Public Policies and Innovation Ecosystem within the Technological Innovation Center of the Federal Institute Baiano: strategic analysis of actions, programs and projects

Sandra Santos Souza (Corresponding author)
Master's Student Professional Master's Program in Intellectual Property and Technology Transfer for Innovation - PROFNIT - PROFNIT/IFBA
Administration Assistant at the Federal Institute Baiano, Salvador-Bahia, Brazil.
Email: sandrarbjones@gmail.com

André Luis Rocha de Souza
Professor at the Federal Institute of Bahia - IFBA, Professional Master's Program in Intellectual Property and Technology Transfer for Innovation - PROFNIT - PROFNIT/IFBA, Salvador-Bahia, Brazil
Email: profandre.ifba@gmail.com

Marcelo Santana Silva
Professor at the Federal Institute of Bahia - IFBA, Professional Master's Program in Intellectual Property and Technology Transfer for Innovation - PROFNIT - PROFNIT/IFBA, Salvador-Bahia, Brazil
Email: profmarceloifba@gmail.com

Jerisnaldo Matos Lopes
Professor at the Faculty of Technology and Sciences - FTC, Salvador-Bahia, Brazil
Email: jerislopes@hotmail.com

Paula Meyer Soares
Professor at the University of Brasília – UNB, Professional Master's Program in Intellectual Property and Technology Transfer for Innovation – PROFNIT – UNB/PROFNIT, Brasília – Distrito Federal, Brazil
Email: paulameyer@unb.br

Abstract

Innovation policies have been gaining ground in the Brazilian scenario, requiring a strategic look at innovation activities by organizations in the conception of technologies. The article aimed to analyze the actions, programs and projects that are driving the innovation ecosystem of the Technological Innovation Center of the Federal Institute of Bahia (NIT IF Baiano) with a view to strengthening Innovation Policies for local and regional development. The research had a qualitative, descriptive, exploratory approach, documentary research and content analysis. Several actions were found to foster innovation, the main ones being: scientific and technological dialogues, seminars. Thus, it was evidenced in this research that

within the scope of IF Bahia the Innovation Policy for the management of Intellectual Property (IP) and Technology Transfer was recently regulated and, as a reflex, it was found that its IP indicators are retracted, for example the patents, trademarks and software. On the other hand, the scientific initiation programs received scholarships and the research projects developed managed to exceed the programmed goals. Finally, the NIT IF Baiano must remain supporting innovation policies to support the institutional Innovation Policy in order to leverage its technological indicators.

Keywords: public policies; innovation ecosystem; technological innovation nucleus; strategic analysis.

1. Introduction

The importance given to innovation is currently growing, which makes it necessary to adopt strategies that make them more competitive by Scientific, Technological and Innovation Institutions (STIIs), since innovation ecosystem drives the creation of entrepreneurial and innovative environments. Thus, Public Policies are essential elements to achieve objectives and direct technologies to the productive sector, as these norms lead STIIs to maximize their actions (Ikenami et al., 2016).

In Brazil, public policies on innovation are being encouraged, in order to promote the strengthening of the innovation system, which links several organizations, with the intention of regulating their actions and following guidelines for socioeconomic development (MCFS Pires et al., 2020). According to Avellar and Botelho (2018), the interaction programs among companies and public members of the Innovation System (IS) have gained relevance. The stimulus of Research and Development (R&D) by the productive sector and internationalization of public STIIs represent some of the challenges in the development and consolidation of the IS (Sidone et al., 2016).

In this context, there are Federal Institutes (FIs) that offer professional education and which are structured in pluricurricular and multicampi format in many provincial cities located in different states of Brazil. They have the purpose of training and qualifying citizens to work in different sectors of the economy, emphasizing national development (Brazil, 2008). It should be noted that the FIs are STIIs, and they are part of the Federal Education Network, being leaders of the organizational innovation policy, strengthening the consolidation of the National Innovation System (Souza, 2020).

Innovation systems encourage creation and development of technologies, providing socioeconomic impacts (Manjarrez et. Al., 2016). In the face of social demands, several technological innovations were presented as essential actions to regulate the culture of entrepreneurship and innovation in organizations, based on the expansion of activities of FIs and universities (Monteiro et al., 2019). According to Coelho and Dias (2016), several Technological Innovation Centers (NITs) disseminate the innovation culture and file many patents, without worrying about the financial share provided by the Technology Transfer.

Therefore, FIs have a primary role in stimulating innovation in order to promote scientific and technological production. Thus, the FIs aim to encourage the creation of environments for innovation and development oriented to entrepreneurship activities in technological parks and centers (Brasil, 2018). To this end, FIs shall be more prepared to offer entrepreneurship incentive programs with the approach of agents who encourage such actions (Rodrigues & Gava, 2016).

Therefore, this strengthening of FIs is contributed by the institutional innovation policy, reflecting positively on the actions, programs and projects carried out on innovation. Public policy makers of innovation in developing countries are investing in science, technology and innovation (S, T & I) aiming at achieving sustainable development, creating startups of S, T & I stimulating entrepreneurship (Surana et al., 2020). Thus, startups are considered as companies that arise involving new business supported by technology, using innovative ideas oriented to the market (Hernández & González, 2016).

It should be noted that the Law no. 11,892/08 regulated the Federal Institutes of Education in Bahia, as it was in this context that the Federal Institute of Education, Science and Technology Baiano (IF Baiano) was born, in 2008 (Brazil, 2008). This organization has a fundamental role in local and regional development in Bahia. According to the IF Baiano (2019), the institution has fourteen *Campi,* it subsidizes fourteen online education centers, in addition to having an administrative unit in Salvador, called Rectory and a Reference Center.

In view of the above, the Federal Institute of Education, Science and Technology Baiano is one of the key actors in activities aimed at teaching, research and extension available to the community, contributing to the production of knowledge and technologies. Thus, the strengthening of Technological Innovation Center of the Federal Institute Baiano (NIT IF Baiano) due to the innovation legislation and the increase of new responsibilities listed in the New Legal Framework for Science, Technology and Innovation (S, T & I) are essential in fostering innovation.

The New Legal Framework of S, T & I strengthened the NITs to manage the innovation policy in STIIs, as well as to make agreements aimed at technology transfer (Rodrigues & Gava, 2016). Among their attributions, they shall promote interaction with the productive sector, performing strategic actions aimed at scientific and technological promotion, contributing to research evolution in Brazil (Brazil, 2016).

In this context, from the growing search for innovation based on its public policies, and considering regulations of the new legal framework of S, T & I, the IF Baiano postures the question: **what actions, programs and projects are driving the innovation ecosystem of the NIT IF Baiano with a view to strengthening Innovation Policies for local and regional development?**

This study aimed to analyze which actions, programs and projects are driving the innovation ecosystem of the NIT IF Baiano aiming to strengthen innovation policies for local and regional development. Therefore, a strategic analysis of the arsenal of activities oriented to innovation of the NIT IF Baiano, can contribute to the interaction of the innovation ecosystem and its Public Innovation Policy.

This work sought to corroborate the Public Innovation Policies of IF Baiano, which are essential tools for fostering innovation and for providing interaction among different actors. S, T & I policies are essential in improving democracy and the STIIs involved aim to cooperate in the optimization of interactions, government and society (Garcia et al., 2017). In view of the above, the NIT IF Baiano will have subsidies to improve the institutional Innovation Policy, as well as providing the sector with a holistic view of innovation activities, making it possible to strengthen its interaction with the innovation ecosystem.

The results of this study demonstrate that S, T & I policies and the connection of institutions in innovation ecosystems are promising strategies for the progress of technological innovation and for the constitution of entrepreneurial environments in Brazil. Thus, this research has theoretical and practical relevance, both for the IF Baiano and for Federal Institutes in the northeast region of Brazil that are overcoming challenges in

fostering innovation.

In theoretical terms, it is expected to advance in discussions regarding the maximization of FIs' ecosystems in boosting their public policies. Regarding practical contributions, this research will seek to elucidate strategies to IF Baiano's managers, in order to strengthen decision making, with the objective of leveraging their Intellectual Property indicators and transmitting them to the market.

