Innovation management in the Federal Institutes of Education, Science and Technology of the Brazilian Northeast: an overview

Rodrigo Nogueira Albert Loureiro – rodrigo.albert@reitoria.ifpe.edu.br
Postgraduate Program in Intellectual Property Science, Federal University of Sergipe / Federal Institute of Education, Science and Technology of Pernambuco
Brazil

Gabriel Francisco da Silva – gabriel@ufs.br
Postgraduate Program in Intellectual Property Science, Federal University of Sergipe, Brazil

Sílvio Sobral Garcez Júnior – silvio.sobral@gmail.com
Postgraduate Program in Intellectual Property Science, Federal University of Sergipe, Brazil

João Antonio Belmino dos Santos – joaoantonio@ufs.br
Postgraduate Program in Intellectual Property Science, Federal University of Sergipe, Brazil

Márcio Vilar - marcio.vilar@globo.com
Federal Institute of Education, Science and Technology of Pernambuco
Brazil

Frederico Duarte de Menezes - frederico.menezes@reitoria.ifpe.edu.br
Federal Institute of Education, Science and Technology of Pernambuco
Brazil

Abstract

With the Law nº 11.892 of 2008, Brazilian´s professional education acquired new status, based on the conception of the Federal Institutes of Education, Science and Technology (FIs). In essence, FIs have the responsibility to stimulate applied research in the development of technical and technological solutions; entrepreneurship; and scientific and technological development with a view to innovative processes. Despite their intrinsic proximity to the productive sector, giving them an environment conducive to the development of intellectual assets, some FIs still have difficulties in managing innovation. Conversely, some of these institutions have developed mechanisms to promote innovation management and the improvement of knowledge protection indicators developed in their locus. In this perspective, the FIs of the Northeast region of Brazil stand out, through their Technological Innovation Centers, presenting the best Intellectual Property (IP) safeguard indexes between the years 2008 to 2016. In this sense, the present work aims to present the innovation actions of the FIs of the referred region that culminated in a greater protection of IP, and may serve as a reference for other institutions in the network.

Keywords: Federal Institutes; Innovation management; Intellectual Property

1. Introduction

The Federal Institutes of Education, Science and Technology (FIs) were created with the mission of promoting basic and technological education in the most different modalities. Nowadays, there are 38 institutions present in all the states of the Federation, with 644 (six hundred and forty-four) unities spread across several municipalities (BRAZIL, 2019a).

Regarding scientific knowledge, the Law 11.892 of 2008, in its article 6, establishes that FIs stimulate applied research, cultural production, entrepreneurship, cooperativism and scientific and technological development (BRASIL, 2008). In order to promote research within these institutions, in 2010 the Term of Agreements and Targets (TAT) was signed between the FIs and the Ministry of Education (MEC), which among other actions established: the development of a research, innovation or development projects and preferably have teachers and students in it with different levels of training and the commitment to expand, in at least 10% per year, of these activities in partnership with public and private institutions with bias of application in social interest.

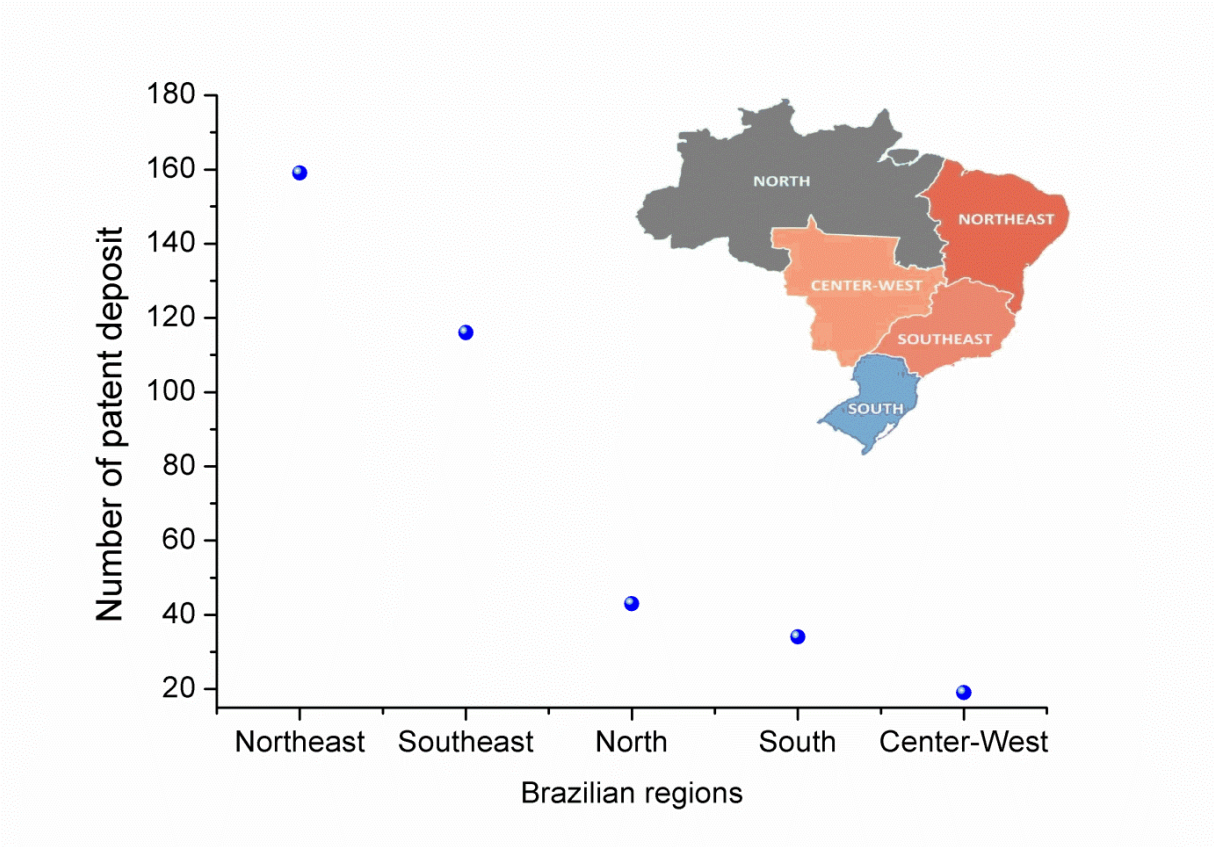
In this sense, FIs have developed mechanisms to increase the promotion of research and innovation over the last decade. This statement can be referenced by some of its indicators, among them the increase in the number of institutional scientific initiation fellowships, increasing from 332 (three hundred and thirty-two) in 2008 to 2,697 (two thousand six hundred and ninety-seven) in the year of 2015 (QUEIROZ NETO et al, 2017). The authors also highlight the significant increase in the research groups certified in the Directory of Research Groups (DGP) of the National Council for Scientific and Technological Development (CNPq) between 2000 and 2016, with 46 (forty six) and 2,749 (two thousand seven hundred and forty-nine), respectively, as well as the expansion of strict sensu graduate programs, increasing from 06 (six) in the year 2007 to 65 (sixty-five) in the year 2015.

In line with the development of the research in the FIs, there was also the idea of products, processes and services of an innovative character, capable of protection by means of the various existing Intellectual Properties (IP). In this context, highlights the role of the Technological´s Innovation Nucleus (NIT), instituted by the Law 10,973 of 2004. According to the law, henceforth referred as Innovation Law, all Scientific and Technological Institutions (STI) must have a NIT to manage the IP policies and the institutional innovation. In general terms, the attributions of these nuclei include: to stimulate the protection of creations, licensing, innovation and Technology Transfer (TT); to monitor the results of research activities; to opine as to the convenience of disclosure of institutional inventions subject to intellectual protection; monitoring and maintenance of the institution's IP requests with the official agencies; among others. (BRASIL, 2004).

