

PUBLIC GOVERNANCE AND INTELLECTUAL PROPERTY MANAGEMENT IN RESEARCH FUNDING AGENCIES

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Abstract

This article aims to analyze the position of the Research Support Foundations (FAPs) regarding the obligation of co-ownership in patent deposits, arising from financial support promoted by them. To this end, a search was proposed in the database of the National Institute of Industrial Property – INPI for FAPs and federal development agencies. For the search of international development agencies, the Orbit Intelligence database was used. The results of this study show that the Foundation for Research Support of the State of Minas Gerais (FAPEMIG) remains the holder with 522 deposits, followed by the Foundation for Research Support of the State of São Paulo (FAPESP) with 275 deposits and the other FAPs with rare cases. Although the three federal agencies do not require joint ownership, 522 deposits with joint ownership by the National Council for Scientific and Technological Development (CNPq) and 27 deposits with joint ownership by the Financier of Studies and Projects (FINEP) were found, however, no deposit was found on behalf of the Coordination for the Improvement of Higher Education Personnel (CAPES). And among the 4 main countries analyzed, France is the only one in which there is a concentration of ownership in a central development agency, this can be explained by the fact that France's Intellectual Property Policy makes this type of requirement. In the other countries surveyed, there is no such requirement for participation in co-ownership of patent deposits. In interviews with managers of the FAPs, it was evident that a percentage of them claim that the arguments for participation or not show advantages, and from the point of view of those who do not defend participation, pointing out disadvantages.

Keywords: Public Governance; Regional Innovation System; Research Support Foundations

1. Introduction

Governance had its use potentialized from the last decades of the 20th century when the State Crisis installed itself and demanded a new relationship between the State and society, and the development that it proposes to achieve through the Public Governance movement is linked to the collective, being the interests and needs of a society (DIAS; CARIO, 2014).

Public governance is formed by different arrangements in a participatory process of different social actors who start to act in networks where actions are joint, these cooperation networks generate the conditions for more effective social control (TIAGO; ROHM, 2019) .

Therefore, the importance of having a culture of innovation and efficient management of intellectual property and technology transfer, within organizations,

it is quite evident, and the greater the portfolio of intellectual property protections of an institution, the greater will be the management work. This need is even more evident when analyzing the reality of public Scientific, Technological and Innovation Institutions (ICTs), being federal universities, which have a legal nature under public law (ARAÚJO, 2019).

The global scenario that the factors of production are at the maximum limit of their use, the increase in the competitiveness of companies is restricted, in general by the insertion of technological resources that impact on increasing the efficiency of the production process or on the generation of innovations in this context, innovation has acquired status to give sustainability to the development of regions and nations (MAMEDE et al., 2016). The structure of national or regional innovation systems influences the propensity to innovate new ventures in emerging countries, and the accumulation of technological capabilities of different actors depends on the existence of an innovation system (CUNHA et al., 2009).

Research Support Foundations (FAP's) promote S,T&I activities through subsidy resources, and most of their income comes from their state, thus, richer states tend to invest more, and receive the benefits economic, several policies, institutions and instruments were created to encourage research, technology and innovation, being able to foster innovation in all regions of the country, promoting economic and social capillarity (MATOS, 2018).

This study aims to analyze the position of Research Support Foundations (FAPs) regarding the obligation of co-ownership in patent deposits, arising from financial support fostered by them. What are the advantages and disadvantages of FAPs of having or not this requirement?

2. Theoretical Foundation

2.1 National Innovation System

The search for innovations has been constant and complex changes in the contemporary world, which demand skills to find alternatives that enable the accommodation, development and survival of organizations (CUNHA et al., 2009).

The Innovation Law is the legislation responsible for providing for incentives for innovation and scientific and technological research in the Brazilian productive environment, stipulating that all Science and Technology Institutes (ICT) must obligatorily establish a Technological Innovation Center (NIT) to management actions (ARAÚJO, 2019).

Innovation has become so relevant that it surpasses the environment of organizations, the industrial or sectorial segment of the economy and expands to the national environment, in which State and government policies, designating the National Innovation System (SNI) (SILVEIRA et al. ., 2016).

