SCIENTIFIC TECHNOLOGICAL PARKS IN BRAZIL AND THEIR INTER-RELATIONS IN UNIVERSITY TRAINING

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ABSTRACT

This study makes a systematic review of scientific publications of research, on the theme Technology Park in Brazil. It seeks to identify and analyze the scope of Science and Technology Parks at the national level, in order to understand the trends and interrelations between university education. The mapping was the basis for knowing and discussing the results of the scientific production of different areas, considering the different times and places, in what form and under what conditions they were produced. For its construction, searches were carried out on the subject in the Capes, Bdtd, Anped and Ibict databases from 2006 to 2017, looking for similarity with a set of descriptors. The survey was performed after selection in the directories that indicate PCT as the subject of study. We retrieved 574 scientific research productions, being selected for reading the abstract 132 works, we observed that only 18 productions are preponderant in relation to the area of education. For the analysis, the following variables were considered: objective, methodology and conclusions pointed out, with the interest concentrated in university formation, scientific initiation, social impact, case study. To analyze the data, the following categories emerged: PCT and the relationship between university, business and government; PCT and Public policies; PCT and technological and economic development; PCT and management model and finally, PCT and the relationship with initiation. The analysis shows that researchers need to follow a planning and scientific strategy that allows them to present different levels of relationships between park and technology, innovation, economics, research, government, business, development and university. The result of the analysis of the categories on methodologies, indicated indications that are the methods and the technical instruments that order

the systematized thought, organizing in a organized way the way of proceeding throughout the investigation to reach the proposed objective.

Keywords: University Education. Technology Parks. Scientific Research.

INTRODUCTION

The present study makes a systematic review of the scientific production of research, on the theme Technology Park in Brazil. It seeks to identify and analyze the scope of the national PCT in the period 2006 to 2017, in order to understand the trends and the interrelation with university education. The systematic review of the literature is commonly used to support research in education, also known as state of the art, state of knowledge, literature review, is a form of research that uses the published literature on themes of any area of knowledge.

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> [...] to examine the emphases and themes covered in the research; the theoretical references that subsidized the research; the relationship between the researcher and the pedagogical practice; the suggestions and propositions presented by the researchers; the contributions of research to change and innovation [...]; the contribution of teachers / researchers in the definition of field trends [...]. Nascimento (2016, apud, ROMANOWSKI; ENS, 2006 p. 39).

In considering these aspects, the article is organized in three parts; the first presents a brief history about PCT in Brazil and its operation; then we describe the methodological course presenting a synthesis of the scientific productions recovered in the repositories with the inclusion and exclusion criteria. In a third topic we propose an analysis of the data, considering the following characteristics: subjects addressed; theoretical references; the relation of the researcher and the pedagogical practice; the methodology, strategies and instruments of research, the results with suggestions and propositions of the researchers and, finally, we present our considerations.

TECHNOLOGICAL PARKS: interaction between university, business and government

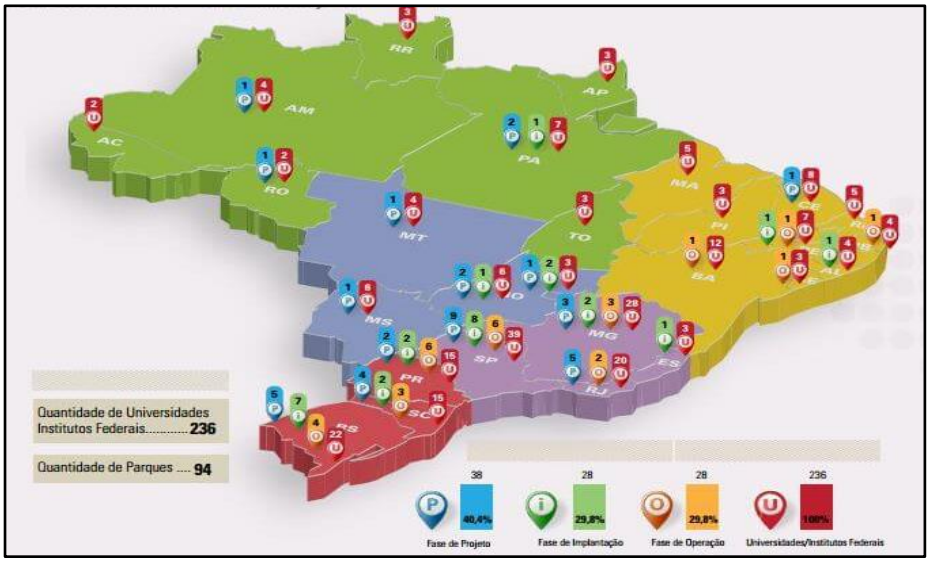
In Brazil the first incentives to foster the development of innovation habitats at the national level began in the 1980s with the creation of the Brazilian Program of Technological Parks by the National Council for Scientific and Technological Development (CNPq), which aimed to modify the economic reality of the

country (PLONSKI, 2010) through a resource allocation and efforts in the improvement and generation of technologies (BRASIL, 2014).