In a regional way, the NIT linked to FIs in the Northeast region have played an important role in IP protection. According to a survey carried out in 2017 by the Forum of Pro-Rectors of research innovation and post-graduation of Federal Institutes, between 2008 and 2016 the Northeast region had the highest rates of patent deposits (Figure 1), with a total of 159 (one hundred and fifty-nine), followed by the Southeast,

North, South and Center-West regions with 116 (one hundred and sixteen), 43 (forty-three), 34 (thirty-four) and 19 (nineteen), respectively. (LIMA JUNIOR, 2017).

Figure 1.Number of FI´s patent deposit between 2008 and 2016 by region. Inset: Brazil's regions without state borders



Source: LIMA JUNIOR, 2017 (adapted by the author)

However, despite the positive indicators of IP protection by the Northeastern FIs, it should be noted that there are discrepancies between the institutions in the region, with some institutes having a culture of IP already established, compared to other FIs, whose culture of innovation is in the process of implementation. In this sense, the objective of this paper is to present an overview of the activities of the NIT, in order to understand how the main actions in innovation management carried out by FIs in the Northeast region occur. Based on this mapping, it is expected that the present work may guide the actions of some institutions of the federal network of professional, scientific and technological education, including the FIs of the Northeast region, in order to minimize local and regional differences.

2. Methodology

From the methodological point of view, this work used the documentary research technique. According to Cervo and Bervian (2007), the documentary research consists of investigating documents in order to describe and compare trends, customs and other characteristics, being able to study both the present and the past. In this technique, the documents can be classified as "first" and "second" order. In the first case, documents that did not receive any analytical treatment are included, such as official documents,

contracts, letters, recordings, etc. In the other hand, the "second" order documents have undergone some type of analysis, such as research reports, statistical tables, company reports, etc. (GIL, 2008).

In this sense, an evaluation of the management report of each Federal Institute selected for this research was carried out. For this purpose, the most recent version of this document available on the institutional website was used. This analysis consists of understanding how innovation management occurs in these FIs through the critical analysis of the main activities carried out by the NIT. Therefore, it was based on the information available in the finalistic macro-processes of the aforementioned report, allowing the understanding of the main functions and the strategic objectives of the FIs regarding to innovation management.

Finalistic macro-processes can be understood as the essence of the organization, directly related to the major functions, the strategic objective of the institution and the generation of a product or service for the internal or external client (TCU, 2018). This information will be extracted from the annual management report, which aims to disclose to society and control agencies the accountability and actions carried out by these institutes. In addition to the management report, the Innovation Policy and the institutional websites of the FIs were used as a source of further inquiry.

For the present work, the 11 (eleven) FIs of the Northeast region will be included in the prospecting, namely: Federal Institute of Education, Science and Technology of Alagoas (IFAL); Federal Institute of Education, Science and Technology of Bahia (IFBA); Federal Institute of Education, Science and Technology Baiano (IF-Baiano); Federal Institute of Education, Science and Technology of Ceará (IFCE); Federal Institute of Education, Science and Technology of Maranhão (IFMA); Federal Institute of Education, Science and Technology of Paraíba (IFPB); Federal Institute of Education, Science and Technology of Pernambuco (IFPE); Federal Institute of Education, Science and Technology of Sertão Pernambucano (IF Sertão-PE); Federal Institute of Education, Science and Technology of Piauí (IFPI); Federal Institute of Education, Science and Technology of Rio Grande do Norte (IFRN); and Federal Institute of Education, Science and Technology of Sergipe (IFS).

3. Overview of innovation activities

3.1 Innovation Management at IFAL

IFAL's NIT was established on June of 2010 with the premise of *"stimulating technological innovation research and promoting the adequate protection of inventions generated at IFAL and their transfer to the productive sector, aiming to integrate it with the community and contribute to the technological and social development of the country"*. Among its goals are: to spread the culture of IP and Technological Innovation; to ensure the adequate protection of innovations generated by the internal community; to support and stimulate the TT developed by IFAL for society and to train and qualify human resources in the area of Intellectual Property.

The above mentioned nucleus is an executive agent linked to the Pro-Rector of research and innovation (PRPI) in order to manage the innovation policy and disseminate the IP culture (IFAL, 2019). According to the hierarchy of the PRPI in the IFAL, the NIT represents a coordination linked to the head of the research and innovation department, and this, in turn, responds to the Pro-Rector of research and innovation.

On June of 2017, the IFAL established the innovation policy, which provides for the ownership and management of IP and innovation at the Institute. In summary, this policy aims to protect the institution's IPs, promote the TT, encourage scientific and technological research in the productive environment, and guide the actions of the IFAL's NIT in accordance with the Innovation Law and the New Framework of Science, Technology and Innovation (NMCT&I) of 2016, already considering the changes brought by this new legislation (IFAL, 2017).

The IFAL Management Report of 2017 brought a series of actions carried out by the PRPI. More specifically, the actions of the NIT-IFAL will be presented through the final macro-processes in that year (Table 1).

Table 1.Finalistic macro-processes of the IFAL's NIT

Action	**Products and services**
To implement actions aimed the dissemination of the associativism and entrepreneurship.	Expansion and strengthening of relationship strategies with both productive and social sector.
	Entrepreneurship and innovation policies.
	Intellectual property policies.
	Promotion of events and entrepreneurial actions.

Fonte: IFAL (2018)

According to Table 1, some strategies were carried out in order to strengthen the institutional relationship with the productive and social sector. Highlights include the participation of IFAL in economic grant notice nº 01/2017 of the Economic, Scientific, Technological and Innovation Development Fund (FUNDECI), promoted by the Brazil´s Northeast Bank (BNB). In this call for proposals, 13 (thirteen) projects were approved for various institutions in the Northeast region, with IFAL being the only institution involved with a project approved in the state of Alagoas. Furthermore, IFAL was the FI with the highest number of approvals in the region, totaling 2 (two) (IFAL, 2018).

The report highlights that in 2017 the institution's first patent was deposited. Although this deposit has occurred recently, the IFAL made 4 (four) TT, 2 (two) of them related to software: the SISPRONATEC with the aim of management the National Program of Access to Technical Education and Employment (PRONATEC) in the IFPI, and the "System of Submission of Projects and Conference of IFAL", used by the events in network such as ConectaIF, Symposium of Post graduation and the North-Northeast Congress of Research and Innovation (CONNEPI).

As relevant actions of the IFAL's NIT the report brings the partnership with 4 (four) local companies by means of economic grant calls; idealization of events and use of social media for the promotion of innovation in the community of IFAL; the evaluation and monitoring of the Institutional Program of Scholarships for Initiation in Technological Development and Innovation (PIBITI); the support in the search for precedence of projects submitted to PRPI; the support to research and innovation coordinators of IFAL´s campus in IP and innovation training; and the partnership in the development of Research and development projects and international scientific cooperation (IFAL, 2018).

3.2 Innovation Management at IFBA

The IFBA's NIT is the oldest of the federal network of professional scientific and technological education of the Northeast region. The innovation department at IFBA is the sector responsible for the implementation, advisory and coordination of activities related to institutional innovation. Nowadays, the innovation management at IFBA is managed by a head of the technological innovation department, and subordinated to this manager, is a coordination of IP and TT.

The IFBA's NIT have a variety of competences, such as: the dissemination of culture on IP and technological innovation; the promotion and strengthening of IFBA's partnerships with government agencies, companies and society; preparation of didactic-pedagogical material on technological innovation and IP; provide guidance to stakeholders (internal and external community) on the suitable protection of their innovations (patents, trademarks, copyrights, legislation, technology transfer, and related issues); the monitoring of application processes and the maintenance of IP titles of IFBA; the encouragement of the creation of technology-based companies; the support and monitoring of TT and the economic exploitation of innovations (IFBA, 2019).

