Innovation as Force for Economic Development

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The fierce business competition overcomes the inertia of obsolescence of organizations, leading them to a constant search for improvement and cost reduction in their processes to offer products and services differentiated from the competition, with the use of business strategies based on technological innovation. In this way, innovation is one of the strategies most pursued by companies that understand that through the gain of market share, they achieve better financial results for themselves and contribute directly to the economic development of the nation. In this search for overcoming its position in the ranking in which they operate, companies, through the emphasis given to innovation applied to the Industry 4.0, appropriate more skilled labor, either to obtain resources for their productive machine to function, or to bring the best ideas to the market, and thus achieve higher levels in the competition. In this way, results show that it is possible to infer that, by demanding the levels of qualification of the individuals for higher skill levels, innovation contributes to increase the rates of employability and, consequently, to become one of the driving forces of economic development.

Keywords: competition, technological innovation, strategies, economic development, capacity

Introduction

Business competition stimulates the movement of market forces, boosting companies in search of better positions in their rankings. This competition is good for the market in general, therefore, consumers favor this dispute for greater participation in a certain industry. To reach this goal, the company must stand out from the competition and thus, investment in innovation can be one of the best strategies adopted. With the application of innovation in products, services, and/or processes, new technologies are shipped bringing improvement in what is offered to the public. However, in the search for overlapping competition, it is necessary to consider the exogenous forces that come from the market, as well as the endogenous ones, present within its own scope and with vision in its trajectory, size, and organizational strategies. Therefore, when the focus of the company is on innovation, it is necessary to have a convergence with organizational strategies, so that the theme becomes a slogan in all plans and actions.

In considering all this market dispute, it is understood that innovation is one of the prime factors of generation of economic development and that, therefore, should be part of the public policy agendas for economic development. Another relevant factor in this analysis is the understanding that innovation promotes the dispute in the company as an economic force, and for individuals who work in innovative organizations. It is possible, therefore, to infer that innovation demands more qualified and qualified professionals to develop

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novelties that will be absorbed by the market, and to act in the application and development of innovation. However, the stimulus to innovation practices must be given by the State, which in its regulatory role needs to create and implement public policies to encourage the theme through the creation of laws that favor the issue at hand.

This article addresses these proposed themes and presents results of research conducted by government bodies and researchers on innovation and the empowerment of individuals in industry, and demonstrates the growth of levels of employability in recent years, without intending to somehow affirm that this growth occurred due to the innovation, but making an inference in which it is possible to show this possibility, including pointing out that public policies to stimulate innovation can be part of the agenda of the government to increase economic development.

In the first item will be presented a discussion about the business competitiveness of innovation as a strategic differential. The next item will address how innovation promotes technological advances and the contribution to economic development. In the third item will be addressed the issue of public policies and strategic actions of innovation and their influence on the specialization of individuals. Finally, the last item will address the empowerment of individuals through the demand created by the development of technological innovation. Although favorable results show that Brazil is still immature in matters related to the agenda, however, with specific and specific actions, in addition to public policies, it is possible to envisage a scenario of great changes.

**Business Competitiveness Advised of Innovation**

The Brazilian business scenario has been similar to international standards of competitiveness. The opening of frontiers for negotiations has greatly expanded the ability of companies to enter and operate in previously untapped markets, allowing a range of new products and services to reach consumers faster and faster.

It is the response time that an economic agent takes to introduce the result of its productive process in this constantly changing market, that will dictate its degree of competitiveness with respect to the competition. However, the great challenge lies precisely in becoming competitive in a scenario in which many other economic agents have the same thinking and conduct, and therefore, it is observed that differentiation is one of the essential factors to lead.

According to Porter (2009), differentiation is a strategy of action, affirming that there are three generic strategies that organizations can adopt in the search for competitiveness, being: differentiation, cost leadership, and niche. The author affirms that a certain company, for the same product, can act with more than one strategy, nevertheless, it is only possible to lead in one of them, indicating that one of them will stand out in relation to the others allowing the leadership in the market in which inserts.

