

**BRAZILIAN POST GRADUATION DEGREE STUDIES: EVOLUTION AND
MAIN CHALLENGES IN THE PROSPECTIVE SCENARIOS
ENVIRONMENT**

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ABSTRACT

This article aims to examine the evolution of post-graduation courses, as from its creation to the present day, based on the work undertaken by the Coordination of Higher Education Personnel Improvement - CAPES and the National Council for Scientific and Technological Development - CNPq, identifying the most important variables in the environment and its perspectives in the environments of future scenarios. It is also noteworthy that today the country goes through a period of the greatest breadth and importance of the post-graduation courses, a sector that consolidated itself for possessing national and international high qualification. In the present study, we proceed to the bibliographical review and to the documentary

examination, to rescue the history of post-graduation degree courses and their main challenges, substantiated in an analysis involving variables that leads to the future of this environment, seeking through the methodology of prospective scenarios, to establish strategies for the continuity of these best practices in the future.

Keywords: Master Degree. MEC. Capes. MCTI. CNPq. Prospective scenarios.

A PÓS-GRADUAÇÃO BRASILEIRA: EVOLUÇÃO E PRINCIPAIS DESAFIOS NO AMBIENTE DE CENÁRIOS PROSPECTIVOS

RESUMO

O presente artigo tem por objetivo analisar a evolução da pós-graduação brasileira, desde sua criação até os dias atuais, com base nos trabalhos desenvolvidos pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Capes e pelo Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq, identificando as variáveis mais importantes e suas perspectivas no ambiente de cenários prospectivos. Destaca-se, também que, hoje, o país passa pelo período de maior amplitude e importância da pós-graduação, segmento que se consolidou por possuir alta qualificação nacional e internacional. Neste estudo, procede-se à revisão bibliográfica e ao exame documental, para o resgate da história da pós-graduação brasileira e seus principais desafios, substanciados em uma análise que envolve variáveis portadoras de futuro desse ambiente, buscando por meio da metodologia de cenários prospectivos, estabelecer estratégias favoráveis à continuidade dessas boas práticas no futuro.

Palavras-chave: Pós-graduação. MEC. Capes. MCTI. CNPq. Cenários prospectivos.

1 INTRODUCTION

The problems faced by higher education in Brazil are quite well known, the legacy goes from government to government both positively and negatively with respect to their actions. As a consequence, the Brazilian university and post-graduation are reflections of those actions that demand deep changes in the current context of Brazilian education.

However, not all sectors of Brazilian education suffer from this discontinuity of actions, i.e. the post-graduation courses that has been developing intensely as from the 1990s, each year achieving excellent results and going up in the worldwide *rankings*.

Over the last decade, advances in science and technology in Brazil, which are confirmed, among other indicators, for its 13th position in the world scientific production, have been highlighted in editorials and in studies published and discussed in magazines, forums and international organizations (Giannetti, 2010).

It is noteworthy that these advancements are connected to the post-graduation relevance, a reality of the last decades, legitimized internally and internationally recognized. And if the Brazilian post-graduation is that case of success, this is due to, above all, the assessment process carried out by the Coordination of Higher Education Personnel Improvement - CAPES and the supporting action for research carried out by the National Council for Scientific and Technological Development (CNPq).

On the assessment process, besides the importance of assessment itself, the national post-graduation system has been consolidating over recent years and expands rapidly because there has been the research financing through competitive funds, created by national and international development agencies. Such initiatives in the post-graduation have become an unusual case of continuity in the field of Brazilian education for more than half a century (Giannetti, 2010).

It is worth noting that we are living in a time where there is consensus regarding the importance of knowledge for economic growth, for social development and for environmental preservation, as well as on the

fact that such knowledge is largely being integrated into our respective organizations and people. In such circumstances, training people who are able to absorb, generate and use knowledge is of cardinal importance for all countries. Part of this matter is, of course, the training of teachers and researchers, which traditionally has been performed in programs and post-graduation courses in Brazil.

It is essential to remember the delayed onset of the university in Brazil, which took place only four hundred years after the Portuguese colonizers' arrival, and long after the Spanish Latin American universities. The scientific research activities, until the early twentieth century, were incipient and represented the effort of individual researchers or small groups connected with the academic sector. These individuals formed the first scientific societies in Brazil: Brazilian Academy of Science (1916) and the Brazilian Society for Progress in Science (1949). (O Estado de S. Paulo, 2011).

The professional exercise of research activities and the organizational effort of Brazilian science appeared only in the 1960s, proving that even belatedly it was possible to overcome the difficulties in this area, since today Brazil represents, in the qualitative aspect which takes into account the number of citations of Brazilian articles in publications around the world, the 22nd place among the 30 countries that dominate 98% of the scientific production in the world (UNB, 2011).

These results, according to Balbachevsky (2005), put the Brazilian post-graduate education among the most important in the world. In addition to the size reached, it impresses with its quality and, since the late 1960s, it has been subjected to a consistent set of policies in order to expand its growth without losing quality. For this reason, in the mid 1970s, Capes (Coordination of Higher Education Personnel Improvement), a Ministry of Education's Institution, created a sophisticated assessment system which allowed systematizing the official support to the post-graduation program performance through the establishment of a minimum standard of academic quality. Maccari et al, (2008 and 2009), emphasize that this measurement procedure is recognized as one of the most modern and efficient in the world.

Alongside, the CNPq (National Council for Scientific and Technological Development) intensifies their fostering actions for research, offering new lines of support and democratizing with more intensity their resources distribution in all regions of Brazil.