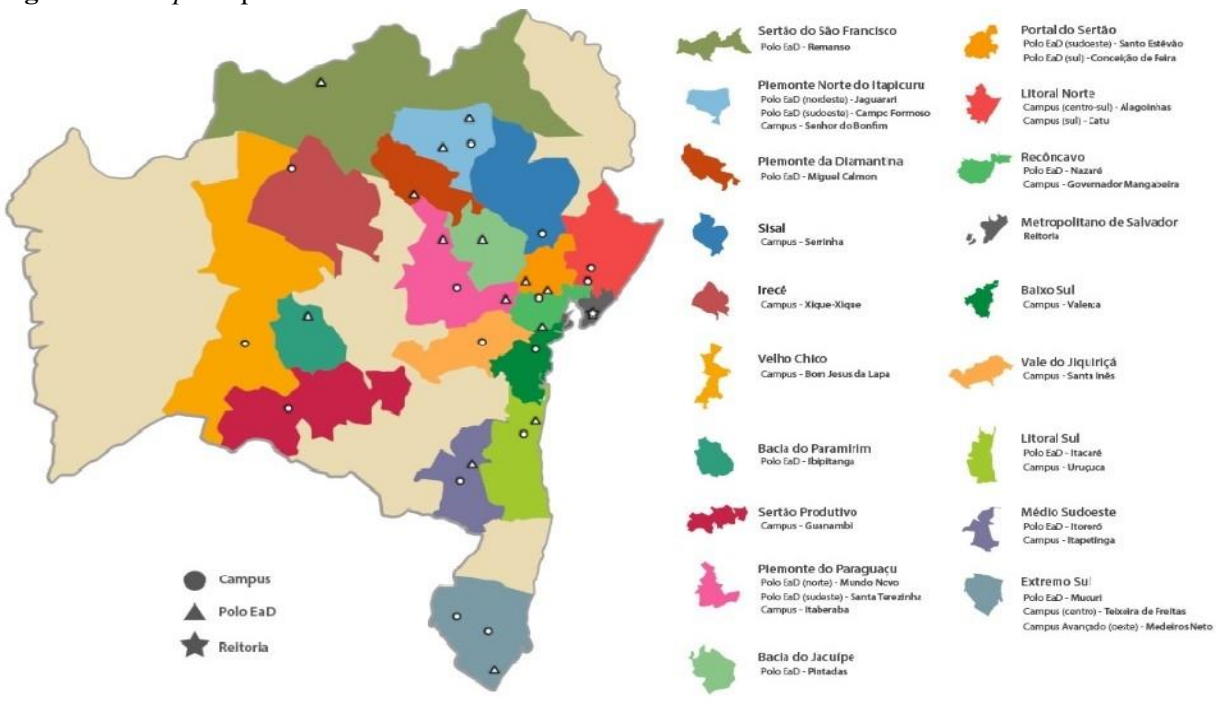
Thus, this work has an introductory structure, followed by the methodology section. After, there is the third section represented by the literature review that addresses public policies and innovation ecosystem in Brazil, and another section encouraging technological innovation cases of NITs of the FIs in the Northeast region. The fourth section refers to the results and discussions, and lastly there is the final considerations.

2. Methodology

2.1 Analysis unit

The NIT IF Baiano was analyzed between the years 2015 and 2019, the period of constitution of institutional documents of IF Baiano. It is worth mentioning that it has been verified that, to date, the 2019 Management Report data has not yet been made available to reference the activities related to this period. This public STII is located in Bahia, being formed by the former Federal Agrotechnical Schools and the Regional Agricultural Medium Schools of CEPLAC (Executive Committee of the Cacao Plantation Plan).

Figure 1- *Campi* map of IF Baiano.



Source: IF BAIANO (2019).

2.2 Research characterization

In order to analyze actions, programs and projects that are driving the innovation ecosystem of the Technological Innovation Center of the Federal Institute Baiano (NIT IF Baiano) aiming to strengthen

Innovation Policies for local and regional development, a qualitative approach was used, with a descriptive and exploratory nature, as well as documentary research and content analysis.

The research was built addressing the subjects: innovation policies and ecosystem in Brazil and incentive to technological innovation: cases of NITs of the FIs in the Northeast region, through literature review and documentary survey of the IF Baiano. These themes enabled the content analysis of the NIT IF Baiano's strategic innovation actions and the exposure of bottlenecks that hinder innovation promotion.

The study had a qualitative approach, as it aims to provide a broad and approximate view of a fact (Gil, 2008). According to the author, the descriptive character can be determined by its objectives, enabling a new perspective of the problem, approaching the exploratory nature. Then, the description of S, T & I activities of the NIT IF Baiano for being strategic in the institution and for managing intellectual capital. The research is characterized as exploratory, since it deepen the study on the actions of NIT IF Baiano, being able to verify its challenges aiming to boost the innovation ecosystem.

The article is characterized as a documentary research, because it uses documents of any nature, generated and maintained by public institutions as well as private ones (Vergara, 2016). Therefore, information on the 2018 Management Report, General Regulation, Institutional Development Plan (PDI), NIT Internal Regulation was verified on the IF Baiano's website. Thus, for the analysis, discussion and scope of the research results, the technique of content analysis was used in order to interpret the data.

According to Bardin (2011), content analysis is a grouping of methodological resources in permanent improvement, which can be applied to extremely different discourses; this instrument makes an objective description of the information for its interpretation. Hence, scientific evidence and S, T & I regulations that collaborated in the information analysis of official documents of the NIT IF Baiano's activities concerning the innovation can contribute for the relevance of the present study.

2.3 Stages, procedure and methodological strategy

The research presented was divided into six stages to achieve the proposed objective. The initial stage included an exploratory research with a theoretical survey to carry out a literature and documentary review aimed at collecting data oriented to innovation, extracted from the IF Baiano's website and official documents. In the second stage, a filter of the theoretical survey was carried out, selecting studies that were related to the theme, as well as identifying innovation activities in official documents of the institution.

In the third step, the IF Baiano's patent, trademark and software registrations at the National Institute of Industrial Property (INPI) from 2011 to 2020, were analyzed. Thus, a search was carried out in this database, including the Registration Depositor's National Legal Entity Number (CNPJ), number "107.249.030.001/79" in the search engine, collecting data on Intellectual Property (PI) and interaction with the innovation ecosystem.

The fourth stage, on the other hand, was carried out on the website of the National Council for Scientific and Technological Development of Brazil (CNPq) in the Research Group Directory, and on the Lattes Platform. In this stage, the institution's research group was first investigated, verifying data such as: quantitative, knowledge field and *Campi* location; these data were obtained in the search field using the expressions: "IFBAIANO" and "baiano". Afterwards, a research was carried out on the Lattes Platform collecting data on the number of professors with exclusive dedication (DE) and doctorate degree who

contributed to the Intellectual Property (PI) of the IF Baiano; those who had registered patents' orders at INPI were used in this search.

In the fifth stage, content analysis was used to compare the information collected to foster innovation related to expected goals, actions performed in the PDI and the institution's management report, with other works that demonstrated practical and realistic evidence. Thus, this analysis will inform if the actions were effective and served as support in the identification of strategic actions: those that are already carried out in the institution, as well as those that can be implemented to leverage Intellectual Property (IP) and stimulate innovation.

In the last stage, the research result identified that the NIT IF Baiano carries out several actions, programs and projects that are drivers of the innovation ecosystem with a view to strengthening Innovation Policies for local and regional development. Despite this, it was also shown that this sector experiences the same challenges as other NITs in the Northeast region. Thus, boosting its innovation ecosystem, generating new technologies and enabling its transfer to the market is essential for economic and technological development.

3. Literature review

3.1 Innovation Policies and Ecosystem in Brazil

Due to the need to leverage socioeconomic development and minimize regional inequalities generated by insufficient resources and demand required by society, the real inclusion of innovation and technological growth in organizations has been verified as important elements in order to sustain competitive advantages in the secondary sector of the economy (MCFS Pires et al., 2020). Szopik-Depczyńska et al. (2020) considers that the regions represent relevant areas for the conception, absorption and propagation of innovation, in addition to being a key element of competitiveness for the centers at national and international level.

Given this context, public policies can be considered fundamental instruments to drive innovation, as well as collaborating to strengthen competitive advantages in organizations. Therefore, innovation policies in the regions must be developed based on the characteristics of innovation environment, assessment of investment sources in Research and Development (R&D), network dimension, among other aspects (Min et al., 2020).

Public Policies that foster innovation have guidelines related to actions that encourage innovation, scientific research and emergence of technologies in organizations, strengthening and stimulating their engagement with the Brazilian productive sector. For this reason, the increase in R&D in institutions and the relentless search for knowledge are essential elements to reverse Brazil's low performance, requiring cooperation among public organizations and productive sector (Arbix & Miranda, 2017).

The Innovation Law (Law n. 10,973 / 2004) established that Brazilian Scientific, Technological and Innovation Institutions (STIIs) institute Technological Innovation Centers (NITs) in order to implement and manage their innovation policies (Machado et al., 2017). In addition, forecasts for concession of business incubators and possible sharing of infrastructure, instruments, personnel, public and private resources aimed at development and design of innovative products were included in the legislation on innovation

(MCFS Pires et al., 2020). Business incubators have the purpose of establishing companies and creating products/services through knowledge (MC Silva, et al., 2018).