PCTs, in addition to providing space for knowledge-based businesses, can house centers for scientific research, technological development, innovation and incubation, training, prospecting, as well as infrastructure for fairs, exhibitions and marketing development. They are formally linked and usually close to centers of technological excellence, universities and / or research centers. (UNESCO and IASP).

With the creation of development agencies, CNPq and FINEP, the federal government has managed over the past 60 years to create a system of scientific research that has placed Brazil among the top 15 science producing countries in the world. However, scientific growth has not yet been enough to place our country in a prominent position in the development of innovative products, processes and services (BRAZIL, 2014). The federal government started, a little more than 20 years ago, a consistent process of public policies and financial investments aimed at the creation and consolidation of PCTs in all regions of the national territory (BRASIL, 2014), distributed in Figure 1.

Figure 1: Technology Park in different stages of development and deployment



Source: CDT/Unb (2014).

Figure 1 shows the map of Brazil with the quantitative distribution of the initiatives of science and technology parks in their various stages of development, as well as the universities and federal institutes in the states of the Federation. Of the 94 PCTs, 38 are in the Projects phase, corresponding to 40,4%, in the Implantation phase 28 corresponding to 29.8% and in Operation 28, corresponding to 29,8%.

It is important to note that, after analyzing the 94 types of PCT initiatives registered by the research, the geographical distribution of innovation habitats is concentrated in the Southeast region with 39 (41,5%) initiatives and in the region South, 35 (37,2%), which together offer 78,7% of the total installed parks in Brazil. In this way, almost 4 of 5 initiatives of science and technology parks are in these regions. In the central-west region we have 8 (8,5%) park initiatives, 7 (7,5%) in the Northeast region and 5 (5,3%) in the

North region, it is worth mentioning that of the 7 parks in the Northeast region , 1 Technological Park in Operation is located in Sergipe.

According to the study carried out by the Brazilian Agency for Industrial Development (BAD) and ANPROTEC, in 2000, it identified about 10 projects of technology parks. In 2008, 74 park initiatives were identified in 2013, through the "Project Study of High Complexity - Indicators of Technological Parks", carried out by MCTI in partnership with the Technological Development Support Center of the University of Brasilia (CDT / UnB), 94 initiatives were implemented to implement parks, demonstrating a constant evolution in the number of habitats of innovation in Brazil (BRAZIL, 2014).

It should be noted that the evolution of 27% of the park initiatives between 2008 and 2013 comes mainly from the 64,7% increase in the number of parks under development. Next, the parks in the project stage with 18,8%, and lastly, parks in the operating stage had a more modest growth of 12%. It is worth mentioning that in this evolution of PCT, the Northeast region stands out due to the fact that it has nine states, six of which have parks initiatives in several stages. As shown in Table 1 below.

Table 1: Initiative of parks by development phase of the Northeast region

State	Project	Implantation	Operation	Total by State
Pernambuco	-	1	1	2
Sergipe	-	-	1	1
Alagoas	-	1	0	1
Bahia	-	-	1	1
Paraíba	-	-	1	1
Ceará	1	-	-	1
Rio Grande do Norte	-	-	-	-
Piauí	-	-	-	-
Maranhão	-	-	-	-
Total per Phase	1	2	4	
Percent by Phase	14%	29%	57%	
Grand Total				7

Sourse: CDT/UnB (2014).

The table above shows the significant increase in the northeast region from 2008 to 2013 of 57% of PCT in operation, above the national average of 18.8% growth. Since the state of Pernambuco has two initiatives of parks Parqtel and Porto Digital - Recife, one in project of implantation and another in operation with more than 600 companies installed. The State draws attention to having 7 federal universities / institutes, the second largest concentration of researchers, masters and doctors in the Northeast. The state

of Bahia has a PCT initiative in operation stage at TECNOVIA - it has the largest number of universities / federal institutes, with a contingent of 25,500 researchers, masters and doctors. The state of Paraíba has a park in the PaqTcPB operation stage, and the number of researchers, masters and doctors is approximately 14,100. The State of Sergipe stands out because it is the smallest state in the federation, it has a TCP in the SergipeTec operating stage with several companies installed and a Technological Vocational Center, although it presents the smallest indicators of the Northeast region in several items, such as universities and institutes.

According to Paula (et al, 2008, apud, BASTOS, SILVA, 2017), there is a significant increase in PCTs at the design, implementation and operation stage in the last six years, between higher education institutions, private sector and government is still small and to reduce distancing, some measures have been taken by the government and universities to promote an increase in the flow of knowledge exchange, such as the parks have links to research centers or education.