The CNPq (National Council for Scientific and Technological Development) contributes in the training of new human resources for the country since it acts in a relevant way through incentives, rewarding in the contest those students who start scientific and research activities and institutions that help these students in accomplishing their targets and findings.

For Ribeiro (1980), the Brazilian post-graduation experience over the recent years is the most positive fact in Brazilian higher education history and is also the one with has to be taken seriously, as it is an essential element for the nation's progress and development. So there is no way to talk about progress, development, strategies, models, training without thinking about the progress and the outcome of post-graduation studies in Brazil.

It is also noteworthy, that the post-graduation studies' history in Brazil, particularly after the 1930s, is an important milestone in the history of the academic community construction and a fundamental social actor to the development of the country.

According to Saorim and Garcia (2008), studying the history of post-graduation studies in Brazil is a challenging subject for many researchers in the field of Social Sciences. Romeo, Romeo and George (2004) highlight the importance of the Brazilian state in driving political actions in the area of post-graduation studies that should start as from the Brazilian social demands.

Despite all the success achieved so far, the post-graduation still faces major future challenges in the universities infra-structures, in the government policies, in the ongoing internationalization, in the recognition of titles from foreign universities, especially from Latin America, and in the regional differences confronted here, inside Brazil.

This article seeks to describe, briefly, the post-graduation history, based on the Capes and CNPq actions, and then describe its main variables and its challenges in the prospective scenarios environment.

2 METHODOLOGICAL PROCEEDINGS

The methodological proceedings of a study are decisive for the researchers' performance, as they will allow the researchers to produce their studies within an objective and suitable rationality according to the reality of their context.

According to Gil (2002), a survey or a study can be defined as a rational and systematic procedure, which aims to seek out answers to the problems posed.

Several classifications, according to a range of significant authors in the area, can be used to describe the same study, which differ from each other according to the variables, the techniques and the instruments used in the process stages of the research or study (Moretto, & Pacheco Coto, 2009).

According to Gil (2002, p. 41), "any classification takes place through some criteria." However, according to Lakatos and Marconi (1992), the research type's classification varies in accordance with the focus given out by each author.

Regarding the type of study carried out, we can classify it as qualitative and predominantly descriptive and interpretive, whose assumptions are based on the idea that social reality does not exist in a concrete meaning, but that it is the product of subjectivity and experiences of individuals and organizations. On the theme, Triviños (2006, p. 110) states that "[...] the descriptive study aims to describe 'accurately' the facts and phenomena of a certain reality".

For Gil (2002), a descriptive research mainly aims at the features description of a certain population or phenomenon, or the establishment of relationships among variables. In this case, it was sought to get to know the reality studied, as well as their characteristics and their problems, i.e. the

study and the effects of the Brazilian post-graduation courses' evolution and their main challenges in the environment of future scenarios.

The sources used for data collection were: studies on the context of the creation and development of *stricto sensu* post-graduation studies in Brazil based on the data from CAPES, CNPq and institutions that offer post-graduation courses in Brazil.

The main techniques adopted to collect data were the bibliographical and documental survey. For the analysis of bibliographical and documental sources it was chosen categories of the totality, of the logical, of the historic and of the contradiction, keeping in view the liaisons existing between them.

To accomplish these tasks, the Delphi method has been used to select and classify the books, the articles and the texts and, in particular, for the identification of variables carriers of future used in this study.

History records that the Delphi method was first used in 1948 by the American organization Rand Corporation, aiming to estimate the likely effects of a massive atomic attack on the United States. According to Moritz (2004, p.127), "[...] one can define it as the assessment technique that seeks the consensus opinion of a group of people, either in the society or in organizations regarding current events and upcoming ones". According to Wright & Giovinazzo (2000) and Wright & Giovinazzo (2006) a Delphi survey technique is characterized as prospective based on the structured consultation with experts, which seeks the convergence of opinions about the future.

Therefore, a prospective view of the variables that are future carriers, in the post-graduation environment and its influence on the management policies of Brazilian universities are the ultimate goal of this study. Variables were selected and assessed using the intuitive judgment of the authors, based on a process of exchange of information, experience and creativity on the study at issue.

3 BRAZILIAN POSTGRADUATION COURSES

The first steps of the post-graduation courses in Brazil were given at the beginning of the 1930s. According to Balbachevsky (2005), at that time the first Brazilian universities succeeded in attract some foreign teachers who brought the first institutional model for the studies in the Brazilian post-graduation programs. The relation of this model involved a tutorial scheme between a professor and a small group of disciples, who would become the future faculty of such institutions.

Initially the post-graduation courses were developed without any external regulation. To a great extent, but not exclusively, the courses were an extension of the students own teaching career. In many cases, the submission of the Master's degree dissertation or PhD thesis could take up more than a decade, owing to those times' complexities.

This model has had very little impact on higher education in Brazil, as the few individuals who attended the post-graduation courses were very special groups found in very few universities and outside those universities their titles were worth very little, but the persistence of these small groups researchers was one of the factors that allowed the training of future generations that gave rise to the post-graduation studies in Brazil (Balbachevsky, 2005).

According to Santos (2003), by the 1940s it was legally first used the term "post-graduation" in the Article 71 of the University of Brazil Statute. By the 1950s, agreements between the United States and Brazil started being entered into, which involved a series of agreements between North American and Brazilian schools and universities through students, researchers and professors exchange.

