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PUBLIC INNOVATION POLICIES: A BRIEF STUDY ON THE CONCEPTUAL FRAMEWORKS, CHALLENGES AND THEIR PERSPECTIVES IN BRAZIL

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ABSTRACT

The general objective of this research is to identify the main conceptual frameworks, challenges and perspectives of Public Policies for Innovation in Brazil, since public policies for innovation are fundamental for the national development and solution of problems presented by society. The study is classified as a bibliographic research, with a qualitative approach. The results indicate that the innovative process started late in Brazil compared to other countries, and over the years there were some actions that contributed to the development of public policies in Science, Technology and Innovation, especially from the 2000s onwards, with the enactment of Law 10973, of December 2, 2004, known as the Innovation Law, which allowed for the creation of measures to encourage innovation and scientific and technological research in Brazil, with a view to developing the national and regional production system. Brazil still has a long way to go to consolidate itself at a global level as an innovative country, and it currently has a document that will direct the Scientific, Technological and Innovation Policy actions in the period from 2016 to 2022, as the National Strategy adopted by the Ministry of Science, Technology, Innovations and Communications.

Keywords: Public Policy. Innovation. Science. Technology.

1. INTRODUCTION

The implementation of Public Innovation Policies is fundamental for the economic and social development of a country, as it inserts the country in the world market with greater competitiveness and helps to develop solutions to the problems presented by society. Given the

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country's requirement to keep up with technological advances and even to comply with current legislation and meet society's concerns regarding development concerning the contemporary technological and innovative process, it is necessary to understand a little about the public policy frameworks of innovation over the years.

Given this perspective, the need to make a brief using this theme, thus, the main objective of this research is to identify the main conceptual frameworks, challenges and perspectives of Public Innovation Policies in Brazil, through a bibliographical, descriptive research, with a qualitative approach and the use of content analysis, as a technique for data collection and analysis.

With the completion of this research, we will have a more precise analysis of conceptual frameworks in public innovation policies in Brazil, collaborating with new data for research on the subject, such as identifying the actions, programs and projects created over the years that contributed significantly to the development of this theme, also verifying challenges and perspectives for public innovation policies in Brazil.

This article is divided into six sections: Introduction (First section); succinct presentation of the context of the Public Policy Frameworks (Second section); theoretical-conceptual framework on Public Policies for innovation in Brazil until the enactment of Law n. 13.243/2016, which regulates the New Legal Framework for Innovation in the country (Third section); Methodology for developing the research (Fourth section), the results and analysis of the data collected (Fifth section) and finally, the Final Considerations (Sixth section).

2- PUBLIC POLICIES AND THEIR CONCEPTS

The expression Policy Analysis (public policy analysis) was used in an unprecedented way in1936, by the sociologist and political scientist Harold Dwight Lasswell (1902-1978), by establishing a relationship between the experience of productions and actions carried out by governments with scientific knowledge (RIBEIRO; SCRATCHED; MENEZES, 2015).

In 1957, the economist Herbert Alexander Simon (1916-2001) put the expression policy makers to discussion, with the aim of creating a rational knowledge base, directed towards political decisions and actions, in order to reduce the problems that could interfere in decision-making and transform these policies into necessary products for society. (SOUZA, 2006; RIBEIRO; RISCADO; MENEZES, 2015).

And, in order to question the concepts previously presented by Laswell and Simon, in 1959 the economist and political scientist Charles Edward Lindblom (1917-2018), placed other variants for the study of public policies, stating that it should involve other actors in the decision-making process (SOUZA, 2006; RIBEIRO; RISCADO; MENEZES, 2015).

However, Public Policy, as an area of knowledge and academic discipline, was born in the US in the mid-twentieth century (TUDE, 2010, p.11) and the focus of research carried out became greater in government actions than in the study of State and its institutions itself (SOUZA, 2018). This period, considered half of the 20th century, was also marked by socioeconomic, political and social changes around the world, mainly resulting from the 1st World War (1914-1918) and the 2nd World War (1939-1945), when the States were reviewing its performance based on social well-being, meeting the demands of the population through programs, projects and actions, not being different in Brazil (TUDE; FERRO; SANTANA, 2010).