In this context, there is the New Legal Framework for Science, Technology and Innovation (S, T & I) established by Law n. 13.243/2016, that was regulated in 2018 by Decree n. 9,283/2018, aiming at reducing the bureaucratization of public-private partnerships to encourage the development of technologies and scientific research in Brazil (Brazil, 2016; 2018). Given that, one of the purposes of the Legal Framework is to bring public STIIs closer to the private sector, stimulating innovation, and technological growth in the country (Sicsú & Silveira, 2016). The regulatory framework for innovation aims to boost Brazil in the innovation ecosystem, encouraging the creation of innovative spaces (Souza, 2020).

Innovation ecosystems have a fundamental role in technological development oriented to their members and influential regions. According to Marchini and Pereira (2019), these environments provide a cooperation among organizations, through strategic partnerships aimed at innovation processes, such as Research, Development and Innovation (RD&I), entrepreneurship, experience exchange with the productive sector, and business incubation (Spinosa et al., 2015).

Society is based on knowledge, and providing ways to improve the innovation ecosystem has become a relevant factor for economic progress. Therefore, Santos and Zattar (2019) report that the interaction among academia, entrepreneurs, productive sector and other actors of the innovation ecosystem can institute a knowledge flow in these places. Public STIIs, such as Universities and Federal Institutes (FIs) are considered to have sources of scientific and technological knowledge, as well as pieces of innovation ecosystems. In this context, these institutions can contribute to the growth of innovation systems in regions of several countries (Sun et al., 2019).

According to Kon (2016), interaction within an innovation ecosystem occurs in two ways of economic interconnection, through either knowledge economy that requires research and teaching, or commercial economy directed by the productive sector. For Bittencourt and Figueiró (2020), the innovation ecosystem establishment and its integration in networks of actors aiming at innovation, has the purpose of contributing to value generation for society. Therefore, the various interactions among innovation agents are essential with regard to S, T & I development, with the objective of promoting business-oriented competitiveness and improvements in a given territory benefiting its residents (Manjarrez et al., 2016).

For Garcia et al. (2017), the NIT has the competence to develop innovation policies focused on scientific and technological development. This NIT assignment requires the sector to structure itself internally, through staff training and qualification in order to perform interaction in various sectors of the economy. Given this context, the sector can promote partnerships, agreements and attract investments in R&D through strategic actions.

Hence, the sector can focus on structuring the innovation ecosystem and assist in strengthening institutional innovation policy by strategically analyzing institutional actions, programs and projects. Strategic analysis is carried out through performance indicators for innovation and scientific research. These benchmarks contribute to the evaluation of planned goals and whether they have been achieved. Accordingly, the innovation ecosystem establishment and its integration in networks of actors contributes to value generation (Bittencourt & Figueiró, 2020).

3.2 Fostering technological innovation: Cases of NITs of FIs in the Northeast region

Technological innovation in Federal Institutes (FIs) has been driven by the promotion of Intellectual Property (IP) and its strengthening in the innovation ecosystem can contribute to development of the region where they operate. STIIs through FIs seek to manage and value generated innovations by research, and the creation of NITs is a motivating factor (Oliveira & Santos, 2017).

Currently, there are 38 Federal Institutes (FI) in Brazil, increasing scientific research, technological innovation and integrating the innovation ecosystem, the majority of which are located in the Northeast region, representing 11 FIs. Thus, one can mention the state of Maranhão (Federal Institute of Piauí), in Bahia (Federal Institute of Bahia and Federal Institute Baiano). The FIs' competencies, in addition to teaching, research and extension, are responsible for contributing to economy development through scientific knowledge generation and applied technologies, leveraging innovation (Rodrigues & Gava, 2016).

The FIs in the Northeast region of Brazil have been implementing actions, programs and projects aimed at technological advances and consolidation of the innovation ecosystem. Thus, the growing transformation of this region demonstrates that science, technology and innovation are essential elements for regional development (Silva, Milani et al., 2019). Therefore, interaction through production in knowledge networks is considered one of the challenges of Science, Technology and Innovation (S, T & I) policies, as it generally favors scientific research quality and adds value to the results (Sidone et al. , 2016).

Within organizations there is a great concern in creation and conservation of knowledge, as the incentive in research and development (R&D) contributes to the emergence of programs to stimulate innovation, where an adequate knowledge management is an improvement factor to their performance (Mendes et al., 2020). Therefore, an innovation policy must be responsible for the establishment of a strong society, enabling innovative potential of localities, since in Brazil public policies are generally limited to regulations of financial support (Silva, Serio et al., 2019).

It should be noted that most NITs located in the Northeast need to leverage their IP indicators. Thus, it is possible to verify some bottlenecks and low IP results in the FIs in the Northeastern region, for example, the Federal Institute Baiano that needs to leverage its IP order numbers. According to Araujo et al. (2018), registration requests for patents, brands and software are not homogeneous in Northeastern FIs, because of its recent creation, as well as its different competence areas. Despite this, the author points out that Bahia is the largest depositor in the Northeast and the only one with a patent granted.

FIs located in the Northeast need to seek economic resources through innovation policies to increase IP production, in order to foster technological development. This is due to the lack of considerable investments in this country's region when compared with the South and Southeast regions, where larger amounts of resources were allocated (Guimarães, et al., 2016). For this reason, budget constraints can make investments that aim to streamline marketing procedures unfeasible, which often impact on expected results and technology transfer (Coelho & Dias, 2016).

Paranhos et al. (2018) describe that structuring NITs is considered difficult because the average number of human resources is low. As a result, STIIs need to insert professionals in this space to carry out strategic actions for innovation, which may increase their IP indicators. Thus, STIIs through NITs shall create IP

management and technology transfer policies by elaborating regulations at the juncture of regulatory innovation frameworks (Fonseca, 2017).

Over time, FIs seek to increase the offer of *Lato Sensu* and *Stricto Sensu* graduate programs. This growth includes the areas of Multidisciplinary knowledge and Applied Sciences, and policies in Exact Sciences, Earth Sciences, Agrarian Sciences and Engineering can be suggested (Cirani et al., 2015). However, FIs' current scenario does not contemplate doctorate courses in a professional modality; then, it is natural that these institutions pursue the academic modality (Alves & DelPino, 2015).

The Brazilian states shall not limit themselves to assuring large amounts of investment, nonetheless it is necessary to permanently improve their intervention, in order to guarantee the allocation of resources in public policy, with the purpose of bringing the productive sector closer to investing significantly in innovation in the regions (Gonçalves & Santana, 2020). Consequently, one can invest in the design of environments aimed at entrepreneurship, with the aim of minimizing social inequalities. In the face of the Brazilian reality, entrepreneurship is one of the decisive elements oriented at problems arising from worker unemployment and can create business opportunities (MC Silva et al., 2018).

Therefore, to foster technological innovation in FIs, it is important to have an ecosystem shaped with effective practices aimed at innovation and entrepreneurship. According to Moraes et al. (2020), these practices can be included in the development of organizational partnerships linked to entrepreneurship, for example pursuing the support of local companies, universities, city halls, and associations. The intra-business perspective is also an important aspect to support entrepreneurship practice, as it may involve business centers, interaction with business schools with coverage in other areas of knowledge in the institution.

4. Results and discussions

Over the course of a decade, the NIT IF Baiano was conceived (4 years ago), but it still has few professionals to manage Intellectual Property (IP) and promote its transfer to the productive sector, aiming at inducing technological innovation (Coelho & Dias, 2016). Over time, there has been an intense implementation of NITs in Brazil, characterizing a development in institution process of NITs by public organizations (Marchini & Pereira, 2019). However, staff shortages occur in most NITs, which makes it difficult to apply innovation policy in the organization.

The NIT IF Baiano is part of the Dean of Research and Innovation (*Pró-reitora de Pesquisa e Inovação* - PROPES), and it is regulated by the Resolution/CONSUP n. 35, 2016 (IF BAIANO, 2016). The article 5 of this resolution reinforces that the NIT IF Baiano aims to formalize, forward and monitor requests for IP registrations at the National Institute of Industrial Property (INPI), referring to requests for technologies generated by the internal or external community (IF BAIANO, 2016). Institutionalization contributes to legitimation of processes representing the standardization of policies and procedures (Machado et al., 2017). Accordingly, such regulation and the innovation framework are essential for strategic management of the sector that aims at partnerships and agreements in order to have greater interaction with the market.

The design of innovative spaces encourages actions that favor innovation and entrepreneurship, and the institution's Innovation Policy regulates the relationship with the productive sector. The Innovation Law

(Law no.10,973/2004) enabled the formation of the Technological Innovation Center (NIT), which has competence in managing innovation policy, and promotion of events for innovation and entrepreneurship. (Guimarães et al., 2016).

The management of the institutional innovation policy by the NIT requires that the sector be structured internally, through staff training and qualification to enable interaction in various economy sectors. The sector relies on the protection of immaterial goods and their transfer to society, technological prospection and competitive intelligence studies aiming to guide innovation activities and strategies for IP (Garcia et al., 2017).