Considering the need to regulate the rights over institutional IPs, on 2013, through, the Intellectual Property Policy, Technology Transfer and Innovation of IFBA was approved. The document was created based on the Innovation Law and its regulatory decree nº. 5,563/2015. The policy recommends that the IFBA act in stimulating and valuing the scientific, technological and artistic activities of its community, as well as the protection of its inventions and transfer of this knowledge to society (IFBA, 2013).

The actions proposed by IFBA's NIT in 2017 can be observed through the finalistic macro-processes set out in Table 2.

Table 2.Finalistic macro-processes of the IFBA's NIT

Description	Products and services
The Pro-rector of post-graduation and innovation of IFBA stimulates scientific and technological research developed by researchers as well as by students from different levels of education. The research and knowledge diffusion activity aims to provide answers to scientific questions and, through technological solutions, to support the demands of society and the productive sector. The integration of teaching, research and extension is one of its main objectives.	Invention Patent Application, Trademark, Utility Models and Software Registration
	Dissemination and distribution of the Intellectual Property and Technology Transfer Handbook of IFBA
	Dissemination of the intellectual property and innovation culture through the offer of lectures and courses involving the theme "Patent Information: Stimulate Creativity and Source of Innovation Patent Information"
	Institutional Program of Scientific and Technological Initiation Scholarships
	"Technological Projects Hotel"
	Scientific Initiation and Technological Innovation Seminar of IFBA

Fonte: IFBA (2018)

The "Technological Projects Hotel" aims to stimulate the technology-based entrepreneurship, encouraging the development of innovative with a focus on TT developed under the IFBA. In this context,

stands out the "Technological Showcase" of IFBA, a website dedicated to presentations of IPs protected by the institution, available for TT, licensing and contracts. In 2018, the collection had 25 (twenty-five) projects in the most diverse areas of knowledge (IFBA, 2018).

Regarding to the training processes, the IFBA's NIT has been disseminating over the years the concepts of IP and TT through the production of didactic materials for their community as well as the creation of manuals for institutional researchers to understand the process of intellectual protection and TT of their inventions (Santos et al, 2015).

The IFBA's NIT also has an Innovation Committee. The main objective of this committee is "to advise, issue reports and evaluate matters of pertinence and merit concerning to the Intellectual Property Policy, Technology Transfer and Innovation of IFBA".

In 2015, the ordinance number 819 was promulgated by the MEC, which provides for the operation of the units that integrate the FIs. In this sense, this ordinance establishes the innovation hubs linked to the FIs, including the hub of Salvador associated with the IFBA and 4 (four) other institutions. The purpose of this hub is to meet the demands of the productive sector in RD&I, human resources training and technological services provision. In the specific case of the hub linked to the IFBA, it focuses on the industrial segment of health, being linked to the Brazilian Company of Industrial Research and Innovation (EMBRAPII) in the area of medical equipment and related (IFBA, 2019).

3.3 Innovation Management at IF-Baiano

The NIT of IF-Baiano was created in September 2016 in accordance with the provisions of the Innovation Law and the NMCT&I. The main attributions of IF-Baiano NIT are: to establish an IP and technological innovation policy; promote and protecting institutional IPs; evaluating and classifying the results of research activities and projects; establish partnerships with government agencies, companies and society for the dissemination of new technologies; providing, coordinating and monitoring the receipt and distribution of economic gains resulting from technology transfer contracts, etc (IF-Baiano, 2017).

Although the IF-Baiano NIT was recently established, it is very effective. According to information available on the IF-Baiano institutional website, 15 (fifteen) patent applications were deposited, 2 (two) trademarks and 1 (one) computer program (IF-Baiano, 2019). The actions planned to promote innovation at the institute in 2016 were briefly explained in the Table 3. However, it should be notice that part of these actions was covered by the IF-Baiano Research sector that is already institutionally consolidated.

Table3.Finalistic macro-processes of the IF-Baiano NIT

Process	Products	Customers	Needs
Scientific and Technological Innovation	- Applied search projects - Processes - Programs - Systems - Services	- Students - Servers - Managers - Society	To develop innovative solutions in different areas.

Fonte: IF-Baiano (2017)

The aforementioned report also highlights the IF-Baiano strong vocation for research, because it informs that all the goals set for the creation of new research groups have been exceeded. Although the report does not explain the nature of the project, if it is basic or applied research, it is reasonable to affirm that such projects have reflected in the institution's IP, since in the 2016 3 (three) patents were filed.

3.4 Innovation Management at IFCE

The IFCE´s NIT was established and regulated in 2011 through the resolution nº 05 of the institutional Superior Council. The aforementioned resolution also provides with the innovation policy and regulates the rights and obligations related to the intellectual creation protected by the Industrial Property Law (IPL) arising from the innovative activities in the IFCE, as well as the participation of the creator server in the financial gains arising from the economic exploitation of the patent or registration.

The IFCE´s NIT is a supplementary agency linked to the Pro-Rector of research and innovation (PRPI) and its creation was based on the Innovation Law, having as main attributions: to support and care for the maintenance of the institutional policy to stimulate the protection of public researchers, creations, licensing, innovations and other forms of technology; to opine for the convenience and to promote the protection of the creations developed in the IFCE; to manage, organize and strengthen the partnership actions of the IFCE with the public and private sectors; act in the dissemination and diffusion of the knowledge generated in the IFCE; propose and support technical and scientific events, among others (IFCE, 2011).

From a structural point of view, the innovation department at the IFCE is composed of the general coordinator of the NIT, the technical coordinator and an advisory service through the Research and Technological Innovation Committee (COMPITEC). COMPITEC is a deliberative and normative organ composed of several actors that are related to innovation in the IFCE. Thus, the COMPITEC aims to analyze and issue an opinion on social, technical, economic and financial feasibility, as well as about the qualitative impact of the projects and agreements proposed by the NIT. Furthermore, the COMPITEC supports the TT developed in the IFCE and analyze the technical and economic feasibility of intellectual creation, and other actions relevant to IP and TT (IFCE, 2011). In this sense, the main actions proposed by IFCE´s NIT in 2016 can be viewed in Table 4.

Table 4.Finalistic macro-processes of the IFCE´s NIT

Macro-processes	Description	Products and services
- Collect quantitative and qualitative data on Technological Innovation - Monitor the processing of applications and the maintenance of the institution's intellectual property rights	Establishment of bases and practices of knowledge management and innovation, with a view to the process of generation and technological innovation in the IFCE	- Insertion of students in companies that work with technological innovation; - Interiorization of the actions of the NIT; - Programs and projects of innovation in the areas of operation of IFCE.

Fonte: IFCE (2017)

Regarding to patent deposits, the 2016 management report shows that 7 (seven) deposits were made. Furthermore, through the official website of IFCE it is possible to evaluate the various institutional projects that have been protected by patents, informing the status of the deposit. In 2019, IFCE had 12 (twelve) projects available for licensing, distributed in the most diverse areas of knowledge (IFCE, 2019).

As with the IFBA, the IFCE also has an innovation hub, however, the areas of operation of this hub are associated with digital mobility and embedded systems. The hub focuses on technological innovation projects, aimed at strengthening a model focused on the competitiveness of small, medium and large companies in the productive sector. In essence, this hub acts as an inducer agent of innovation in the IFCE, providing an expansion of the technological capacity of this institute in meeting the business demands for applied research (IFCE, 2019).

3.5 Innovation Management at IFMA

IFMA's NIT (henceforward referred as AGIFMA) was established in 2009 with the premise of: managing IFMA's IPs; fostering innovation activities and the technological development, and providing a favorable environment for partnerships between institutional researchers and the productive sector in innovation projects.

The management report shows that AGIFMA is linked to the Pro-Rector of research, post-graduation and innovation. Hierarchically the innovation department is subordinated to the research director. Among AGIFMA's priority actions in 2017 is the training of human resources in innovation and support for the development of projects in applied research, as shown in Table 5.