However the great momentum for the post-graduation courses in Brazil was only attained in the 1960s. For Silva (2010), it was in 1965 that the Federal Government adopted measures based on the American model to formalize the post-graduation degree, recognizing it as a new level of education, beyond the bachelor's degree.

In this period important initiatives were carried out in order to create Master and Doctoral programs at the following universities: Federal

University of Rio de Janeiro, Masters' in Physics and Biological Sciences, University of Brasilia, Masters' in Mathematics, Doctorate of the Institute of Pure and Applied Mathematics, the Master and Doctorate degree at the Higher School of Agriculture of Viçosa and at the Federal Rural University of Rio January, as well as the Aeronautical Engineering Course at the Aeronautics Technological Institute in São José dos Campos (MAer / ITA).

In addition to the Federal Government incentive in many different areas of post-graduation, it is impossible not to mention the influence that the establishment of the University of Brasilia (UnB) has had to spread the post-graduation courses in our country. The UnB, created in the 1960s, comes up with the innovative concept i.e. the inseparability of learning and research, the organization of courses through the credit system, the concept of Department as a minimum academic unit, the working arrangements with the exclusive dedication and post-graduation as a regular part of the institutional activity.

Darcy Ribeiro (1978, p.117) refers to this last feature in this way:

One of UnB's key projects, wide and maturely planned, was to help Brazilian universities to take the decisive step to advance toward their maturing. I am referring to the institutionalization of a post-graduation system not through any occasional master's and doctorate programs, but of an actual ascent to the fourth level education. That is, to add to the educational systems, to the elementary level, to the secondary level and to the tertiary, this latter corresponding to the Higher Education level, a fourth level, corresponding to the post-graduation degree. It is only after reaching this level, in fact, a university deserves this name.

In 1965, after the Decree No. 977 (Brazil, 1965), known as Sucupira Decree, of the Education Federal Council, it takes place the deployment of formal post-graduation courses in Brazil. According to Prof. Newton Sucupira, the post-graduation model to be deployed, coming from the

world's most developed countries (MEC/CFE, Decree No. 977/65) was suitable for the university new conception.

If the Sucupira Decree has created an institutional environment, the growth of post-graduation also depended on other players and circumstances. I was taken advantage of, for example, the seed planted in the 1950s by the American foundations such as Ford and Rockefeller, who initiated on a regular basis the scholarships distribution for post-graduation in Brazil and abroad, according to competitive meritocracy norm criteria (Balbachevsky, 2005).

The post-graduation regulation has occurred only after the college reform which happened in 1968. In that year, at the peak of the military dictatorship, the government imposed a thorough reform in higher education considering that it was under pressure from social and students' movements. This important reform was done, based, in a high extent, on the North American model substituting the professorship model by the Departmental organization, establishing the hiring of full-time teachers and substituting the traditional sequential courses system by the credit system. The master's and doctorate levels were set, with many similarities to the American structure. The specialization became more stringent, and the master's and doctoral counted on plenty of freedom in their early deployment (Balbachevsky, 2005).

In this new college environment and taking into account the peculiarities of Brazilian higher education it arises in political and academic circles, a broad discussion about the need for investment in research and science for the country's development (Passion, Barbosa & Neves, 2009).

The big news of the ongoing reform process was the emergence of the Capes as appraiser and financier of the postgraduate in general. This agency of the Ministry of Education began to develop a system of assessment and qualification of courses developed in close cooperation and participation of the scientific community.

According to Verhine (2008), the new emphasis on research and on formal titling ended up by causing the rapid proliferation of post graduate programs in Brazilian universities, coordinated and, after 1980, evaluated by the Ministry of Education, through the Capes. The national legislation

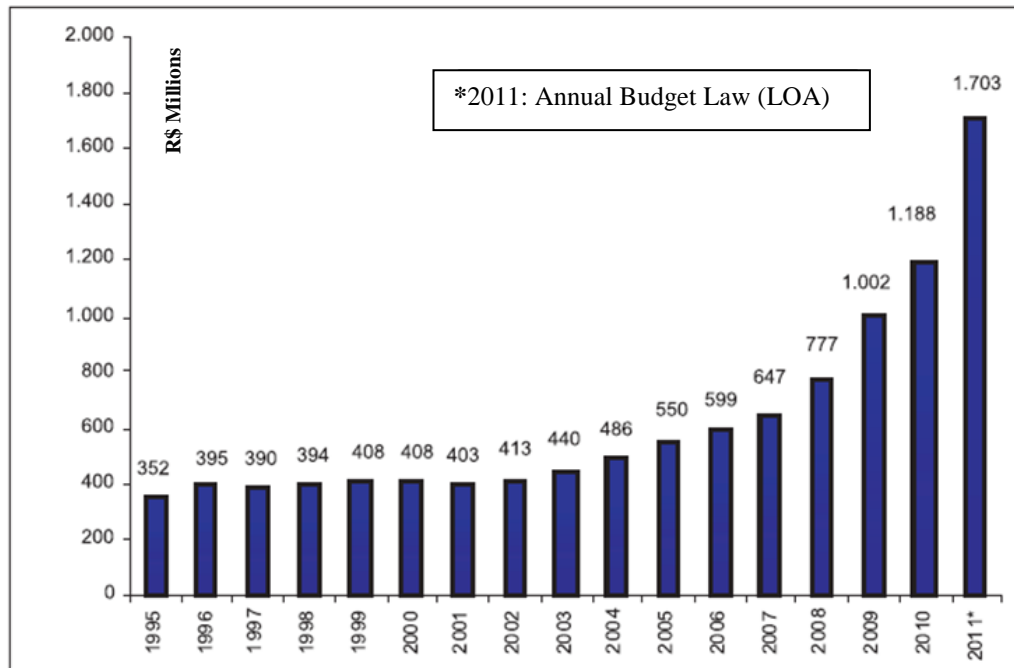
stipulated that such post- graduation programs should also follow the North American model, consisting of a combination of course, credits, examinations and supervised dissertation and thesis.