In the military period (1964-1985), public policies were control, selective, fragmented, excluding and sectored policies, which generated several popular demonstrations with demands for better living conditions for the population (PIANA, 2009). And, the role of the State became clearer with the democratization that occurred with the promulgation of the 1988 Constitution, contributing to the advancement of social well-being and the evolution of public policies, which consequently positively affected the life of the Brazilian population (MADEIRA, 2014) .

2.1 PUBLIC POLICY CONCEPTS

To understand the field of public policy, two concepts are fundamental: the public problem and public policy. The first deals with the end or intention of resolution, that is, it is the distance between the current State and a possible ideal situation for the public reality. The second deals with the means to achieve such an intention; they are the guidelines designed to face public problems. (SECCHI, 2020).

For Schmidt (2018, p.122) “public policy is a response to a political problem”, the author also emphasizes that in the political science literature there are numerous definitions of public policies, but one concept stands out: “public policies they are public authorities' responses to political problems. In other words, policies designate State initiatives (governments and public powers) to meet social demands related to political problems of public or collective order” (SCHMIDT, 2018, p.122).

Public Policies are also understood as a set of decisions and actions proposed by the union, states, municipalities and the Federal District, for a given area, on a discretionary basis or by combining efforts with a given community or community sectors. This concept evolved over time, as, in the beginning, Public Policies were understood exclusively as outputs (decisions and actions), where there were inputs (social demands) and the political system that transformed these social demands into outputs (state actions) (TUDE; IRON; SANTANA, 2010; RIBEIRO; SCRATCHED; MENEZES, 2015).

Over the years, the field of public policies has gained complexity and not only outputs but also inputs have been analyzed (TUDE; FERRO; SANTANA, 2010). For Teixeira (2002, p. 3), Public Policies are:

> guidelines, guiding principles of public power action; rules and procedures for the relations between public power and society, mediations between society and state actors. In this case, they are explicit policies, systematized or formulated in documents that guide actions that normally involve the application of public resources (TEIXEIRA, 2002, p. 3)

Souza (2006), on the other hand, states that there are several definitions of public policies, including:

> One can then summarize public policy as the field of knowledge that seeks, at the same time, "putting the government into action" and/or analyzing this action (independent variable) and, when necessary, proposing changes in the course or course of these actions (dependent variable). (SOUZA, 2006, p. 26).

The priorities adopted by governments constitute the basis of policies and Public Policies are decisions taken by state entities that are reflected in actions, which, according to Dye's definition (1984), are “what the government chooses to do or not to do”. Therefore, “public policy is often understood as an action or set of actions through which the State interferes in reality” (DIAS; 2012, p. 41).

Thus, Public Policies have their contribution as a posture towards a certain issue, since they are designed and elaborated with the purpose of facing a public problem, reducing and even solving those problems considered relevant to society. (SECCHI, 2012). The participation of society is always essential, for which and for which public policies must exist.

3. PUBLIC INNOVATION POLICIES IN BRAZIL

Until 1950 there were no Public Policies for innovation in Brazil, but some specific actions such as: the creation of the Federal Serotherapy Institute in 1900 (now known as the

Oswaldo Cruz Foundation) and the Serumtherápico Institute in 1901 (now known as the Butantan Institute), both created for the manufacture of serums and vaccines to fight the epidemic of bubonic plague.

The Museu Paraense Emílio Goeldi was also created in 1866 and the Instituto Agronomo de Campinas (1887), and during this period the teaching and research system was institutionalized at the University of São Paulo – USP and 160 higher education establishments (not linked to the research) (SANGLARD, 2005; SANTANA, 2020). that helped in the development of this theme in the country.

In the 50s and 60s, the institutionalization of Science and Technology Policies began in Brazil, where the Coordination for the Improvement of Higher Education Personnel - CAPES (1951), National Research Council - CNPq (1951) was created to promote them) and Energy and Nuclear Research Institute - IPEN (1956). However, the researches developed were focused on strategies with nuclear energy, stimulated by the post-war (2nd World War), since Brazil had reserves and exported uranium (U) and thorium (Th).

