Intellectual property challenges for the roads of innovation in Brazil

Cleiton Rodrigues de Vasconcelos
Production Engineering, Universidade Federal de Sergipe Centro de Ciencias Exatas e Tecnologia, Sao Cristovao, Sergipe, Brazil and Postgraduate Program in Intellectual Property Science, Universidade Federal de Sergipe, Sao Cristovao, Sergipe, Brazil, and

Daniel Pereira da Silva
Production Engineering, Universidade Federal de Sergipe Centro de Ciencias Exatas e Tecnologia, Sao Cristovao, Sergipe, Brazil and Professor of the Post-Graduate Program in Science Intellectual Property, Universidade Federal de Sergipe, Sao Cristovao, Sergipe, Brazil

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Abstract

Purpose – This paper aims to present reflections and points of interest on the performance of Brazil and highlight the advances and challenges in relation to the intellectual property (IP) system; the authors highlight some scientific, economic and technological indicators on the main IP objects registered in the National Industrial Property of Brazil (INPI).

Design/methodology/approach – A structured literature reviews the main indicators of IP of Brazil (2013-2017), related to the scientific and economic factors more evidenced in the global scenario, with emphasis on the investment of national GDP in R&D activities, the allocation of resources from the government sector and private initiative, as in other emerging economies, such as the BRICS.

Findings – Despite Brazil's progressive efforts to achieve greater efficiency in the public IP management system, GDP investment in R&D activities for 2019 is still below the OECD average of 2.3 per cent, and the IP indicators in the areas of patent registration, industrial designs and technology contracts have been declining.

Research limitations/implications – Because of the difference between the laws of the countries on IP rights, the more incisive comparison could not be established among the emerging economies, highlighting the need for a standardization between the different international legislations.

Originality/value – In the scientific field, this paper allows understanding the performance of the Brazilian IP system, and the categories that require greater investments, strengthen the IP culture and stimulate integration between the international IP systems, as it is a recurrent discussion in different research studies. Originally, the paper brought together economic and scientific indicators going beyond the traditional approach that deals with IP only restricting to the quantitative of patents.

Keywords Indicators, Intellectual property management, Performance Brazil

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1. Introduction

In recent years, Brazil has developed some actions to achieve greater efficiency in the public IP management system, but are we on the right track? The recent priority measures to strengthen and expand T&I policies, such as investments in infrastructure, expansion of education and research networks, partnership between public and private agents, and international cooperation (Brasil, 2016) have stimulated strategic areas; however, the assessments of the impacts of these incentives still presents a major challenge for national governments (Matias-Pereira, 2011).

Intellectual property (IP) today is responsible for most of the value generated by modern companies, especially in the most dynamic segments, those referring to products differentiated by brands and other distinctions, design and technological or author content [Instituto Nacional de Propriedade Industrial (INPI), 2009]. With the companies' internationalization, market strategies increasingly require the insertion of new technologies in their products and processes, making patents an important factor among the different industrial segments, having a positive impact on the process of economic growth and technological progress of the countries in the international world trade (Cavalheiro, Joia, & Veenstra, 2016).

The protection of IP presents itself as a crucial area to support the development process of any country, as it is in this context that the greatest strategic disputes are taking place: the domain of proprietary technology and information, responsible for the generation of royalties, the exploitation of patents and trademarks, the reproduction of artistic and literary works, and also for the protection of the genetic patrimony (Matias-Pereira, 2011).

With the objective of presenting reflections and points of interest on the performance of Brazil and highlighting the advances and challenges in relation to the IP system, in this Pensata we highlight some scientific, economic and technological indicators on the main IP objects registered in the national Industrial Property of Brazil (INPI) from 2013 to 2017, in the areas of patents, trademarks, industrial design, computer program, circuit topography, technology contracts and geographical indication.