Hence, the NIT IF Baiano is in accordance with the Innovation Law and the Industrial Property Law (LPI) for promoting local, regional and national technological innovation. It was observed that **within the scope of IF Baiano, the Innovation Policy for the management of Intellectual Property (IP) and Technology Transfer was recently regulated** (emphasis added). This policy was regulated by resolution 73/2020 CONSUP/IF BAIANO of 29 June 2020, a legal instrument that has guidelines regarding innovation incentive aimed at the development of the country (IF BAIANO, 2020). Therefore, this article can provide support to the NIT IF Baiano by strengthening its innovation policy in order to create a strong ecosystem that provides innovative spaces. Thus, according to Oliveira and Santos (2017), the Innovation Law sought to promote research increase and approximation of STIIs with companies, enabling the formation of partnerships.

The result is structured in a subsection referring to the analysis of actions, programs and projects that aim to foster innovation in the IF Baiano. It is divided into three topics: actions, programs and research projects related to fostering innovation in the organization. It can be seen that the challenges of the NIT IF Baiano are similar to other NITs in the Northeast in order to overcome barriers and boost technological development in Brazil.

4.1 Analysis of actions, programs and projects aimed at encouraging innovation in the NIT IF Baiano

According to DeMoura et al. (2019), the public STII has the complex task of providing environments that promote innovation. These spaces shall be structured and systematized, in order to provide assistance and service to workers who seek to undertake new ideas and innovate. It is recommended to know the ecosystem in which an organization is inserted, analyzing its behavior and its interaction, since it is possible to obtain examples of good practices enabling alternative strategies in stimulating entrepreneurship (Hernández & González, 2016).

In this context, the strategic analysis of actions, programs and projects carried out by the NIT IF Baiano serve as support to rethink new innovative activities and implementation of entrepreneurial spaces. This analysis is based on the PDI goals, as well as other related studies. Thus, Public Innovation Policies can be considered a driving force behind scientific and technological production. EA Pires and Quintella (2015) describe that these policies were proposed based on government discussions about the fundamental role of scientific knowledge and technological innovation in accelerating Brazilian socioeconomic development.

4.1.1 Actions

The IF Baiano carried out several interaction actions aimed at interdisciplinary themes with the community

between 2015 and 2019, in order to bring internal and external community together with the purpose of strengthening the innovation ecosystem. These events represented a strategy to bring together different audiences and contribute to the innovation culture. Table 1 shows the goals of actions developed by IF Baiano.

Table 1- Expected goals x Executed goals of actions.

PERIOD	2015	2016	2017	2018	2019
Expected goals: seminars, fairs, congresses	19	22	28	28	28
Goals achieved from actions taken: seminars, fairs, congresses	49	192	63	268	*
Variation of actions implemented by the institution	**30**	**170**	**35**	**240**	*

Source: Own elaboration based in data from 2014 PDI and 2018 Management Report.

It is worth mentioning that the 2018 Management Report accounts that the IF Baiano, in order to bring the internal and external community closer together, held events with several interdisciplinary themes, through: scientific and technological dialogues, workshops, seminars, exhibition, congresses, fairs, among others, between 2015 and 2019 (IF BAIANO, 2018). The culture of innovation provides dynamics to ecosystems, raising organizational energy, and motivating those involved through its promotion (DeMoura et al., 2019). Therefore, it was demonstrated that the actions carried out exceeded the expected goals between 2015 and 2018, reaching the greatest numbers of actions carried out in 2016 and 2018, with a variation of actions implemented in the institution of 170 and 240 respectively, observing a disproportion in values in this period. Rodrigues and Gava (2016) state that lectures aimed at raising awareness are commonly used resources in FIs and universities in order to disseminate the culture of innovation and IP. Thus, it can be seen that IF Baiano promotes the culture of innovation in its actions to innovate, bringing the community closer and raising awareness.

That is why innovation ecosystems are designed to create links of interaction among STIIs, business and government. Spinosa et al. (2015) report that several recent initiatives, encompassing academia, government and the private sector in Brazil, seek to leverage the country's technological indicators, establishing innovation ecosystems in emerging cities, employing them as one of the essential strategies. Therefore, the structuring of an innovation ecosystem, intermediated by interrelationship and network connection of actors in the innovation generation, can favor this consolidation process (Bittencourt & Figueiró, 2019).

It can be emphasized that, despite its 4 years of regulation, the NIT IF Baiano must pay attention to an effective strategic management for structuring the Innovation Policy according to the legislation directed to innovation, as well as aligned with the organizational mission. Despite this, the IF Baiano regulated the Resolution n.31 of November, 2015, which establishes guidelines for activities aimed at research and innovation in the institution's *Campi* (IF BAIANO, 2015).

According to Monteiro et al. (2015), innovation centers provide organized environments, have services that can interconnect and strengthen companies, in addition to providing regional development through innovation. With this reflection, it can be inferred that the research and innovation units in *Campi* work as

innovation centers, since they aim to collaborate with the NIT IF Baiano in innovation activities, enabling intermediation with local actors contributing to regional development.

To verify the quantity of the IF Baiano's Intellectual Property (IP), a survey was conducted to collect data from the National Institute of Industrial Property (INPI) from 2011 to 2020, with regard to patents, brands and software. Table 2 shows the result of this research.

Table 2- The IF Baiano's Intellectual Property recorded at INPI from 2011 to 2020.

Item	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Patent Application	0	0	0	0	5	7	0	4	2	1	19
Trademark Registration	1	0	0	0	0	2	0	0	0	0	3
Software Registration	0	0	0	0	0	1	0	1	2	1	5
Total	1	0	0	0	5	10	0	5	4	2	27

Source: Own elaboration.

According to Fonseca (2017), information dissemination related to registration of patents, trademarks and computer programs contributes in the long term to raising innovation indicators of a certain sector. In this context, in the period between 2011 and 2014 no patent application requests were identified at the IF Baiano, however, there were applications in 2015.

Therefore, it can be seen that in 2016 there was a greater number of requests for IP protection relative to the study's time cut (2015 to 2019). The authors Coelho and Dias (2016) reinforce that the recent increase in patent filings by institutions may be an effect related to the Brazilian Innovation Law. Due to this, regulations of the NIT IF Baiano must also have favored this increase.

In the Institutional Development Plan (PDI), the indicator of patents number had intermediate targets of 3 and 12 patent filings forecasted respectively in 2018 and 2019, with a total of 6 patent applications being protected (IF BAIANO, 2014). Therefore, in this period there was a reduction in patent applications in relation to the time cut of the research. Araújo et al. (2018) points out that patent applications require an 18-month confidentiality period according to INPI rules.

It should be noted that in the period from 2011 to 2020 the institution had 27 requests for IP protections, consisting of patents, trademarks and software. Thus, the following IP protection requests could be taken as examples on the INPI website: patents (development of cookies with the addition of mushroom flour); trademarks (Bem Baiano); software (Fitness & Health).

Thus, it became evident that out of the sum of IP protection requests, about 70% of them are patent registrations filed at INPI. Out of the number of patent application requests, 11 of them were published and currently they are waiting analysis of the regulatory body, 5 of them were annulled, and 3 of them are confidential. Accordingly, there is no patents granted at the IF Baiano until nowadays. Motta and Pereira (2019) report that patent application is inexpressive and without continuous growth it can be suggested the lack of actions or policies that encourage the protection of intellectual property in the organization.

In this context, out of the institution's 19 patent applications, it was found that 3 of them contribute to interaction of the innovation ecosystem because it has public institutions involved, such as: the Federal University of Bahia (UFBA) and the Federal University of Recôncavo da Bahia (UFRB). Among these, there is a patent application of 2019, which is confidential, with interaction between public institutions, cooperatives and associations aimed at regional development. One of the NITs' challenges is the execution oriented to entrepreneurial culture, regarding the acceptance of incorporation directed to the productive sector (Machado et al., 2017).

Thus, inventors and/or innovative researchers need support in terms of assuring IP protection, since it has the possibility of generating profitability from their innovative knowledge. Therefore, the concern regarded to the economic and technological development is born in Brazil due to the importance of this protection (Amorim, 2019). In view of the analyzed data, one can take as an example the relation between the low IP number versus the number of professors with Exclusive Dedication (ED) with Doctorate degree in order to maximize technological indicators in public STIIs. Table 3 displays the relationship between the amount of intellectual property and professors with exclusive dedication with a doctorate degree at the IF Baiano.

Table 3- IP *x* Professors (ED) with doctorate degree.

PERIOD	2015	2016	2017	2018	2019	TOTAL
IP Registration Quantity (patents and *software*)	5	8	0	5	4	22
Professors (ED) with doctorate degree	3	6	0	2	0	11

Source: Own elaboration based in data from INPI and CNPq.