As the strategy was more focused on nuclear energy, the scientific system was not involved with the technological needs of the productive system (ANDRADE; SANTOS, 2013), so, in this period, the University of Brasília was created -UnB (1962), linking scientific research to teaching (SANTANA, 2020). In the 70s, Science and Technology Policies were already linked to the government's foreign policies of that period, that is, industrial and economic development, with developmental vision (large Brazil), prosperity, national sovereignty, which was characterized by the link with the ruling class and demobilization of popular forces.

In this sense, the Financier of Studies and Projects - FINEP (1967) was created to foster technological development through partnerships between companies and research institutions supported by the government and national and multilateral organizations. And, with the objective of developing science and technologist in the country, the Basic Plan for Scientific and Technological Development - PBDCT was created during this period, during which the I PBDCT (1973-74), II PBDCT (1976- 79) and III PBDCT (1980-85).

However, other actions were also important for the development of science and technology, such as the creation of the Amparo Foundation andResearch Development – FADESP (1962) and the Brazilian Agricultural Research Corporation – EMBRAPA (1972) to assist in technological development (LUCAFÓ, 2013; SANTANA, 2020).

The early 1980s and 1990s was a very challenging period, due to the economic crisis in the early 1980s, which made investments in science and technology impossible. However, there

were many financing actions in areas defined as priority, which was the implementation of the Support Program for Scientific and Technological Development I - PADCT I (1985), PADCT II (1991) and PADCT III (1998) which carry out loans throughof the World Bank, CNPq, FINEP and CAPES. This period was marked by the creation in 1985 of the Ministry of Science and Technology and also by the 1st National Conference on Science and Technology (1985), which helped to strengthen the innovation and technology policies in Brazil(LUCAFÓ, 2013; SANTANA, 2020).

In the 2000s, with the enactment of Law 10973, of December 2, 2004 (BRASIL, 2004), which established university-industry collaboration as a central issue in the innovation policy, aimed at building competitiveness, the stimulus to innovation gained strength in the private sector and became part of the Brazilian political agenda. In fact, this Law, known as the Innovation Law, is considered the regulatory framework for innovation in Brazil (LUCAFÓ, 2013; ABDAL, 2019; SANTANA, 2020), and through this regulation, innovation was stimulated through tax benefits, with the State , in this context, the main policy stimulus agent for science and technology.

The Federal Institutions of Higher Education (IFES), indicated by Law 10973 of December 2, 2004 (BRASIL, 2004) as Science and Technology Institutions (ICT), were responsible for structuring an internal body that would manage their innovation policies. This body is called the Technological Innovation Center (NIT). For Souza (2013), this Law allowed the IFES to create means of relations with companies in the management of innovation, since its Article 21-A established the mandatory protection of intellectual property and the transfer of technology by Science and Technology (ICT).

In addition, Law No. 13,243/2016 in its Article 1 establishes measures to encourage innovation and scientific and technological research in the productive environment and, through the promulgation of the aforementioned Law, institutions began to learn about a new model not to stay on the sidelines of stimuli for scientific development, research, scientific and technological training and innovation.

4. METHODOLOGY

The research carried out is classified as bibliographic with a qualitative approach, as it offers the researcher the possibility of carefully investigating already published bibliographies, in order to expand scientific knowledge, make their own interpretation of the theme and the

researched object.

The technique used for data collection and analysis was content analysis, which for Bardin (2006) are techniques capable of enabling the analysis of communications, through the creation of categories that help in understanding the discourse. The author also argues that “this is not an instrument, but a range of gadgets; or with greater rigor it will be a single instrument, but marked by a great disparity of forms and adaptable to a very wide field of application: communications” (BARDIN, 2006, p. 31).

The platform chosen to carry out the bibliographic survey was Google Academic, for providing articles, dissertations and theses from several repositories in Brazil, the search was carried out on pages in Portuguese and publications in the last 5 years (2017 to 2021). The selection of articles was made through articles similar to the topic discussed, after this step, the bibliographies found were organized in a matrix elaborated in Excel for further categorization.

