

**THE BRAZILIAN POLICY OF FUNDING SCHOLARSHIPS ABROAD:
THE CASE OF CAPES**

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ABSTRACT

This thesis is a study on the Brazilian policy of funding scholarships abroad for postgraduate studies. The main purpose of this research is to analyse the changing rationale for this type of investment over time. The focus of the investigation is on the Programme of Scholarships Abroad of CAPES, a major funding agency of scholarships for postgraduate studies in Brazil and abroad.

To do this, the research was conceptualised in two distinct layers of investigation. The first layer referred to the historical processes that have shaped the issue of education abroad in Brazil. In the other layer of investigation, the way the policy of CAPES was and is put into practice was examined. To link these two layers of investigation, research interviews with people who know the Brazilian academic environment well were conducted. In order to develop these themes, the thesis has been strategically divided into six chapters.

Chapter One is the Introduction when the problem is located, the strategy adopted to develop the topic is explained, and the concepts most used in the research are defined. Chapter Two provides a historical review of the custom of studying abroad among Brazilian upper classes, from colonial times up to the early

twentieth century. Chapter Three describes the emergence of an institutional infrastructure to build up high-level personnel, from the fifties onwards. Chapter IV provides a type of more detailed information on what scholarships abroad consist in practice, where a set of numerical data is offered. Chapter V is the analysis of the interviews collected during the fieldwork.

Finally, the closing Chapter VI is an attempt to bring together the evidence gathered throughout this study and to present an overall interpretation of the role of the policy of scholarships in Brazil.

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Chapter I

The Introduction

The purpose of this thesis is to analyse the policy of CAPES,* a major federal agency in Brazil,¹ for the funding of scholarships for postgraduate studies in national and in foreign universities.² Over several years, this policy has underpinned the education of Brazilians abroad, as a means of developing high-level human resources.³ The focus of the study will be on the programme for ‘scholarships abroad’.

The strategy of funding postgraduate study abroad was first adopted in the early fifties, with the purpose of building up manpower rapidly and efficiently.⁴ Governmental policy-making at that period of time was framed by the political thinking of the post-World War II years that a highly educated workforce was crucial for economic expansion.⁵ In this context, the Brazilian government launched a range of policies to educate people in advanced research to meet the demand for specialised manpower, given the growing industrialisation of the nation. In this context, CAPES was created in 1951 to foster the education of lecturers, researchers, and professionals in order to improve the public system of universities.

* CAPES means The Foundation for the Improvement of High-Level Human Resources

In the seventies, there was another wave of investment in the training of Brazilians in foreign universities. In these years, however, scholarships abroad were awarded in terms of the political agenda of the military government. The building up of a scientific and technological capability was seen as crucial for the accomplishment of the government's goals of economic growth and national security. Consequently, scientific research as a means for the advancement of technology underlined greater investment in the education of scientific manpower in foreign universities

As a result of the association of the need of educating people abroad with these broad political projects, the theme of 'economic development' has provided a rationale for the funding of scholarships overseas.⁶ In the fifties, the lack of people with higher education degrees was regarded as an impediment to industrialisation. Thus to expand higher education, quantitatively and qualitatively, to build up a critical mass, was the primary purpose of the policy of scholarships abroad. In the seventies, the links between the need for educating Brazilians in foreign universities and the government's political project were sharper and better defined. The aim at this moment was to train people in the technological areas that were considered of strategic interest for the construction of a politically and economically autonomous nation.

At the present moment, however, the national scenario no longer provides a visible purpose for the policy of scholarships abroad. Brazil has changed in many aspects since CAPES was founded in the 1950s. After nearly twenty years of a dictatorship regime, democracy has been reinstalled. This has brought about new priorities in governmental policy making. Also, the Brazilian economy has expanded and achieved such a complexity

that the training of a relatively small group of people abroad is unlikely to have major impact on the economy. Education has been changing accordingly. The growth of higher education that occurred in the last five decades has given rise to a postgraduate sector able to respond to the training of the overwhelming majority of Brazilian master and doctoral students.⁷ If, in the present Brazilian context, neither economic motives, nor the lack of a formally organised postgraduate system validates such investment, why does the Brazilian government continue to invest in the education of people in foreign universities?

To answer this question, an analysis of the political motivation on the part of the government that had sustained the investment on this type of education over time was required. To do that, it was necessary to address the broad context embedding the issue of scholarships abroad in Brazil. Thus, the study needed be conceptualised within a broader social and political framework. However, the investigation of the elements of this policy at the federal level did not allow other aspects of the topic to be investigated. A wide set of issues significant for the understanding of the problem was left aside.⁸ For instance, the characteristics of the students studying abroad were relevant to the location of the problem in its Brazilian context.

To know what type of people were granted a scholarship to study in a foreign university, their destinations, and what type of research was undertaken abroad was also necessary to specify the problem. These are matters linked to the way the programme of scholarship abroad was and is handled in practice. Hence, the study of CAPES - the institutional arena where this policy is implemented - was thought as necessary for a more thorough understanding of the theme. This, however, was a difficult task.

As a staff member of CAPES, the author has noticed that while the education of scientists and academics in foreign universities has been a permanent practice in Brazil, the policy of scholarships abroad lacks definition in terms of the aims to be accomplished. In fact, although the term 'policy' is used throughout the thesis, there is little evidence to suggest that the funding of scholarships abroad has ever been conceptualised as a policy. There are no official guidelines with stated objectives and the means by which this practice should be implemented. In the documents, the purposes of the scholarships for studies abroad are vague and the investment in this type of education is justified only in national governmental plans in terms of the need for qualified manpower to meet economic goals. There is no further documentation stating how this should be achieved, nor is there any explicit concern about the contributions to the nation of people trained abroad. This has culminated in an absence of empirical data on the professional careers of people educated overseas.⁹

However, such a lack of written guidelines does not mean that the funding of overseas scholarship is unregulated. On the contrary, the programme of scholarship abroad of CAPES follows an unwritten set of norms. These norms encompass a process of recruitment of candidates within which, in principle, any higher education graduate is eligible for federal financial support. In practice, the process of selection is highly competitive.¹⁰ Bursaries abroad are awarded by 'peer review'¹¹ of the scientific merit of the research project, of the quality of the foreign institution and of the relevance of the theme of investigation to national interests. These are the official criteria guiding the award of the scholarships.