The interaction of PCT with research centers was an innovation model developed in the 1990s by Henry Etzkovitz (2003) based on the relationship of the triple helix - government, educational institution and industry. The triple is a model that attracted attention, since it was only through the interaction of the three players that the possibility of creating sustainable innovation system with durability in the economic scenario of knowledge.

In the economic scenario, according to Etzkovitz (2003), each of the actors has a fundamental role for the result to be positive, with the triple industry operates as a production space, government as source of contractual relations that guarantee stable relations and exchange , and the university as a space for innovation in scientific and technological knowledge, the general principle of the knowledge-based economy.

In the same view,

> "Indicate that each component of the propeller has specific competencies and responsibilities. The university has the task of promoting economic and social development through new organizational structures, such as interdisciplinary centers. Abdalla, Calvosa e Batista (2004, apud. NETO, GALINDO E CRUZ, 2009)".

These structures allow the generation of new disciplines, laboratories, which originate research that becomes theses, publications and patents, the result of interaction with the productive sector. Abdalla et al. (2009) have developed a framework that presents the individual responsibilities and limitations of each actor, which facilitates understanding of the performance of each actor in the triple helix. See table 1.

Table 1. Responsibilities and Limitations of each actor of the triple propeller.

Actor	Responsibilities	Limitations
Government	Promote economic and social development through new organizational structures; Possess political plans with clear governmental goals	Excessive bureaucratization and lack of flexibility to implement partnership projects;

	focused on innovation and knowledge; Interact among the various policy areas; Promote benefits to the population.	Need for professional and participatory public management.
Private initiative	Develop innovative products and services; promote interaction with the technology transfer centers of the scientific community and lead the processes of change.científica e liderar os processos de mudança.	Little capacity for investments in innovation and technology development; Unprepared academic and technological to conduct research.
University	Creating sources of new knowledge and technologies; Establish relationships with companies and governments; Create new areas of action; Leading the processes of change.	Dependence of development agencies for conducting research; Myopic vision of professional qualification and training of labor; Weak links with society and private initiative.

Source: Adapted of Abdalla et al. (2009, apud, BASTOS, SILVA, 2017).

The above chart clearly describes the role of each actor, with government responsible for promoting economic and social development through new organizational structures, private initiative to develop innovative products and services, and university to create sources of new knowledge and technologies. This interaction between the triple helix helps to improve each other's performance, where collaboration occurs through their traditional roles involved in innovation, Faria and Ribeiro (2016, apud ETZKOWITZ, 2009).

Still on the triple, Abdalla et al. (2009) argue that diverse relationships between industries, governments and universities are emerging in countries with different stages of development, socioeconomic systems and cultural values. As regions seek to create a dynamic of economic development based on the generation of specialized knowledge, the three institutional spheres begin to take on internal transformations, and new relationships are established across institutional boundaries, creating hybrid organizations such as technology centers and virtual incubators.

To mediate interaction between the triad, ANPROTEC, headquartered in Brasília / DF, and an institution that congregates and supports entities that act in the creation, development or operation of enterprises to encourage innovation and entrepreneurship, including Business Incubators, Accelerators of Business, Parks and Scientific, Technological and Innovation Poles, Tecnopoles and the like, aiming at the social, economic, scientific and technological development of Brazil.

For this association,

> "A technological park is a complex industrial and service-based scientific and technological base, planned, of a formal, concentrated and cooperative nature, which aggregates companies whose production is based on technological research developed in R & D centers linked to PCTs. It is an enterprise that promotes the culture of innovation, competitiveness, increased business capacity building, based on the transfer of knowledge and technology, with the aim of increasing the wealth production of a region." (ANPROTEC, 2017).

PCTs, besides offering services with high added value to companies, help in the flow of knowledge and technology, enabling the generation of qualified jobs, increasing the culture and the entrepreneurial activity, facilitate the communication between the actors, favor local competitiveness, besides promote innovation, accelerate business growth.

METHODOLOGICAL STUDY: Systematized Review Practice

The study of Systematic Review as a methodological strategy in the scientific community linked to the educational sciences, must approximate the paths already covered by the medical sciences in which the Systematic Review has revealed profound influence on the results of the studies where it is applied (CONTANDRIOPOULOS et al. 2010) and (SAMPAIO RF, MANCINI MC, 2007).

Because of the above, it is a type of research with characteristics of a qualitative and descriptive nature, the methodological course generally systematizes some criteria such as: (1) to establish inclusion and exclusion criteria for the selection of the material that compose the corpus of research; (2) definition of the descriptors to direct the information search; (3); set the location of the search bank; (4) collection of research material; (4) reading of scientific productions, with elaboration of syntheses; and (5) analysis and preparation of preliminary findings. As a methodological procedure, we applied content analysis (BARDIN, 2016, page 38).