Until 2019, the IF Baiano has 525 professors, out of which 502 ED professors, and out of these professors, 134 of them have PhD level, 274 MSc level, 92 specialist course, 5 improvement course, and 20 undergraduate level (IF BAIANO, 2014). In general, training at the doctoral level is essential in acting in graduate programs and participating in calls for research support in Brazil (TMR Dias et al., 2019). The data show that the sum of these professors represents half of the total IP of the analyzed period, therefore it is important to seek strategies to improve this relationship. From this perspective, it can be seen that in 2015, the list of doctors and patent registration in the Northeast region stood out in Bahia, Ceará and Pernambuco, surpassing the other states in this region (Gonçalves & Santana, 2020).

The PDI portrays a strategic objective of improving and expanding policies to qualify and train staff, as well as an indicator related to teaching staff's degree index (IF BAIANO, 2014). This indicator shows how many teachers are trained to foster innovation in the IF Baiano, through knowledge application in research groups aiming at providing technological development. The qualification for entrepreneurship of teachers, can be considered a prosperity factor in the ecosystems of public education entities, because these professionals can provide connection between the academy and entrepreneurial environments, in addition to spread this knowledge to students (MORAES et al., 2020).

Table 4 – Expected goals x achieved goals related to academic degree index of teaching staff.

PERÍODO	2015	2016	2017	2018	2019
Expected goals: academic degree index of teaching staff	4,0	4,1	4,2	4,4	4,5
Achieved goals: academic degree index of teaching staff	3,82	3,87	4,1	3,94	*
Variation in the academic degree index of teaching staff	0,18	0,23	0,1	0,46	*

Source: Own elaboration based in data from 2014 PDI and 2018 Management Report.

The data reveal that the IF Baiano was close to the goal set in relation to its teaching staff's qualification between 2015 and 2019. It should be noted that in 2018 there was a small decrease, due to staff hiring, who are still likely to have access to the Institutional Qualification Policy (IF BAIANO, 2018). In the last decade, there has been an increase in the number of professors and vacancies for who have master's and doctoral degrees, with a diversified geographical distribution, with predominance in the most developed regions of Brazil (Cirani et al., 2015).

Between 2011 and 2020, three trademark registrations were filed by the INPI regarding the name of the institution and sector. Regarding software registration, there was a sum of 5 requests in the highlighted period. The low number of protections made by the IF Baiano of trademarks and software may be influenced by the teachers' lack of IP technical knowledge. For Fonseca (2017), the NIT should encourage the culture of IP protection, contributing to management improvement of its intellectual capital.

4.1.2 Programs

The IF Baiano provides the internal community with scientific initiation programs on technological development and innovation, to encourage graduate programs, among others. Therefore, these programs are intended to encourage innovation, and entrepreneurship practice (IF BAIANO, 2018). According to Alves and Del Pino (2015), when comparing the increase in *stricto sensu* graduate programs offered at FIs and the increase in available graduate programs in Brazil, it is evident that the growth of these courses in these institutions is great.

In addition, these programs strengthen interaction and bring together innovation actors (STII, companies, government and society), with the aim of minimizing inequalities in the areas where they are implemented seeking the country's growth (Amorim, 2019). As evidenced, scientific initiation programs have the purpose of qualifying the community and favoring the potential to innovate and create products, narrowing the relationship with companies. As a result, the IF Baiano grants scientific initiation scholarships with internal funding, as well as scholarships to promote research and technological innovation to students. (IF BAIANO, 2019).

Scientific initiation programs aimed to foster innovation in the organization have as main objectives to encourage students: to exercise entrepreneurship, to innovate and to promote technologies (IF BAIANO, 2018). Thus, this program fostered by CNPq, has as one of its purposes to contribute to the scientific culture with presentation of researches by undergraduate students (Araújo, 2018). Therefore, it was found that the

organization has been fulfilling its function to provide programs that stimulate innovation and entrepreneurship. Moraes et al. (2020) points out that entrepreneurship insertion as a research area comes to represent a fundamental point that can facilitate conditions for growth in the practice of entrepreneurial culture and bring academia closer to companies.

It is worth mentioning that the institution offers 23 graduate courses in different areas: multidisciplinary, humanities, agrarian sciences, among others; out of which 18 are directed to teacher training (IF BAIANO, 2018). Federal Education Institutions believe that stimulating graduate education is considered a qualification resource for their staff, contributing to teaching and research practices (Araújo, 2018).

Regarding *stricto sensu* graduate programs, the IF Baiano offers the community Professional Master's vacancies in: Vegetable Production in the Semiarid Region; Professional and Technological Education (PROFEPT) and Professional Master in Environmental Sciences. In view of this, regional inequalities in Brazil are accentuated with regard to the number of graduate programs by region, with a tendency towards convergence (Cirani et al., 2015).

The IF Baiano offers an initial training program for teachers to integrate with basic education institutions, in order for them to have greater interaction with these organizations (IF BAIANO, 2018). In addition, it offers the Program that grants productivity incentives to teachers, in order to encourage innovation and productive arrangements in the regions (IF BAIANO, 2019). Motta and Pereira (2019) reinforce that the patent is an important innovation indicator directed to the Brazilian state, and notes that registration of patents itself does not bring benefits, as it shall be launched to the market for innovation.

The Extension Dean (PROEX) of the IF Baiano in 2018 made the Pro-extension Program public, an instrument aimed at promoting student extension activities, stimulating *Campi* interaction with local productive sector, strengthening the identity territory and its productive arrangement in the offer of continuing education courses, among others (IF BAIANO, 2018). For Figuerêdo et al. (2020) continuing education to update professional practices and didactic changes can be part of extension activities. The authors describe that the offer of these courses to pedagogical coordinators and teachers, aiming at building educational goals and actions contributes to technical and theoretical skills of those involved and to quality education consequently.

The IF Baiano has an Extension Policy that aims to combine scientific and cultural education with teaching and research, with the scope of transforming society through education (IF BAIANO, 2014). Thus, the extension activity meets plural and differentiated demands, since these actions dialogue with research and teaching, instigating interference and interactions with the population (Ribeiro et al., 2018).

The IF Baiano provides the Initiation Scholarship Program aimed at extension with the purpose of promoting interaction between students and staff in extension actions aimed at institution integration with society seeking regional development (IF BAIANO, 2018). The institution also offers the Margaridas Project, which is a proposal for extension actions that promotes activities to qualify women, aimed at women's empowerment and the fight against domestic violence (IF BAIANO, 2020).

4.1.3 Research projects

In the Institutional Development Plan (PDI) between 2015 and 2019 it was demonstrated that the process indicators and intermediate goals related to the total number of research projects forecasted in 2015 resulted in 58

projects, increasing until 120 projects in 2019 (IF BAIANO, 2014). Table 5 presents the indicators and intermediate goals regarding the strategic objective that strengthens research and innovation actions.

Table 5 – Expected goals x achieved goals related to research projects.

PERIOD	2015	2016	2017	2018	2019
Expected goals of the total number of research projects carried out at the institution	58	79	90	104	120
Achieved goals of the total number of research projects carried out at the institution	58	321	190	180	*
Variation in the increase of research projects	0	242	100	76	*

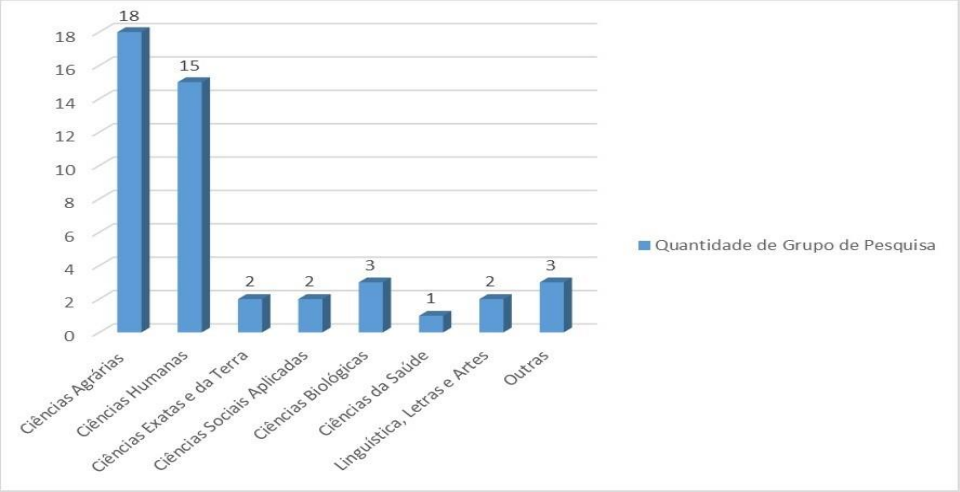
Source: Own elaboration based in data from 2014 PDI and 2018 Management Report.