The SNI is a specific policy for the field of science and technology and is an event dating back to the mid-50s of the last century. In this period, only one S&T system was configured in the country, as a large part

of the actors and links usually associated with an innovation system did not exist, consolidating itself in the 1990s (VALLE, 2005).

According to Freeman (2004), the SNI is a continuous process of accumulation, as it involves radical and incremental innovation, diffusion, absorption and innovation. The SNI has an evolutionary approach, with technological progress, individual innovations are focused on systemic processes (FREEMAN, 1995). Lundvall (1992) emphasizes that the SNI is an institutional arrangement constituted by elements that relate and interact in the production, diffusion and knowledge in the state. However Nelson (2006) states that the SNI encompasses innovation, as processes that companies dominate putting products and processes into practice.

One of the factors that has delayed the development of the innovation system is the financial crisis in the Brazilian State, with implications for the reduction of resources for financing innovation, which makes it impossible to generate synergies and create a learning trajectory in new companies (SIEGLINDE; BULGACOV; FIGUEIREDO, 2009).

2.2 Regional Innovation System

Regions are natural economic zones as they genuinely represent the interests of communities and the flows of economic activities, they can take advantage of synergies between economic agents, regions have the competitive advantage including institutional and governmental (BARROS, 2018).

According to Storper (1995), geographic proximity promotes interactions in the local system due to the sharing of common language, norms, cultural values. For Cooke (2006) the main argument is that the different regions that make up a country have their own historical, cultural, political and economic characteristics, differentiating them from each other and constituting their own innovation systems. Doloreux and Parto (2005) state that innovation is spatially located, taking place in a historical, institutional, political, social and economic context. Different regional innovation systems result in different levels of technological and economic development, thus reproducing the regional imbalances that exist in the Brazilian economy. In this sense, the innovation system of a given country or region is a fundamental factor in its ability to create and adopt innovations (CASALI; SILVA; CARVALHO, 2010).

The cut of Regional Innovation Systems (SRIs) is innovation as a systemic phenomenon, as it occurs in the economic environment and socio-institutional permeated with geographically determined specificities (MARCELLINO; AVANCI; BRITTO, 2013).

According to Diniz (2001), analyzing the Brazilian regions, concludes that the North region has expanded its participation in industrial product, this expansion is due to tax incentives granted by Sudam and Suframa and by the performance of the Manaus French Zone, with the production of goods of consumption, in Rio Grande do Sul, the growth of the leather and footwear industry as a response to external demand, thus concluding that regional innovation with external incentives is essential for the SRI.

According to Borges (2011), it is emphasized that the National System of Science, Technology and Innovation cannot give up the protagonist participation of the Research Support Foundations (FAPs) to contribute to its success.

Both in the National Innovation System and in the Regional Innovation System, the observance of good management practices, good public governance, good governance that provide social management, can be

considered efficient management, building the figure of the new model of public governance, which focuses on the effective application of resources.

2.3 Public Governance

The Public Administration acts under the influence of the hues of the models management that are present in the national administrative culture (GOMES et al., 2021). And governance is born in view of the distancing of the owners, of the management of its projects, with the primary objective of aligning the expectations of managers (TEIXEIRA; GOMES, 2019).

Governance has become a key concept that everyone uses without knowing exactly what it is, and its original meaning contains an understanding associated with the developmental political debate. Thus, Public Governance is associated with a change in political management, as it is a tendency to increasingly resort to self-management in the social, economic and political fields (KISSLER; HEIDEMAM, 2006).

Governance is applicable to various organizational forms, including the public organizations, since their principles and actions aim to optimize the results, therefore, it is possible to see that governance suggests the establishment of procedures and the corresponding execution (TEIXEIRA; GOMES, 2019). Public governance has been proclaimed as a new paradigm, distinct from the new public management and orthodox bureaucratic public administration (CORREIO; CORREIO, 2019).

In this sense, good public governance plays a fundamental role in the development and implementation of programs and projects, which will bring about improvements for society. Within the good practices of this governance one can observe the deal with the management of intellectual property.