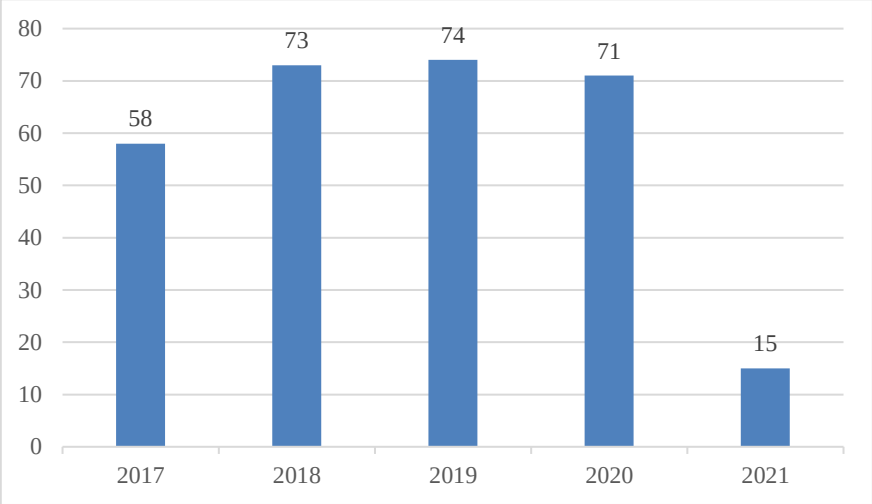
This research sought to define the categorization of content for analysis, having as reference the conceptual discussions on Public Policies of Innovation. These categories were adjusted when analyzing the publications found on the Academic Google Platform.

5. RESULTS AND DATA ANALYSIS

From the Theoretical Framework, two categories for analysis were defined, categorized according to the content analysis proposed by Bardin (2006), which will be detailed in the next paragraphs.

The terms "concepts" and "public innovation policies" were used as a search strategy, and 291 results were found, published in the period 2017 to 2021, distributed as shown in Graph 1

Graphic 1 - Publications with the terms "concepts" and "public innovation policies" per year found in ACADEMIC GOOGLE



Source: Prepared by the authors (2021)

After analyzing the data obtained, it is observed that the number of publications on the topic increased from 2017 to 2018 and remained stabilized in the years 2018 to 2020, however, as the research was carried out until 06/02/2021, the year 2021 has only 15 publications, but the trend is for this number to increase, as there may be articles submitted that have not yet been published. So, the interest in the topic and development of research in the researched area in the last 5 years is noticeable.

As mentioned above, for data analysis, the most frequent categories were used in the content investigation, in order to relate them to the characteristics present in the conceptualization of Public Policies in Brazil, as shown in Table 1 below:

Table 1: Categories for analysis of data obtained from selected publications.

ORDER	CATEGORIES	ATTRIBUTES
1	Innovation stimulus policies in Brazil	Strategies, actions and programs that contribute to the growth of innovation in Brazil.
two	Challenges for consolidating public innovation policies in Brazil	Difficulties and perspectives for the implementation of public policies in Brazil

Source: Prepared by the authors (2021).

Of the 291 publications surveyed, 31 publications were selected to perform analysis of theInnovation stimulus policies in Brazil, entitled Category 1, and the Challenges for the consolidation of public innovation policies in Brazil, entitled Category 2, as shown in Table 1.

5.1 CATEGORY 1: INNOVATION STIMULUS POLICIES IN BRAZIL

On March 31, 2004, the Federal Government launched the First Industrial, Technological and Foreign Trade Policy (PITCE), with actions aimed at the industrial sector, with a plan to strengthen innovation, production structure and expansion of exports in this sector (PINHO , 2017).

Still in the early 2000s, through support for the creation of the first PITCE, some actions stimulated the development of innovation policies in Brazil, among them the creation by the Federal Government of Law nº 10,973 in 2004, known as the Innovation Law, already mentioned in this research, which aims to provide measures to encourage innovation and scientific and technological research in Brazil, with a view to developing the national and regional production system. The Federal Government also created Law No. 11,196, of November 21, 2005, known as the Lei do Bem, regulated by Decree No. 5.798, of June 7, 2006, which allowed tax incentives to carry out technological research and development of technological innovation (TURCHI; MORAIS, 2017).