2. Impacts of innovation on the development processes

The impact of innovation (whether direct or indirect) as a prime factor on the economic prosperity of nations was already of nations was pointed out by some classic scholars, such as Dosi (2000), Pavitt (1984), Romer (1986, 1987, 1990, 1992), Schumpeter (1982, 1984) and Solow (1994) when, in the second half of the 1980s, the authors proposed a new approach to economic theory about development, incorporating technological innovation, i.e. the production of ideas, as the main driver for growth. Later on Doppelhofer, Miller, and Sala-I-Martin (2000), Garelli (2006) and Porter (1990) presented the concepts of innovation as a factor of competitiveness that include the generation of new market opportunities and jobs, public incentives, technological infrastructure that are considered factors that determine the level of productivity of the country.

The plurality of technological innovations associated with the end of World War II (1939-1945) led to the development of new knowledge and the economic openness of Brazil in a globalized world. The impacts on local firms led them to restructure their market strategies, investments in teaching and research, and international cooperation, making technology a prime factor in quantifying the competitive advantages of business (Cavalheiro et al., 2016).

As the investment in research and development (R&D) increases, patents have become a major factor in calculating the private rate of return on investment and a distinctive factor in brand protection, counterfeiting, and piracy. Thus, the guarantees granted through IP rights gained a great strategic importance among the various industrial segments, having a positive impact on the process of economic growth and technological progress of countries in the international trade (de Vasconcelos & da Silva, 2018).

At some point, incentives for new inventions will be offset by the costs of monopoly over existing technologies and the complexity of the invention, such as the case of the pharmaceutical and chemical industry. Not to mention that consumers will have greater confidence in acquiring products and services with widely recognized records, such as patents and industrial secrets. (Deardorff, 1992; Donoso, 2017; Hudson & Minea, 2013).

The creation of the Nucleus of Technological Innovation (NTI) in 1980 constitutes the Brazilian government's framework for stimulating the interaction between universities and companies. It was only after the introduction of the Innovation Law (Law no. 10,973/2004), however, that the first Nucleus of Technological Innovation (known in Brazil as NIT) and Scientific and Technological Institutions (known in Brazil as ICT), strengthened scientific and technological research and consolidated creations in broader fields of knowledge, promoting the culture of IP (Lotufo, 2009; Torkomian, 2009).

In this sense, the management of public policies for the protection of IP presents itself as an important instrument to support the country's economic growth with direct impacts on society. On the other hand, when there are deficiencies in the management of policies in the area of IP protection, their effects tend to affect companies' competitiveness (Matias-Pereira, 2011).

According to the United Nations Educational, Scientific and Cultural Organization, the national development strategies must make better use of the power of science in strategic areas, especially those focused on energy, aerospace, health, water crisis, public security, national defence and the Amazon. However, the recent global economic crisis has particularly affected investments in R&D, leading both private companies and public agents to withdraw their financial contributions distancing Brazil from the most dynamic economies such as Korea, Japan, Germany, USA, France, China, Canada, Portugal and Spain [MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÃO (MCTI), 2016; United Nations Educational, Scientific and Cultural Organization (UNESCO), 2015].

The goal of investing 2 per cent of the GDP in R&D in 2019 would lead Brazil to an investment level closer to the OECD average of 2.3 per cent. However, when adding public and private investments in R&D, it does not exceed 1.8 per cent of the GDP, indicating the Brazilian economic instability and precarious signs of recovery when considering the country's history. However, from 2004 to 2012, Brazil recorded the highest GDP investment rates in R&D activities [Organisation for Economic Co-operation and Development (OECD), 2014; UNESCO, 2015].

Some researches (Brüggemann, Crosetto, Meub, & Bizer, 2016; Forero-Pineda, 2006; Tanaka & Iwaisako, 2014) emphasize that IPRs have dynamic and static effects depending on the degree of the development of countries. Dynamic effects arise from the promotion of innovation, resulting in products of superior quality over time, providing well-being to consumers. On the other hand, static effects can be reflected in the strength of IPR protection, reducing the frequency of innovation of firms (especially for sectors characterized by a strong frequency in innovation processes) through the monopolistic effects of patents, affecting consumer's welfare through the payment of fees and licenses, which are more noticeable in developing countries.

