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Why Brazil does not innovate: a comparison among nations

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Abstract

In this paper, we analyze the relevance of innovation concerning the emergence of important changes in the society. In order to verify which are the most relevant factors when it comes to the allocation of countries in an innovation ranking (Global Innovation Index), we accomplished a quantitative study, in which the procedure of multiple linear regression was used. The sample of our study comprised 33 countries and the analysis of the theoretical framework was carried out conducive to the creation of six independent variables. As a result, the variables "GDP per capita", "Public expenditures on R&D", "Exports of high-tech goods", "Public expenditures on education", "Number of large companies" and "Number of patents" are in descending order the ones most related to the innovation level reached by some countries. The only variable negatively correlated to innovation is the number of patents registered in a determined country; in other words, one may conclude that patents are not the most relevant indicator linked with the development of innovation. We also emphasize the role played by the government when providing a favorable institutional environment in order to encourage and support innovation.

Keywords: Innovation; Countries Brazil; Governments; Global Innovation Index

Introduction

When analyzing the historical events that took place in past centuries, one can notice that the revolutions that occurred in humanity were predominantly followed – or preceded – by changes and, consequently, by improvements in the way to manufacture new products, to process activities and to administrate them. These changes arose, therefore, due to technological advances, whose emergence caused transformations capable of changing the livelihoods of the population, who started not only to adapt to the new technological paradigm, but also to demand for new products and services that could provide improvements in the life quality.

It is not hard to mention examples related to such technological changes. When thinking about, for instance, the emergence of telephony and electricity and the revolution regarding mass production, one can deduce that such events were responsible for the social and economic transformations that marked the society in several moments – from the discovery of penicillin as a powerful antibiotic in the beginning of the last century to the technology used in war artilleries during the two world wars.

It is known, however, that the discoveries made by isolated inventors, e.g. Graham Bell in telephony and the Wright Brothers in aviation, do not happen presently in the same way. Due to the complexity that technology has reached over the past years, innovative projects start being developed and structured by specific teams focused on the development of new products, services and business models. The appreciation attached to the figure of the inventor no longer exists in the current society – there are no strong evidences of inventors that, alone, create technologies that lead to breakthrough innovations.

In the same way that inventors were subject to innovative ideas in the past that became the starting point for original discoveries, current innovators are subject to (and/or aligned with) companies, which have the capacity to supply all the necessary facilities to stimulate the development of innovation. Such facilities involve the provision of proper infrastructure, research laboratories and development centers, while providing

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the necessary financial support, which is indispensable to finance the development of projects.

There are certainly internal factors within a company that may facilitate or hinder the emergence of innovation. A culture for innovation, for example, is considered nowadays an essential factor to foster innovation in companies – without such culture of innovation and technology development, a company may turn into a business that only imitates technologies developed by its competitors; that way, it tends to remain in the market only to survive, not to compete and prosper. As mentioned earlier, the establishment of a proper infrastructure and management to spread technology is the key factor to develop innovation within a company.

It is, however, common to forget that there are external factors that can also boost and/or hinder the emergence of innovation. Such factors can be attributed to specific institutional characteristics of the countries in which innovative companies originate from. These characteristics can be identified by incentives for innovation (e.g. tax incentives) and also by public expenditures on Research & Development (R&D), which is an aspect strongly related to innovation.

We intend to, therefore, point out in this study, based on comparative observations, the main differences there are between Brazil, not a very innovative country according to international rankings that allocate nations according to the different levels of innovation, and other countries. Through the selection of variables related to innovation, we intend to demonstrate herein which are the factors that influence innovation more significantly and which of them demand for more investments in order to boost technology and innovation.

Research issue and objectives

As mentioned earlier, several authors (Davila, Epstein, & Shelton, 2007; Dyer, Gregersen, & Christensen, 2012; Kelley & Littman, 2007; Maital & Seshadri, 2013; Midgley, 2009), when exploring the universe designed by and for innovation, tend to emphasize internal issues – within the company – related to innovation, neglecting many times the strong external influence, which seems to be at times more relevant than internal issues. We believe, therefore, that external factors related to national policies, economic development and incentive to innovation deserve some attention. That way, we will not deal with issues regarding companies, nor within companies, because we consider that external issues can be the main drivers for the development of innovation in countries.

When talking only about Brazil, it is possible to find information that justify the delay (and/or the lack) of innovation. There is in the country no effective industrial policy that boosts the development of national technologies. In fact, import substitution policies implemented during the military regime were not as successful as the ones in East Asian countries. In Brazil, there was no policy preserving the development of proper human resources to continue the technological and scientific progress. Besides, the end of the market reserve did not provide a proper time period so that Brazilian entrepreneurs could adapt to the new market conditions.

When analyzing indexes provided by the World Bank[1] and OECD,[2] one realizes that Brazil is in a worse position than other developed countries when analyzing data related to the number of patents and scientific publication and the number of students graduated in sciences, technology and engineering. We discuss, however, the relevance of such aspects for the development of innovation, as well as the most relevant ones to predict the level of innovation of countries.

The Brazilian technological delay does not seem to be isolated in Latin America; the delay of Latin American countries occurs due to geographic and microeconomic aspects (Feldmann, 2009). It is important to emphasize the need to make comparisons between countries to evaluate the performance regarding innovation; when compared to other Latin American countries, Brazil has a superior performance in terms of public expenditures on R&D.[3] The country invests 1.16% of its GDP in activities related to research and development; Argentine invests 0.62%; Mexico, 0.46%, Chile, 0.42%; and Uruguay, 0.40%. Not by chance, in the ranking published by the Financial Times,[4] from the 500 largest companies in the world, only three Latin American countries are represented: Brazil, Chile and Mexico. When comparing Brazil and the United States, for example, the investment of the USA in R&D is 41.9% larger than the investments in Brazil.

Some findings justify the delay of Latin America in technological and innovation areas that go beyond the investment of GDP on R&D. The companies of these countries are not very active in high-tech sectors, the governments do not foster a proper institutional environment for the emergence of innovation and there is still a predominance of imported technologies, which limits the articulation between scientific and technology activities in Latin American regions. Another circumstance that justifies the delay and underdevelopment of technology is the abundance of natural resources aligned with cheap workforce (Feldmann, 2009). The focus on natural resources becomes very clear when analyzing the most internationalized Brazilian companies; from the ten largest multinationals, four of them are directly related to the exploitation of natural resources (FDC, 2013).[5]

It is also important to mention the absence of effective support to small- and medium-sized Brazilian companies; regular expenditures on R&D are feasible only in large companies due to the lack of government incentives directed to smaller companies (Prochnik & Araújo, 2005). Even though there is one specific legislation in Brazil that aims to promote tax incentives to innovative companies (Law 11.196/05), such incentives only approach joint-stock companies – in other words, large companies that are usually subsidiaries of large multinational corporations. Such law also presents a certain contradiction regarding the normative ruling that forbids the outsourcing of

[1] http://data.worldbank.org/indicator
[2] http://stats.oecd.org/
[3] http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS
[4] http://www.ft.com/intl/indepth/ft500
[5] http://www.fdc.org.br/imprensa/Paginas/noticia.aspx?noticia=19