This legislation has divided the post-graduation in two categories, *stricto sensu*, focused on an academic career, and *lato sensu* (specialization) for those working in other organizations or other professional activities. This legislation also established the categories of master and doctorate degrees without, at that time, being the first a mandatory requirement for the second.

During the period of 1974-1989, it was set three National Plans for Post-Graduation (PNPG), aiming to improve the system. However, during the period 1990-2004, there were no national plans to officially guide the sector development, a fact that started to happen again in 2005, with the V National Plan for the Post-Graduation, regarding 2005-2010 (Silva 2010).

Quantifying some data from post-graduation, we can see that between the years 1963 and 2004, the federal government invested R\$ 11.1 billion on updated amounts, in granting scholarships for master and doctorate degrees. Around 60% of these scholarships were funded by CAPES and other 40% by CNPq (Silva, 2010).

As an example of CAPES importance for the development of post-graduation studies in Brazil, it can be mentioned the increase that has taken place throughout the years in research funding through scholarships in Brazil and abroad. This can be seen in Figure 1, in the period from 1995 to 2010 and the budget forecast for 2011, which shows an expected increase of approximately 40%.



Source: Post-graduation National Plan - PNPG 2010 - 2020, p. 259.

Table 1 – CAPES’ Investment in scholarships for post-graduation degrees (Brazil and abroad) as from 1995 up to 2011*.

As highlighted in the Post- Graduation National Plan - PNPG, the increase in the scholarships assignment for post-graduation was a result of the budget growth approved in the Annual Budget Law, as it is shown in Figure 1. From the figures presented, the increase started gradually, steady and mild, since only in 2008 (after 14 years) the amount invested was R\$ 777 million reaching 121% compared to the amount invested in 1995, which was 352 million. However, this investment policy, was modified for the subsequent years, as in 2009, compared to 2008, there was an increase of 29%. In 2008 and 2010, the growth was 53% and the forecast when comparing the years as from 2008 up to 2011, is that the increase may reach 119%.

According to the Post- Graduation National Plan - PNPG (2010) the forecast in the increase of scholarships grants and the required inflow budget for the years of 2013 and 2020 show that CAPES has been investing heavily in scholarships granting, as shown in Table 2.

Table 2 - Forecasts in the amount of scholarships from CAPES in the country, and the required inflow budget

N° Scholarships		Required Budget	Budget Forecasted
2013	Master degree	49.751	R\$ 716.414.400,00
	Doctorate degree	34.248	R\$ 739.756.800,00
	Post-Doctorate	3.325	R\$ 131.660.100,00
	Total	87.324	R\$ 1.587.831.300,00
2020	Master degree	88.004	R\$ 1.267.257.600,00
	Doctorate degree	96.791	R\$ 2.090.685.600,00
	Post-Doctorate	3.491	R\$ 138.223.800,00
	Total	188.286	R\$ 3.496.167.000,00

Source: Adapted from the Post- Graduation National Plan - PNPG 2010 - 2020, p. 273.

With regard to such panorama evidenced hereby, the scientific and technological research associated with the Post-graduation programs

acquires increasingly importance and impact towards the Brazilian society, becoming unquestionable the contributions of the scientific knowledge generated in the context of research networks for the country scientific and technological development.

3.1 CAPES AND CNPq ROLE IN THE BRAZILIAN POST-GRADUATION DEVELOPMENT

It is no coincidence that the Brazilian Post-graduation has evolved at a rapid pace, thanks to the sound investments, the legal incentives and the essential roles of the fostering research agencies in our country, that ended up by determining the success and consequently the renowned post-graduation *stricto sensu* programs that Brazil possesses.

3.1.1 The Coordination for the Improvement of Higher Education Personnel (Capes)

The Coordination for the Improvement of Higher Education Personnel was established in July 11, 1951, in the Vargas government, by Decree No. 29,741, in order to "ensure the availability of skilled personnel in sufficient quantity and quality to meet the needs of public and private ventures which aim the country development"(Brazil, 1951).

At that time Brazil called for the manpower qualification due to its heavy development, stemming from its industrialization and its commercial relationship with the world's most developed countries such as the United States, Canada, Japan, Germany, France, England and others of Western Europe (Capes, 2011).

According to Amorim (1992), in the 1950s, Capes was created aiming at the coordination of a Post-graduation policy focused on the college professors' level improvement, but also to prevent the quality standard fall, brought about by the higher education expansion.

CAPES was set up in 1951 as a campaign, but its actions were unleashed only ten years later, in 1961. The institution has been developing, as from the 1970s, a number of evaluative experiences of master's and doctorate's courses in the country. The CAPES' evaluation

model follows experiences of higher education institutions in the United States (Bernardes & Melo, 2004).

Currently, the CAPES' activities are developed through four main lines of action:

- assessment of post-graduate studies - *stricto sensu*;
- access to and dissemination of scientific production;
- investments in the training of high level features in the country and abroad;
- promotion of national and international scientific cooperation.

The CAPES, within its field of action, set a standard for post-graduation programs that greatly contribute to the scientific development and growth in the country.