Table 5.Finalistic macro-processes of the AGIFMA

Macro-processes	**Description**	**Principal actions**	**Principal customers**
Improvement in research and innovation	Training of human resources in research and innovation at the level of scientific and technological initiation, post-graduation and graduate.	- Scientific initiation for Students; - Academic, scientific and cultural cooperation for postgraduate training	- IFMA´s students; - IFMA´s servers.
Research developmentand innovation	- Stimulate the development of intensive research in knowledge, applied to technological innovation.	- Publications of calls for research promotion	- IFMA´s students; - IFMA´s servers.

Fonte: IFMA (2018)

Regarding to IP protection applications, the management report indicates that IFMA had deposited 16 (sixteen) patents and 1 (one) trademark by 2017. Of the total number of patents, 14 (fourteen) were awaiting formal examination in 2017, while 1 (one) was rejected and another one was filed. In this context, part of

the projects that originated these patents is available on the IFMA website, working as a portfolio of innovations developed institutionally and licensable innovations.

The growth of applied research is also one of IFMA's priority actions. According to the management report shows it was expected to increase the number of applied research and innovation programs by 40% in 2018 compared to the previous year. The report also highlights the events managed by AGIFMA, including the IFMA Universe, considered the environment to encourage innovative ideas, applied research and innovative entrepreneurship, with the aim of taking institutional research projects to meet the demands of society in Maranhão State (IFMA, 2018).

3.6 Innovation Management at IFPB

Innovation management at IFPB occurs through its Directorate of Technological Innovation (DIT). The DIT was created in 2015 with the following function: *"support to researchers in the protection of their creations, the dissemination of the innovation culture, the zeal of compliance with the technological innovation policies of the institution, the partnership with the public and private sector and also the technology transfer".*

Among the DIT's attributions are: planning, coordinating and executing IFPB's innovation policy; managing IFPB's intellectual property rights; coordinating and supervising TT; have internal organs to carry out their activities; ensuring the secrecy and confidentiality of restricted information to which DIT has access; promoting the economic exploitation of IFPB's creations, when appropriate; promoting actions to raise funds with development agencies, aiming at strengthening management; among others (IFPB, 2015).

Hierarchically, DIT is linked to the Pro-rectory of Research, Innovation and Post-Graduation (PRPIPG) and also counts on the support of the intellectual property and technology transfer coordination and the innovation representatives in each campus of IFPB. In addition the DIT has the support of the Innovation Chamber of the PRPIPG, which is a collegiate body of a propositional and consultative nature to support the promotion of institutional innovation.

IFPB's innovation policy was instituted in 2017 with the following objectives: to establish the rules to the research results carried out within the scope of the IFPB that can be protected; to define procedures for management and TT of institutional IPs; to provide for the provision of specialized services and the sharing of laboratories and intellectual capital of IFPB and other institutions; to provide for the criteria on the division of economic gains from the exploitation of IPs; to support technological extension and entrepreneurship and to promote actions of innovative nature and the articulation with the productive sector (IFPB, 2017).

The management activities proposed by the FIs sectors are commonly described through management reports in the finalistic macro-processes. At the IFPB, these actions were summarized in Table 6.

Table 6. Finalistic macro-processes of the DIT-IFPB

Macro-processes	Description
Research	The macro-process encompasses research and innovation activities and technological development, constituting the phases of planning, execution, dissemination of results of projects related to research lines, signing of research and qualification agreements and the search for resources to enable research and innovation.

Fonte: IFPB (2018)

Despite being summary, the management report presents several DIT actions throughout 2017, such as the number of IP deposits in that year. The IFPB had on its website a "technological showcase" containing the INPI's filing number and a description of the various projects developed at the institution or in partnership. In this sense, of the 30 (thirty) patent applications described in the website, 15 (fifteen) were made in 2017. Also in relation to IP, this window contained 10 (ten) registers of computer programs and 2 (two) trademarks (IFPB, 2019).

The report also emphasizes the actions to disseminate the culture of innovation and IP, which would justify the growth in the number of deposit for protection. It also includes the promotion of technological, social and educational innovation and compliance with what is determined by the institutional innovation policy and the law on FIs. However, registered as a historical achievement in the management report, the accreditation of IFPB at the end of 2017 as the innovation hub of EMBRAPII (IFPB, 2018) stands out. The João Pessoa innovation hub of the IFPB will allow the promotion of RD&I business projects and the strengthening of collaboration between institution of science and technology and the business sector, with a focus on projects with an applied research character. The center was accredited in the competent area of manufacturing systems, directed to technologies such as embedded software, electronics and intelligent systems.

3.7 Innovation Management at IFPE

The guidelines for the creation of the IFPE´s NIT began in 2009 from its Institutional Development Plan (IDP) which advocated the structuring of an organ to manage institutional innovation policies. In this sense, to comply with what was determined by the Innovation Law, the TAT and the IDP, ordinance nº 994/GR was approved on August 20, 2010, establishing the NIT of the IFPE. Regarding the attributions of the NIT-IFPE it is important to highlight the responsibility for the zeal in complying with intellectual property policies; the incentive to innovation; the support and monitoring of TT and economic exploitation of intangible assets; and the preparation of didactic teaching material on technological innovation, as well as training in intellectual property.

Initially, the IFPE´s NIT operated at the Ipojuca campus, located near the industrial complex of SUAPE, considered to be the center of the resumption of the state's petrochemical and naval industry. The

choice of this campus for the beginning of IFPE´s NIT actions occurred due to the possibility of being closer to the technologies developed in the complex of SUAPE, which corroborated with one of the main functions of the NIT that is to stimulate partnerships between private institutions for the development of new research (LOUREIRO, 2016).

The initial management of the IFPE´s NIT was marked by a process of training its agents, with the participation in courses and institutional partnerships, as well as structuring its internal regulations. As of 2013 there was a reformulation of the structural *modus operandie* of the sector. Among these changes is the creation of the position of coordinator of the NIT through ordinance nº 1,008/GR and the change of the headquarters, starting to function in the Pro-Rectory of Research, Post-Graduation and Innovation (PROPESQ) (LOUREIRO, 2016).

In order to ensure the transparency and legitimacy during the process of structuring a NIT, it is suggested the establishment of a committee with representation of various areas of the institution, to support the construction of its regulations and consulting on IP and TT issues (VAILATI, 2012). In this perspective, as part of the reformulation of the IFPE´s NIT, on February 3, 2014, through the ordinance nº 189/GR, the Intellectual Property and Technology Transfer Committee (COMPITT) was established. The COMPITT is a collegiate, consultative body, linked to the NIT, of a technical-scientific nature, with the task of assisting it in compliance of the Intellectual Property, Technology Transfer and Innovation Policy.

According to Vailati (2012), it is essential to create normative acts that guide the actions of the innovation department of an Institution of science and technology. In this sense, the IFPE´s NIT developed its Intellectual Property, Technology Transfer and Innovation Policy (PPI), which was approved on July 2, 2015 through the Resolution nº 31 of the Superior Council. Based on the Innovation Law and its regulatory the decree nº. 5,563 of 2015, the objectives of the IFPE's PPI are: the establishment of rules for the results of research carried out in the IFPE that may be protected and/or valued; the definition of the necessary instruments for the protection and TT of the institution's PIs; and the provision on the criteria for the division of the financial results of the exploitation of the PIs (IFPE, 2015).

With regard to the actions of the IFPE´s NIT, the 2017 management report points to a great appeal for the dissemination of the culture of innovation in the institution and the protection of IP, as demonstrated in Table 7.