This thesis will not question the value of overseas education as a means of building up qualified personnel. For centuries, scholars have crossed frontiers in search for knowledge and the benefits of living in a different cultural environment are well recognised in the literature.¹² Also, the usefulness of foreign studies for improving academic conditions is a practice that has been adopted even in relatively rich educational environments.¹³ Neither will this study question the reliance on peer review for the analysis of the scientific merit of the research proposals presented to CAPES. The pros and cons of such a practice are also well acknowledged in the literature.¹⁴

The point to be made is that the way a policy is implemented is crucial for the outcomes to be achieved. The implementation of a public policy involves many levels of motivation, namely national, institutional and individual. These are not always clear and sometimes they can overlap each other and interfere in the outcomes to be yielded.¹⁵ Specifically, in matters related to the production of knowledge, as in the case of postgraduate training, the interaction between local academic culture and government can also influence the way scientific activity is organised or managed.¹⁶ In the case of CAPES, the lack of clear policy definition, the absence of evaluation on the results of the investment made, combined with a remarkable emphasis on a set of tacitly accepted norms and procedures, are matters that raise concern. Consequently, there have been criticisms of the funding of scholarships abroad on the basis that it is too expensive and not justifiable in view of the national postgraduate system that, presumably, is able to meet the demand for this type of education.¹⁷

Summing up, the focus of this thesis is on the Brazilian governmental policy of providing scholarships for postgraduate studies in foreign universities. The main purpose of this research therefore is to analyse the rationale for this type of investment in Brazil at the present time. Therefore, the issue of scholarships abroad will be dealt with, primarily, from a Brazilian perspective in policy making.

In order to do that, the research was conceptualised in two distinct layers of investigation.¹⁸ In the first layer, the political motivation that led the Brazilian authorities to invest in this type of education over time was examined, so that the rationale for this strategy could be traced. In the other layer, the focus of the study was on the programme of scholarships abroad of CAPES and the way this policy is implemented in practice.

This conceptual approach has arisen from the very nature of the theme to be researched and also from the peculiarities of the Brazilian context.¹⁹ The study of a theme linked to the education of people in postgraduate studies, and thus to scientific research, required an understanding of the ecology of the production of knowledge in Brazil.²⁰ This could only be achieved by addressing the social processes in which Brazilian scientific activity is embedded.²¹ On the other hand, however, the lack of factual information called for a research strategy that would allow the researcher to go beyond the governmental ‘discourse’ and to look for the elements that have shaped this policy in practice.²² The research design needed to respond to such a conceptual approach and, hence, the investigation was also divided into two distinct perspectives.

One of them is the historical review that will provide the broad social and political context that has shaped the policy of scholarships abroad, so that a contrast between past and present rationales could be traced. In this case, a descriptive narrative was adopted, that focused mostly on matters relating to the development of the Brazilian higher education system, in view of its implications for the development of high-level human resources.

The other perspective is institutional, where the work of CAPES served as the main reference point for the description of what scholarships abroad consist of and what the profile for the Brazilian student overseas is. Also in this part of the thesis, the patterns that have arisen from the data are compared with the international flow of students worldwide and to the main tendencies in the phenomenon of ‘brain drain’, a major concern in the issue of foreign education.

Nevertheless, to make a link between these two distinct styles of narratives, another type of information was required. The historical review and the information on student numbers and so on set the contextual boundaries of the problem. They did not, however, provide access to evidence beyond official documents. The construction of a ‘meaning’ for the issue of scholarships abroad in Brazil required taking into consideration the views of the people most likely to be affected by this policy.²³ Thus, research interviews were conducted with Brazilian academics, scientists and policy makers in order to obtain their opinions on the relevance of this policy for Brazilian society.

To do what has been described above, this thesis has been strategically structured in six chapters:

Chapter One is this Introduction where the problem is located and explained. The approach chosen for the research is discussed, the strategy to develop the topic presented, and the concepts clarified.

Chapter Two describes the custom of studying abroad among the upper classes in traditional Brazil, from colonial times up to the early twentieth century. The argument presented in this chapter is that a series of ‘contextual factors’, among which are the lack of a formal educational organisation, influenced the outflow of the Brazilian elite to foreign universities.²⁴

Chapter Three describes a turning point in the evolution of overseas education in the Brazilian context when an institutional infrastructure was created to build up high-level human resources. It is argued that from the fifties onwards, when CAPES was created, the rationale for the training of people in foreign universities was incorporated into broad governmental plans and became primarily framed by national political projects.

Chapter Four describes how the programme of scholarship abroad of CAPES works in practice and the types of scholarships granted. It is argued that the data reveal well-defined patterns in the management of the scholarships overseas. Also in this chapter, these patterns are compared to the international flow of foreign students and to the main tendencies in the phenomenon of ‘brain drain’.

Chapter Five provides the analysis of the interviews done with people who know the Brazilian academic environment well. The methodological guidelines and ethical procedures that were adopted during the research interviews are also explained.

Chapter Six is the conclusion of this thesis, where the evidence gathered throughout the research permits an overall interpretation of what the funding of scholarships abroad is about in the Brazilian context. This chapter is also an attempt to provide a theoretical basis for further discussions on the issue of the training of academics in foreign universities, as part of public policies in peripheral societies.

¹ CAPES was not the only agency created in the fifties. The Council for Scientific Research-CNPq is another federal body to foster the education of scientific manpower. However, because CAPES is the major funding institution of scholarships for postgraduate studies in Brazil and abroad, this research will be concerned mostly with its policies and procedures. Whenever necessary, however, the work and the data of other agencies will be used and, in this case, fully acknowledged. For the history of CAPES, see Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. *A Formacao de Pessoal de Nivel Superior e o Desenvolvimento Economico [High Level Manpower and Economic Development]*. Rio de Janeiro: CAPES. For an overview on the creation of CAPES, see Rogerio de Andrade Cordova. 1996. *A CAPES e sua Trajetoria [CAPES and its History]*. Brasilia, DF: unpublished.

² A scholarship abroad consist of monthly allowances for living expenses in the foreign country, the payment of academic fees, return air travel ticket and, in some countries, health insurance for the grantee and family. Postgraduate studies in this thesis mean master and doctor's degrees, post-doctoral attachments and doctorate sandwich degrees. The latter consist of a project of research that include a few months abroad but not the full length of a regular doctoral training. There are some types of scholarships for non-degrees studies, mostly in the fields of the Arts. These, however, will be left out of this study because they were adopted very recently and follow different criteria.

³ The terms 'high-level human resources' or 'high-level manpower' mean people with postgraduate degrees and will be used interchangeable throughout the thesis.

⁴ America Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op.cit.

⁵ The political thinking in less developed countries in the post-war years was influenced by the emergence in the industrialised nations of new approaches to science as public policy and also by research highlighting the role that a well-educated workforce could play in economic growth. These studies reinforced the idea that an endogenous scientific capacity was essential for non-central societies in their task of getting rid of poverty and backwardness. See Ina Spiegel-Rosing and Derek de Solla Price, ed. 1977. *Science, Technology and Society: a Cross-Disciplinary Perspective*. London: SAGE Publications.