However, Pisano and Teece (1998), Dodgson (2000), Barney (2002), and Tidd, Bessant, and Pavitt (2008) also dealt with the organization’s resources in the Theory of Firm Growth, the subject with mastery, noting that all the resources present in the company is fundamental in the generation of successful innovations.

It is concluded that in order to differentiate, a company needs to introduce innovations in the market and in its managerial and productive processes, and it is the innovations that are the major responsible for the economic progress and basic stimuli of the competitive dispute in companies and nations.
Neo Schumpeterian authors, such as Freeman and Soete (2008, p. 457), emphasize that “failure to innovate is tantamount to dying”, as well as “changes in technology and the market and the advances of its competitors compel them to try to maintain the rhythm in one form or another”. Schumpeter (1997) argued that the leader in the decision-making process is not a specific employee, that is, the consumer who, through his/her needs and interests determines the demands of the market, forcing companies, through their employees, to make the right decisions to serve them.

Thus, production is not responsible for the physical creation of something and, to induce demand, it is necessary to change the state and level of consumer needs. With a correct combination of forces and technical aspects given through technological development, it is possible to determine if a company will become competitive by determining a specific demand.

Innovation management must take place in order to integrate the technological issues of the company, in the development and implementation of new products and services in the market, and in the improvement of the productive and internal management processes, which will allow the gain in operational efficiency and an appropriate manipulation of data and information that will enable the achievement of the financial results and positioning in the ranking. The leaner and more efficient the internal processes are, the more the company can reduce its production costs and become more attractive in the market competition. At the same time that the company is able to generate value to its client, it manages to reduce its operational costs (Porter, 2009). For Schumpeter, the premise is also valid:

In short, every production method in use at any given moment is bowed by economic suitability. These methods consist of ideas of not only economic but also physical content. The latter have their own problems and logic, and the role of technology is to think of them systematically until solving them—without considering the economic factor, decisive at the end; and to the extent that the economic element does not demand something different, to carry out these solutions is to produce in the technological sense. (Schumpeter, 1997, p. 32)

This statement is corroborated by Porter’s claim that the demand determined by the customer must be influenced by the companies as they develop innovations and technology, adding value to the products and services and thus gaining advantages over their competitors. Mytelka (1999, as cited in Cezarino & Campomar, 2006) defended the idea that for it is necessary that the organization participate daily in a competition model for innovation. Still, this perception has broken paradigms in the market, determining levels of competitiveness and investment.

Entrepreneurial competition seeks not only to achieve profitability directly, although it is driven by financial results, but seeks, above all, to stand out from the competition and expand its market share, boosting the profitability of a specific sector. This financial leverage in sectors of the economy contributes directly to the generation of employment and income, allowing greater capital to circulate in society. A survey carried out by the Brazilian Institute of Geography and Statistics (IBGE), using data from the Research of Technological Innovation (PINTEC), shows that in the period from 2009 to 2011, just over 73% of companies interviewed in the manufacturing industry implemented some of the actions related to innovation, of which only 2,615 out of a total of 114,212 companies, or about 2%, did not complete their projects on the subject, thus forming a favorable outcome to the theme (see Table 1).

When you have a whole productive sector understanding and pursuing these principles, as well as making use of them to increase their capital, the competition will intensify and it becomes more and more important to stand out from the others so that their participation in the market is also favored. In a specific sector of the
economy, there are participants of different lines of action and even indirectly compete with each other for the conquest of new consumers.

Table 1

| Transformation industry | Who implemented innovation | Only incomplete and/or abandoned projects | Only organizational and/or marketing innovations |
|-------------------------|-----------------------------|------------------------------------------|-----------------------------------------------|
| Total companies         | Product and/or process innovation | 41,012 | 2,615 | 40,166 |
| 114,212                 | Sum                         | 83,793 | 73.4% |
| Percentual              |                             |                                     |                                               |

Note. Source: PINTEC—Brazilian Institute of Geography and Statistics (2015). IBGE considered the companies that implemented new or substantially improved product and/or process.