Forero-Pineda (2006) stresses that developed countries have exerted influence on developing countries towards a stronger position in IP issues, covering both legislation and enforcement, thereby reducing the counterfeiting of firms with low technological capacity. Cavalheiro et al. (2016) and Jandhyala (2015) analyze how global and local pressures can influence the performance of IP policies and even protect domestic producers from external competition.

There are progressive efforts in Brazil to achieve greater efficiency in the public IP management system, which recently has led to the restructuring of research activities, which can be seen in the following examples: growth of mergers and the size of organizations; improved coordination between research units and the introduction of

managerial approaches in universities in order to strengthen the autonomy; accountability and business-inspired operational models (INPI, 2016).

Considering its expressiveness for the development of economies, studies on the evaluation of IP in a broader concept are gaining more and more expressivity, aiming for greater dynamicity and increasing the adhesion of countries.

To the extent that Science Technology and Innovation (ST&I) policies are in the hands of the public sector, it is noticeable that many demands, as a result of the interaction among global markets, cannot be fully satisfied, not to mention that the formulation of the development of policies commonly finds resistance and conflicts of interest.

3. Overview of intellectual property in Brazil and its perspectives

The World Intellectual Property Organization (WIPO) defines IP as the results of the individual's inventive capacity, enabling recognition or reward for creativity and human effort in accordance with legal norms and standards. The WIPO together with the offices in each country and in line with international agreements (ONU, TRIPS, OMC, OECD) regulate the objects subject to protection and the economic-commercial conflicts arising from such guarantees [Cavalheiro et al., 2016; INPI, 2017; World Intellectual Property Organization (WIPO), 2018].

The National Institute of Industrial Property (in Portuguese, Instituto Nacional de Propriedade Industrial -INPI) is the Brazilian government institution responsible for the improvement, dissemination and management of the Brazilian system of granting and guaranteeing IP rights for the industry.

In accordance with the Brazilian law, the various IP objects may be classified in three broader areas: Industrial Property (which includes patents, trademark, industrial design, industrial secret, and geographical indications), Copyright (which includes literary, artistic and scientific works, related rights, computer programs), and Protection "Sui Generis" (cultivars, traditional knowledge and topography of circuits), where, for each request, the IP right in Brazil grants different deadlines depending on the characteristics of the objects.

INPI's operations in Brazil until the end of 2018 registered only 12 regional offices in effective operation, some of which were recently closed in some regions of the country, especially those with low IP records, reflecting the quality of the services offered by agencies and their representation offices (Matias-Pereira, 2011). This situation reflects the backlog of patents and other device registrations due to the low number of examiners, and the complexity of some patent applications, possibly in new areas (digital TV technology, 3D printing, graphical interface for industrial design, genetic material, nanotechnology), which require greater knowledge and require more time for analysis (de Vasconcelos & da Silva, 2018).

Among the types of IP registrable objects, in Brazil brand services (12.2 per cent), computer programs (11 per cent) and geographical indications (40 per cent) had a positive percentage variation in the period from 2013 to 2017. During the same period, patent registrations that were registering a growth in 2015, in 2016 and 2017, had a significant reduction, accumulating a retraction of -16 per cent (2013-2017). Among the countries that had the most patents registrations issued by INPI, we highlight the USA, Germany, Japan, Sweden, France and Italy (INPI, 2017).

Public policies to encourage IP culture, according to UNESCO, have not yet shown satisfactory results when compared to other countries, because the precarious basic education, the degree of innovation of companies, excessive bureaucracy between companies and ICT, and disconnected research from social demands, have direct repercussions on the culture of IP (Jandhyala, 2015; Jungmann and Bonetti, 2010; Matias-Pereira, 2011; UNESCO, 2015;).