Comparing the data above, it can be seen that the goals achieved of the number of projects executed by the institution exceeded the goals forecasted by the PDI, except in 2015. In 2016, this data had a considerable variation of 242 research projects in relation to the goal predicted, but this variation dropped by more than 50% compared to 2016, in consecutive years. Thus, it is evident that in 2016 with the regulation of the NIT IF Baiano and the legislation, innovation may have contributed to the increase of these data related to projects.

Research groups are a springboard for innovation, as they can act in several knowledge fields, once they facilitate fundraising for STIIs, empower involved researchers, and can structure their research laboratories (Garcia et al., 2017). In view of this, care should be taken to design research groups aligned with the NIT and in compliance with community demands so that they can provide local and regional improvements.

Resolution no. 39, 2018 was instituted to regulate research and innovation activities at the IF Baiano. This instrument has the purpose of delineating the attributions of those involved in a research project, providing guidance on procedures related to the monitoring and execution of projects (IF BAIANO, 2018). The development process to innovation, research actions and a favorable environment enable entrepreneurs' interaction from different sectors, favoring the development of a given region (Marchini & Pereira, 2019). Therefore, it can maximize knowledge exchange among participants of research groups in order to make their activities efficient and boost research projects directed to innovation in educational institutions. In this context, most PhD level professors have conducted research at FIs and worked in graduate courses in the country, and several of them have high scientific production (TMR Dias et al., 2019). Figure 2 shows the number of research groups by fields of knowledge.

Figure 2- Number of research groups by fields of knowledge.

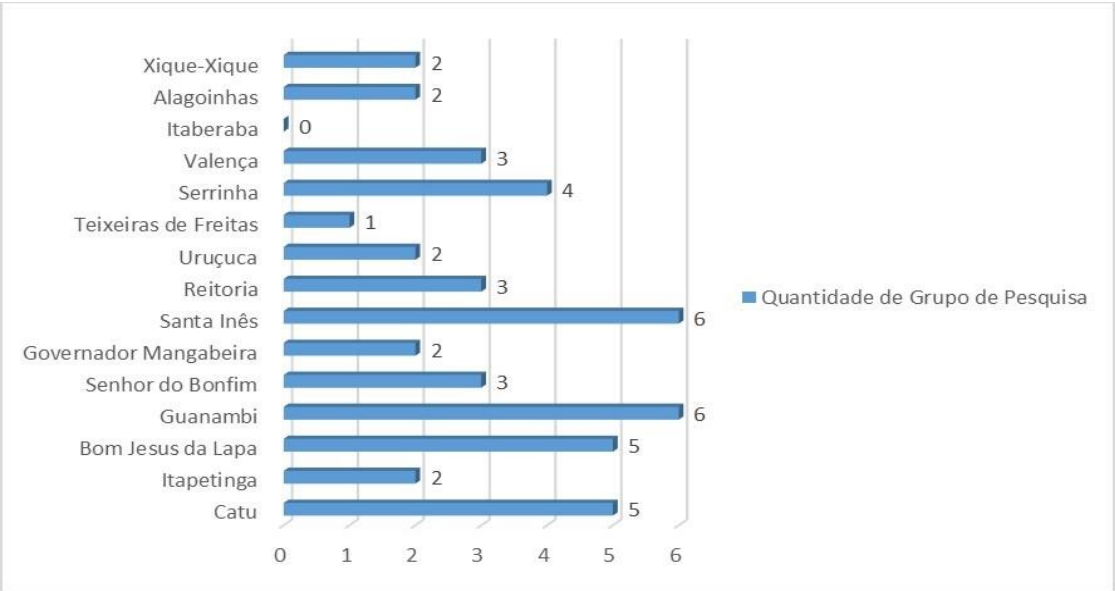


Source: Own elaboration based in data from CNPq (2020).

In the survey carried out on the CNPq website, it is possible to have a view of the distribution of Research Groups and knowledge fields in the IF Baiano's *Campi*. Therefore, it is noted that 46 research groups represent 8 fields of knowledge, in which highlights agrarian sciences and human sciences. Respectively, these fields house the Food Science and Technology Study Group, and the Research Group in Education, Diversity, Languages and Technologies, for example.

These predominant fields represent about 39% and 33% of the total research groups respectively, adding up to about 72% of the total research groups, which reveal a quantitative disproportionality among the knowledge fields. It should be noted that the fields of knowledge: exact and earth sciences, agrarian and engineering symbolize the technological knowledge that the population craves in periods of growth (Alves & DelPino, 2015).

Figure 3 - Research groups by *Campi*.



Source: Own elaboration based in data from CNPq (2020).

It is worth mentioning that the IF Baiano *Campi* that have the largest number of research groups are located in Santa Inês and Guanambi, representing about 13% in each region. Thus, it is evident that among 14 institution's *Campi*, the unit located in Itaberaba has no research groups in the research analysis period, which may be due to the fact that this *Campi* is being implemented. For Souza (2020), the institution may be more focused on teaching and academic practice, reflecting in few or lack of research groups in some units of the institution, and inequality among scientific and technological production.

5. Final considerations

Public Innovation Policies play a fundamental role in expansion of innovation ecosystems of STIIs, through NITs. In view of this, this study aimed to analyze the actions, programs and projects that are driving the innovation ecosystem of NIT IF Baiano with a view to strengthening Innovation Policies for local and regional development. In order to carry out this study, a qualitative approach of an exploratory nature was used, along with a documentary research and content analysis.

In this research, it was possible to have as a result the composition of innovation promotion actions of the NIT IF Baiano that collaborate in the innovation ecosystem's interaction, despite the institution having recently regulated its Innovation Policy. Thus, its implementation can contribute to IP management, as well as to technology transfer.

Thus, it was verified that the NIT FI Baiano goes through the same bottlenecks experienced by other NITs in the Northeast region. Among their main obstacles, there are: personnel shortage; lack of considerable investments; registrations of patents, trademarks and software are considered inexpressive and are not homogeneous; inexistence of a professional doctorate, but greater adherence to the academic doctorate; predominant research groups in multidisciplinary area, and little interaction with the productive sector.

Therefore, the objective of this research was reached, through a documentary research and content analysis based on other studies. It is evident that the IF Baiano carries out several activities related to innovation, such as scientific and technological dialogues, workshops, among others. Thus, the IF Baiano uses the culture of innovation, since it is considered a major factor in innovation, motivation and interaction among ecosystem actors.

From INPI data analysis, one can obtain technological indicators such as: patent, trademarks and software that are still retracted in the IF Baiano. Therefore, the recent regulation of its innovation policy has the purpose of positively influencing the technological innovation generation.

At this juncture, this study revealed that the NIT IF Baiano needs to structure itself with strategies to manage intellectual capital and innovation activities, through the design of an institutional innovation policy with a view to local, regional and national development. In this way, the IF Baiano *Campi* units can collaborate with the NIT IF Baiano, through actions that strengthen the innovation ecosystem and enable intermediation with local actors.

As noted, the institution promotes training and education for its community by providing scientific initiation programs and teacher training initiation programs aiming at producing knowledge oriented to innovation, entrepreneurship and technological development. Regarding the number of research projects between 2015 and 2019, it was demonstrated that the number of projects exceeded the expected goal in

2016. In this context, the regulation of the NIT IF Baiano, the innovation legislation and the NIT alignment with research groups can induce innovation.

It is concluded that, in spite of the timid data demonstrated, the NIT IF Baiano complies with innovation laws, because it enables means to stimulate scientific research and technological innovation, uses the innovation culture to increase the capacity of the community to innovate and to undertake new ideas, contributing to the development of new technologies. Thus, there is a beneficial interaction in *Campi* with networking, strengthening the innovation ecosystem and approaching the productive sector. Therefore, strategies' implementation in the context of the New Legal Framework of S, T & I for the NIT IF Baiano will be essential to structure its institutional actions and consolidate its Innovation Policy.

Despite the study limitation regarding the time cut between 2015 and 2019, it is possible to have a diagnosis of the innovation sector in this period, so that its managers and members can implement or enhance strategic actions for local and regional development. Therefore, this work can serve as a basis for other studies, in addition to motivate the innovation culture in the institution, since it demonstrates the possibility of creating innovation centers to strengthen the innovation ecosystem, providing interaction and knowledge exchange.

Finally, an in-depth study at the NIT IF Baiano is recommended for future research, through a case study aimed at contributing to the institutional innovation policy in the context of the New Legal Framework of S, T & I. Thus, it has the purpose to provide support to leverage scientific and technological production indicators of the organization, with a view to strengthening the innovation ecosystem and contributing to technology transfer progress.