Following the pre-established criteria, the data available in the repositories make clear a summary of all the studies on the researched subject. The revisions allow us to incorporate a larger spectrum of relevant results as well as the possibility of analysis of the consistency and generalization of the results among the findings, such as the specificity and variations of the data. It is worth remembering that it is a type of study with retrospective and secondary vision, that is, the review is usually drawn and conducted after the publications of empirical studies on a certain theme.

Authors point out that,

> [...] systematic reviews with meta-analysis are different from other reviews for their metanalytic component [...] is the analysis of the analysis, ie it is a literature review study in which the results of several independent studies are combined and synthesized through procedures quantitative, qualitative or mixed, in order to produce a single estimate or index that characterizes the effect (SAMPAIO e. MANCINI, 2007, Apud. AKOBENG, 2005).

Within the panorama of the searches for research works in the databases and following the methodological criteria, it was necessary to create a systematized script that aims to meet the research objective. Below table 2, it presents the criteria of "inclusion and exclusion" of the investigation, as a way of delimiting the object studied (SAMPAIO and MANCINI, 2007).

Table 2 - Inclusion and Exclusion Criteria

Inclusion	Exclusion
Empirical studies	Experimental study
In-class Higher Education	Distance Higher Education

PhD Theses	Scientific articles
Master's Dissertations	Magazines
Scientific outputs evaluated by peers	Course Completion Works
Publications of the last 15 years	Off-period publications

Sourse: Prepared by the authors (2018).

The above table justifies the exclusion of an experimental study by establishing a cause and effect relationship between variables; Higher Distance Education because it is not a scientific research production; Scientific articles and journals, due to their majority being part of the results of the thesis and dissertations of master's and doctoral programs of several areas of knowledge.

In the first moment giving the methodological procedure of the study, a general survey of the identification and location of the Institutions of database like Coordination of Improvement of Personnel of Superior Level - CAPES; National Association of Post-Graduation and Research in Education - ANPED; Digital Library of Theses and Dissertations - BDTD; and Brazilian Institute of Information in Science and Technology - IBICT with the combination of sets of word descriptors. The searches in the BDTD with the terms "PT AND Formación Universitária" and "PT AND Iniciação Cientifica" begin, no registration; then "PT and Scientific Production", recovered 131 records; finally, with the term "Technological Park" located 295 theses and dissertations. Already the searches in CAPES with the terms "PT AND" University Training "and" PT AND Scientific Initiation ", no records found, for the term PT AND Scientific Production" recovered 1 record; finally, with the term "Technology Park" recovered 147 records.

Having as sources the data collected on the theme "Technological Park and its relationship with university education", object of study of this investigation, started for floating reading of the titles of 574, being selected for reading the abstract 132 papers. After analysis, 18 productions are preponderant in relation to the education area, which represent the copus of the research, being the interest concentrated in university formation, scientific initiation, scientific production of research and case study. Of these works, 9 theses and 9 dissertations from several areas of knowledge are listed in Table 3.

Table 3: Dimension of the specification of the Research Corpus

TITLE	YEAR	INSTITUTION OF HIGHER EDUCATION	PRODUCTION	TECHNOLOGIC PARK
Cooperation between university, business and government in the promotion of innovation environments: A study in Science and Technology Parks in Brazil and Portugal.	2013	UNISINOS	Thesis	Tecnosinos (Brazil) and Tanguspark (Portugal)
The Relationship of the Legal Framework of Sapiens Parque S / A with the Process of Innovation	2015	Federal University of Santa Catarina	Dissertation	Sapiens Park

Potentialities and Limits for Economic and Innovative Local Development: A comparative analysis in technological parks of the Northeast region.	2010	Federal University of Paraiba	Dissertation	Nutec, Digital Port, ParqTel, PaqTcPB and SergipeTec.
1-LOCAL INNOVATIVE SYSTEMS, INNOVATION AND COMPETITIVENESS: The contributions of the State in the expansion of the competitiveness of micro and small enterprises: the case of the Parque Tecnológico Porto Digital	2013	Federal University of Bahia - Ufba	Thesis	Porto Digital Technology Park
Technological Park Funding Prospects: A Comparative Study	2007	Faculty of Economics - University of São Paulo.	Dissertation	Tecnopuc, Sapiens Parque-Brasil; Biocant Park Taguspark-Portugal; Technological Park of Cartuja 93-Spain.
Conceptual Model of Technology Park: Proposal Based on Economic, Social and Environmental Sustainability	2016	UNIMEP	Thesis	Triple Helix and Triple Bottom Line
Construction of Organizational Identity and Reciprocal Influences with Personal Identity: A Study in Technology Parks.	2014	University of Sao Paulo	Thesis	Damha Eco Technology Park, - Sao Jose dos Campos Technological Park of Sorocaba.
InHab-Read - IHR Environment Reading Methodology for Innovation Habitats	2017	Federal University of Santa Catarina - Ufsc	Thesis	Orion Park Sapiens Park
Lights and Shadows of the urban requalification Oriented for the New Technologies: the case of the Digital Port	2006	Federal University of Pernambuco	Thesis	Digital Port
SCIENTIFIC INITIATION IN COLLABORATIVE NETWORKS AND UNIVERSITY QUALITY TRAINING: the egress perspective (2007-2013)	2016	Pontifical Catholic University of Rio Grande do Sul	Thesis	Technology and Research (ITP) Tecnopuc and SergipeTec
Model Governance for Science and Technology Parks in Brazil	2011	Federal University of Santa Catarina	Thesis	Did not mention