As the body responsible for the introduction and establishment of Post-graduation National Plans (PNPG), it summarizes the guidelines that govern the public policies for personnel qualification at Master and Doctoral degrees.

Edited every six years, the Post-graduation National Plans (PNPG) makes a diagnosis of the national post-graduation. Based on this evaluation, it is presented proposals for guidelines, scenarios for the system growth, targets and budget for the actions implementation. The current version of PNPG comprises the period from 2011 to 2020 approved by MEC (Capes, 2011).

3.1.2 CAPES Assessment System

The CAPES Assessment System for the Post-Graduation plays, since its implementation in 1976, a key role in the level increase of Brazilian Education, turning into the decisive factor for raising the quality, for the improvement and for the regulation of the master's and doctoral courses in the country. The evaluation carried out by Capes has followed the national

Post-Graduation evolution and provided important data for the investments policy in the Brazilian educational sector.

According to Capes (2011):

The assessment system, subject to continual development, serves as an instrument for the university community in the pursuit of a standard of academic excellence for the national masters and doctorates programs. The assessment's results provide the basis for policies development for the area of Post-Graduation and for the dimensioning of fostering actions (scholarships, supports, assistance).

Castro (2008), reflecting on his experiences as a Capes' former general director and researcher, asks about the directions that the Post-graduation has taken in Brazil. He considers it as the "greatest accomplishment of Brazilian education throughout its history" and believes that, since the 1980s, it has been undergoing a process to enhance its quality and quantity along the coming years.

The main purpose of the Assessment System is to get the Productivity Indicators of the Post-Graduation Studies in Brazil, which can be observed more clearly when we have in view the assessment system demands regarding the teachers and students' intellectual production and the students' formation through the average time for titling. Maccari *et al* (2009).

The programs data collecting is started by the system Capes Collection, through which the coordinators of Post-Graduation courses inform all the data in their programs. This work is coordinated by the Evaluation Committee, which has an evaluation form for each course containing: the program proposal, faculty, research activity, educational activities, students, theses and dissertations, and intellectual production. The assessment process also includes discussions per areas, aiming at improving the assessment and also a committee of visits, which

accompanies the courses development of on the spot (Carneiro & Lawrence, 2003).

For being of national coverage, the Capes assessment system often reflects distortions, characteristics of a country as large as Brazil. The evaluation concepts assignment must take into account, according to the V National Plan for Post-Graduation, the regional differences. Such guideline is an important element for the Post-Graduation development in some regions of the country (Saorim & Garcia, 2008).

According with Balbachevsky (2005), the Capes evaluation process was accepted as the most important quality benchmark for Post-Graduation programs in Brazil. The evaluation allowed the establishment of a connection between performance and successful achievements: the better the assessment reached by the program, the greater were its chances and its researchers' chances to get support in both scholarships and resources for research and infrastructure.

The Capes assessment has deeply influenced the referrals of Post-Graduation studies in Brazil. Not only the control system has been rapidly changing, but also the Post-Graduation policy has been considerably influenced by such a system.

3.1.3 The National Council for Scientific and Technological Development (CNPq/MCTI)

The National Council for Scientific and Technological Development is an agency of the Ministry of Science, Technology and Innovation (MCTI) dedicated to the fostering of scientific and technological research and the training of human resources for the research in the country. Its history is directly associated with scientific and technological development of contemporary Brazil.

The CNPq functional structure comprises of an Executive Board responsible for the institution management, and a Board of Directors responsible for the institutional policy. Besides participating in these bodies,

the country scientific and technological community also participates in its management through the Committees and Commissions of Scientific and Technical Advisory.

According to Barros (1998), in the early 1970s, CNPq was assigned the task of articulating the science and technology policy in Brazil. However Schwartzman (1992) considers that what is seen today as a system for Research Support, had its beginnings in the 70s, with the advent and consolidation of the main institutions that make up this system: CNPq, CAPES, the Financier of Studies and Projects (FINEP) and the State Foundations for Research Support (FAPs).

Among the several methods of research support, CNPq offers subsidies to scientific publications, support for researchers qualification through scientific exchange or through the promotion and attendance at meetings and scientific conferences.

In the total, the CNPq grants more than 93,000 scholarships of different academic modalities, ranging from undergraduate research up to productivity in research (CNPq, 2011).

Besides fostering the research and developing the scientific characteristics within the country, CNPq seeks to support agreements and exchanges with other countries in order to develop new researches.

As an example, it can be highlighted the Cooperation Programme Brazil - European Union (2010/2011) in the area of Information and Communication Technologies (ICT), the investment of which of R\$ 11.5 million comes from the FNDCT / Sectorial Fund-CT INFO. The CNPq and the Ministry of Science, Technology and Innovation initiative will enable researches development in strategic areas, besides enabling the interaction among researchers and companies networks from Brazil with major research centres in Europe.

4 THE BRAZILIAN POST-GRADUATION EXPANSION

According to Velloso (2004, p. 20), "post-graduation in the country has experienced remarkable growth in addition to greatly expand its scope as to the areas of knowledge. Formally established in the mid-60s, ten

years later, the number of Brazilian post-graduation courses was nearing one thousand". He further states that, according to data found in Martins (2003), 15 years later, in the early 1990s, this figure had already risen to nearly 1,500, covering all areas of knowledge.

In Table 3 below, it is shown the number of programs of academic masters, doctoral and professional master available in Brazil.