References

Alves, C. G. M. & DelPino, J. C. (2015). Performance of FIs before the National Graduate System: a comparison between 2008 and 2014. *Hoslo, 5*(31), 379-400. https://doi.org/10.15628/holos.2015.3090 [Portuguese]

Amorim, V. P. (2019). *Analysis of the innovation policies of the Federal Institutes of Science and Technological Education (IFETs) of the Northeast region: an exploratory study*. [Undergraduate Final Paper], Federal Institute of Education, Science and Technology of Bahia, Salvador, Bahia, Brazil. [Portuguese]

Araújo, L. O., Antenor, M. C., Andrade, J. S., Fernandes, R. F., Araújo, G. G., Carneiro, R. F. & Carneiro, J. M. (2018). Mapping of industrial property in the Federal Institutes of Education in the Northeast. *Cadernos de Prospecção, 11*(ed. especial), 284-294. http://dx.doi.org/10.9771/cp.v11i2.23078. [Portuguese]

Araújo, P. C. C. de. (2018). *Scientific production analysis of the UFPI-CMRV with an emphasis on contributory studies for the city of Parnaíba-PI*. (Masters dissertation), Federal University of Piaui, Teresina, PI, Brazil. Available at: https://repositorio.ufpi.br/xmlui/bitstream/handle/123456789/1565/DISSERTA%c3%87%c3%83O_MES

TRADO%20GEST%c3%83O%20P%c3%9aBLICA_PATRICIA%20CANTUARIA_CORRE%c3%87%c3%83O%20FINAL.pdf?sequence=1. [Portuguese]

Arbix, G. & Miranda, Z. (2017). Innovation policies in a new key. *Estudos Avançados, 31*(90), 49-73. http://dx.doi.org/10.1590/s0103-40142017.3190004. [Portuguese]

Avellar, A. P. M. de & Botelho, M. dos R. A (2018). Impact of innovation policies on small, médium and large Brazilian firms. *Applied Economics, 50*(55), 5979-5995. https://doi.org/10.1080/00036846.2018.1489109.

Bardin, L (2011). *Content analysis*. (edições 70). São Paulo: Almedina. [Portuguese]

Decree n. 9,283, of February 7, 2018. (2018). Regulates the Law n. 10.973, of December 2, 2004, the Law n. 13.243, of January 11, 2016, and art. 24, § 3º, and art. 32, § 7º, of Law n. 8.666, of June 21, 1993 [...]. Brasília: Republic Presidency. Available at: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/decreto/d9283.htm. [Portuguese]

Law n. 11,892, of December 29, 2008. (2008). Establishes the Federal Network for Professional, Scientific and Technological Education, creates the Federal Institutes of Education, Science and Technology, among other measures. Brasília: Republic Presidency. Available at: http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2008/Lei/L11892.htm. [Portuguese]

Law n. 13,243, of January 11, 2016. (2016). Provides for incentives to scientific development, research, scientific and technological training and innovation [...]. Brasília: Republic Presidency. Available at: http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2016/Lei/L13243.htm. [Portuguese]

Bittencourt, B. A. & Figueiró, P. S. (2019). Creating shared value based on an innovation ecosystem. *Cadernos EBAPE.BR, 17*(4), 1002-1015. http://dx.doi.org/10.1590/1679-395174403. [Portuguese]

Cirani, C. B. S., Campanario, M. de A. & Silva, H. H. M. da (2015). The evolution of graduate *sensu stricto* education in Brazil: exploratory analysis and research proposals. *Revista Avaliação, 20*(1), 163-187. http://dx.doi.org/10.590/S1414-40772015000500011. [Portuguese]

Coelho, L. C. D. & Dias, A. A (2016). *The Technological Innovation Nucleus at UFPE: instrument of innovation policy or legal obligation?*. Revista de Administração. Contabilidade e Economia da Fundace, *7*(1), 28-42. http://dx.doi.org/10.13059/racef.v7i1.181. [Portuguese]

Dias, T. M. R., Moita, G. F. & Dias, P. M. (2019).

A study on the scientific collaboration network of Brazilian researchers with curricula registered on the Lattes Platform. *Em Questão*, *25*(1), 63-86. http://dx.doi.org/10.19132/1808-5245251.63-86. [Portuguese]

DeMoura, S. L. Filho, Rocha, A. M. R, Teles, E. O. & Torres, E. A. (2019). Entrepreneurial university: an evaluation and planning method applied in Brazil. *Revista Gestão & Tecnologia*, *19*(1), 159-184. https://doi.org/10.20397/2177-6652/2019.v19i1.1514. [Portuguese]

Figuerêdo, R. C. L., Joye, C. R, Maia, R. L. & Rurato, P.A. (2020). Continuing training: experience in EAD extension. *Brazilian Journal of Development*, Curitiba, *6*(5), 30650-30658. https://doi.org/10.34117/bjdv6n5-502. [Portuguese]

Fonseca, M. L. M. da (2017). Strategic knowledge management and potential mapping of the National Laboratory for Scientific Computing - LNCC / MCTI in technological innovation generation. *Cadernos de Prospecção*, *10*(2), 77-89. http://dx.doi.org/10.9771/cp.v10i2.17496. [Portuguese]

Garcia, D. L., Bisneto, J. P. M. & Santos, E. M. dos (2017)**.** Technological Innovation Center of the Federal University of Recôncavo da Bahia: a sectorial diagnosis. *Revista Brasileira de Gestão e Inovação*, *5*(1), 23-49. http://dx.doi.org/10.18226/23190639.v5n1.02. [Portuguese]

Gil, A. C. (2008). *Methods and techniques of social research* (6 ed.). São Paulo: Atlas. [Portuguese]

Gonçalves, B. S. & Santana, J. R. de (2020). A performance analysis of the northeastern states in the science, technology and innovation policy between 2000 and 2015. *Revista Gestão & Tecnologia, 20*(1), 215-232. https://doi.org/10.20397/2177-6652/2020.v20i1.1653. [Portuguese]

Guimarães, A. de A., Araújo, M. L. V. & Cardoso, H. S. P. (2016). Patent production in the Northeast region: a comparative study between Public Higher Education Institutions in the period from 2002 to 2012. *Revista Gestão e Planejamento, 17*(2), 146-161, https://doi.org/10.21714/2178-8030gep.v17i1.3944. [Portuguese]

Hernández, C. & González, D. (2016). Study of the Start-Up Ecosystem in Lima, Peru: Collective Case Study. *Latin American Business Review*, *17*(2), 115–137. http://dx.doi.org/10.1080/10978526.2016.1171678.

Ikenami, R. K., Garnica, L. A. & Ringer, N. J. (2016). Innovation ecosystem: an analytical approach from the business perspective to formulate interaction strategies. *Revista de Administração, Contabilidade e Economia da Fundace***,** *7*(1), (ed. especial), 162-174. http://dx.doi.org/10.13059/racef.v7i1.232. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2019). *Infographics 2015-2018*. Available

at: http://ifBaiano.edu.br/portal/pesquisa/plano-de-dados-abertos/. Access on: March 16, 2020. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2018). *Margaridas*. Available at: https://ifbaiano.edu.br/portal/extensao/margaridas/. Access on: July 23, 2020. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2020). *Pibiex*. Available at: https://ifbaiano.edu.br/portal/extensao/pibiex-2/. Access on: July 23, 2020. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2014). *Institutional Development Plan of the Federal Institute Baiano 2015-2019***.** Available at: http://ifBaiano.edu.br/portal/wp-content/uploads/2015/12/pdi-2015-2019-versao-2018.pdf. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2018). *Promotion Program for the extension actions of IF Baiano Pro-extension 2018*. Available at: https://ifbaiano.edu.br/portal/extensao/wp-content/uploads/sites/4/2018/05/Edital-n-01-2018-PROEX-CPPEX-IF-BAIANO.pdf. Access on: July 27, 2020. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2018). *Programs, projects and actions*. Available at: https://ifbaiano.edu.br/portal/acesso-a-informacao/acoes-e-programas/programas-projetos-e-acoes/. Access on: February 25, 2020. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2016**).** *Internal rules of the IF Baiano Technological Innovation Center*. Available at: https://ifbaiano.edu.br/portal/pesquisa/wp-content/uploads/sites/3/2017/03/Regimento_NIT.pdf [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2018). *2018 Management Report*. Available at: http://ifBaiano.edu.br/portal/wp-content/uploads/2019/06/Relat%C3%B3rio-de-Gest%C3%A3o-2018.pdf. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2015). *Resolution n.31, of November, 2015*. Approve the Regulatory Norms for Research and Innovation Activities within the scope of IF Baiano's *Campi*, according to CONSUP's deliberations. Available at: http://ifBaiano.edu.br/portal/pesquisa/resolucao-normas-regulamentadoras-das-atividades-de-pesquisa-inovacao-campi/. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2018). *Resolution n.39, of September 24, 2018*. Regulation of research and innovation activities of the Federal Institute of Education, Science and Technology Baiano. Available at: https://www.ifbaiano.edu.br/unidades/lapa/files/2019/10/Regulamento-de-Atividades-de-Pesquisa-e-Inova%C3%A7%C3%A3o-do-IF-Baiano.pdf. [Portuguese]