THE ROLE OF TECHNOLOGICAL PARKS IN THE STIMULATION AND CREATION OF ACADEMIC SPIN-OFFS	2014	Univ. Fed. Of São Carlos	Dissertation	São Carlos Science Park Damha-São Carlos Eco Tech Park
The Impact of Technology Park Management on Regional Development: A Case Study in Northeastern Brazil	2016	Federal University of Sergipe	Dissertation	Northeast Region Technology Parks
The development of the absorptive capacity in technological projects between university and company: a case study of the cooperation UNISINOS - HT Micron	2012	UNISINOS	Dissertation	Northeast Parks
The challenges of innovation environments for the development of sustainable tourism - a case study of the Itaipu technology park - Brazil	2014	University of Brasilia	Dissertation	Itaipu Technological Park Brazil (PTI)
Structure of knowledge services in Science and Technology Parks - increasing the company-university relationship - research centers	2009	Federal University of São Paulo	Thesis	Did not mention
Knowledge flow between University and Company: an analysis of companies installed in TECNOPUC.	2015	Catholic University of Rio Grande do Sul	Dissertation	TECNOPUC
Characterization of the university-company relationship in technological parks. Case study on the technological park of Rio	2013	Federal University of Rio de Janeiro	Dissertation	REINC - Network of Incubators, Technology Parks and Poles of Rio de Janeiro

Sourse: Survey carried out by the authors on the website of higher education institutions. (2018).

The previous table is a synthesis of the systematized review, in which the data were treated according to the methodology of content analysis proposed by Bardin (2016), in front of the 18 scientific productions under study of the last eleven years, 9 were presented in the years of 2013, 2014 and 2016, which represent 50% of the works analyzed.

OUTCOME OF THE ANALYSIS: objectives, methodologies and results

This subsection aims to discuss the perspective of the new on the topic PTCs of Capes and Bdtd research productions from the relationship between government, universities and companies, as well as policies to technological innovation, the central factor of a knowledge-based economy. It should be remembered that an innovative environment tends to be concentrated in a space of proximity, linked to educational institutions and research centers, generally supported by the interconnected productive public sectors, constituting an innovative productive arrangement in its location (CORREIA, 2010, p.18).

In view of the 18 productions under study, sub-categories emerged to analyze the proposed objectives. For the development of any study, it is important to delimit or specify the general purpose for the purpose of describing, analyzing and clarifying in clearer terms what can be observed in the research.

Table 4 - General Objectives of the production under study

SUB-CATEGORIES	OBJECTIVES OF STUDIES ON PCTs IN BRAZIL
PCTs AND THE RELATIONSHIP UNIVERSITY, COMPANY AND GOVERNMENT	To propose a conceptual scheme that makes possible to understand the elements involved in the promotion of innovation environments in science and technology parks, based on the dynamics of cooperation between university, business and government.
	To verify how the presence of a technological park stimulates the creation and development of academic spin-offs in the city of São Carlos - SP
	to explain the process of development of the absorptive capacity by a university in the context of a technological collaborative project
	Analyze the knowledge flow in joint projects between university and companies installed in a technological park - environment conducive to this type of interaction.
	To analyze the experience of the Rio Technological Park -UFRJ and its companies regarding the interaction established with laboratories and researchers of UFRJ. We identify the reasons that led the companies to settle in the park and the nature of the interactions developed with the university's laboratories.
	Understand the connection between university-business-government as well as leadership in PCTs under the perception of leaders.
	To present the context of technological parks in Brazilian deployment / operation.
PCTs AND PUBLIC POLICIES	To expose the challenges related to the implantation of Scientific and Technological Parks, Brazilian public policies of incentives;
	Raise the financing perspectives used in the stages mentioned in the Technological Parks
PCT AND THE RELATIONSHIP WITH SCIENTIFIC INICATION	To analyze the impact of scientific initiation (CI) on the training of fellows / volunteers who were participants in collaborative research networks, considering the perspective of citizenship, scientific and professional inclusion, as well as the proposal of quality indicators in higher education

Source: Authors from the publications Capes and Bdtd (2006-2017).