2.4 Intellectual Property Management

Intellectual property is considered the driving force of a globalized economy, for bringing its creators and developers the right to recognition and exclusive exploration of their inventions (LOPES, 2019). Intellectual property is regulated in each country respecting the sovereignty of nations that have their own legislation, as there are international agreements and treaties, in order to standardize the formal issues related to intellectual property protection and each country has its own legislation and regulation, therefore, it is important to verify the peculiarities of each country when seeking to claim intellectual protection outside Brazil (ARAÚJO, 2019).

Due to its importance in the academic world, intellectual property is premised on the protection of human creation, whether in the literary, artistic or scientific field, as well as being grounded in the legal context with relevance to the competitiveness factor in the market (VASCONCELOS; SANTOS, 2018) . The management of intellectual property within educational and research institutions is very complex, due to the very nature of protection of inventions (VICENTE, 2019).

Research centers and Higher Education Institutions (HEIs), when playing a relevant role in supporting innovation in the technological development environment, should also bet on property management, as a factor that provides greater security in establishing partnerships with the public and private sectors (CORSO, 2019).

And, with the Innovation Law in 2004, Intellectual Property became more relevant in universities, due to the formation of (NIT's) which are the entities responsible for issues related to the licensing, protection and

transfer of technological innovations (VASCONCELOS; SANTOS, 2018). Therefore, there are some essential actors to encourage innovation (NIT's) linked to ICT's (ARAÚJO, 2019).

3. Methodology

The methodology of this study is characterized as qualitative and descriptive in nature, as a bibliographic survey was carried out for a better understanding of the subject, as well as interviews with the managers of the FAPs and national agencies, as they have expertise in the subject covered and analyzes for better understanding. This study is quantitative in nature, as data were tabulated for data collection and analysis. This study was divided into bibliographic research, using articles for a better understanding of the theme and visiting the websites of the FAPs where the profile and history of these foundations was traced, with research being carried out in the documents of state and federal agencies, as well as international agencies . To obtain the data for this research, the quantities of patent deposits were collected in the database of the National Institute of Industrial Property (INPI) for Brazilian patent deposits, as well as the Orbit Intelligence database was used for the deposits of international patents.

Then, interviews were conducted with the managers of the Brazilian FAPs, from March to June 2021, through emails and/or messaging application, in order to improve the data in this research, as they are trained professionals who has knowledge about the subject, and can thus contribute significantly to the work. In the same period, public agents from the three national development agencies, CAPES, CNPq and FINEP, were also interviewed.

4. Analysis and discussion of results

4.1 Analysis of Results

The Research Support Foundations (FAPs) is a specific category of foundation in the States of the Federation, they are agencies that provide financial resources for the promotion of research projects and scholarships aimed at the development of Science, Technology and Innovation in the various areas of knowledge , aiming at socioeconomic development, promoting the well-being of the population. There are currently 26 FAPs across the country (EDUCABRASIL, 2021).

The first FAP in Brazil was the Foundation for Research Support of the State of São Paulo (FAPESP), founded in 1962. Since then, other Brazilian states began to structure their own foundations, based on the FAPESP model. In 1964, the state of Rio Grande do Sul founded the Foundation for Research Support of the State of Rio Grande do Sul (FAPERGERS). In 1980, the state of Rio de Janeiro founded the Foundation for Research Support of the State of Rio de Janeiro (FAPERJ). In 1985, the state of Minas Gerais created the Foundation for Research Support of the State of Minas Gerais (FAPEMIG). Outside the South-Southeast axis, the state of Pernambuco created in 1989, the Foundation for the Support of Science and Technology of the State of Pernambuco (FACEPE). But it was during the 1990s that the country began to see the growth of FAPs in the rest of the states (EDUCABRASIL, 2021).

Table 1 highlights the chronology of the Research Support Foundations in Brazil, with the Research Support Foundation of the State of São Paulo standing out as the pioneer, followed by the Research Support Foundation of the State of Rio Grande do Sul (FAPERGERS). And the Foundation for Research Support

of the State of Tocantins (FAPT), Foundation for Research Support of the State of Rondônia (FAPERO) and the Foundation for Research Support of the State of Acre (FAPAC), respectively in 2011, 2011 and 2012, and the foundation of Acre is the most recent, not having been in existence for ten years.