Mytelka (1999, as cited in Cezarino & Campomar, 2006) reinforced the perception that without the insertion of embedded technology, the company is marginalized from participation by market slices, tending to lose its already achieved share. Therefore, the survival of a business can be guaranteed by investing in innovation, necessitating that a management plan be drawn with a focus on achieving this goal.

Authors, such as Barney (2002) and Prahalad and Hamel (1990), emphasized the importance of proper management of the resources and competencies of the company, in line with the strategic plans adopted, in the pursuit of competitiveness. More than Porter’s focus on focusing on market forces, there are endogenous variables and scenarios to understand how the organization is in its environment. Strategies that consider the endogenous forces of the organizational environment do not rule out Porter’s theory, and the author does not rule out the organization’s endogenous forces to determine its theory, only major emphasis was given to market forces to determine greater importance to competition.

In Figure 1, the research data of the Dom Cabral Foundation’s Innovation and Entrepreneurship Center, presented by Tadeu (2014), show that Brazilian companies place great emphasis on innovation, when compared to the average of global companies. It is observed that those that give a high strategic priority to the topic, total more than 50%, being approximately 10% above the global average. However, at the managerial and operational levels, Brazilian companies remain below the global average, adding in each of the categories, about 40% of the companies surveyed.

These results demonstrate the lack of maturity of Brazilian companies in the development of innovation strategies, requiring the interest of the strategic level to embrace the theme, and the involvement of the whole organization, with the integration of the three decision levels. Other evidence is demonstrated by the need to create multifunctional teams that live innovation in their daily lives so that they can turn the plans into effective actions in search of a better position in the market.

In speaking of the strategies, Pisano and Teece (1998), Dodgson (2000), and Tidd et al. (2005) presented important contributions by addressing proposals that align both innovation strategies and organizational strategies, emphasizing the congruence of objectives and goals set and pursued in achieving competitiveness. The view of Freeman and Soete (2008) approaches this context and demonstrates a classification of innovation that companies adopt according to the strategy chosen to be a leader or a follower of the market.
A company does not always choose to achieve profitability at any cost, and even though it is clear that any enterprise in the market exists to achieve favorable financial results, pure pursuit of profit is not always the best form of performance. When innovation gives the emphasis to the business with a focus on organizational culture and individual change, then it is likely that the results obtained will be enhanced by bringing gains in competitive advantage.

![Figure 1. Strategic innovation and priority (Source: Tadeu, 2014).](image)

**Technological Advances and its Contribution to Economic Development**

Neo Schumpeterian theorists, Rosenberg (1994) emphasized that technology is both characterized as input and output of industrial processes and is present in the transformation and generation of macroeconomic results, involving relations between those who demand and consume technology and those who produce it. In this way, it is the balance of these forces, customers, and suppliers, as demonstrated by Porter (1986) and (2009), which give the market equilibrium.

In this search, companies adopt strategies focused on innovation, so that they become responsible for the introduction of technology and innovation in the market, be they as leaders or followers of trends and thus be able to conquer their shares in the market. Still, it is consumers of this embedded technology that compete for market forces and seek to participate in groups that use technological advances for a variety of purposes.

Regardless of the strategy, the technological innovation embarked in the industry allows the growth of production levels, either by the technology present in the productive and managerial process or by the development of new products with high added value. This increase in productivity is a stimulating factor for the generation of capital and the purchasing power of the population, as well as for the condition generated by their employability, which can be stimulated through empowering individuals (see Figure 2).

Another important result of the research of Tadeu (2014), shown in Figure 3, which highlights the importance of innovation as an organizational strategy, is the guiding aspects of innovation, where factors, such
as increased profitability, development of new business models, as well as the development of new products or services, whether current or those focused on the customer, sustainability or regional markets, Brazilian companies are prominent in the global market, not only leading in the category of development of customized products to local demands.