⁶ 'Economic development', 'economic growth' and 'autonomous development' will be used throughout the thesis in a broad sense, following the term used in the official documentation in Brazil meaning a process of achieving a standard of life for Brazilian society compatible with that of the industrialised nations. The debate on the concept of development applied to a non-industrialised nation will not be explored because it constitutes matter beyond the purpose of this thesis. See Fernando Henrique Cardoso. 1973. *O Modelo Politico Brasileiro e Outros Ensaio [The Brazilian Political Model and other Essays]*. 2nd ed. Sao Paulo: Difusao Europeia do Livro, and Enzo Faletto and Fernando Henrique Cardoso. 1979. *Dependency and Development in Latin America*. Berkeley, CA: University of California Press. Celso Furtado. 1963. *The Economic Growth of Brazil*. Berkeley: University of California Press;

⁷ Postgraduate sector means a system of courses for master and doctors' degrees mostly established within the federal institutions of higher education. The main exceptions are USP and UNICAMP, both linked to the state of Sao Paulo that offer postgraduate courses, and the private catholic faculties, such as PUC of Rio de Janeiro. The overwhelming majority of higher education institutions in Brazil is private and does not offer advanced research training. For the legislation for postgraduate education, see FUNADESP, Fundacao Nacional de Desenvolvimento do Ensino Superior Particular. 2001. *Legislacao e Normas da Pos-Graduacao Brasileira [Legislation and Norms of the Brazilian Postgraduate Education]*. Brasilia, DF: FUNADESP. For an analytical approach see Roger de Andrade Cordova, Divonzir Arthur Gusso and Sergio Vasconcelos Luna. 1986. *A Pos-Graduacao na America Latina : O Caso Brasileiro [Postgraduate Education in Latin America: The Brazilian Case]*. Brasilia, DF: UNESCO/MEC. For more general accounts see, Daniel C. Levy 1986. *Higher Education and the State in Latin America: Private Challenges to Public Dominance*. Chicago: The

University of Chicago Press and Claudio de Moura Castro and Daniel C. Levy. 2000. *Myth, Reality and Reform - Higher Education Policy in Latin America*. Washington, D.C.: Inter-American Development Bank.

⁸ Paul A. Sabatier. 1993. Top-Down and bottom-up Approaches to Implementation Analysis. In *The Policy Process*, edited by M. Hill. New York, London: Harvester Wheatsheaf.

⁹ From 1997 onwards, there have been consistent attempts from CAPES to evaluate matters related to the training of people abroad. A programme for evaluation and follow up of alumni was created, the PAAEBEX-Preograma de Avaliação e Acompanhamento de Ex-bolsista no Exterior [Programme of Evaluation and Follow up of ex-Students Abroad]. The data presented in this thesis are mostly from this programme. Also, there have been some studies on problems linked to the adaptation of Brazilians to the foreign academic environment. These constitute general reports on issues such as the educational condition offered by foreign institutions. See Fernando Spagnolo. 1999. Bolsistas Brasileiros no Exterior: Características Pessoais e Profissionais [Brazilians Overseas: personal and professional characteristics]. *INFOCAPES*. Vol. 1. Fernando Spagnolo and Takako M. Tundisi. 1998. Doutorado no Exterior: Vantagens, Problemas e Perspectivas na Ótica dos Ex-bolsistas da CAPES [Advantages and Problems of Doctor Degree Done Abroad from CAPES' Alumni Perspective]. Brasília: CAPES. For an overview of the problems encountered by CAPES to follow up the return of people educated abroad. See Maria Auxiliadora Nicolato. 1995. *Acompanhamento de Ex-bolsistas no Exterior* [Follow up of Brazilian Overseas Alumni]. Brasília, DF: CAPES. There have been some individual efforts to analyse the benefits of such policy. For a cost-benefit approach on the training of Brazilians biochemists abroad see Leopoldo de Meis and Paulo H. Longo. 1990. The Training of Brazilian Biochemists in Brazil and in Developed Countries: Costs and Benefits. *Biochemical Education* 18 (4):182-188. See, also, Hartmut Gunther, 1985. Exequibilidade dos Estudos no Exterior: uma comparação interdisciplinar e internacional [Aplicability of Study Abroad: an interdisciplinary and international comparison]. *Ciência e Cultura* 37 (3):394-405.

¹⁰ And not so democratic in view of the characteristics of the Brazilian higher education system. See Jerry Haar. 1977. *The Politics of Higher Education in Brazil*. New York, N.Y.: Praeger Publisher.

¹¹ 'Peer review' will be defined as 'any method of judgement of (a portion of) someone's work by one or more other individuals who are supposed to be knowledgeable about this field of work, usually from working in the same field, and that relies solely or predominantly on the judge's (or judges') statements. In John Brennan, Elaine El-Khawas and Tarla Shah. 1994. *Peer Review and the Assessment of Higher Education Quality: An International Perspective*. London: The Open University, p. 9.

¹² The training of people at postgraduate level overseas is only one aspect of the extensive literature on foreign education. There are a great number of studies, papers, reports and dissertations on the various aspects related to the experience of studying in another country. These studies are mostly from the industrialised nations and, thus, adopt their perspective on the problem. Over half of the literature is produced in the United States of America because of the great attraction of this country to foreign students. The other high production of research on international education has been sponsored by the West European nations and comes mostly from institutions such as the OECD – Organisation for Economic Co-operation and Development, the Overseas Students Trust and the British Council (UK), the DAAD – German Academic Exchange Service, the European Institute for Educational and Social Policy (Belgium) and also UNESCO-United Nations Educational, Scientific and Cultural Organisation. Nevertheless, despite the large number of studies available on themes such as the psychological impact of the experience of living in another culture or problems related to adaptation in an alien environment, there are few analyses of a scheme of training high-level human resources abroad as a public policy from a sending country perspective. Moreover, most of the research on this topic lacks theoretical grounds. According to Teichler:

Irrespective of the countries involved, most of the research available on academic mobility and international education seems to be occasional, coincidental, sporadic or episodic. Admittedly, organisations in charge of academic mobility that perceive occasional problems faced by certain programmes, or are sporadically in favour of documenting the

achievements of their activities, sponsor research in this area here and there. However, they very rarely do so on a continuous systematic basis. Instead, individual scholars get involved for a short period only in a single research project devoted to academic mobility or its related themes, with the names of no more than a small handful recurring frequently in the corresponding research bibliographies. (Ulrich Teichler. 1996. Research on Academic Mobility and International Cooperation in Higher Education - An Agenda for the Future. In *Academic Mobility in a Changing World*, edited by P. Blumenthal et al. London: Jessica Kingsley, p. 341.)