Table 7. Finalistic macro-processes of the IFPE´s NIT

Description	Products and services	Customers
Spread the culture and encourage the search for innovation; prospect the technologies developed in the IFPE; advise teachers, researchers and students in aspects related to innovation management; foster and strengthen partnerships and seek funding from government agencies,	- Initiation Scholarship in development and innovation at technical level	Technician level students
	- Patentsand both software, trademark and industrial design registration	Society, servers and students of the IFPE
	-Intellectual Property, Technology Transfer and Innovation Policy	IFPE's academic community

companies and society for the dissemination of new technologies; develop and integrate information networks.	- Training Course in Technological Innovation	
	- Lectures on Technological Innovation at IFPE scientific events	
	- Training Course on Industrial Property Deposits and Registrations	

Fonte: IFPE (2018)

As described in Table 7, there were several capacity-building actions under the IFPE. Among the highlights, the report points to green patent workshops and training in applied research, innovation and IP, and patent search and writing. The report also emphasizes the increase in the number of fellows in projects linked to the Technological Development and Innovation Initiation Scholarship Program (PIBITI), from 11 (eleven) in 2016 to 32 (thirty-two) in 2017 (IFPE, 2018).

These programs are inductors in the development of protectable creations. In this context, the management report informs that in 2017 the IFPE filed 3 (three) patents, 1 (one) industrial design and 1 (one) trademark. The IFPE´s NIT goal was to increase these numbers in the following year. To this end, some activities to stimulate the innovation bias of the IFPE were planned, such as the "challenge of ideas" and the preparation of the draft of the Technological Innovation Program of the IFPE (PDIT) for analysis and approval in 2018, with the purpose of to standardize and regulate expenditure-related issues with the various institutional innovation programs (IFPE, 2018).

3.8 Innovation Management at IF-Sertão-PE

The IF-Sertão-PE established its NIT on May 31, 2010 through the resolution nº 23/2010. However, its activities were regulated in 2017 through there solution nº36 of the Superior Council, which approved the Technological Innovation Policy, Intellectual Property, Technology Transfer and Entrepreneurship within the scope of IF-Sertão Pernambucano. Among the objectives of IF-Sertão-PE´s Innovation Policy are: the development of strategic plans for investment in research, development and innovation, and technological and social-based entrepreneurship; the induction of a culture of technological development and innovation in all campuses of the institution; the stimulation of the search for technical and technological solutions in various sectors of the productive environment, meeting the needs of companies (IF-Sertão-PE, 2017b).

Regarding the actions of the NIT of IF-Sertão-PE, the above mentioned resolution recommends: implementing the measures required to support the processes and actions of technological innovation; supporting the process of protection of IPs developed by its academic community; encouraging the culture of innovation in the productive sector; be responsible for the TT of patents and registrations of the institution; contributing to the creation and consolidation of the policy of institutional innovation (IF-Sertão-PE, 2017b).

The IF-Sertão-PE´s NIT is subordinated to the Department of research, innovation and post-graduation of the Pro-rectory of research, innovation and post-graduation (PROPIP). Aiming at fulfilling its institutional mission, the article 2 of the Resolution 36/2017provides for the creation of an advisory committee for support during the implementation of the NIT, with appointment made by the Rector and mandate of 2 (two) years.

Among the pretensions of the NIT of IF-Sertão-PE is to be a reference in the region of the submedia São Francisco Valley in the management of technological innovation, consolidating the institution's duty in the promotion of teaching, research and extension. In this sense, the actions set out in the year of 2016 of the management report (Table 8) show the efforts of the NIT in articulating the creation of research networks and technological innovation, as well as encouraging the creation of research that generates technologies applied to the demands of the semi-arid region by its internal community.

Table 8.Finalistic macro-processes of the NIT-IF-Sertão-PE

Macro-processes	**Description**	**Customers**
Stimulate the implementation of research networks and technological innovation	Meetings with research, innovation and post-graduation teams	Researchers and students
Stimulate Innovation and Entrepreneurship of servers and students: Expansion of the participation of the internal community in the development of research and the generation of technologies applied to the semi-arid Northeast, extending its benefits to the community.	Pre-incubation and business incubation calls for proposals	Servers, students and external community
Encourage applied research, in order to contribute to the technological extension aimed at the social development of local arrangements.	courses, events, workshops, training on innovation and entrepreneurship	
Strengthening the institutional policy to encourage the protection of creations, licensing, innovation and other forms of TT.	Guidance and referrals of intellectual protection processes	

Fonte: IF-Sertão-PE (2017a)

To reach the proposed actions, the training process was emphasized by the NIT to the various actors of the IF-Sertão-PE. This situation can be confirmed by the information provided in the management report,

which states that 27 (twenty-seven) awareness and dissemination events were held for the NIT in 2016, covering 690 (six hundred and ninety) people. It also includes the training of its members in innovation courses, including workshops, congresses, seminars, innovation fairs, journeys and academic weeks (IF-Sertão-PE, 2017a).

Also concerning to training actions, the report informs as successful actions the insertion of disciplines linked to innovation in 5 (five) courses of the institution and the incentive to the creation of junior companies. In this last one, a call for proposals was published for the selection of pre-incubation and incubation of companies, with 4 (four) and 2 (two) companies, respectively, selected in these characteristics.

The report also states that in 2016, 2 (two) patent applications were filed at the National Institute of Industrial Property (INPI) and that between 2011 and 2014 a total of 9 (nine) patents were filed. Part of these protections can be appreciated on the institutional siteof the NIT, which has a "technological showcase" presenting the technologies resulting from the IF-Sertão-PE RD&I activities available for transfer and services to the productive sector. The site also has information about the activities carried out by the NIT, as well as the procedures for IP protection and partnerships with external agents (IF-Sertão-PE, 2017a).

3.9 Innovation Management at IFPI

Accordingly to the Innovation Law and the decree nº 563/2005, the IFPI's NIT was established on August 12, 2011, through the resolution nº12 of the Institutional superior council. This NIT was created with the premise of stimulating research and technological innovation, acting in the adequate protection of the inventions generated under the IFPI, as well as promoting their transfer to the productive sector, aiming at integration with the community and contributing to the technological and social development of the country.

Among other attributions, the IFPI´s NIT is responsible for: establishing an IP and innovation policy; evaluating and classifying the results resulting from institutional research activities and projects; expressing an opinion on the convenience and promoting the protection of creations developed at the Institute; monitoring the application procedures and the maintenance of IFPI's IPs; stimulating partnerships with public or private legal entities, statutorily instituted for research purposes; among others (IFPI, 2011).

The resolution nº 12/2011 of IFPI deals of the organization and functioning of the NIT at the IFPI. In this sense, the document informs that the NIT is subordinated to the Pro-Rectory of research, post-graduation and innovation (PROPI) and has in its composition: Managing Council; General Coordination; Coordination of Research and Innovation of each Campus; Secretariat; Intellectual Property Advisory Services; and Technology Transfer Advisory Services to support the various activities of NIT in the institution.

Regarding to the actions of the IFPI's NIT, the institutional management report of 2016 shows that the activities of this nucleus were concentrated on supporting the programs of technological initiation, training and protection to IP, as provided in Table 9.

Table 9. Finalistic macro-processes of the IFPI´s

Macro-processes	Description	Actions	Programs
Research and innovation	- Scientific Initiation; - Scientific Initiation in Innovation and Technological Development; - Structuring and Restructuring of Laboratory Infrastructure.	- Call for Proposals PIBIC/PIBIC Jr. - Call for Proposals PIBIC/PIBIC Jr. - IT - Call for Proposals PROAGRUPARY	- Institutional Scholarship Program Scientific - PIBIC /PIBIC Jr. - Institutional Program of Initiation Scholarships Scientific in Innovation and Development Technological - PIBIC /PIBIC Jr. - IT - Support Program for the Research, Structuring and Restructuring of PROAGRUPAR-INFRA Laboratory Infrastructure
Innovation	Innovation Policy; Specialization and Master's Degree	Disclosure; Technological prospecting; Software and patent deposits; Intellectual property policy.	

Fonte: IFPI (2017)

Regarding to the training of its community, there are annual meetings and lectures with experts on IP and innovation, and the inclusion of the disciplines of notions in IP and technological entrepreneurship in the curriculum of the various undergraduate and post-graduate institutional courses (IFPI, 2017).