Faced with the emerging subcategories, “PCTs and the University, Company and Government relationship”, the authors propose to explain the most diverse types of cooperation relations established between educational institutions, private companies and the government, this triangulation stimulates the exchange of information and knowledge.

As far as the relationship between PCTs and Public Policies is concerned, the authors Silva (2013) and Figlioli (2007) bring in their investigation that the parks have consolidated as one of the main development

strategies of the country to position as a competitive, innovative and globalized globally, that the park initiative has a public policy dimension focused on local / regional development and national politics in general.

As for the subcategory relationship between Parks, Technological and Economic Development, the authors, Bichara (2013) and Correia (2010) make a comparative analysis of the potentialities and limits for economic development in technology parks in local and national region, presenting concepts and business competitiveness in the various areas of activity.

The authors Schirrmeister (2014); Giugliani (2011) and Feitosa (2016) draw an approach regarding the management and governance model that this type of initiative has, as well as the management strategies that condition the development process of the region. For the author the experiences implanted and evaluated, diverse management models emerge:

> [...] a) management is unique and centralized; b) based on advice; c) based on market executives; d) based on international experience, from a non-profit corporation; e) mixed and other effective models (GIUGLIANI, 2011).

In his research, Schirmeister (2014) emphasizes that PCTs have a unique, complex and innovative organizational identity, either through the interaction of shared processes and values, or through the brand and strength it reflects in the governance structure.

The studies of Nascimento (2016) analyzed the impact of the scientific initiation of fellows who participated in collaborative research networks such as Tecnopuc, SergipeTec and ITP, considering the perspective of citizenship, scientific and professional inclusion, as well as the proposal of quality indicators in higher education. It establishes a direct relationship of PCTs, Scientific Initiation of scholars in a context of collaborative network and higher education. It analyzes the impact of the scientific initiation and university formation from the Vallaey conception. Cruz and Sasia (2009) on the social responsibility of universities that permeates the impacts that Higher Education Institutions generate in their environment, namely: the organizational impact; educational impact; cognitive impact and social impact.

After the synthesis of the 18 productions under study, the subcategories for analysis of the methods proposed by the authors emerged. The scientific method consists of the tools that order the beginning of systems thinking, systematically map the researcher's way of proceeding along a path to reach the goal.

The purpose of any research research is to find answer to questions by applying scientific method. Most of the researchers used in their work a diversity of interconnected interpretive practices to reach a better understanding of the investigated phenomenon. Below the table with the synthesis by groups of qualitative, quantitative, mixed nature (quanti-quali).

Table 5 - Nature of data collection of the research under study

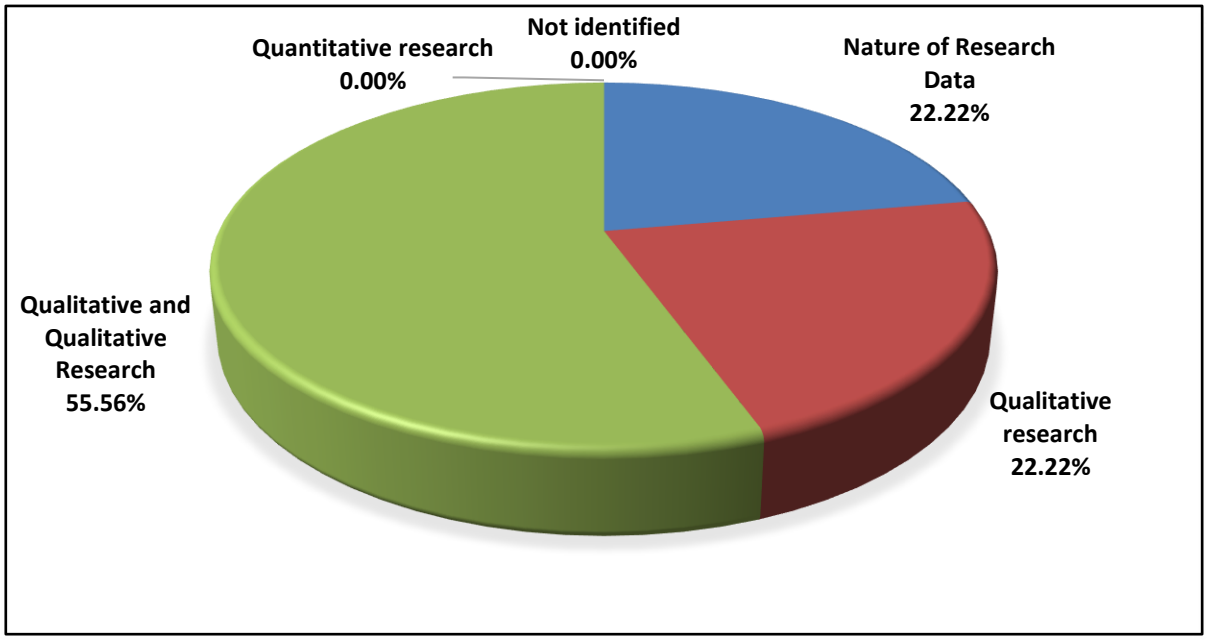
SUB-CATEGORIES	RESEARCH METHODOLOGIES ON PCTs IN BRAZIL
QUALITATIVE METHOD	Exploratory, qualitative study, multiple case study.
	Theoretical Research; Qualitative research; Interviews.