For studies on the movement of scientists and researchers see, for example, Charles V. Kidd. 1983. The Movement of Younger Scientists into and out of the United States from 1967 to 1980: Some Aspects of the International Movement of Scientific Knowledge. *Minerva* XXI (4):387-409; UNESCO. 1971. *Scientists Abroad*. Paris: UNESCO; and, also, Michael J. Moravcsik. 1973. Foreign Students in the Natural Science: a Growing Challenge. *International Educational and Cultural Exchange* 9:1-45. For a view of overseas education from the point of view of a receiving country, see Gareth Williams, Martin Kenyon and Lynn Williams, ed. 1987. *Reading in Overseas Student Policy*. London: Overseas Students Trust. For a view from sending nations see Viswanathan Selvaratnam. 1988. Higher Education Co-operation and Western Dominance of Knowledge Creation and Flows in Third World Countries. *Higher Education* 17:41-68. David G. Scanlon, ed. 1960. *International Education - A Documentary History*. New York: William Byrd Press.

¹³ See Timothy Carlson and Dominique Martin-Rovet. 1995. The Implications of Scientific Mobility Between France and the United States. *Minerva* 33:211-250; and also Elinor G. Barber, Philip G. Altbach and Robert G. Myers, ed. 1984. *Bridges to knowledge: foreign students in comparative perspective*. Chicago: The University of Chicago Press.

¹⁴ G. R. Evans 1999. *Calling Academia to Account: rights and responsibilities*. Buckingham, UK: SRHE and Open University Press.

¹⁵ According to Cerych and Sabatier, "The fusion of these distinct interests can make it difficult for public administrators to maintain the predominant motivations throughout the process of policy application. Between the initial policy decision up to the final service or product, there is an implementation process that can be affected by most predominant or prestigious groups. Therefore, the outcome of a public policy does not necessarily relate directly to its respective original goal." In Ladislav Cerych and Paul Sabatier. 1986. *Great Expectations and Mixed Performance - The Implementation of Higher Education Reforms in Europe*. Stoke on Trent, UK: Trentham Books, p.16. For more, see also Bill Jenkins. 1993. Policy Analysis: Models and Approaches. In *The Policy Process: A Reader*, edited by M. Hill. New York, London: Harvester Wheatsheaf. John Fitz, David Halpin and Sally Power and. 1994. Implementation Research and Education Policy: Practice and Prospects. *British Journal of Educational Studies*, March, 53-69. Paul A. Sabatier 1993. Op.cit., and Ignacy Zsaniawski. 1982. Cross-Cultural Exchange: How Students Can Frustrate the Aims of Study Abroad Programmes. *International Review of Education* 28:373-376.

¹⁶ The literature on the interaction of academics with themselves, with the government and with the market place is extensive. See Tony Becher and Paul R. Trowler. 2001. *Academics Tribes and Territories*. 2nd ed. Buckingham: SRHE/Open University Press. Burton R. Clark, 1977. *Academic Power in Italy: bureaucracy and oligarchy in a national university system*. Chicago: The University of Chicago Press; Eric Ashby. 1958. *Technology and the Academics: an Essay on Universities and the Scientific Revolution*. London: Macmillan; Derek J. de Solla Price. 1963. *Little Science, Big Science*. New York: Columbia University Press; For an approach from the perspective of a peripheral society see Stephen C. Hill. 1977. Contrary Meanings of Science - Interaction between Cultural and Personal Meanings of Research in a Developing Country Scientific Research Institution. In *Perspective in the Sociology of Science*, edited by Stuart. S. Blume. Chichester: John Wiley & Sons, p.199.

¹⁷ The cost of a student abroad - approximately US\$ 100,000 for a full PhD in a foreign university- is estimated to be three times higher than the training done in national institutions. For more, see Geraldo Nunes

Sobrinho and Yuri Lopes Zinn. 2000. *Dos Custos Financeiros da Formacao de Doutores no Exterior e Consequencias nas Politicas e Programas de Pos-graduacao* [Financial Costs of the Training of Doctors Abroad and its Consequence for the Policies for Potgraduate Education]. Brasilia: CAPES.

¹⁸ The choice of a qualitative paradigm of research will imply following the basic assumptions guiding its methodology. The antagonistic view of qualitative versus quantitative approaches has been questioned by contemporary social scientists who have been more concerned with a combination of methods that makes use of the best of each approach. The conventional view of qualitative approach, however, will be applied to this thesis for simplicity purposes. For more on the implications of paradigms for methodologies see Yvonne S. Lincoln and Egon G. Guba. 1985. *Naturalistic Inquiry*. Beverly Hills, CA: Sage Publications, especially Chapter 8. For more on this theme see Louis Cohen and Lawrence A. Manion. 1989. *Research Methods in Education*. 3rd. ed. London: Routledge, p.42. For more on paradigms, see Thomas S. Kuhn. 1963. Scientific Paradigms. In *Sociology of Science*, edited by B. Barnes. Harmondsworth: Penguin Books Ltd, pp.80-103.

¹⁹ For an analysis on the transformation of political and administrative aims into theoretically-based research hypothesis linked to the training of people abroad, see Breitenbach, Diether. 1970. The Evaluation of Study Abroad. In *Students as Links Between Cultures: a cross cultural survey based on Unesco studies*, edited by I. Eide. Oslo: International Peace Research Institute/Unesco, pp. 70-89. The training and experience of the researcher, his or her 'worldview', the audience for the study and the type of data available were some other factors influencing the choice of the research approach. John W. Creswel. 1994. *Research Design - Qualitative & Quantitative Approaches*. London: Sage, p. 8.

²⁰ The term 'scientific research' and 'scientific activity' will be referred to throughout the thesis and means the type of 'pure' science done mainly in the universities. Although the definition of 'pure' versus 'applied' science has been disputed within the literature, such distinction will be adopted in this study for clarity purposes. For more on the theme see Stuart S. Blume, ed. 1977. *Perspective in the Sociology of Science*. Chichester, Great Britain: John Wiley & Sons; John Ziman. 1984. *An Introduction to Science Studies: the Philosophical and Social Aspects of Science and Technology*. Cambridge, UK: Cambridge University Press, and Ina Spiegel-Rosing and Derek de Solla Price, ed. 1977. Op.cit.

²¹ A classic reference to the broader context involving the development of science is the work of J. D. Bernal 1939. *The Social Function of Science*. London: Routledge & Kegan Paul. For studies on the production of knowledge in non-central societies see Francisco R. Sagasti. 1979a. *Technology, Planning, and Self-Reliant Development - A Latin American View*. New York: Praeger Publishers, Michael J. Moravcsik. 1975. *Science Development - The Building of Science in Less Developed Countries*. (2nd ed.) Bloomington, Indiana: Pasitama-Program for Advanced Studies in Institution Building and Technical Assistance Methodology, and Hebe M. C. Vessuri. 1986. The Universities, Scientific Research and the National Interest in Latin America. *Minerva* XXIV (1):1-35. John Ziman. 1971. Science in Developing Countries. *Minerva* IX (1):33-55.

²² The term 'discourse' will mean the bureaucratic justification for overseas training, extracted from governmental plans and legislation, implying that this type of training was meant to build up highly qualified manpower for economic purposes.