The management report points out that the market of performance of IFPI in relation to the activities of PROPI and its coordination is very recent, and adds: "*In Piauí, the organizations responsible for teaching, research and extension still have a very focused on teaching actions"*. Moreover, the local business community is still reticent to research and innovation, for believing that these aspects do not add competitiveness to their products or services. However, the actions carried out by local Institutions of science andtechnology have minimized this paradigm. In a more specific look at the IFPI, innovation actions have been expanded every year and a culture of patent prospecting has been implemented based on work developed by the institution's employees. As a consequence, the first patent application of the institution was made in 2016 (IFPI, 2017).

Concerning to the servers, the report presents as a successful action the partnership with other institutions in the availability of both Interinstitutional master (MINTER) and doctoral (DINTER) programs. The partnership between IFPI and the Federal University of Sergipe (UFS) in the MINTER in Intellectual Property Science, enabling IFPI's servers to be trained to support the various innovation actions at the institutional level. Such partnership provided the students of this MINTER the creation in the IFPI of the Research Group in management and technological innovation, and also in the development of the

INTERTEC Magazine - Management, Science, Technology and Innovation with the objective of promoting scientific publication in the area of interest of the group.

The industrial property rights resulting from intellectual production at the IFPI are regulated by Resolution nº 028/2015. This resolution also addresses topics related to the stimulus of innovation; the possibility of dismissal of the public researcher and its remuneration; among others. Although the title of the resolution is directed to industrial property, the referred document also functions as an institutional innovation policy. it is noteworthy that, until to the moment of this research, there is not available on the IFPI website or in other sources, a document entitled "IFPI´s innovation policy", suggesting that the resolution cited fulfils this role.

3.10 Innovation Management at IFRN

The IFRN's NIT was established on May 20, 2011 by means of the resolution nº 07/2011. Briefly, the IFRN's NIT has the following basic competencies: to ensure the maintenance of the institutional policy of stimulating the protection of creations, licensing, innovation and other forms of TT; to opine for the convenience and promote the protection of creations developed in the institution; to evaluate and classify the results from activities of institutional research projects; to monitor the requests for protection of IPs; and to support for technological entrepreneurship projects and incubation of companies and junior companies within the institution (IFRN, 2011).

Regarding to its organization, the IFRN's Department of Innovation has the following structure: a Coordination; an Innovation Sector; an Entrepreneurship Sector and an Executive Secretariat. The reduced number of members in the NITs appears as one of the major obstacles in the promotion of innovation in Institutions of science and technology. In this sense, surprises in a positive way what is said in articles 5º and 6º of the resolution n°08/2011, determining that the Innovation and Entrepreneurship Sectors have at least 04 (four) employees each, and that these members are from different areas of knowledge.

To support the institutional actions of the IFRN's NIT, in June of 2017 was approved the IFRN´s scientific and technological development, innovation and entrepreneurship policy, through the resolution nº 31/2017. The resolution in question establishes guidelines for the incentive to applied research to innovation, technological extension, IP protection, negotiation processes and TT, the promotion of technological entrepreneurship activities aiming to professional and technological training and the insertion of graduates (IFRN, 2017).

Concisely, the 2017 actions of IFRN's NIT can be viewed through Table 10, which is an excerpt from the management report of the year mentioned.

Table10.Finalistic macro-processes of IFRN´s NIT

Macro-processes	Description	Actions, product and services	Programs	Partners
Scientific and technological development	Stimulate the development of intensive research in applied technological innovation knowledge	Scientific initiation for students; Development of calls and applied research; Technology transfers	scientific initiation programs; Directory of Research Groups	Finep, Sebrae, Fiern, Fapern, UFRN, Ufersa, Uern, Funcern, Capes, CNPq, INPI, Embrapa
Innovative entrepreneurship	Strengthening of the multi-company incubators	Intellectual Property Protection Entrepreneurship and incubation	Technology Incubators and Hotel´s Project	Anprotec, Sebrae, INPI Funcern

Fonte: (IFRN, 2018)

As pointed out in the macro-processes, the incentive to the development of technological incubation is one of the premises of the IFRN's NIT. In this perspective, the management report reports that there was an overcoming of the target set by the institution in 2017, reaching a total of 08 (eight) incubators at IFRN (IFRN, 2018).

Another point to be highlighted by the management report is the number of technological innovation projects developed in 2017, which includes the number of technological innovation hubs created, and programs to stimulate the cooperative organization that encourage research, innovation and entrepreneurship implemented (NITs, project hotels, junior companies and business incubators), totaling 23 (twenty-three), a number higher than the previous year that registered 15 (fifteen) programs.

Similarly to other Institutes, the provides a virtual portfolio of technologies developed. Currently, the portfolio presents information on research and innovation projects and some of the laboratories linked to these projects and the patents linked to the projects that are available for licensing. In the virtual portfolio, in 2018, there were 14 (fourteen) inventions in the various areas of knowledge, with information about the project, inventors, holders, date of filing and registration number with the INPI (IFRN, 2019). This portfolio also makes available the software developed by the institution or through partnerships, using the same logic of patent presentation. Regarding to software, the portfolio presents 70 (seventy)available programs, including some of them used by members of RFEPCT, such as SUAP - Unified System of Public Administration, demonstrating the vocation of IFRN in software development.

3.11 Innovation Management at IFS

The resolution n°019 of October 24, 2007 was the normative act that created the IFS´s NIT. The NIT was established with the mission of strengthening the relationship of the IFS with the community, integrating government agencies, the business sector and other civil society organizations, for the purpose of promoting opportunities for technological innovation and knowledge transfer in favor of the economic and technological development of the society (IFS, 2007).

In terms of attributions, the IFS´s NIT has the following competencies: to implement and manage the policy of protection of creations, licensing and institutional innovation; to promote and care the IFS's IPs; to support the independent inventor; to prospect the regional needs and seek their service through radical and incremental innovation proposals, etc.

Structurally, the IFS´s NIT is made up of human resources from the Pro-rectory of research, extension and innovation (PROPEX) and the IFS´s campuses. The NIT is part of the coordination of science and technology, which in turn is linked to PROPEX. The IFS´s NIT regulation states that to meet its objectives, the NIT may make use of the entire structure available at IFS, emphasizing the need for common agreement with the leader of each area (IFS, 2015).

The IFS´s NIT is linked to a Pro-rectory that encompasses the activities of research, innovation and extension in the IFS. In this sense, The NIT has attributions related to the three sectors, as demonstrated by the finalistic macro-processes set out in Table 11.

Table11.Finalistic macro-processes of IFS´s NIT

Macro-processes	Description	Products and services	Customers
Research and innovation	Plan, supervise, coordinate, propose and foster research and technological innovation activities.	- Applied research - Technological projects - Patents - Knowledge - Technology - Innovation - Technological Services, such as: Consultancy, service rendering, technical reports with technological aggregate for the productive world.	Academic community and society
Extension	Plan, supervise, coordinate, propose, promote extension and articulation activities with society.	Creation of incubators	

Fonte: IFS (2018)

The management report, year-base 2017, shows that the IFS´s NIT acted strongly in the dissemination of the innovation culture, covering the various campuses of the institution, promoting training in the area of IP and project management in innovation. Accordingly to the macro-processes, the management report highlights that the number of people involved in applied research, innovation and extension programs was higher than the expected 100 (one hundred) participants, totaling 457 (four hundred and fifty seven) in that year (IFS, 2018).

The IFS´s NIT is very active in the processes of protection of institutional IP. Indeed, the IFS occupying the 38th position in the ranking of Brazilian´s institutions that most made patent deposits in 2015 in the INPI, been the member of RFEPCT with the largest number of deposits in Brazil. In part, these numbers are justified by the actions to publicize the NIT in its community, through posters, folders and the offer of courses in the area of IP and innovation (IFS, 2019). Furthermore, the IFS´s NIT has its own website linked to the institutional site of the IFS, with various materials on IP and innovation, including the IP manual, legislations, invention community forms, events held and a portfolio with the technologies developed in the institution with information on the invention, creators and the number of the protection registration with the INPI.