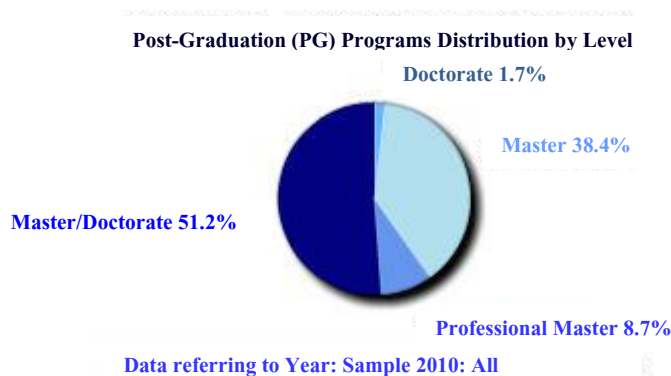


Table 3: Post-Graduation (PG) Programs Distribution by Level

Source: Capes (2011)

As it can be observed in Table 3, it is large the number of programs and post-graduation courses spread throughout all the regions of the country.

In addition to this large number of programs, the total number of courses evaluated by (CAPES) has grown 20.8% in Brazil in the last three years. Although the South-eastern Region still concentrates the largest number of courses, a total of 2,190, representing 53.4% and the higher proportion of courses considered to be excellent (78%) which are those that received grades 6.0 or 7.0 in the evaluation, it was the North Region of the country that registered the highest growth in terms of the number of courses: 35%.

The Southern Region is the second largest in number of courses, 810, and is also the second largest percentage of courses of excellence. From

among 810 courses, 91 were scored 6.0 or 7.0. (*O Estado de S. Paulo*, 2011).

According to the CAPES' President, Professor Jorge Guimarães, the reason for this disparity is historical and connected to the scientific and economic organization of the country, and also by the fact that the courses are undergoing consolidation in all the country Regions.

According to Capes (2011), from 2007 to 2010, the Brazilian Post-Graduation has graduated 100,000 masters, 32,000 doctors and 8,000 professional masters, a total of 140 000 titled.

In the Northeast, two states grew greater than or equal to 100% in their Post-Graduation courses. Sergipe more than doubled its number of courses by going from 13 to 27 (an increase of 107.7%). Other state that has doubled its number of courses in the last three years is Piauí, from 10 to 20 courses.

The Northeast Region has had, in all, 31.3% increase in its Post-Graduation since the last triennial assessment in 2007. The post-graduation *stricto sensu* education in this region consists of 672 courses of master degree, doctorate degree and professional master degree.

In the Center-West, the Brazilian Federal District brings together the largest number of courses. From a total of 270 courses evaluated in the region, 135 are from the Brazilian Federal District. The remaining 135 are spread over the states of Goiás (71); Mato Grosso (26) and Mato Grosso do Sul (38). (*O Estado de S. Paulo*, 2011).

On the basis of the data presented, it is clear that the National Post-Graduation system has been consolidating over recent years and is expanding rapidly towards the countryside. The most deprived regions are obviously those ones which are far from large urban centres.

Taking into consideration all the areas, there has been progress, albeit tenuous, and still insufficient in terms of the lessening of inequalities among regions. "The analysis of the growth rates in the number of courses shows that the growth was higher in the Northern region (15% per year), followed by the Center-west (12%), South (12%), Northeast (9.6%) and Southeast (6.3%). Despite the high growth rate of the North Region,

according to Oliveira Filho (2005), such increase was not sufficient to reduce inequalities among regions and especially among states.

Balbatchevsky (2005) agrees that these regional differences are noticed as an unfair inequality imposed by Brazilian society and have been subject to special policies and programs since the 1970s. These incentives end up by creating a tightly closed market, using varying criteria and investments for just a small numbers of researchers and not in the Post-Graduation programs themselves.

Researchers of these regions that are known as remotest regions end up by incorporating into their research agendas the socioeconomic problems most relevant to their region. This means that in addition to funds, what these regions need to develop, from an academic standpoint is a set of programs which might be able to acknowledge and encourage these regional differences and peculiarities, while also relying on the quality acknowledged in the programs of Brazil's central regions. Accordingly, Pardim and Maccari (2012), talk about the use of Information and Communication Technologies - ICTs, as well as tools for the promotion of Virtual Learning Environments (VLEs), as one of the viable solutions to reduce existing disparities in the Post-graduation courses.

Within this context, it is evident that the Post-Graduation implementation is quite recent and has developed within a complex political context in the last half century, having its expansion, and importance, increasingly accelerated and concentrated mostly in large Brazilian urban centres.

Today it is noticed that there is a particular focus on empowering the programs and the Post-graduation courses to leave the major urban centres and start heading for the countryside of Brazil.

5 THE POSTG-RADUATION AND THE PROSPECTING OF ITS SCENARIOS IN BRAZIL

To develop scenarios histories about multiple possible futures gives organizations conditions to face more appropriately the complex and uncertain futures, laying the foundation for more creative, comprehensive and long-term strategies, (Popcorn & Hanft, 2001). Thus, based on the prospective scenarios methodology, one can establish the strategies that will facilitate and speed up the future pathways of the environment or of the organizations.

The changes that have been transforming the educational systems of Brazilian universities are far away from keeping up with the fantastic speed of the changes undertaken by true economic and social revolutions triggered by powerful factors such as the demographic, economic, political, scientific, technological and their impacts on the old social and cultural patterns (Cunha, 1970).