²³ 'Meaning' is a mode of understanding that involves alternative conceptions of reality in which the subject matter is no longer objective data to be quantified, but meaningful relations to be interpreted. Steinar Kvale. 1996. *Interviews - An Introduction to Qualitative Research Interviewing*. Thousand Oaks, California: Sage, p. 11.

²⁴ 'Contextual factors are factors that cannot be ascribed to current or recent government policies; they are a consequence of the country's past history, cultural and social features, resources, geography, and so on, and they are modifiable only in the long run.' Francisco R. Sagasti. 1979. Op.cit., p.54.

Chapter II

The Custom of Studying Abroad Among the Brazilian Upper Classes (1700-1900) ¹

The purpose of this chapter is to describe the broad context embedding the emergence of the first institutions of higher education in Brazil, from colonial times up to the twentieth century. It will be argued that foreign influences permeated the development of a formal educational organisation, giving rise to a ‘custom’² of studying abroad among the Brazilian upper classes.

This chapter will focus on three historical periods of time: i) the influence of religious principles on education in the colonial period, from the sixteenth to the seventeenth centuries; ii) the adoption of foreign paradigms³ in the creation of the first higher education schools in the post-colonial period up to the republican movement in the late nineteenth century; and, iii) the initial process of institutionalisation of academic science⁴ with the establishment of the University of Sao Paulo. These phases exemplify the changes that occurred in the rise of the first universities in Brazil which, in turn, framed a tradition of studying abroad.

Education in Traditional Brazil

The custom among the Brazilian upper classes of going abroad in search of advanced education is a phenomenon that dates back to colonial times.⁵ As has happened with other societies that have been colonised, the life of the metropolis was a cultural reference for the elite of colonial societies.⁶ In traditional Brazil, the same was true, and to study in European universities was seen as essential for those who wanted to keep abreast of scientific discovery, to be exposed to modern ideas and was also a way to get in touch with the main cultural centres.⁷

There are various interpretations on the implications of such a custom in the development of education and of science in Brazil. According to Fernandes, the reliance on foreign education has framed the sociology of knowledge in Brazil in terms of an ‘internationalist’ tendency in the way information was acquired and diffused in Brazilian society.⁸ The historical processes that have shaped colonial societies are part of a complex social, economic and political context and it is not possible to point out whether foreign education is more cause than consequence. In this respect, Azevedo says that:

It is wrong the idea that the delay in the creation of universities in Brazil, in contrast to the emergence of these institutions in other colonies in the Americas, was one of the causes of the delay in the development of a scientific spirit and of scientific methods in Brazil. The missing element to the introduction of a critical attitude was not, in fact, the transplant from the Metropolis to its colony of old institutions but rather modern principles, new conceptions of life and culture that did not penetrate the

societies of the peninsular reigns, and thus could not be transferred to their colonized societies.⁹

Nevertheless, despite the controversy over the delay in creating the first universities in Brazil, the lack of an appropriate formal organisation for higher learning was a predominant theme in the issue related to the flow of Brazilians outwards for, since colonial times, the development of Brazilian educational system is interwoven with foreign influences.¹⁰

From 1500 up to the late 1700s, education in Brazil had a strict religious orientation.¹¹ Groups of missionaries that went to Brazil, mainly to work with indigenous people with the purpose of converting them, founded the first schools of elementary and superior teaching. Among these groups were the Jesuit priests, or the members of Ignatius of Loyola's Society of Jesus. These priests, arriving in Brazil in 1549, were the only religious group providing some type of formal instruction for both religious and non-religious purposes.¹²

According to the literature, Jesuit education was based on a scholastic type of teaching and was completely alienated from the needs of the colonised society.¹³ Their schools were oriented towards the paramount purpose of educating members for their order. As such, they followed a rigid code of practice, the 'Ratio Studiorum', that synthesised the pedagogical principles adopted in their practice of teaching.¹⁴ There was a set of explicit rules for courses, programmes, and methods of teaching for the two levels of learning, a lower and a superior, that had to be strictly followed.¹⁵ The superior

level of teaching comprised a classic and humanist type of education with an emphasis on theology and philosophy.¹⁶ Courses for this level had the same pedagogic norms as used by Jesuits in Europe and tried to reproduce, in the colony, the same rituals as those practice in European universities.¹⁷

The use of the Portuguese language, for example, was allowed only during break time or holidays. Teaching of the indigenous language ‘Tupi-Guarani’ was substituted for Greek and Hebrew in order to prepare priests for their main mission of converting South American Indians. Latin was used as the language to study authors in the Humanities.¹⁸ In addition, to these norms in the use of languages, the Jesuit followed rigid pedagogical rules and rejected the new liberal ideas that were flourishing in Europe in the Enlightenment period.¹⁹ According to Schwartzman:

their overriding goal was to preserve established knowledge and to prevent any possible epistemological and theoretical innovations. The Jesuits were not opposed to new information or techniques; but they would not tolerate the broader philosophical views and innovative intellectual institutions that had arisen in some parts of Europe.²⁰

Additionally, superior education provided by the Jesuit was not recognised in Portugal. Although the syllabus taught in Brazilian schools was identical to that given in the University of Evora, also founded by Jesuits priests, the degrees obtained in the colony did not have the same prestige as those from the latter.²¹ Graduate students from Evora could enter the University of Coimbra, but those who came from the colonial schools had to undertake an additional course, usually in Logic, in preparation for entrance. In some cases, they had to undergo examinations before enrolling in Portuguese

universities. After much negotiation, in 1689, graduate students from Brazilian schools were finally allowed to enter the University of Coimbra without going through tests of proficiency.²² The religious and the traditional nature of the Jesuit teaching, however, was not the only constraint on the development of education in colonial Brazil. Another problematic aspect involving the rise of higher education in sixteenth and seventeenth century Brazil was the political vision of the Portuguese court.²³

In order to secure total control and hegemony in the tropical territory, Portugal explicitly hindered any attempt to consolidate higher education in Brazil.²⁴ Several requests for permission to open higher education institutions were denied. In contrast to Spain, Portugal did not welcome the establishment of universities in its South American colony, as de Carvalho reported:

The political elites formed during the Spanish and Brazilian colonial periods confront us immediately with a major contrast. The great majority of the Brazilian elite at the time of independence and up to mid-century had three common characteristics: first, they were all trained in one university, Portugal's Coimbra; second, they were trained mostly in civil law; third, they were principally bureaucrats, especially magistrates or judges. Although there are, to my knowledge, no quantitative studies of the elites of the Spanish-speaking countries, from the evidence available it can be safely asserted that no groups comparable to the Brazilian were present in any of them. Many elites were certainly highly educated, but not in one place and in one subject, and not with practical experience in matters of government. This fact, I will argue, was due to a clear difference in the colonial educational policies of Portugal and Spain. Portugal refused systematically to allow the organisation of any institution of higher learning in her colonies, not considering as such the theological seminaries.²⁵