Regarding to the institutional innovation policy, up to the moment of this research, no document records were found that specifically address this issue. Although the regulation of IFS´s NIT creation is explicitly directed to the regulation of the actions of this nucleus, it also brings an approach on innovation when it deals with some of its chapters: Stimulus to the construction of specialized environments and innovation cooperatives; stimulus to participation in the innovation process; partners and the innovation stimulus grant; and economic exploitation of technological innovation and application of obtained resources (IFS, 2015). In this context, we can understand that this regulation fulfils the function of innovation policy in the institution.

4. Conclusions

The universe of the finalistic macro-processes of the FI's management reports delineated for this research shows that the NITs have made efforts to fulfill the mission assigned to them, mainly regard to the protection of intellectual assets and the dissemination of innovation at the institutional level. In general, these FI's have demonstrated a strong performance in IP and innovation capacity building processes for their academic community.

From the perspective of the students, notice the promotion of several innovation courses e.g., patents, technological prospecting and industrial property. Furthermore, there was also the inclusion of disciplines on the subject in the curriculum of several courses, in the most diverse teaching modalities. The management reports analyzed shows that there was an increase in the promotion of technological initiation scholarships focused on applied research projects, and in some cases, the insertion of students in companies with innovation bias.

The NIT team in FIs is usually reduced and, strategically, these nuclei have created both IP and innovation committees to support the advice of their actions. Also as a successful action, some FIs have included in the NIT's regulations the minimum number of servers that must compose the referred organ. Another strategy used by some FIs to minimize the effect caused by the reduced number of servers is the representation of the NIT in each campus, acting as an interlocutor for innovation actions. This mechanism becomes very effective, since it represents an internalization of the actions of the NIT, especially considering the multi-campi structure of the FI and the distance between the cities. The training in IP and innovation of the FI´s servers is also verified in the management reports, either through the participation in

scientific events in correlated areas or in the articulation with other institutions in the training of innovation manager'strough the offer of strict sensu post-graduation.

The management reports also show that the Northeastern FIs usually make partnerships with other institutions in the development of technologies, including universities, technology parks, among others. In this sense, 03 (three) FIs in the region already have an Innovation hub in cooperation with EMBRAPII, in the execution of technological research for innovation in strategic areas. Part of the projects that culminated in some type of IP by the FIs of the region can be glimpsed through portfolios and "technological showcases", which are available for commercialization and transfer to the productive sector.

It is necessary to emphasize the social role of FIs in promoting technical and technological solutions to the productive sector through TT. In this sense, the actions reported here show that there is an effort by FIs to comply with the provisions of their legislation. However, there is still a slight transfer of knowledge by these institutions to society. According to the Ministry of Science, Technology, Innovation and Communications (MCTIC), in 2017 only 4 (four) FIs conducted some type of TT (BRAZIL, 2019b). Although this reality is not exclusive to the FIs, this discussion becomes more important in these institutions due to the attributions that were established by law.

There are several factors that justify the low rates of TT in Brazilian´s institutions of science and technology to the productive sector. Accordingly to Desidério and Zilber (2014), the various limitations of the NITs appear as one of the main factors, and this aspect includes: high staff turnover; low understanding of the concept of innovation; recent constitution; low budgetary resources; reduced structure; among others. Additionally, the lack of a favorable legal framework for innovation processes also has an impact on TT indicators.

In this sense, in order to bring greater legal certainty and flexibility to the Institute-company relationship, the law nº 13,243/2016, known as the New Framework for Science, Technology and Innovation (NMCT&I), changing 09 (nine) laws, including the Innovation Law. To consolidate these changes, the NMCT&I establish new attributions to the NITs, mainly regarding the TT processes, e.g., developing studies of technological prospection and competitive intelligence in the field of intellectual property; promoting studies related to strategies for the transfer of innovation generated by the ICT; monitoring the ICT relationship with companies; negotiating and managing the TT agreements originating from the ICT (BRASIL, 2016).

Additionally to the above-mentioned modifications, the NMCT&I allows the NIT to assume its own legal personality, including the possibility of adopting the form of a support foundation. According to Rauen (2016), this change will allow a series of advantages for the NIT, including flexibility in the management of financial resources, which does not directly depend on Institution of science and technology resources. Consequently, it will facilitate the engagement of professionals with an adequate profile for the NITs, promoting a more efficient management. The regulation of the NMCT&I occurred recently, on February 7, 2018, after the promulgation of decree nº 9.283. As a result, there are no numbers that show the impact of this regulation on the NIT´s actions. At the same time, it is necessary that the FIs update their innovation policy according with this new legislation, benefiting from the new provisions that make the Institute-company interaction process more flexible.

Finally, it is hoped that the presentation of the various management actions of the NITs reported in this work may subsidize the activities of other RFEPCT entities, contributing to the consolidation of an IP culture, as well as the promotion of the transfer of knowledge carried out in the context of FIs to the productive sector.

5. References

BRASIL. **Lei n°11.892, de 29 de dezembro de 2008**. Institui a Rede Federal de Educação Profissional, Científica e Tecnológica, cria os Institutos Federais de Educação, Ciência e Tecnologia, e dá outras providências. Brasília, DF: Presidência da República, Casa Civil, 2008.

BRASIL. **Lei nº 13.243, de 11 de janeiro de 2016**. Dispõe sobre estímulos ao desenvolvimento científico, à pesquisa, à capacitação científica e tecnológica e à inovação e altera (...). DF: Presidência da República, Casa Civil, 2016.

BRASIL. **Lei nº. 10.973, de 2 de dezembro de 2004.** Dispõe sobre incentivos à inovação e à pesquisa científica e tecnológica no ambiente produtivo. Brasília, DF: Presidência da República, Casa Civil, 2004.

BRASIL. **Ministério da Ciência, Tecnologia e Inovação**. Política de propriedade intelectual das instituições científicas e tecnológicas do Brasil: relatório FORMICT 2017. Brasília. 2019b.

BRASIL. **Ministério da Educação. Secretaria de Educação Profissional e Tecnológica**. Instituto Federal de Educação, Ciência e Tecnologia: Concepção e diretrizes. Brasília: 2019a. Disponível em: <http://redefederal.mec.gov.br/expansao-da-rede-federal> Acesso em: 20 jan. 2019.

CERVO, Amado Luiz. BERVIAN, Pedro Alcino. SILVA, Roberto da. Metodologia científica, v. 6, 2007.

DESIDÉRIO, Paulo Henrique Martins; ZILBER, Moisés Ari. Barreiras no processo de transferência tecnológica entre agências de inovação e empresas: observações em instituições públicas e privadas. Revista Gestão & Tecnologia, v. 14, n. 2, p. 101-126, 2014.

GIL, Antonio Carlos. Métodos e técnicas de pesquisa social. 6. ed. Editora Atlas SA, 2008.

IFAL - Instituto Federal de Educação, Ciência e Tecnologia de Alagoas. Relatório de Gestão ano base 2017. Maceió, 2018.

IFAL – Instituto Federal de Educação, Ciência e Tecnologia de Alagoas. 2019. Disponível em: <https://www2.ifal.edu.br/>. Acesso em: 10 jan. 2019.

IFAL – Instituto Federal de Educação, Ciência e Tecnologia de Alagoas. Resolução n°06/CS de 12 junho de 2017 que dispõe sobre a propriedade e a gestão de direitos relativos à PI e inovação no âmbito do IFAL. Maceió, 2017.

IFBA - Instituto Federal de Educação, Ciência e Tecnologia da Bahia. Relatório de Gestão ano base 2017 – Prestação de constas ao TCU. Salvador, 2018.

IFBA – Instituto Federal de Educação, Ciência e Tecnologia da Bahia. 2019. Disponível em: <https://portal.ifba.edu.br/>. Acesso em: 02 fev. 2019.