IF Baiano - Instituto Federal Baiano (Federal Institute Baiano). (2020). *Resolution 73/2020 CONSUP/IFBAIANO, of July 29, 2020***.** Available at: https://ifbaiano.edu.br/portal/pesquisa/wp-content/uploads/sites/3/2020/07/Resolu%C3%A7%C3%A3o_Pol%C3%ADtica-de-Inova%C3%A7%C3%A3o.pdf. [Portuguese]

Kon, A. (2016). Innovation and Entrepreneurship Ecosystems. *Revista de Administração, Contabilidade e Economia da Fundace*, *7*(1), (ed. especial), 14-27. http://dx.doi.org/10.13059/racef.v7i1.170. [Portuguese]

Machado, H. P. V., Sartori, R. & Crubellate, J. M. (2017). Institutionalization of Technological Innovation Centers in Science and Technology Institutions in the Southern Region of Brazil. *REAd*, Porto Alegre, *12*(3), 5-31. http://dx.doi.org/10.1590/1413-2311.177.67190. [Portuguese]

Manjarrez, C. C. A., Pico, J. A. C. & Díaz, P. A. (2016). Industry Interactions in Innovation Systems: a Bibliometric Study. *Latin American Business Review*, *17*(3), 207-222. https://doi.org/10.1080/10978526.2016.1209036.

Marchini, E. L. & Pereira, M. F. (2019). The Evolution of Science and Technology Institutes and their Technological Innovation Centers in Brazil. *Cadernos de Prospecção*. Salvador, *12*(5), 1174-1189. http://dx.doi.org/10.9771/cp.v12i5 %20Especial.32804. [Portuguese]

Mendes, P. P., Júnior, J. R. de O. C. & Ubina, L. M. S. (2020). Critical knowledge analysis in promoting innovation by SEBRAE. *Brazilian Journal of Development*, Curitiba, *6*(5), 28179-28193. https://doi.org/10.34117/bjdv6n5-315. [Portuguese]

MIN, Sujin; Juseong, K. & Sawngc, Y. (2020). The effect of innovation network size and public R&D investment on regional innovation efficiency. *Technological Forecasting & Social Change*, *155*, 1-13, 2020. https://doi.org/10.1016/j.techfore.2020.119998.

Monteiro, P. O., Tajra, S. F., Ribeiro, J. R. & Bussolotti, J. M. (2019). Education, innovation and entrepreneurship: the university and its new role in society. *Revista Brasileira G&DR*, Taubaté, *15*(6), (special ed.), 264-276. https://www.rbgdr.net/revista/index.php/rbgdr/article/view/5200/858. [Portuguese]

Moraes, G. H. S. M., Fischer, B. B., Campos, M. L. & Schaeffer, P. R. (2020). University Ecosystems and the Commitment of Faculty Members to Support Entrepreneurial Activity. *Brazilian Administration Review*, *17*(2), 1-26. http://dx.doi.org/10.1590/1807-7692bar2020190013.

Motta, E. M. & Pereira, J. R. D. (2019). Study on indicators of scientific production versus technological production at the State University of Maringá. *Cadernos de Prospecção*, Salvador, *12*(4), 795-809. http://dx.doi.org/10.9771/cp.v12i4 .327 67 p795. [Portuguese]

Oliveira, E. H. A. de & Santos, J. P. L. S. (2017). Intellectual property management tools in Brazil's Technological Innovation Centers. *Cadernos de Prospecção*, Salvador, *10*(3), 416-425. http://dx.doi.org/10.9771/cp.v10i3.23068. [Portuguese]

Paranhos, J., Cataldo, B. & Pinto, A. C. de A. (2018). Creation, institutionalization and functioning of the Technological Innovation Centers in Brazil: characteristics and challenges. *REAd*, Porto Alegre, *24*(2), 253-280. http://dx.doi.org/10.1590/1413-2311.211.84988. [Portuguese]

Pires, E. A. & Quintella, C. M. A. L. T. (2015). Policy for intellectual property and technology transfer in universities: a NIT perspective from the Federal University of Recôncavo da Bahia. *Hoslo*, *6*(31), 2015. https://doi.org/10.15628/holos.2015.3600. [Portuguese]

Pires, M. C. F. S., Rita, L. P. S. & Pires, A. C. S. (2020). Profile of the Technological Innovation Center in innovation management: a study at the Federal University of Alagoas. *Navus*, Florianópolis, *10*, 01-16. http://dx.doi.org/10.22279/navus.2020.v10.p01-16.1000. [Portuguese]

Ribeiro, M. R. F., Mendes, F. F. de F. & Silva, E. A. (2018). Curriculum of extension in favor of a referenced university. *Revista Conexão UEPG*, *14*(3), 334-342. https://doi.org/10.5212/Rev.Conexao.v.14.i3.0004. [Portuguese]

Rodrigues, F. C. R., Gava, R. (2016). Training to support innovation at Federal Institutes and Federal Universities in the state of Minas Gerais: a comparative study. *Revista Eletrônica de Administração*, Porto Alegre, *22*(1), 1-2. http://dx.doi.org/10.1590/1413-2311.0282015.5445. [Portuguese]

Santos, M. L., B. dos & Zattar, I. C. (2019). The importance of knowledge management for the functioning of innovation ecosystems**.** *RISUS*, São Paulo, *10*(1), 48-56. https://doi.org/10.24212/2179-3565.2019v10i1p48-56. [Portuguese]

Sicsú, A. B. & Silveira, M. (2016). Advances and setbacks in the legal framework of science, technology and innovation: necessary changes. *Rev. Ciência e Cultura*, São Paulo, *68*(2), 4-5. http://dx.doi.org/10.21800/2317-66602016000200002. [Portuguese]

Sidone, O. J. G., Haddad, E. A. & Mena-Chalco, J. P. (2016). Science in Brazilian regions: evolution of production and scientific collaboration networks. *TransInformação*, Campinas, *28*(1), 26-51. http://dx.doi.org/10.1590/2318-08892016002800002. [Portuguese]

Silva, G., Di Serio, L. C. & Bezerra, E. D. (2019). Public Policies on Innovation and Small Businesses in a Swinging Economy. *Brazilian Administration Review*, Maringá, *16*(3), 1-26. http://dx.doi.org/10.1590/1807-7692bar2019180140.

Silva, M. C. da, Rampasso, I. S., Anholo, R. & Ordoñez, R. E. C. (2018). Critical Success Factors of Brazilian Business Incubators. *Latin American Business Review*, *19*(3-4), 197–217. https://doi.org/10.1080/10978526.2018.1534545.

Silva, T. de S., Milani, A. M. R. & Antunes, V. N. B. (2019). Regional analysis of policies to support S, T & I: a preliminary study of the scientific and technological structure of the Northeast. *Revista Econômica do Nordeste*, Fortaleza, *50*(3), 107-123. https://ren.emnuvens.com.br/ren/article/view/923/780. [Portuguese]

Souza, J. dos R. (2020). *The role of innovation and intellectual property policy as an inducer of applied technological production: a study at the Federal Institute of Education, Science and Technology of Bahia - IFBA*. 155p. (Concluding Technical Report of the Master in Administration Intellectual Property and Technology Transfer for Innovation) – Federal Institute of Education, Science and Technology of Bahia, Salvador, Bahia, Brasil. [Portuguese]

Spinosa, L. M., Schlemm, M. M. & Reis, R. S. (2015). Brazilian innovation ecosystems in perspective: some challenges for stakeholders. *REBRAE*, Curitiba, *8*(3), 386-400. https://doi.org/10.7213/rebrae.08.003.AO08.

Sun, S. L., Zhang, Y., Cao, Y., Dong, J. & Cantwell, J. (2019). Enriching innovation ecosystems: The role of government in a university science park. *Global Transitions*, *1*, 104-119. https://doi.org/10.1016/j.glt.2019.05.002.

Surana, K., Singh, A. & Sagar, A. D. (2020). Innovation level and local development of EU regions. *Technological Forecasting & Social Change*, 157(nd.), 1-17. https://doi.org/10.1016/j.techfore.2020.120057.

Szopik-Depcynska, K., Cheba, K., Bak, I., Kzdzierska-Szczepaniak, A., Szczepaniak, K. & Ioppolo, G. (2020). Innovation level and local development of EU regions. A new assessment approach. *Land Use Policy, 99*, 1-11. https://doi.org/10.1016/j.landusepol.2020.104837.

Vergara, S. C. (2016). *Projects and research reports in administration* (16 ed.) São Paulo: Atlas.