Table 1: Chronology of Research Support Foundations (FAPs)

Foundation	Federation Unity	Year
FAPESP	São Paulo	1962
FAPERGS	Rio Grande do Sul	1964
FAPERJ	Rio de Janeiro	1980
FAPEMIG	Minas Gerais	1985
FACEPE	Pernambuco	1989
FAPEAL	Alagoas	1990
FUNCAP	Ceará	1990
FAPESQ	Paraíba	1992
FAPDF	Distrito Federal	1992
FAPEPI	Piauí	1993
FAPEMAT	Mato Grosso	1994
FAPESC	Santa Catarina	1997
FUNDECT	Mato Grosso do Sul	1998
Fundação Araucária	Paraná	1998
FAPITEC	Sergipe	1999
FAPESB	Bahia	2001
FAPEAM	Amazonas	2002
FAPEMA	Maranhão	2003
FAPERN	Rio Grande do Norte	2003
FAPES	Espírito Santo	2004
FAPEG	Goiás	2005
FAPESPA	Pará	2007
FAPEAP	Amapá	2009
FAPT	Tocantins	2011
FAPERO	Rondônia	2011
FAPAC	Acre	2012

Source: CONFAP (2021)

With regard to joint ownership of Research Support Foundations (FAPs) in patent filings, developed by researchers in projects supported by them, as a rule there is no obligation to participate. FAPEMIG is the only one that requires participation, as described in Document No. 72 of August 13, 2013.

The other Foundations do not have this obligation to participate. However, FAPESP, despite not being included in its Intellectual Property Policy through Ordinance PR nº. 60, of April 20, 2021, in some specific notices it even includes ownership interest. In a search in the patent database of the National Institute of Industrial Property (INPI), twelve (12) FAPs were found that have patent registrations with co-ownership, in the period from 1982 to 2021, as shown in Table 2.

Table 2: Patent Filing Records of FAPs

UF	FAP	No. of Deposits
MG	FAPEMIG	522
SP	FAPESP	275
PR	ARAUCÁRIA	12
RJ	FAPERJ	8
ES	FAPES	5
MT	FAPEMAT	4
GO	FAPEG	3
MA	FAPEMA	2
RS	FAPERGS	2
CE	FUNCAP	1
MS	FUNDECT	1
PE	FACEPE	1

Source: INPI (2021)

It is observed that FAPEMIG continues to hold five hundred and twenty-two (522) patents, followed by FAPESP with two hundred and seventy-five (275) patents and, in third, the Araucária Foundation of the state of Paraná with twelve (12) deposits. The FAPERJ, FAPES, FAPEMAT, FAPEG, FAPERGS, FUNCAP, FUNDECT and FACEPE came to appear as holders of a small amount.

Within the scope of the National Science and Technology System, Brazil has three (03) research development agencies, the first two created in 1951 the National Council for Scientific and Technological Development (CNPq) and the Coordination for the Improvement of Higher Education Personnel (CAPES). The third agency was created in 1967 and is classified as the Financier of Studies and Projects (FINEP). Also, using the same patent database as the National Institute of Industrial Property (INPI), the participation of federal development agencies was researched, with the objective of verifying their participation in patent filings, in the period from 1980 to 2020, as shown in Table 3.