![Figure 2. Innovation-productivity-training-employability cycle (Source: Created by the author).](image)

The research of the author demonstrates the current scenario and future expectations of an innovation agenda. The picture of Brazilian companies is highlighted and still incipient if considered realities experienced in other countries with more advanced technological development.

The expected long-term situation should continue to be directed towards the pursuit of profitability through projects to develop new products and services, pointing to aspects that consider that technological
innovation in the context of Brazilian companies is associated with investment levels, both public and private, in promoting economic development. This future vision is observed and can be analyzed in Figure 4.

This projection demonstrates the tendency of Brazilian companies to gain maturity in relation to the global scenario by addressing the innovation agenda within the context of economic development, helping to leverage the local economy, especially if it takes into account the participation of individuals in the productive process and in how their specialization is capable of providing financial gains to the companies where they operate, contributing directly to regional economic development.

Although the research is unclear about the specific actions that will lead to the new scenario, it is possible to infer that individuals will be considered key factors in this process of new perspectives in innovation, and that due stimulation and investment in their development and capacity building will contribute for success in economic development.

Figure 4. Aspects will drive innovation (Source: Tadeu, 2014).

Public Polices and Strategic Actions of Technological Innovation and Its Influence in the Specialization of Individuals

Although there are several forces and conditions that promote and increase employability, such as national economic policy and public and private capital investment, whether national or foreign, it is not possible to discard the great force that innovation has precisely to demand professionals every time more qualified and able to generate ideas and act in the innovative processes implemented. In this way, it is understood that innovation is part of national plans and policies that are part of the public policy agendas of certain governments.

The workers of a certain company employ their force of action and are stimulated by mechanisms of compensation that they judge fair and, thus, it is also observed that the individuals have their own expectations about the employment relationship that they have with their employer. The more they feel that there is retribution for their productive force, the more they will give themselves to the process as a whole. In this sense, developmentalists, such as Evans (2008) argue that the great challenge for the 21st century is to think of the
institutions that will contribute to the development of countries, and places the individual as a highlight among a range of factors. The author presents his ideas that this new century disengages from the specific focus on productive processes by placing the importance of greater emphasis on ideas and knowledge, demonstrating the importance of individuals at the center of discussions of economic development.

This concern does not only defend the improvement in quality of life of workers, but also their better ability to deal with intangible issues surrounding the discussion of knowledge. These ideas reinforce the idea that investments in technological innovation can bring the necessary thrust and stimulus to the generation of capital, as well as to place the individual at the center of economic discussion and the role of innovation as a driver of qualification.

It is, therefore, a reflection on the role of the State in the promotion of public policies to stimulate innovation, since, observing the patterns of industrial revolutions, it is observed that especially in the third, qualified work as one of the essential factors for development, thus demonstrating that this theme has already been emphasized throughout economic history. In the last decades, this type of policy has been presented with greater intensity and countries that have internalized issues related to innovation, develop agendas that include program creations and specific legislation to stimulate the economy through technology, such as the advent of Industry 4.0, or Fourth Industrial Revolution.

Corroborating the PINTEC survey of IBGE shows a high rate of employability among people with higher qualifications in innovation activities (see Table 2). The results of the survey show that among the 41,102 companies surveyed, there were 70,800 people working with R & D, showing that the number of people with higher education, in addition to the categories of researchers and technicians, was 47,401 people, representing 67% of the total 70,800 stations. The number of graduates is significantly higher among researchers, being more than 300% higher than the number of graduates working at the technical level. Another important factor observed in the research is that the postgraduate professionals are in the category of researchers, with hierarchical positions of greater prominence in the organizational structure.

Table 2
People Engaged in Internal R & D Activities—2011

| Transformation industry | Total  | Researchers | Técnicos | Auxiliaries |
|-------------------------|--------|-------------|----------|-------------|
| Companies that have implemented product and/or process innovations | 41,012 | 70,800 | 5,632 | 31,810 | 7,604 | 9,959 | 9,357 | 6,439 |

*Note. Source: PINTEC—Brazilian Institute of Geography and Statistics (2015).*

When thinking about the formal way in which the state should behave to promote economic and social development, for Boisier (1999), it is necessary to separate only from the method and the metrics to determine these patterns, it is fundamental to develop mental models, with use of a holistic and systemic view of development so that the structure and organization of nations are properly understood, with emphasis on the set of laws that govern order, principles, and the government itself.