	Descriptive, qualitative research, case study, documentary research and in-depth interview.
	Qualitative, exploratory and interpretive research
	Qualitative, exploratory, descriptive and causal (or explanatory) research of the case study type.
	Case study; document review; qualitative methods.
	Bibliographical and documentary review, qualitative study, case study research, descriptive exploratory.
	Research of qualitative nature, exploratory, multiple case study Bibliographic review, Comparative analysis.
	The method of the case study uses a qualitative approach, the technique of semistructured interviews
	Qualitative research, with a descriptive character, case study, semi-structured interviews and consultation with secondary sources.
MIXED METHOD (QUANTI-QUALI)	Exploratory study, mixed method (quanti and quali), with the strategy to study multiple cases, collected primary and secondary data that were analyzed by the categorical content analysis technique.
	Quantitative-qualitative research (mixed methods) conducted in the light of the dialectical method.
	Quantitative and qualitative nature, documentary analysis; direct observation; and semi-structured and structured interviews.
	Case study, qualitative and quantitative research, exploratory with application of interview and questionnaire, bibliographic survey.
QUANTITATIVE METHOD	_____
DID NOT IDENTIFY	Exploratory research in the perspective of action research, questionnaire application.
	Qualitative research, of descriptive character, based on the phenomenological method proposed by Taylor and Bogdan (1987), through the use of the in-depth interview.
	Empirical research, conceptual schema design, multiple case study strategies, interviews.
	The case study method, semi-structured interviews, interviews.

Source: Author from the publications of Capes and Bdtd (2006-2017).

Table 5 presents a variety of methodological procedures used for the composition of the investigated studies. In this way, we present an explanation of the classification of the research, the nature and sources of data, as well as the research techniques and data collection instruments. For the development of the framework, sub-categories emerged to identify the nature of the data used and the techniques applied in

scientific production. Figure 1 below shows the nature of the data that most prevailed to achieve the objective proposed by the researcher.



GRAPH 1 - Nature of Data Collection of CAPES / BDTD Research Productions
Source: Authors from the publications Capes and Bdtd (2006-2017).

In order to answer the guiding questions and achieve the objectives proposed in their research, the researchers propose the methodological approach based on the qualitative approach or the mixed approach (quanti-quali). Graph 2 presents 56% of the research productions, the researchers used the approach of the qualitative research method, which corresponds to 10 works; still according to the graph 22% presents the use of the mixed method which corresponds 4 works; being that 22% of the investigators do not present the type of method used, which corresponds to 4 studies and, finally, of the 18 papers analyzed, none present use of the quantitative method.

As for qualitative research, considering that there is a dynamic relationship between the real world and the subject, an inextricable link between the objective world and the subjectivity of the subject, in brief, is a type of research that seeks to understand in detail the meanings and the (Richardson et al., 2007). In this paper, we present the results of the present study. Being the nature of collecting qualitative data regarding the objectives, they can employ procedures of a project that arises from personal experiences in a natural environment (CRESWELL, 2007).

As for the mixed method, the chart points out that 22% of research productions researchers do adoption in their research. This happens when problem variables need to be explained from more than one data source. The exploratory findings need to be generalized and a second method helps for an in-depth theoretical analysis (CRESWELL, 2007).

Still in relation to analysis of the methods, it is worth mentioning a point that draws attention to the technical procedures of the scientific productions. Of the 18 analyzed works 12 are characterized by the authors as being a case study, the other productions are distributed as follows: 1 phenomenological method;

1 theoretical investigation, 1 dialectical method, 1 exploratory in the perspective of the action research and finally, 2 works does not make clear its technical procedure.

The relevant factor in the case study as a research strategy is a comprehensive one, carried out through an empirical investigation of a phenomenon inserted in a given context, which is based on several sources of evidence to converge in a given result and which benefits from existing theories for the collection and analysis of data (YIN, 2001, 32). As a research effort, the case study unequivocally contributes to our understanding of individual, organizational, social, and political phenomena (YIN, 2001, 22) and can "explain, describe, evaluate, and explore contexts".