The analysis of a country's IP indicators should not only consider high patent volumes (as these do not reflect the differences in each country's legislation), but consider the

complexity of each innovation, bureaucratization and sanctions in regulatory requirements, scientific and/or commercial cooperation, volume of publications in relevant journals in the international scenario (highlighting the fields of research with greater representativeness) to understand the efforts of RD&I (Alcácer, Beukel, & Cassiman, 2017; Donoso, 2017; Papageorgiadis, Alexiou, & Nellis, 2016).

Some important differences between countries may lead to misunderstandings about innovative capacity. Foreign firms, for instance, may request protection for their products and services in a large market, while innovation occurs elsewhere, such as in the USA, where 50 per cent of orders of patents issued by the USPTO did not come from American candidates, denoting that in the US applications come from foreign companies and inventors interested in manufacturing or selling their products. In countries like Turkey, France, Japan, China and South Korea most patent applications were presented by the residents themselves (Alcácer et al., 2017; United States Patent and Trademark Office (USPTO), 2015).

In recent years, government policies have been striving to bring to the federal state's responsibility the economic growth in priority areas, such as Science, Technology and Innovation (ST&I), contributing to a stronger alliance with the private sector, less generic and more specific, rather than investing across the business community (such as the targeted support for technology-based startups and spin-offs). As an example we can highlight some recent incentives in competitive areas, such as aeronautics, oil and gas, and renewable energy (INPI, 2016; UNESCO, 2015).

The IP culture promotion is polarized in several parameters that involve not only the academic background, but also the closer relationship between the business community and the know-how of Brazilian universities, aiming to create larger cooperation environments, alliances, licenses and technologies, as we can widely see from several examples of successful economic policies implemented in Europeans countries, as Germany, Austria, Switzerland, United Kingdom and France, among others. Historically, Brazil has no tradition in promoting R&D (Forero-Pineda, 2006; Stal & Fujino, 2016).

4. Final considerations

Considering their expressiveness for the development of economies, studies on the effects of IP on a broader concept are gaining more and more expressiveness in view of their impact on the countries covered by these guarantees.

In recent years, Brazil has been undertaking some actions in favor of Science, Technology and Innovation (CT&I), stimulating partnerships between public and private initiatives in order to promote research on social demands. Such actions are focused on priority patent examination programs (Patents Greens, Patents for health products, Biodiversity Law, patents for Small and Medium Enterprises - SME, among others) with the purpose of correcting some deficits in the fields related to IP.

By analyzing GDP investments in R&D activities, it was found that the contribution of public resources (1.24 per cent), although more significant than the private sector (0.52 per cent), constitutes a challenge to the OECD's goal for 2019 (2.3 per cent). This situation emphasized by the historical deficiency in conducting R&D activities, since the economic policy of 1950, which did not favor the technological qualification of Brazilian companies in their products and processes, on the contrary, stimulated local companies to specialize in primary sectors and multinationals in high-technology activities.

Another factor associated with the low technological potential of companies is related to the lack of technical qualification, evidencing the precarious technological and development

capacity to deliver innovation. Whereas in developed countries, up to 80 per cent of researchers are working in the private sector; the 20 per cent left are working in universities.

The lack of bureaucracy in the knowledge exchange, technologies and knowledge between companies and ICTs, or the institutionalization of partnerships, is a consensus in much of the literature, which supports the efficient cooperation between universities and companies in order to strengthen the national productive system and increase the degree of innovation and the culture of IP, since it is possible for an individual or company to appropriate the technical content of a scientific publication and transform it into a patentable industrial product or process without having to pay royalties for it.

According to the research, it is important that the population in general obtains knowledge about the potential of IP in order to avoid that projects with possibilities of commercial application are unduly published in scientific circles without any previous strategy of future exploration. Thus, the protection of IP rights contributes to the enrichment of society's technological heritage by promoting formal jobs, reducing counterfeit and pirate products that endanger the health and safety of consumers around the world.

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Corresponding author
Cleiton Rodrigues de Vasconcelos can be contacted at: cleitongv@yahoo.com.br

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