Amidst this intensive debate about the role and purpose of the Post-Graduation studies in Brazil and regarding the quality of their academic proposals, at a time when it is demanded postgraduate programs which meet the wide range of social, technological, political and ecological challenges, it is of great significance to reflect on the current conditions and the desirable future for them.

The Post- graduation future is anchored in its specific history in Brazil and in the manner in which it is presented currently. In this sense, several questions have to be answered: What is the purpose and the nature of the Post-graduation studies, at a time of speeded up changes? What value does its product have for people, for organizations and for society?

The major dilemma to be tackled by the Post-graduation, especially at public universities, is to open up to new perspectives, curricular modalities and types of students, or to remain as an area reserved for the few, with selectivity criteria defined according to a single standard. Underlying this challenge is the issue of a perspective relating to the equity principle, such as social and ethical value, which presents itself as fundamental to the future of human societies and even as a condition for sustaining a process of civilized survival.

This paper, according to the set out methodology, has elected the Delphi method to exercise this research practices and the future visions in

order to produce a selection of variables that will influence the Brazilian Post-graduation on the way for 2020, the year the current National Plan for Post-Graduation (PNPG) ends, which for the first time, is elaborated for ten years.

The variables that have future, or facts that have future, selected by the Delphi method in scientific articles, Capes, PNPG, reports of the Capes' President and data from the Ministry of Education, were chosen by the authors as those that will most influence the context of the Post -graduation courses over the next 10 years.

1) The search for quality: the legitimate aspiration of our society growth needs to be integrated into a comprehensive view of development, with respect to environmental sustainability and to the progressive qualification of Brazilian citizens for a life in freedom and dignity. The Post-Graduation challenge will be how to change its current paradigm of teaching, still deeply based on theories and structures of the past that explain the present only, but cares very little about the future, in forming their scholars.

2) Reduction of regional differences: this situation, also highlighted by the Capes' President, Professor Jorge Guimarães, emphasizes the utmost importance of the expansion of courses and programs recognized and enjoying of a high reputation in the different Brazilian regions and applied according to each region reality. To encourage the growth of availability of courses that meet certain regions environmentally, technologically and socially will be a crucial role played by the fostering agencies for the establishment of scientific and technological straightness among the regions. To increase the use of the Information and Communication Technologies - ICTs and to promote the Virtual Learning Environments - VLE - present themselves as a strong trend towards the Post-Graduation development of. This coupled with the possibility of offering distant learning programs and courses, as long as they meet the quality requirements.

3) Internationalization of programs: the increase and the facility that Brazilian students and teachers in do a master degree, a sandwich doctorate degree or postdoctoral degree in foreign countries have provided huge demand and have facilitated the costs and the scholarships' distribution. But despite this growth, the reverse flow of foreign students coming to Brazil is little noticed by large programs. Therefore there is the need to enhance the work international cooperation network through the execution of cooperation agreements with foreign institutions that make it easier the exchange of scientific initiation students (graduation students), master students, doctorate and post-doctorate students, in both directions.

4) Corporate Incentive grants: It is missing in Brazil a policy for corporate companies, which should help the higher education as there are many researchers at universities and very few researchers in corporate businesses, as opposed to what happens in the most developed countries. Brazil publishes a large number of articles, but records few patent applications. In order to solve this it would be necessary to encourage the training of teachers and doctors also for domestic corporate companies. To do so, it would be important to establish and enhance partnerships among the Federations of Industries, Commerce and Agriculture, and the Commercial, Industrial and Agricultural Associations across the country for the establishment of the areas of mutual interest that could be better addressed in the academic research environment in the programs and post-graduation courses in Brazil.

5) Assessment criteria and new philosophy: although it is considered successful the model in force, currently the programs funding is associated with their performance. But it is important to notice that there are new features in the programs and so the assessment must meet this demand. One of these innovations that impact the assessment is the multidisciplinary programs, i.e., they are more thematic and less based on subjects, as it occurs with traditional courses. The idea is that the Capes Superior Council opens other ways of evaluating the Post-graduation courses, which take into account assessment new philosophies once the assessments today are

extremely focused on the publication of articles in high concept (high impact) journals, in the Quails, and this fact hinders the access of researchers from institutions outside the major urban centres, and also that Capes stimulates the researches regionalism and gives more support and funding to other specific areas of knowledge, not only the quantitative ones, besides incorporating the assessment criteria for the programs and courses done as distant learning courses...

6) Internationalization of production: Analyzing the data it is clearly seen that it is missing in Brazil the dissemination of its scientific production: the country possesses volume of publication but does not have a wide international representation. In this regard, it is not enough to publish, it is necessary institutional policies at universities and at the government to internationalize the production from a scientific viewpoint and make it more practical in the context of its use by society in general and in particular for the country development.

7) Labour market and the Post-Graduation: today we are experiencing a society of knowledge and the "learn how to learn" is an ongoing process that lasts a lifetime. According to Brasil (2011) quoting data from FINEP, in 2006, 132.420 students joined the post-graduation in Brazil. In 2010, this number increased by 21.6%, reaching 161,068 students. Considering only the Federal Universities, the variation was even higher, reaching 31%. Despite this historic, indicators from the National Survey by Household Sampling (PNAD), point to the risk of discontinuity on the growth of this number and, consequently, a risk of discontinuity in the country scientific development. According to the 2005 Survey, the majority of young people as of the age of 19 only work. The portion that continues to study, especially those ones who will attend graduation and post-graduation do not exceed 2% of the population. The student must be encouraged since graduation to go to the post-graduation courses, through the increase of the scholarship programs, through their involvement in the researches

being undertaken, through their integration with the existing research centres, through the expansion and acceptance of the academy towards the teaching profession internship, among others. This change in culture and behaviour of IES will have to become the natural path for students and responsible for their arrival to the labour market, competently and with adjustments to the competitive and globalized process in which one lives.