The nations that have inserted innovation as an element of their public policy agendas have developed action plans aimed at the development and empowerment of individuals, with a focus on their insertion in the innovation model. They also developed National Innovation Systems (NIS), and the known concept about a
system is that it is a set of parts that acts in an integrated way to achieve the result for the whole as a whole.

By extrapolating this concept and placing it in the NIS classification, we have Freeman’s (2008) statement that it is a set of actors involved in the search for the creation and diffusion of technological innovation. The author includes the institutions and mechanisms that corroborate the proposed objectives, highlighting the research institutes, the education system designed and aligned by the State, companies and their research and development (R & D) laboratories, state agencies and agencies, the set intellectual property, universities, and the national financial system. Figure 5 shows a slight, however, increasing trend towards greater investment in items considered by the Science and Innovation System in Brazil in 2011, compared to the first decade of this century. Still, in the period 2000-2010, there was some oscillation, however, with a better result in the following year, highlighting that almost the total invested in research in higher education, with an emphasis on post-graduation, has its main source of financing in the public sector, either through the government or public companies.

![Figure 5](image)

| Indicator | 2000 | 2005 | 2010 | 2011 |
|-----------|------|------|------|------|
| R & D expenditure (% of GDP) | 1,02 | 0,97 | 1,12 | 1,21 |
| Per capita R & D expenditure in current dollars adjusted by PPP | 72,87 | 83,82 | 134,17 | 142,36 |
| Researcher R & D expenditure per researcher in current US $ thousands adjusted by PPP | 168,97 | 140,5 | 187,05 | n.d. |
| Distribution of R & D expenditure by execution sector (%) | | | | |
| - Government | 27,28 | 26,61 | 27,65 | 26,91 |
| - Companies (public and private) | 47,16 | 50,44 | 47,04 | 45,23 |
| - College education | 25,56 | 22,95 | 25,31 | 27,86 |
| Distribution of R & D expenditure by financing sector (%) | | | | |
| - Government | 54,07 | 49,73 | 52,66 | 52,64 |
| - Companies (public and private) | 44,73 | 48,29 | 45,43 | 45,21 |
| - College education | 1,2 | 1,98 | 1,9 | 2,14 |

*Figure 5. Allocation of financial resources of the Science and Innovation System: Brazil (2000-2011) (Source: Plonski, 2015).*

In addition, Cruz and Chiamovich (2010) presented a summary of the main Brazilian laws and their impacts on taxes for R & D and subsidies to R & D in Brazil, from 1991 to 2005 (see Table 3). Table 3 makes a relation between the legal instrument and the type of fiscal benefit brought, aiming to foment the development of R & D.

There is still a long way to go, however, in Brazil, it is important to emphasize the need to implement legal instruments that somehow regulate and stimulate relations with foreign capital companies to develop their R & D activities internally. What is observed, is a reality where in fact the development of R & D is in the country of origin of the companies, using favorable conditions for its installation in the Brazilian territory, but that, however, do not contribute much to the generation of cutting-edge technology with know national knowledgment. However, much cultural issues are addressed in local production; there is still much of the influence of developed country standards, precisely because of the lack of internal technology generation at our borders.
Table 3
\textit{Tax Laws for R \& D and R \& D Subsidies in Brazil, 1991-2005}