Furthermore, according to the survey carried out, it was identified that in 2007 the Federal Government created the Action Plan on Science, Technology and Innovation (PACTI), with the purpose of expanding and consolidating the national system of Science, Technology and Innovation in the country, through the promotion of scientific and technological research. And the following year, in 2008, it created the Productive Development Policy (PDP), whose goal was to resume the Industrial, Technological and Foreign Trade Policy (PITCE), which began in 2004 (TURCHI; MORAIS, 2017; ABDAL, 2019).

These joint actions, adopted by the Federal Government, mainly the PITCE and PDP, made Brazil increase its development and research in science, technology and innovation. And among the measures or initiatives carried out by these actions, we highlight the main ones identified during the research: CNPq and CAPES grants for research and studies, training of masters and doctors, creation of economic subsidy notices for the development of projects and companies, interaction through partnerships with the actors of the Science, Technology and Innovation System, international cooperation and development of programs to encourage the development of innovation (TURCHI; MORAIS, 2017; ABDAL, 2019).

It was also possible to identify many innovation stimulus programs in Brazil financed by FINEP and BNDES, the main ones are described in Table 2:

Table 2 -Programs created by Finep and BNDES to support innovation research and development

	PROGRAMS/PURPOSE
FINEP	*Housing Technology Program (HABITARE):* Created in 2009, it is a program that supports scientific and technological development and the dissemination of knowledge in the field of Built Environment Technology, through scientific, technological and innovation research aimed at contributing to the solution of the country's housing deficit and the modernization of the civil construction sector. *Business Research Support Program (PAPPE Integration):* created with the objective of stimulating the innovative capacity of micro and small companies in the North, Northeast and Midwest regions through subsidy projects, adding value to the business and competitiveness in the market. *National Program of Incubators of Popular Cooperatives (PRONINC):* created with the objective of financially supporting research projects, technological development and the extension of technological incubators for solidary economic enterprises, which would contribute to scientific, technological and innovation development in Brazil. *Inova Program:* created in 2013 with the objective of supporting, through credit, economic subsidy and non-refundable resources, projects developed in partnership between ITCs and companies. Projects developed in several areas such as: aerodefense, agriculture, energy, health, minerals, sustainability and oil. *Basic Sanitation Research Program (PROSAB):* created to support the development of research and the improvement of technologies in the areas of supply water, wastewater and solid waste that are easy to apply, low cost of implementation, operation and maintenance and that result in the improvement of the population's living conditions Brazilian, especially the less favored. *National Program of Incubators and Technological Parks (PNI):* created with the aim of fostering the consolidation and emergence of Business Incubators that contribute to socio-economic development, characterized by technological innovation in their products, processes and services and by the use of modern management methods. *Zero Interest Program:* Created in 2005 with the objective of supporting you micro and small companies with interest-free loans and payment divided into 100 (one hundred) installments, which want to innovate in the commercial sector, in processes, services and products. *National Qualification and Modernization Program of Technological Research Institutes (MODERNIT):* Created with the objective of supporting projects for the modernization of technological research institutes (IPTs), recovering infrastructure, equipment and technical staff, aiming at the improvement of technological services, and research and development activities to meet the demand of the business sector.
BNDES	*Support Program for the Development of the Pharmaceutical Productive Chain (Proforma):* created in 2004 with the objective of stimulating research and development of radical or incremental innovations in pharmaceutical companies, it also aims to contribute to the solidification of the infrastructure of innovation in health in the country. *Program for the Development of the National Industry of Software and Information Technology Services (Prosoft):* Created in 1997, with the objective of contributing to the development of the national software and Information Technology services industry, through support for productive investments, innovation, consolidation processes and business internationalization, strengthening national companies. *National Industrial Park Modernization Program (Modermaq):*Created in 2004 with the objective of financing the isolated production and acquisition of new and domestically manufactured machinery and equipment. It also aims to modernize the national industrial park and boost the capital goods sector, reduce the sector's costs, expand infrastructure, improve product quality and expand exports.