Refusals were mostly on political and economic grounds. The Portuguese wanted their tropical land isolated from any external influence that would interfere with their authority and commercial practices. All activities likely to bring about a possibility of political emancipation were strongly repressed. In replying to a request from the Capitancy of Minas Gerais to open a school of medicine in the colonial captaincy, the Portuguese Overseas Council argued that:

... the question was a political one and that a favourable decision could lead to a further request for a law academy, and the whole process would end up in independence, since 'one of the strongest unifying bonds that keeps the dependency of the colonies, is the need to come to Portugal for higher studies.'²⁶

Portugal's intention to isolate its colony went beyond the creation of institutions for higher learning. Their policies aimed at harnessing all initiatives that could bring cultural improvements to Brazil. The establishment of a press in the tropical territory, for example, was not allowed.²⁷ Furthermore, to reinforce the ties between the colony and the metropolis, the Portuguese court used to sponsor scholarships for Brazilians to study at the University of Coimbra.²⁸

From the mid-sixteenth century onwards, the monopoly over educational activities held by the Jesuits was broken. This happened mainly as a result of the political reform of the Portuguese educational system promoted by the Marquis of Pombal who was the Portuguese Prime Minister at that time and was determined to change Portuguese education.²⁹ Pombal believed that the backwardness of the Portuguese schools was mostly because of the religious orders, mainly the Jesuits, that held tight control of all

matters related to education.³⁰ In his view, in order to introduce secular ideas to Portuguese schools, it was necessary to ban the work of missionaries and to get rid of their religious influences. As a result, in 1759 the Jesuits were banned from Portugal and its colonies.³¹

However, the expulsion of the Jesuits from Brazilian territory did not improve educational conditions. On the contrary, it brought about a series of negative consequences for education in Brazil.³² As all schools managed by the Jesuits were abruptly dismantled and there was no other organised system to replace them, a deep fragmentation of the incipient education system occurred. The disruption caused by the expulsion of the Jesuits was aggravated even more by the difficulties encountered by local authorities in replacing the teachers who were no longer available. The secular teachers who were recruited to substitute for the Jesuit priests were not only ignorant in the discipline they were to teach but they also lacked pedagogic skills.³³ Such disruption delayed even more the emergence of conditions favourable for the consolidation of advanced education. In this respect, Fernando Azevedo says that:

In all the colonial period, from the discovery until the transfer of D. Joao VI (and the Portuguese family) scientific activity had not been registered in the history of our culture, but for sporadic and isolated manifestation of foreigners that saw the inhabitants and the natural resources of the nation as object of their studies, or some exceptional Brazilian characters that lived abroad and, thus, had the opportunity to engage in scientific enterprise in the metropolis and, later on, try it in the colony.³⁴

However, the educational scenario started to improve after the transfer of the Portuguese Court to Brazil in 1808. A turning point in the history of higher education in Brazil was the process of change that occurred in the colonial society brought about by the Portuguese administrative court in Brazil.³⁵

The Initial Process of Secularisation of Education

Fleeing from Napoleon's troops, D. Joao VI, the Portuguese Monarch, the Royal Family and the whole court with its administrative apparatus was installed in its South American colony in 1808. To house the Portuguese monarchy, Brazil had its colonial status up-graded and it became part of the United Kingdom of Portugal. The new condition of Brazil as the seat of a European Court greatly facilitated the transmission of modern principles.³⁶ As the contact between the Portuguese living in Brazil and the cultural centres of Europe increased, the divorce between church and education was accelerated and the first courses of engineering and medicine were established.³⁷

Despite the creation of the first new schools for higher learning, the flow of students to Europe continued. There occurred, however, changes in the pattern of people studying overseas. Portugal was no longer the only destination, and France and Belgium became the preferred places for the Brazilian elite to undergo their professional training.³⁸ There was also greater diversification in the fields of study. Although the

preferences for education were still predominantly related to the Humanities and the degree of *bacharelismo*, it is possible to identify new tendencies in the fields of study of Brazilian students living abroad. For example, patterns of enrolments of Brazilians in Belgium, from 1817 up to 1914, indicated that it may be possible to link the demand for engineering courses to economic changes that occurred in Brazil in the mid-nineteenth century and at the turn of the twentieth century.³⁹

Greater expansion of educational institutions, however, took place after Brazil achieved its independence from Portuguese rule in 1822. The new status of Brazil gave rise to an increasing demand for a variety of trained professionals to fill the new bureaucratic positions that were being created. People to work in the civil service, in the liberal professions and in the military were urgently required.⁴⁰ To train these people, the existing old schools were restructured and courses and academies were reorganised. The disciplines of Mathematics, Physics, Biology and Mineralogy, that were previously attached to courses of philosophy controlled by the Catholic Church, were transferred to medical courses or to military academies.⁴¹ These new higher education institutions existed only in the main urban centres and had a restricted number of students.⁴² However, concomitantly, new scientific institutions began to be founded outside the higher education schools. Schwartzman reports that:

...for the first time in its history Brazil was granted the right to have a few institutions of higher learning and technological training. In rapid succession, courses of medicine were organised in Bahia and Rio de Janeiro, a botanical garden was created in Rio, together with a national library, military academy, and museum. These institutions, along with the schools of Sao Paulo and Recife founded in 1827, were the only ones to offer some opportunities for scientific work and higher education in Brazil until the last decades of the nineteenth century.⁴³

The main purpose of these institutions was to research themes related to problems of practical use that could improve the living conditions of the Brazilian people.⁴⁴ Such utilitarian orientation of Brazilian scientific research began to change with the flow of foreign ideas from Europe to Brazil that took place in the second half of the nineteenth century.

The Adoption of Foreign Paradigms in the Establishment of Higher Education in Brazil

The adoption of foreign ways of viewing educational matters and of teaching in higher education in nineteenth century Brazil can be explained by the strong influence of French culture on the Brazilian way of life.⁴⁵ French ideas and customs became the cultural framework in the development of an intellectual tradition within the Brazilian leadership during the period of the Empire.⁴⁶ The permeability of European influence on the Brazilian society was also a result of the personality of D. Pedro II, the Emperor who ruled Brazil from 1840 to 1889.