And when considering the case study as a research strategy, it is important to emphasize that the researcher should outline the basic method and instruments such as: (visits, interviews and questionnaires), and secondary ones such as: (documents, laws, projects, contracts and covenants) that order the systematized thinking, arranging in an organized way the way of proceeding throughout the investigation to reach the proposed objective.

The investigators characterized the research as being a case study, which were inserted in the subcategories of the qualitative method or the mixed method (quanti-quali), are types of research approach that are better suited to interpret about the phenomenon PCTs and the relationship with the triple helix. Being that, the mixed method research allows the investigator to collect and analyze the data, integrates the findings and extracts inferences in a single case.

Another point that stands out are the results of the researches pointed out by the researchers from the proposed objectives. Like the research productions analyzed in relation to the sub-categories of objectives, it can be said that the relationship between PCT, university, business and government, researcher Amaral (2014) realized that the presence of this type of initiative alone is not sufficient to stimulate the creation of academic spin-offs and those that were created suggest through process effusion of technologies from the academy to the business environment, for him parks offer only physical spaces.

Silva (2015) pointed out that the financial viability of a PCT requires an effort by the State, acting as a catalyst and supporters of investments, as well as the need to strengthen the union between government, educational institution and research and companies, that is, the triple propeller.

Regarding the subcategory between Parks and technological and economic development, the researcher Yamamoto (2016) points out the need for PCTs to develop actions and actions with a view to the sustainable growth of the park itself, the participating companies, the community involved and of the inserted region, so that they contribute to the formation of an entrepreneurial culture stimulated by technological development and innovation, with social, economic and environmental responsibility.

Another sub-category also relevant and treated by researchers was the relationship between the park and the management model that, because they are not legally constituted, the management model rests largely on the management bodies that respond to the park to which they are responsible and although the identity of the technology park is particular and imposes challenges due to its complexity of managing.

Finally, the researcher Nascimento (2016), the subcategory of the PCT relationship and scientific initiation, reveals that the collaborative networks are instruments of interlocution between graduates, researchers and society, being a relevant space for the formation of scientific spirit, not only by the threefold

propeller of technological parks and technology and research centers, by stimulating social progress and innovation.

This context denotes that the initiative of scientific and technological parks is in the face of design, implementation or in operation in partnership with the triad, university, government and company, are vectors and protagonists of innovation idealized to promote and strengthen economic sectors, leading scientific and technological development for Brazilian society.

FINAL CONSIDERATIONS

Understanding how to develop a systematic review helps the researcher in the task of constructing research that are important facts for scientific advances, but is still a methodological strategy little adopted in research of the science of education. In this context, the study considers the systematic review as a methodological strategy that made it possible to identify, record and categorize information that leads to reflection and meta-analysis with the purpose of identifying and analyzing the scientific publications of research, on the topic Technology Park in Brazil with a view to understand the interrelationships between university institutions in the last 12 years, retrieved in the databases of Capes and Bdtd. With the systematic review, it sought to identify the scope of the Scientific and Technological Parks from the 18 research productions. To this end, the subcategories emerged to analyze the objectives, methodologies and results proposed by the researchers in the studies.

The analysis of the categories on the objectives generally shows that researchers to reach the goal proposed in their research must follow a planning and scientific strategy that allow different levels of relationship between park and technology, economy, research, government, company, development and university.

Another subcategory that allowed for further study was the nature of the methods and technical procedures used by the researchers, in which 56% of the research productions used the qualitative research method approach and 22% addressed the use of the mixed method (quanti-quali). In the technical procedures, the basic instruments used were (visits, interviews and questionnaires), and secondary ones such as: (documents, laws, projects, contracts and covenants) that order systematized thinking, arranging in an organized way the way of proceeding research to achieve the proposed goal. This sub-category allowed us to understand that the researcher can make use of the simultaneous methods by implementing qualitative and quantitative elements during the same face of the research process in contemporary context.

Based on the information collected and analyzed, the result indicates that the initiative of scientific and technological parks is in the face of design, implementation or in operation are vectors and protagonists of innovation idealized to promote and strengthen economic sectors, leading local scientific and technological development / regional, as well as the synergy in the interrelationship with teaching, research and business institutions. The triple propeller is also called between government, company and university, a unique model that calls attention, since it is only through the interaction of the three actors that the possibility of creating sustainable innovation system with durability in the economic scenario of knowledge.

Regarding the interrelationship between the PCT and the academic environment, the experiences studied allowed us to perceive that both are sources of new scientific and technological knowledge, create new areas of action, lead the processes of social and economic change, generate works and brings development to parents. Another example of the direct relationship between the park and the university is the work of theses and dissertations of masters and doctoral programs of several areas of knowledge that show a panorama of the national scenario of parks initiative.

As a suggestion for future work, it proposes an analysis in the areas of knowledge of master's and doctoral programs that are producing research work on Science and Technology Parks.

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