	Engineering: program created in 2009 with the objective of financing engineering in the sectors of capital goods, defense, automotive, aeronautics, aerospace, nuclear and in the supply chain of the oil/gas and naval industries, aiming at strengthening the engineering areas of the companies and encouraging the improvement of skills and technical knowledge in the country. *Pro-aeronautics:* created in 2007 with the objective of long-term financing and/or underwriting of securities to support investments made by micro, small and medium-sized companies that are part of the Brazilian aeronautical industry's productive chain, aiming at the consolidation of this chain. *Support Program for the Implementation of the Brazilian Digital Terrestrial TV System (PROTVD):* created in 2006 with the objective of supporting the investments of companies producing software, electronic components, equipment and infrastructure for the transmission network, reception equipment and equipment for the production of content related to the Brazilian Digital Television System.

Source: Adapted from http://www.finep.gov.br and wwvv.bndes.gov.br

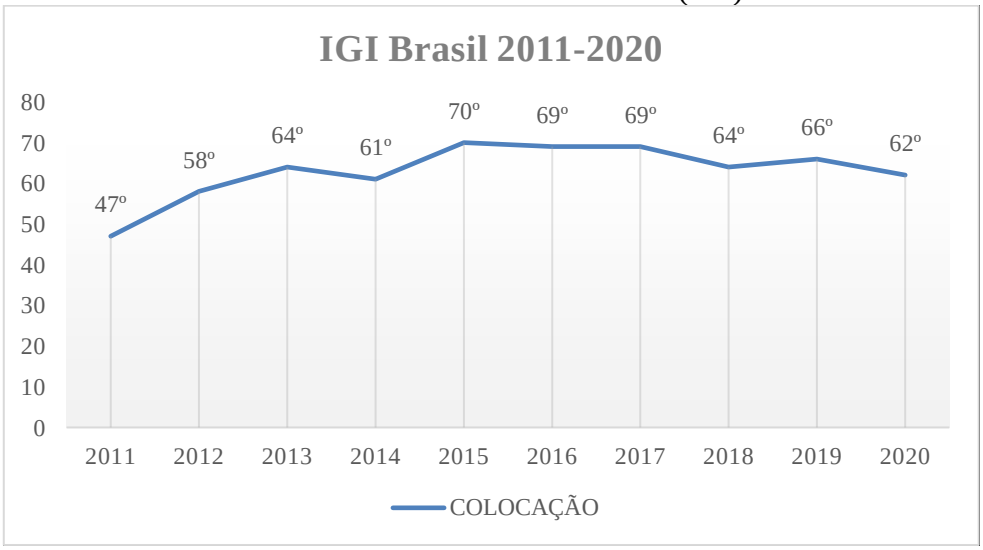
As shown in Table 2, it is observed that there were several stimuli for the Industrial, Technological and Foreign Trade Policy, focusing on the development of physical infrastructure and the industrial sector, thus leveraging national production and exports, due to the competitiveness of the productive structure (PEREIRA , 2013; PINHO, 2017). These tax benefits created in these programs were driven by Law 10973, of December 2, 2004 (Law of Innovation), which stimulated the creation by the Federal Government of the Productive Development Policy and Industrial, Technological and Foreign Trade Policy (PEREIRA, 2013 ; ABDAL, 2019).

With the identification of these Programs, even though Brazil was lately inserted in this area of innovation and technology policies, it is clear that the need for development in this field of research is quite latent, but the advances stimulated by legislation itself. However, it is true that there are still many challenges for the consolidation of these policies, which we will see some, identified in category 2 below.

