos investimentos públicos, muito barulho. E os resultados? *Gestão & Planejamento-G&P*, 17(2). 299-314. doi:10.21714/2178-8030gep.v17i1.4448.

Tumelero, C., dos Santos, S. A., & Kuniyoshi, M. S. (2016). Sobrevivência de empresas de base tecnológica pós-incubadas: estudo sobre a ação empreendedora na mobilização e uso de recursos. *REGE-Revista de Gestão*, 23(1), 31-40. doi.org/10.1016/j.rege.2014.11.001.

Vedovello, C., & Figueiredo, P. N. (2005). Incubadora de inovação: que nova espécie é essa?. *RAE-eletrônica*, 4(1), 01-18. dx.doi.org/10.1590/S1676-56482005000100006.

Verma, P., Singh, B., & Rao, M. K. (2014). Developing innovation capability: The Role of organizational learning culture and task motivation. *Global Journal of Finance and Management*, 6(6), 575-582.

Weick, K. E., & Westley, F. (2004). Aprendizagem organizacional: confirmando um oxímoro. In. Clegg, S. R., Hardy, C., & Nord, W. R. *Handbook de estudos organizacionais: ação e análise organizacionais* (pp. 361-388). São Paulo: Atlas.

Welchen, V., Mukendi, J. T., & Larentis, F. (2020). Compartilhamento de conhecimento como fator de inovatividade em empresas graduadas de uma incubadora tecnológica. *Navus-Revista de Gestão e Tecnologia*, 10, 01-19. DOI: doi.org/10.22279/navus.2020.v10.p01-19.1256 .