D. Pedro II was a person of sophisticated culture, well-connected with other royal families and with institutions of higher learning in Europe.⁴⁷ He was determined to establish in his nation some institutions for scientific research. For this purpose, foreign

missions with well-known artists and scholars were commissioned to come to Brazil to study the tropical environment and to improve cultural life. According to Schwartzman, the Emperor:

...was an enthusiastic supporter of modern technology, and brought foreign scientists to the country to help establish research institutions. He was, for instance, directly responsible for establishing the School of Mines of Ouro Preto [Escola de Minas de Ouro Preto], based on the French model and under a French director, Henri Gorceix; he organised the National Observatory [Observatorio Nacional], also directed by a Frenchman. The emperor established several of the research laboratories of the National Museum [Museu Nacional] and he was always willing to co-operate with foreign scientific expeditions.⁴⁸

As a result of the increased exposure of Brazilian society to European culture, education started to adopt a configuration in accordance with foreign patterns. For instance, schools for higher education that initially consisted of one teacher using his own material, books and surgical instruments, usually lecturing at his own residence or in a hospital, began to be better organised. The schools became administratively defined, and gradually, courses founded in the academies and in the colleges became more structured, with specific disciplinary orientations, serialised courses, administrative staff and appropriate facilities.⁴⁹ Over time, the official pattern adopted for the opening up of new higher education schools followed the French model of *grand ecoles*, with their system of chairs and isolated schools for professional training.⁵⁰

The French system of chairs for separate professional schools was the genesis of modern higher education in Brazil. The Brazilian institutions were restricted to a few fields of study, mainly, Law, Engineering, Agriculture and Medicine. Teaching in these areas was also separated, and the disciplines were independent from each other.

Engineering teaching, for instance, that went through rapid changes because of military demands, was given a differentiated status in 1874, with the foundation of a polytechnic school of engineering for non-military purposes, but mainly for civil engineering.⁵¹ Schools dealing with Agriculture appeared as a result of the opening of botanical gardens for the study of native plants and acclimatisation of imported species, mostly herbs, brought from Asian countries.⁵² Courses in Law were based on French in public, naval and commercial law. Proficiency on the French language thus became a pre-requisite for students interested in becoming lawyers.⁵³ From the mid-nineteenth century onwards, the French influence was reinforced with the import of August Comte's ideas as the main inspiration for reforms in education as well as in other sectors of national life.

Positivist Influence During the First Republic

In the second half of the nineteenth century, members of the Brazilian elite studying under the influence of August Comte in the French 'Ecole Polytechnique' disseminated positivistic thought back in the Brazilian context.⁵⁴ The positivist way of thinking defended the study of the phenomena through the application of a particular methodology derived from the study of natural science. This method was based on the idea that transformations of society followed objective laws with distinct stages of development. These stages were the theological, metaphysical and positive phases. The

positive phase meant that facts and phenomena could be understood from an empirical view of reality instead of the interpretations of abstract entities.⁵⁵

This way of thinking influenced the Brazilian elite and was spread as the ideology of the civilian leadership in Brazil. It became a political attitude against the state of backwardness afflicting the nation and a reaction against monarchy, slavery and religious doctrines.⁵⁶ Within this context, positivist thought impregnated Brazilian policy making in the last decades of the nineteenth century. It is also acknowledged to have contributed greatly to the change of regime that occurred in 1889, from Empire to a Republic.⁵⁷

Although positivist thinking provided a sense of modernity for those among the Brazilian upper classes who were in favour of science, the Brazilian version of the Comtian doctrine had a strict utilitarian and authoritarian nature. Brazilian positivists, for example, were against the creation of universities. According to the literature, they regarded universities as academic and elitist institutions that would interfere in the spread of their beliefs about freedom of teaching, universal opportunity of education, and freedom from religious doctrines.⁵⁸ Therefore, in spite of the influence of modern and liberal thinking and the efforts of some political and intellectual leaders to improve and modernise the nation, education and scientific activity in the nineteenth century Brazil remained precarious.⁵⁹ In sum:

Science in the Brazilian Empire was first perceived as applied knowledge, and as such it proved unpractical or uneconomical; later it was perceived as culture, and therefore mostly irrelevant. The gradual expansion of higher education throughout the nineteenth century was in part a quest for new and useful knowledge with a growing scientific context. It was also part of a growing urban elite to open space and gather

recognition in society through the strength of their special asset: the new knowledge they captured in Europe and were carrying to Brazil.⁶⁰

However, the way science was viewed in Brazil began to change with the process of secularisation of Brazilian society initiated with the introduction of Comtian principles brought about with the Republican regime.⁶¹ Greater economic autonomy of the newly created federal states facilitated the spread of schools, giving rise to an expansion in their number, in the types of higher education institutions and also the creation of new institutions concerned with advanced research.⁶²

The Initial Process of the Institutionalisation of the Natural Sciences in Brazil

The emergence of a more rational and positivistic attitude in Brazil towards the natural sciences is regarded in the literature as, mainly, a result of the process of economic and political transformation that the nation went through at the end of nineteenth century and in the early years of the twentieth. These changes occurred from 1889 up to 1930, in the period of time known as 'First Republic' during which time in Brazil a shift in the groups in power occurred.⁶³ The old Northeast aristocracy, that relied on traditional agricultural practices and on slavery for their wealth, were replaced by the economic elite of the central Southeast region of the nation that, better educated and economically progressive, called for modernising practices in their coffee business. They demanded, for example, a more cost-effective workforce based on free labour.⁶⁴

Although slavery in Brazil had already been abolished in 1888, in practice, the workforce available was mainly formed by the newly freed slaves who were illiterate and did not have the skills and the discipline to meet the production targets stipulated by the landowners. Moreover, profits from the coffee business at the turn of the twentieth century provoked an economic boom that gave rise to the creation of the first industries in Brazil and aggravated the needs for a better-trained workforce and a greater variety of professionals to work in the new industries.⁶⁵ Consequently, immigrants from Europe were encouraged to come to Brazil to work in the coffee plantations.

This new workforce was better educated and had more discipline than freed slaves. With better working conditions created by the economic expansion caused by the new industries, the immigrants started to emerge socially. Soon they became the first generation of industrial owners in the coffee business as well as in other areas, such as fabric and paper manufacturing. The way of life of this new upper class in the early twentieth century, was mostly shaped by foreign thought for, similarly to previous generations, the sons of this new emerging republican aristocracy also went to Europe for higher education.⁶⁶

At the turn of the twentieth century, a significant growth and diversification of institutions for scientific research began to take place.⁶⁷ Among the institutions founded were the *Instituto Butantan* and the *Instituto de Manguinhos*, pioneering centres for biomedical research in the history of the Brazilian natural science.⁶⁸ Additionally, it was also in the first decades of twentieth century that higher education institutions proliferated and the first universities appeared in Brazil.⁶⁹

The First Brazilian Universities

Three universities were founded at the turn of the twentieth century. All of them had a brief existence. They were the Universities of Manaus, the University of Sao Paulo and the University of Parana. The University of Manaus, in the Northern state of Amazonas, was founded in 1909 following an economic boom in the region caused by the extraction and export of latex for the production of rubber. With the decline of the rubber trade, the region entered a process of decay, causing the closing of the university in 1926.⁷⁰