Table 3: Patent Filing Records of Federal Agencies

Parents	Federal Agency	No. of Deposits
BR	CNPq	127
BR	FINEP	27
BR	CAPES	0

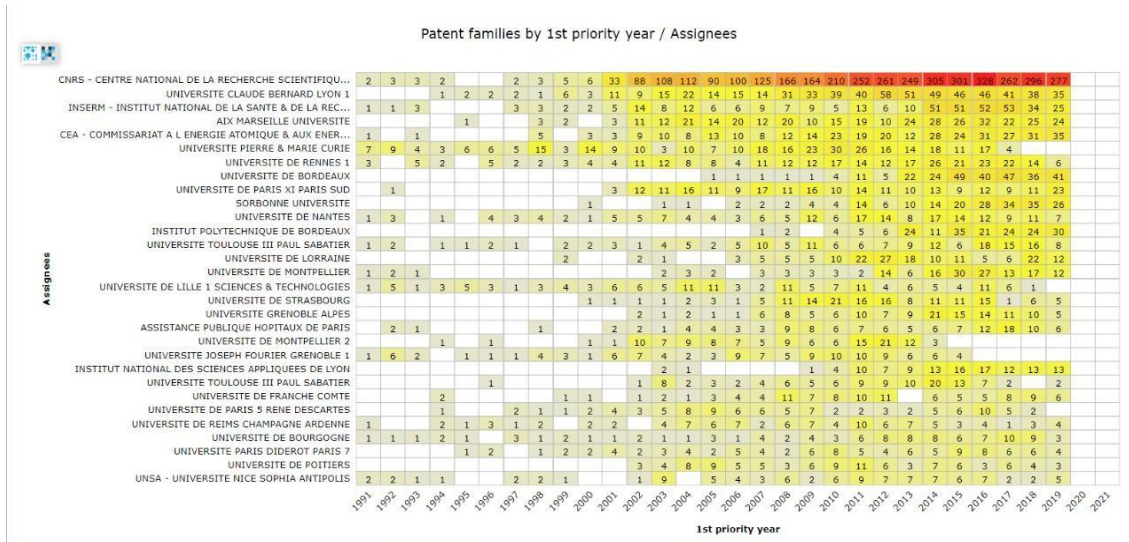
Source: INPI (2021)

Although the three federal agencies do not require co-ownership, one hundred and twenty-seven (127) patent deposits with co-ownership of CNPq and twenty-seven (27) patent deposits with co-ownership of FINEP were found, however no deposit was found in name of CAPES.

In the international sphere, four (04) renowned agencies from different countries were analyzed: in the United States of America, the National Science Foundation (NSF), in the United Kingdom the United Kingdom Research and Innovation (UKRI), in France the Center National de la Recherche Scientifique (CNRS) and in Germany the Deutsche Forschungsgemeinschaft (DFG).

The Orbit Intelligence database was used, which performs searches in several international patent databases, the participations of four (04) international development agencies were researched, with the objective of verifying their participation in patent deposits, in the period from 1991 to 2021, as shown in Figure 1.

Figure 1: Patent Filing Records of International Agencies



Source: Orbit Intelligence (2021)

In Table 4, it is possible to notice that among the four (04) countries, France is the only one in which there is a concentration of joint ownership in a central development agency. And this is explainable since the Intellectual Property Policy in France makes this kind of requirement. In the other countries surveyed, there is no obligation to participate in co-ownership of patent deposits. Still, it is possible to identify that the Center National de la Recherche Scientifique (CNRS) has the highest number, with thirteen thousand eight hundred and fifty-five (13855), however the Deutsche Forschungsgemeinschaft had the lowest number, with only eight (08).

Table 4: Comparative of Patent Filing Records of International Agencies

País	Agência Federal	Nº de Depósitos
FRA	Centre National de la Recherche Scientifique (CNRS)	13.855
USA	National Science Foundation (NSF)	57
GER	Deutsche Forschungsgemeinschaft (DFG)	8
UK	United Kingdon Research and Innovation (UKRI)	0

Source: Orbit Intelligence (2021)

4.2 Advantages and Disadvantages of co-ownership

According to the interviewees, it was emphasized that intellectual property is considered a driving force in a globalized economy, as it gives its creators and developers the right to recognition and exclusive exploitation of their inventions. Regarding the joint ownership participation of Research Support Foundations (FAPs) in Brazil, there is a great deal of discussion about the relevance or not of their participation. In interviews with some Foundation managers, the arguments for participation or not show on one side those who defend advantages and on the other side those who see disadvantages.

The Minas Gerais Research Support Foundation (FAPEMIG) has in its Intellectual Property Policy, the obligation to participate with well-defined rules. In an article published on the FAPEMIG website, the head of the Department of Intellectual Protection and Technology Transfer at FAPEMIG, Cynthia Mendonça Barbosa, states that the Foundation, as co-owner of intellectual property, involves important aspects: the first is that it allows society to demonstrate directly, a portion of what is being developed in terms of products and processes with the resources promoted by FAPEMIG in favor of Science, Technology and Innovation. “Any citizen, for example, can access INPI's patent database and search for the Foundation, where it is possible to find all technologies (products and processes) deposited in the name of FAPEMIG”, explains Cynthia.