| Law approach                           | Year of adoption | Reference                                      | US$ PPP | Type of advantage                      |
|----------------------------------------|------------------|-----------------------------------------------|---------|----------------------------------------|
| Tax incentive                          |                  |                                               |         |                                        |
| - Tax incentive for the IT Sector      | 1991             | Law N° 8248/91                                | 2,236.4 | Tax incentive for the IT Sector         |
| - Tax incentive for business R \& D    | 2005             | Law N° 11196/05                               | 1,085.0 | Tax incentive for all sectors           |
| Subsidy                                |                  |                                               |         |                                        |
| - Subsidies for corporate R \& D in the form of government loans | 2002 | Law N° 10332/02 and Industrial Technology Development Plan (ITDP) | 62.9    | Equalization of interest rate           |
| - Subsidies for business R \& D        | 2004             | Law N° 10973/04                               | 224.1   | General subsidy                         |
| Total (incentives + subsidies)         |                  |                                               | 3,643.3 |                                        |
| Business expenditure in R \& D         |                  |                                               | 9,946.3 |                                        |
| Share of incentives and subsidies in business spending on R \& D |      |                                               | 37%     |                                        |

\textit{Note.} Source: Cruz and Chaimovich (2015).

**Training of Individuals Demanded by the Development of Technological Innovation**

On the basic concepts of the work, Schumpeter claims that the goods can be classified in “orders”, considering the distance that they have of their final consumption, among the several classifications pointed out by the author, the work is the good of the highest order, therefore, is inserted at the beginning of the production of any and all products. This positivist view of work is shared by Adam Smith in thinking that labor is what allows the economic calculation of a labor activity, since the means of production can be the same for all, the difference being precisely given by this element. Although Schumpeter’s (1997, p. 36) point of view is not exactly consonant, he does not rule out what was actually preached by other authors, such as Ricardo, who also put the work in the foreground. However, he believed that work as well as land is “saved”. Work, like land, is evaluated, is used according to economic criteria and both receive equal economic focus.

From the point of view of the author, a distinction is made between the managerial and the directed work, stating that it is the position in the organizational hierarchy that will say what type of work exists, as well as the creativity embedded in the managerial work. In spite of emphasizing the hierarchy within the structure of the company, it is evident in its explanation that it is not this location that will give more or less value to a certain work, as well as to an essential economy promoted by him. It is clear that it is possible to conclude that this point of view allows us to understand that the emphasis is professional, or economic, will be based on how much more specialized the work that individual exerts and how he/she applies this qualification in the performance of his/her duties, being what in fact makes his/her work distinct from the others.

The authors Sicsú and Bolaño (2007) affirmed that the individual is the key element in the new economy, even more than the information or codified knowledge that can be transmitted and disseminated through technologies. They still emphasize the worker who was present in the productive process because of the tacit knowledge he/she embraced. This view is very favorable to the human element in the productive process, thus considering and reinforcing the need to involve a whole range of actors and institutional arrangements for the promotion of individual qualification.
This idea is in line with the concepts of Diniz (2009) that on the vision of Furtado, affirms that it goes beyond regionalism, articulating a whole web of institutions and urban actors in defining the role of technology and innovation processes, envisaging an involvement interdisciplinary in the formulation of public policies adequate to the understanding and fulfillment of the regional demands.

In this way, actions that occur regionally tend to have a faster and direct reach to workers, inserting them efficiently in the production chain, aiming at the development of innovation as an economic activity, thus achieving greater success in the proposal presented. However, they will still have to have well-designed public policies in order to meet the specificities of each region. Regarding the level of occupation of workers in Brazil, it is the object of studies by the Brazilian Institute of Geography and Statistics (IBGE) which presents information that in the second quarter of 2013, showed the results as shown in Table 4.

Table 4

| Level of Employment in Brazil in the First Quarter of 2013 |
|----------------------------------------------------------|
| 2º QUARTER/2012 | 1º QUARTER/2013 |
| 57.1%          | 56.3%          |

Note. Source: IBGE, Directorate of Research, Coordination of Work and Income, National Survey by Sample of Continuous Domiciles 2012-2013.