5.2 CATEGORY 2: CHALLENGES FOR CONSOLIDATION OF PUBLIC INNOVATION POLICIES IN BRAZIL

According to WIPO (2020), Brazil is in 62nd place in the Global Innovation Index (IGI) of 131 countries, and this placement has improved, rising 4 positions compared to 2019, as shown below in Graph 2:

Graph 2 -Evolution of Brazil in the Global Innovation Index (IGI)



Source: Prepared by the authors (2021)

Graph 2 shows that the best ranking achieved by Brazil in the last 10 years was in 2011, being in 47th place, being the worst in 2015 with 70th place. From 2011 onwards Brazil did not evolve, on the contrary, from 2011 to 2020 Brazil lost 15 places, demonstrating that policies are needed to strengthen innovation and make the country a world power. Brazil has difficulties in transforming the knowledge produced into technology, and it is important for this to happen, so that the country can reach better rates of innovation (GARROTI, 2016).innovation is the dominant factor in national economic growth and in international trade patterns and "without diffusion, innovation has no economic impact" (OECD, 2005, p.24).

In this sense, the Federal Government's effort, in the early 2000s, to increase innovative performance through fiscal and financial incentives for research by theFINEP and BNDES of programs and projects, was unsatisfactory, as it did not achieve the expected results (TURCHI; MORAIS, 2017; PINHO, 2017). It is noteworthy that Brazil increased the production of knowledge in this period, but was unable to transform this knowledge produced into patents or innovative technologies (TURCHI; MORAIS, 2017; PINHO, 2017), which indicates the need to further link the public policies of innovation to Education, to disseminate this knowledge and, consequently, record everything produced as a result of research.

The innovation process needs several sources, including universities, companies, laboratories, research and development institutes, among others (HSU, 2005). Companies need to invest in innovation and technology so that their products can impress consumers, investors, competitors and drive the economy. But,for innovative knowledge to reach companies, it needs to be socialized, and it is diffusion that helps in this socialization of innovations among agents

(Universities, Institutes, companies, researchers, governments, NGOs, banks, est.) that work with science and technology.

Public innovation policies in Brazil were developed late in relation to other countries, and it was only from the 2000s onwards that science and technology policies began to be debated more intensely as development strategies for the country. (GARROTI, 2016). Being that:

> [...] Brazilian scientific public policies were developed over the decades in an incipient way, within budget possibilities, being often in the background due to political and/or economic problems that needed urgent measures and investments (GARROTI, 2016 , p. 110).

As a measure to enable national development, a document entitled: National Strategy for Science, Technology and Innovation 2016-2022. This document was revised and updated by the Ministry of Science, Technology, Innovation and Communications (MCTIC) to conduct Scientific, Technological and Innovation Policy (PCTI) actions in the period from 2016 to 2022 in Brazil (MAZZETTI et al., 2020). This document has important challenges and actions and guidelines for the development of innovation, consequently national development, as described in Table 3:

Table 3 - Challenges and national actions for Science, Technology and Innovation (CT&I)

NATIONAL CHALLENGES FOR CT&I	ACTIONS
Position Brazil among the most developed countries in Science, Technology and Innovation (CT&I)	• Invest 2% of GDP in Research and Development (R&D); • Triple the number of researchers involved in R&D
Improve institutional conditions to increase productivity through innovation	• Promote the ability to convert ideas into value; • promoting an innovative culture; • Prioritize and invest heavily in increasing productivity through innovation; • Risk reduction in escalation activities; • Formation of innovation ecosystems; • Greater articulation between business demand and the supply of qualified research infrastructure.
Reduce Regional Asymmetries in production and access to CT&I	• Recognize competences and potential of Regional ST&I Systems; • Disseminate excellence and increase the participation of CT&I throughout the country; • Explore the potential of the talent pool and spread the benefits of CT&I across the country; • Investments in RD&I must consider the different spatial scales: local, regional, national and global.
Develop Innovative Solutions for Productive and Social Inclusion	• Social inequalities must be the object of public policies that articulate the ST&I; • Insertion of the portion of the population that is in social

	vulnerability; • CT&I's social roots aimed at solving regional issues; • Expand the perceptive and analytical capacity of the problems and take a stand in dealing with them; • Develop more effective ways of working the scientific education of the population; • Establish a democratic practice, based on knowledge and dialogue with projects and life concerns of communities that potentially benefit from or suffer the impacts of scientific and technological advances; • Ensure a permanent supply of quality food, in sufficient quantity, without compromising the supply of other essential needs.
Strengthen the foundations for promoting sustainable development	• Enable development, ensuring environmental integrity; • facing a greater frequency of extreme weather events; • investment in sustainable management techniques for local wealth aiming at better social balance; • the proposition of solutions for the adaptation of production models to reduce the intensive use of natural resources and application in clean technologies; • The country must promote initiatives that favor clean development; • Waste recovery projects must be understood as an economic factor for the industry of the future.