The second aspect concerns the power of exchange acquired by FAPEMIG. As the co-owner of a product or process protected by patents, the Foundation will be able to use it whenever necessary, in favor of the State and, consequently, of society, generating fair and egalitarian negotiations.

The third aspect pointed out as an advantage is “As the product - or process - is commercially exploited by companies, for example, through technology licensing, a percentage of the economic gains arising from this exploitation are received by the holders of intellectual property. In the case of Fapemig, the economic gains received may be reinvested in new research, moving the system to generate knowledge, new products, processes and innovative services within the State”.

But there are those who think otherwise, in an interview with the Director of Technology at the Research Support Foundation of Rio de Janeiro - FAPERJ, Maurício de Vasconcellos Guedes Pereira, said the new Intellectual Property Policy is in the elaboration phase and the same points out three arguments contrary to the participation of FAPs in joint ownership.

The first point is that a decision of this nature must be based on the Foundation's mission, in the vast majority of cases it becomes an obstacle to innovation, because the patent, even though it is partially an asset of the State, makes the entire licensing process much more complex, many FAPs would not have adequate mechanisms to carry out a licensing process without going through a bidding process in the higher-priced models, which makes the transfer of this technology unfeasible, and therefore hinders the promotion of innovation.

The second point is the question of reasonableness and fairness in values, when a financial return is required, this return is an “X” percentage on a basis that is not well defined. In the case of FAPERJ, this writing of 1% on the economic result earned is very common. For example, a project that achieves an economic result has many sources of funding, and if each one of them requires a percentage, that would be a problem.

The third point would have to have an auditable mechanism, if the FAP adopts a percentage on a basis that is not clear what it is, at the time of a charge there may be a great discussion and litigation between the agency and the grantee. Even if both reach an agreement, it may be that the State's control bodies implicate with this agreement and say that the wrong basis was used, so there is a question of legal uncertainty.

At FAPESP, however, according to Patrícia Pereira Tedeschi, the innovation research manager, summarized what is described in FAPESP's Intellectual Property Policy, which “may be co-owner in cases where the institution does not have a Technological Innovation Nucleus (NIT) qualified by FAPESP. Even in these cases, FAPESP will assess the convenience and opportunity of co-ownership. An NIT can be qualified by FAPESP when it has the minimum conditions to deal with the intellectual property resulting from FAPESP projects. Currently, the main universities in the State of São Paulo have Qualified NIT. Co-ownership hampers the administration process and eventual negotiations of intellectual property. Therefore, FAPESP is a joint holder only in exceptional situations.”

5. Conclusion

The Brazilian FAPs have independent programs to encourage innovation in companies according to the characteristics of each state, this power of capillarity differentiates them from National and International Agencies, as the programs meet the characteristics of each region.

It was verified regarding the participation in the co-ownership of intellectual property, as the Research Support Foundations, comparing national and international agencies manage intellectual property and in this sense it was noticed that according to the websites and interviewees, there are advantages and disadvantages in certain aspects, and as a rule, almost all of the FAPs do not have a mandatory participation in their intellectual property policy, with the exception of FAPEMIG.

According to research in national and international databases, it was noticed that in Brazil, the records found in the INPI of patent deposits have the highest quantity in FAPEMIG, with five hundred and twenty-two deposits (522). While at the national level, despite no federal agency having co-ownership mandatory, the CNPq stood out with the number of one hundred and twenty-seven (127) patent deposits, according to FINEP with twenty-seven (27) of the patents. patents, while CAPES did not file any filing. As for patent deposits found through the Orbit Intelligence database, the international agency that stood out with the largest amount of deposits was the Center National de La Recherche Scientique, from France, with a quantity of thirteen thousand eight hundred and fifty-five (13,855), which confirms the obligation provided for in that country's Intellectual Property Policy.

It is concluded that regarding the advantages and disadvantages of the participation of Research Support Foundations with regard to the mandatory nature of intellectual property, there are managers who argue that the right to participate in supposed future negotiations is used by public resources, but there are also managers who they claim disadvantages due to difficulties in the administration process and legal uncertainty.

For the development of future research, it is suggested to evaluate the perception of users regarding the effectiveness of co-ownership of Intellectual Property, through questionnaires the FAP's.

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