For a broader comparison and understanding, we analyze the data that the estimated for the second quarter of 2013 was 56.9% and, therefore, between the estimated and the realized stability was observed with a small variation. However, in the regional scenario, the South (61.6%) and Central-West regions (61.3%) had the highest percentages of working people, among those in the active age range, and the Northeast region (50.5%) presented the lowest level of occupation (see Figure 6).

| Big Areas    | Level of occupation, in reference week, of persons aged 14 years or over (%) |
|--------------|-----------------------------------------------------------------------------|
|              | 2012                                                                 | 2013                                                                 |
|              | 1º Quarter | 2º Quarter | 3º Quarter | 4º Quarter | 1º Quarter | 2º Quarter |
| Brazil       | 56.3       | 57.1       | 57.2       | 57.1       | 56.3       | 56.9       |
| North        | 55.7       | 57.3       | 57.0       | 58.0       | 56.9       | 56.9       |
| Northeast    | 51.3       | 51.4       | 51.7       | 51.1       | 49.9       | 50.5       |
| Southwest    | 57.4       | 58.4       | 58.6       | 58.5       | 57.8       | 58.6       |
| South        | 60.6       | 61.4       | 61.4       | 61.5       | 61.2       | 61.6       |
| Center-West  | 60.4       | 61.1       | 61.1       | 61.1       | 60.7       | 61.3       |

Figure 6. Level of occupation, in the reference week of people aged 14 years and over, according to the Major Regions, 2012-2013 (Source: IBGE, Directorate of Research, Coordination of Work and Income, National Survey by Sample of Continuous Domiciles).

A view of the annual level is given by the Institute of Applied Economic Research (IPEA), which through its database provides important tools for the analyzes that follow, with Figures 7 and 8 being representations of the employed population between 1992 and 2013, in throughout the national territory.

Figure 8 represents the population occupied between 1992 and 2013, throughout the national territory, emphasizing the growth of numbers over the years, and it can be inferred that the favorable result is due to the implementation of public policies that reflect in the levels of employability of the population economically active.
Considering the figures pointed out by the IPEA in relation to the increase in the number of people employed in Brazil in the last years, the inference is even stronger that technological innovation contributes to the level of occupation and employability, if the information with the presented one by Plonski (see Table 5).
Table 5

*Human Resources Endowment of the Science and Innovation System: Brazil (2000-2010)*

| Indicator                                                      | 2000   | 2005   | 2010   |
|---------------------------------------------------------------|--------|--------|--------|
| Distribution of personnel employed in Science and Technology (FTE) (%) |        |        |        |
| - Researchers                                                 | 55.54  | 55.74  | 51.99  |
| - Support staff                                               | 44.46  | 44.26  | 48.01  |
| Technicians per researcher (FTE)                              | 0.8    | 0.79   | 0.92   |
| Researchers for each thousand members of the EAP              | 0.91   | 1.14   | 1.26   |
| Distribution of researchers (FTE) by employment sector (%)   |        |        |        |
| - Government                                                  | 7.41   | 5.27   | 5.53   |
| - Companies (public and private)                              | 31.43  | 37.57  | 25.94  |
| - Educação superior                                           | 60.52  | 56.3   | 67.8   |
| - Private Non-Profit Organizations (PNPO)                     | 0.65   | 0.85   | 0.73   |

*Note. Source: Plonski (2015).*

Table 5 shows the growing number of people employed and dedicated to R & D, having doubled in the last decade and presented a growth of more than 100% from 2000 to 2010. However, there is a reversal in the indices presented between technicians and researchers, with technicians growing by 15% in relation to researchers, as well as the number of researchers with higher education who increased by 12%, while the performance of researchers working in government and in public and private companies decreased, in the proportions of 25.4% and 17.5%, respectively.

It is considered that these results represent an increase in the proportion of researchers with this level of training working in universities, technological institutes and research centers, and university students, demonstrating that there is still a strong shortage of professionals with qualification at higher and postgraduate level acting in the productive and/or service sectors, and that really act directly with the innovation, from Schumpeter’s point of view, which considers what actually generated economic-financial results in the market. Through the analysis of Figure 9, it is still clear that innovation is a force responsible for demanding improvement in the qualification indices of individuals.