8) Demographic processes and aging: medical and technological advances have extended the human lifespan beyond 100 years old. As a result, the age concept to retire will no longer exist as it is known today. The university must be prepared to recycle these new employees of the third age or, who knows, the fourth age (a society of Methuselahs) so that they are enabled to occupy new positions and are able to manage the leisure enjoyment in order to collaborate with governments to deal with the "social turmoil" caused by a growing and active population who is nearly 100 years old and who will occupy themselves, entertain themselves, invest and vote in the new economic and social environment. For this reason, education and post-graduation will be fundamental in the development of academic structures that absorb part of these "new elderly" researchers and citizens of the future.

9) China determining factor for competitiveness: China has become Brazil's largest trading partner since 2009, surpassing the United States after decades. However, relations between Brazil and China indicate more than the change in the hierarchy of Brazilian trade partners, it indicates also a change of both, in the Brazilian foreign relations and in the very balance of forces in the international system. Despite the increased political and economic dynamism between Brazil and China, there has been occasional or low academic involvement with this region. There is therefore a complete marginalization of Asia within Brazilian education, at all levels, both in the primary cycle, and the secondary and even in the university level in all of its learning environments, research and extension. The lack of academic specialization in the area for Asian studies implies loss of professional opportunities because there are hardly a syllabus in the various university

courses that provides opportunities for application of this expertise and, why not? the opportunities for hiring.

10) The research outside university: yes, there is life out there! For this the Brazilian universities faculty have to go to the marketplace, where Brazilian companies are clamouring for new professionals and new innovations. It has been noticed that CAPES has directed strong incentives to the Professional Masters programs aimed at the training of highly qualified professionals for the labour market. On the other hand, companies need to be encouraged to open their doors most widely and allocate more funding for research, as the Brazilian researcher needs to know more deeply the country corporate organizational life. In making this change, i.e., taking academic knowledge to the corporate organizations and bring the corporate practice to universities we cause the increase in the competitiveness of the national organizations and expansion of the range of new knowledge in the Brazilian educational institutions.

The variables that lead to the future, outlined above do not exhaust the subject, but have been scored in order to alert universities and especially the Post-Graduation Programs and all stakeholders in the context of Brazilian organizations, to the message that the future begins in the strategic actions of today to help to structure for tomorrow.

6 FINAL CONSIDERATIONS

This topic begins with a question: what can be expected from the Post-Graduation in 2020?

The Brazilian university lives a rare moment of innovation and expansion, suitable to review practices and rethink structures. Brazil has improved in recent years, but still does not have the kind of obsession that is making China one of the world's greatest powers and show it to the

country will be the mission of political, institutional and national business leadership. (Giannetti, 2010)

As a result, the country is still far from an education system capable of sustaining the outbreak of innovation needed to position itself in the global market as something more than a large exporter of *commodities*.

With the development of the Post-Graduation, the graduation is also privileged on the inclusion of innovative methodologies and subjects, in that it is trained a new professional, competent, efficient, intuitive, critical and aware of his social role, more involved with the research and holding a greater decision insight.

Despite the advancements, even though timid, in education in Brazil, there is still much to be done. It is necessary a complete modernization of teaching practices and curricula, the appreciation of the teaching career, especially in primary education, a better training of teachers, the establishment of an infrastructure of quality, that is, a continuous improvement of the entire national education system in all its stages, in other words, from kindergarten to the Post-graduation environment. It is a huge task that requires a lot of effort, dedication and long-term investment. The effects will be felt throughout the next generations.

It is within this environment of challenges that the universities, government and society can and must use the scenario technique, because it assists these institutions by identifying their key social and economic variables, holders of the future, preparing them for the different possibility of future events by giving them conditions for more strategic and proactive decision making, with greater effectiveness and thus making them suitable for the development of an appropriate, flexible organizational planning with the indispensable vision of future.

However, the debate needs to be further developed in the academy, and the guidelines and actions should be implemented immediately, in order to promote the necessary advancements in the strengthening of the Brazilian education quality of today, and especially in the time to come.

From the perspective of those who advocate the construction of a more fair and egalitarian society, the way the Post-graduation has been developed today must undergo radical changes. It has been questioned, at

this moment, aspects related to the purposes, proposals, most innovative philosophies, new educational structures, curricula best suited to modernity, new ways of performance, use of new technologies for teaching, researches more focused on the needs of organizations and quality programs that are socially relevant to the Brazilian society, expected from the Master and Doctorate degrees in the country.

In addition to the issues raised above, the variables previously discussed, refer back to the strategic management more focused on the future and for the need to find new paths for the post-graduation and its indispensable involvement to help Brazil to be part of the largest economies in the world, at the start of this XXI century, with knowledge, technology, innovation, ethics and respect to the environment.

What is expected of the post-graduation by 2020 is that it operates with an enlarged social conscience, be alert to the conditions for meaningful learning and to the new human ages, where studying and working do not exclude each other, and those who work in it need to use their skills to find alternatives of transformation as from innovative practices in the master and doctoral programs to such an extent that its contribution to the consistent qualification of new and diversified groups of professionals, whose different demands begin to put themselves in the present, be indeed relevant to a renewed and innovative Brazil of the future.

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