Source: adapted from MCTI (2016, p. 63-70)

From this perspective, Brazil still has a long way to go in order to consolidate itself as an innovative country worldwide (JOAQUIM, 2020). Since to reach this level, some points are important, according to Turchi and Morais (2017), the path to innovation is the interaction of the productive system and the Science and Technology Institution (ICT), as these institutions are responsible for managing innovation .

Law 10973, of December 2, 2004 (BRASIL, 2004), allowed the IFES to create means of relationships with various actors in the management of innovation, since its Article 21-A establishes the mandatory protection of intellectual property and of technology transfer by the Science and Technology Institutions (ICT). Thus, for Turchi and Morais (2017) it is necessary to “improve the legal and institutional conditions for the provision of technological services within the scope of ICTs, providing them with more competitive operating conditions”.

An important instrument for this perspective was the enactment of Law No. 13.243/2016, entitled as New Regulatory Framework for Science, Technology and Innovation, fits in its Article 1 measures to encourage innovation and scientific and technological research in the productive environment, and through this law the institutions passed to learn about the new model, so as not to be left out of stimuli for scientific development, research, scientific and technological training and innovation, so ICTs are the main agents of innovative technological services that can be transferred to the solution society's problems and need greater attention in public innovation policies (JOAQUIM; PRETE, 2018).

6. FINAL CONSIDERATIONS

Public Policies on Science, Technology and Innovation (ST&I) are fundamental for the progress and development of a nation, as they generate economic development, competitiveness with the international market and solutions to problems demanded by society.

This study carried out a historical review of the emergence of the concept of public policies and their contribution to the development of innovation over the years in Brazil. It was noticed that the innovative process started late in Brazil, compared to other countries, starting in fact from the 2000s, with the enactment of the Innovation Law (Law No. 10973/2004) which motivated the innovative process, through stimuli that they made it possible to finance programs and projects, as well as financial incentives for innovation. Before the 2000s, innovation actions were developed in the country, but in a timely manner and in accordance with the economic and political situation in the country.

These incentives to innovation were financed by the Financier of Studies and Projects (Finep) and by the National Bank for Economic and Social Development (BNDES) and this stimulus increased the production of knowledge, but did not increase the number of patents, a fact that made Brazil not reaching its goal of becoming an innovative country. However, some actions were created by the government over time, the main ones being created from the 2000s onwards, which are the Action Plan on Science, Technology and Innovation (PACTI) the Productive Development Policy (PDP), these plans helped Brazil achieve its best position in the Global Innovation Index (IGI), which was 47th in the ranking, but currently ranks 62nd out of 131, dropping 15 positions over 10 years.

This demonstrates that Brazil has numerous challenges to establish itself as an innovative country, requiring actions with planning and control. In this sense, the Federal Government, through the Ministry of Science, Technology, Innovation and Communications (MCTIC) created the National Strategy for Science, Technology and Innovation 2016-2022, a document that directs strategic actions of Scientific, Technological and Innovation Policy (PCTI) until 2022 in Brazil, this document contains bold objectives for a country considered technologically backward, but which can be achieved with the interaction, cooperation, strategic planning, structuring and commitment of all federation entities (Federal District, States and Municipalities) together with the actors involved in the innovative process (Universities, Institutes, Companies, Industries, Banks, NGOs,

Thus, governments and innovation actors must think, plan and cooperate together in the development of Science, Technology and Innovation (ST&I) Policies in the country, for socioeconomic growth, which will enable broad national, regional and local development. In addition, this research is far from exhausting the theme, being necessary to carry out other researches in this area to add to the existing data. An important point to be addressed in future research is about the impact of Public Policies on Innovation in Science and Technology Institutions (ICT), since by Law, they are responsible for managing innovation and transferring technology to society.

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