Regarding the level of education, the IBGE survey showed results found in groups of people with higher levels of education, with the highest occupancy rates. Another highlight in the second quarter of 2013 was that approximately one-third of those who had no education were working. However, it was the group of people with complete upper level, the level of occupancy with greater prominence, having reached 79.6%, as shown in Figure 9.

In Figure 9, each group of measures represents a level of education, in percentage, from left to right, no schooling, incomplete elementary school, complete elementary school, incomplete secondary school, complete secondary school, incomplete upper, and complete upper. The blue color of the meters represents the numbers of the Midwest. Regarding the numbers of employability, with the levels of employment in Brazil, there is no evidence that they are directly related to the issue of innovation, however, due to this research and the numbers that show the relation of the level of education with the qualification of the individuals, it is possible to verify that there is a market tendency, determined by the business competition, as well as the public policies of
incentive to the subject and of the promotion and attempt of protection to the MSEs, and that they relate to certain public agendas.

![Bar Chart](image)

**Figure 9.** Level of occupation, in the reference week, of persons aged 14 years and over, by level of education, by Major Regions—2nd quarter 2013 (Source: IBGE, Directorate of Research, Coordination of Work and Income, National Survey by Household Sample Continuous 2013).

Even though Brazil demonstrates a scenario that is not fully mature in the area of innovation, it is logical to understand that the more the company innovates, the better it will position itself in the ranking of its market, the more financial returns it will have, the more it will generate employment and income and, even more will be its share of contribution to the national economy.

**Methodological Procedures**

This work is the result of a bibliographical research about innovation management practices in companies operating in Brazil. To do so, a survey of national and international bibliographic sources of academic, governmental, industry-class entities and consulting firms in the areas of business management, technology and innovation, and small and medium-sized enterprises. Here, it is important to offer some important observations related to the methodological delineation that shows that there is a lack of concrete data that allow to relate the advent of innovation in the economy of a nation with a demand generating the need for training and professional improvement. Academic and market studies lead us to this inference, however, it is still difficult to verify factitiousness through research conducted by official bodies. Faced with this limitation and recognizing that an expressive basis for the reflections on the theme is accommodated in more complex models that are institutionalized in the macroeconomics concepts, the bibliographical reflection used in all this work that inspires the conclusion presented comes from a diversity of bibliographic sources already previously explained.

**Final Considerations**

Considering all the exposed in this article and through the realized researches, it is necessary to make some comments that will continue punctuated. The scenario of intense global competitiveness led companies to leave the inertia of the lack of updating in their products and production processes, and to move constantly in search of differentials, especially technological ones, to improve the products and services that reach the final consumer. In order to be able to stand out from the competition, strategies must be adopted by companies to
overcome the forces that are imposed by the market and mark gains in the production processes, thus reducing costs and increasing the technology embedded in what is offered to the market. By increasing new technologies, whether in their processes or in their products and services, companies are finally able to offer their customers greater added value, thus justifying their gain in the ranking in which they operate.

When considering that the technology to generate the competition differential needs to present a load of innovation that justifies this increase of market share, then it is possible that companies, when pursuing these specific objectives of the theme, aligned with the organizational objectives, obtain financial results for themselves, besides contribute to the economic development of the nation. Still, innovation by embarking on technology in its productive chain demands increasingly qualified professionals both to think and develop new technologies and to act in the production process already installed. It is possible to prove the direct relationship between the development of innovation and higher levels of qualification and qualification of personnel involved in this chain.

In addition to the promotion of the training of individuals, there has also been an increase in the level of employment and employability in recent years, and although there is no evidence of the relationship between the themes innovation and employability, it was possible to infer that there is a correlation that comes through demand for training. Although it is known that several other factors are stimulating the level of employability, the relationship presented becomes quite clear. If we consider this relationship to be valid, we can, in addition to the other factors presented as a result of this research, observe even more strongly that innovation is indeed one of the driving forces of economic development.

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