IFBA – Instituto Federal de Educação, Ciência e Tecnologia da Bahia. Resolução/CONSUP nº39 de 29 julho de 2013 que aprova a Política de Propriedade Intelectual Transferência de Tecnologia e Inovação do IFBA. Salvador, 2013.

IF-Baiano - Instituto Federal de Educação, Ciência e Tecnologia Baiano. Relatório de Gestão ano base 2016. Salvador, 2017.

IF-Baiano – Instituto Federal de Educação, Ciência e Tecnologia Baiano. Resolução CONSUP n°35/CONSUP de 01 de setembro de 2016, Regimento do NIT do IF-Baiano. Salvador, 2016**.**

IF-Baiano – Instituto Federal de Educação, Ciência e Tecnologia Baiano, 2019. Disponível em: <https://portal.ifba.edu.br/>. Acesso em: 29 jan. 2019.

IFCE - Instituto Federal de Educação, Ciência e Tecnologia do Ceará. Relatório de Gestão 2016. Fortaleza, 2017

IFCE – Instituto Federal de Educação, Ciência e Tecnologia do Ceará. Resolução CONSUP n°05/CONSUP de 04 de fevereiro de 2011, Dispõe sobre a política de inovação tecnológica do IFCE e regulamenta o NIT. Fortaleza, 2011.

IFCE – Instituto Federal de Educação, Ciência e Tecnologia do Ceará, 2019. Disponível em: <https://www.ifce.edu.br/>. Acesso em: 30 jan. 2019.

IFMA - Instituto Federal de Educação, Ciência e Tecnologia do Maranhão. Relatório de Gestão do Exercício 2017. São Luís, 2018.

IFMA – Instituto Federal de Educação, Ciência e Tecnologia do Maranhão. Resolução CONSUP n°04/CONSUP de 25 de setembro de 2009. Institui o NIT no âmbito do IFMA. São Luís, 2009.

IFPB - Instituto Federal de Educação, Ciência e Tecnologia da Paraíba. Relatório de Gestão 2017. João Pessoa, 2018.

IFPB – Instituto Federal de Educação, Ciência e Tecnologia da Paraíba. Resolução CONSUPER n°238 de 2015, que cria a Diretoria de Inovação Tecnológica no âmbito do IFPB. João Pessoa, 2015.

IFPB – Instituto Federal de Educação, Ciência e Tecnologia da Paraíba. Resolução CONSUPER n°116 de 10 de abril de 2017, Dispõe sobre Política de Inovação e Propriedade Intelectual do IFPB. João Pessoa, 2017.

IFPB – Instituto Federal de Educação, Ciência e Tecnologia da Paraíba. 2019. Disponível em: <https:/http://www.ifpb.edu.br/>. Acesso em: 15 fev. 2019.

IFPE - Instituto Federal de Educação, Ciência e Tecnologia de Pernambuco. Relatório de Gestão ano base 2017. Recife, 2018.

IFPE – Instituto Federal de Educação, Ciência e Tecnologia de Pernambuco. Resolução CONSUP n°31 de 02 de julho de 2015, estabelece a Política de Propriedade Intelectual, Transferência de Tecnologia e Inovação do IFPE. Recife, 2015.

IFPI - Instituto Federal de Educação, Ciência e Tecnologia do Piauí. Relatório de Gestão ano base 2016. Teresina, 2017.

IFPI – Instituto Federal de Educação, Ciência e Tecnologia do Piauí. Resolução CONSUP n°12 de 02 de agosto de 2011, estabelece o regimento interno do Núcleo de Inovação Tecnológica do IFPI. Teresina, 2011.

IFPI – Instituto Federal de Educação, Ciência e Tecnologia do Piauí. Resolução CONSUP n°28 de 29 de dezembro de 2015, aprova o regulamento dos direitos de propriedade industrial, resultantes da produção intelectual do IFPI. Teresina, 2015.

IFRN - Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte. Relatório de Gestão ano base 2017. Natal, 2018.

IFRN - Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte,2019. Disponível em: <https://http://parcerias.ifrn.edu.br/portfolio/patentes.html/>. Acesso em: 13 fev. 2019.

IFRN – Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte. Resolução CONSUP n°07 de 20 de maio de 2011, cria o Núcleo de Inovação Tecnológica do IFRN. Natal, 2011.

IFRN – Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte. Resolução CONSUP n°31 de 01 de junho de 2017, cria a Política de Desenvolvimento Científico e Tecnológico, de Inovação e de Empreendedorismo no âmbito do IFRN. Natal, 2017

IFS - Instituto Federal de Educação, Ciência e Tecnologia de Sergipe. Relatório de Gestão ano base 2017. Aracaju, 2018.

IFS - Instituto Federal de Educação, Ciência e Tecnologia de Sergipe. 2019. Disponível em: <http://www.ifs.edu.br/ultimas-noticias/195-inovacao/4029-ifs-integra-ranking-das-instituicoes-que-mais-patentearam-em-2015/>. Acesso em: 16 fev. 2019.

IFS – Instituto Federal de Educação, Ciência e Tecnologia de Sergipe. Resolução de 13 de outubro de 2015, cria o regulamento do Núcleo de Inovação Tecnológica do IFS. Aracaju, 2015.

IFS – Instituto Federal de Educação, Ciência e Tecnologia de Sergipe. Resolução CONSUP n°19 de 24 de outubro de 2007, cria o Núcleo de Inovação Tecnológica do IFS. Aracaju, 2007.

IF-Sertão-PE - Instituto Federal de Educação, Ciência e Tecnologia do Sertão Pernambucano. Relatório de Gestão ano base 2016. Petrolina, 2017a.

IF-Sertão-PE – Instituto Federal de Educação, Ciência e Tecnologia do Sertão Pernambucano. Resolução CONSUP n°34 de 26 de outubro de 2017, que aprova a Política de Inovação Tecnológica, Propriedade Intelectual, Transferência de Tecnologia e Empreendedorismo no âmbito do IF-Sertão-PE. Petrolina, 2017b.

LIMA JUNIOR, G. A**. Núcleo de Inovação Tecnológica: da criação ao momento atual**. In: Ruberley Rodrigues de Souza. (Org.). Pesquisa, Pós-Graduação e Inovação na Rede Federal de Educação Profissional, Científica e Tecnológica..1ª ed.Goiania: Editora IFG, 2017, v.1, p. 179-188.

LOUREIRO, R.N.A. **A gestão da propriedade intelectual nos institutos federais: ações para a construção de uma cultura de propriedade intelectual no âmbito do Instituto Federal de Educação, Ciência e Tecnologia de Pernambuco**. Dissertação de mestrado. Universidade Federal de Sergipe. UFS. SE, 2016.

QUEIROZ NETO, J. P. ; PEREIRA, J. L. A. R. ; NAKA, M. H. . **A Evolução da Pesquisa na Rede Federal.** In: Ruberley Rodriques de Souza. (Org.). Pesquisa, Pós-Graduação e Inovação na Rede Federal de Educação Profissional, Científica e Tecnológica. 472 ed. Goiânia/GO: Editora IFG, 2017, v.1, p. 35-46.

SANTOS, A. S. et al. **Processo de negociação e transferência de tecnologia em uma instituição multicampi**: caso do IFBA. Cadernos de Prospecção, v. 8, n. 2, p. 222, 2015.

TCU - TRIBUNAL DE CONTAS DA UNIÃO, 2018. Glossário. Disponível em: <https://portal.tcu.gov.br/lumis/portal/file/fileDownload.jsp?fileId=8A8182A15C84133D015CA713B5A363EE>. Acesso em: 25 ago. 2019.

VAILATI, P. V. **Relação com a sociedade**. Capítulo de Livro IN: Estruturação e Gestão de Núcleos de Inovação Tecnológica: Modelo PRONIT. Blumenau, SC: Nova Letra, 2012.