There was a second attempt at founding a private university, in Sao Paulo in 1911; namely, the University of Sao Paulo. This university was the first institution of higher education that tried to develop educational activity beyond the traditional practices of the old isolated schools for professional education. There were extension activities that promoted weekly seminars, conferences and speeches, free and open to the public, on a variety of subjects and themes.⁷¹ Nevertheless, the University of Sao Paulo began to face competition from the state sponsored schools, especially in the field of medicine, and experienced financial difficulties. A private school could not provide accreditation equivalent to the ones offered by the state's institutions, and thus the University of Sao Paulo lost prestige and credibility. Enrolments dropped, and the University of Sao Paulo was forced to close in 1917.⁷²

A third initiative that also failed was an ambitious project to establish a university in the city of Curitiba: the University of Parana, in 1912. This university attempted to offer a wider range of studies compared to the traditional law, medicine and engineering schools. Nevertheless, the central government implemented a law restricting the status of university to places where there was a city of more than one hundred thousand inhabitants or to the capitals of states with more than one million people.⁷³ Curitiba did not meet any of these criteria and was forced to close down.⁷⁴

In 1920, the University of Rio de Janeiro was created and became the first Brazilian institution formally recognised by the state as such. Soon after, in 1927, the University of Minas Gerais was also founded. The creation of these universities, however, did not bring about much innovation to higher education. They consisted mainly of a bringing together under the status of a university of the old independent and isolated schools of law, medicine and the polytechnic school of engineering.⁷⁵ Formally, the old schools remained the same isolated institutions, with the same curricula but ruled by a central senate house. The establishment of a central senate to rule and to manage internal matters diminished the political power of the previous independent schools, provoking increasing discontent and criticisms of the new universities.⁷⁶

Efforts to establish universities in Brazil coincided with a wave of criticism in the Brazilian upper classes on the poor educational condition of the nation.⁷⁷ The bad state of the national educational system gave rise to a popular debate on the role that education

could play in helping the Brazilian society to get rid of the state of backwardness that had afflicted the nation for centuries and on the needs of a truly Brazilian 'identity'.⁷⁸ In 1932, a group of intellectuals involved with education launched a public manifesto known as the 'manifest of education' which brought about positive strategies for the modernisation of educational thinking in Brazil.⁷⁹

If the nation would only recognise the importance of education, the intellectuals – and especially those working on education would come to the fore in national life. They would then have a chance to use what means they had to solve the problems of backwardness, poverty, ignorance, and lack of public-mindedness that prevailed in Brazil.⁸⁰

From World War I onwards, influences from the United States began to shape a new approach to education in Brazil. Such an approach was greatly influenced by the ideas of John Dewey that were imported by Brazilians who had started to prefer the United States as their main destination for advanced education.⁸¹ Dewey's view on issues related to the 'place of education in the politics of modern society'⁸² inspired Brazilian educators in pursuit of a more appropriate type of education for the nation. Also, in the first decades of the twentieth century groups of people began to discuss publicly problems related to science and to education in Brazil. Among them there was the Brazilian Academy of Science created in 1916 and the Brazilian Association of Education created in 1924.⁸³ These were associations formed by the Brazilian *intelligentsia* with the purpose of addressing issues concerned with education and in particular, science education issues.⁸⁴

The discussion on the need for educational change eventually gave rise to significant changes in the policy making linked to education and, for the first time in Brazil, education began to be planned. This was possible mainly because of the creation of the Ministry of Health and Education in 1930. As a result, in 1931, federal laws regulating the Brazilian university were created. Such legislation, named ‘the Francisco Campos reform’ after the Minister in charge of the ministry at the time, provided the guidelines for the nature and structure of the Brazilian universities.⁸⁵

The new legislation for the universities was a combination of thinking on education matters proposed by two distinct intellectual segments of Brazilian society. These groups represented different views regarding the way education in Brazil should be managed. The liberal group defended a secular and progressive educational system and was opposed by a conservative group formed by Catholics, which insisted on a religious oriented education in accordance with family values and the avoidance of materialism and communism. Although encompassing issues of interest to both groups, the main characteristic of the new statutes for the Brazilian university was, however, not linked to these groups’ demands for reforms. Rather, its main feature was the definition of a type of university system based on the authoritarian vision of the government of the thirties. Tight control from an increasingly centralised State and a strictly utilitarian attitude was the predominant legal aspect of the new legislation. In this respect, there was ‘no doubt that the intent was to achieve a single monolithic, coherent, and official understanding of a university, in tune with the new regime’.⁸⁶

Therefore, the new statute for the Brazilian universities imposed a single model of university to be followed by the whole nation as well as a centralised decision making process in all matters, from didactics to administration.⁸⁷ The new rules to be followed by all federal institutions consisted of two forms of organisation for higher education, the university and the *faculdade*, or colleges. A university could be of two types, one official financed by the federal and state governments, and another financed by foundations or private associations.⁸⁸ It was the requirement that a university had at least three faculties in either law, medicine, engineering, education, sciences or letters, plus an autonomous administrative office. If these criteria could not be fulfilled then the title of university could not be applied.⁸⁹ Consequently, these rules defined a single type of university to be adopted throughout the nation. As Figueiredo has indicated:

The adoption of a national pattern had much contributed to the formalism, the centralisation and the uniformity of the university system. The concentration of power at the central level was reproduced inside the university. Academic governance was primarily in the hands of the rector and the University Council. ...The rector was appointed by the federal or state government. His power extended over an enormous range of matters such as the financial administration, the appointment of academic and administrative staff, the exercise of disciplinary action. The responsibility of the University Council included legal, financial and administrative matters. ...The same pattern of authority was reproduced in each faculty, school or institute.⁹⁰

Such rigid and centralized structure would prevail in nearly all universities in Brazil, the only exception being the University of Sao Paulo.⁹¹

The University of Sao Paulo

The foundation of the University of Sao Paulo - USP, in 1934, is considered a turning point in the history of Brazilian academic life.⁹² The creation of USP was a result of the efforts of regional intellectual and political elites of the state of Sao Paulo, who had for a long time been the most politically powerful groups in Brazil. However, it had begun to be considerably less influential within the federal spheres of decision making given the emergence of other groups from the state of Rio Grande do Sul, linked to President Getulio Vargas, who was also from this southern state.⁹³

According to the political view of the economic elite from Sao Paulo, the creation of a high quality academic institution for higher education was a way to show their superiority and their prominent role in national life. It was believed that only through an outstanding institution of higher education, could the state of Sao Paulo reassert its political influence in the national scenario. Therefore, from its beginning, the University of Sao Paulo was meant to be different.

In contrast to most universities in Brazil, its academic conception was clear and well defined. Its main goal was to promote the progress of science through research. Also, emphasis was on institutional autonomy, quality of teaching, and on educational values such as the need to form competent professionals.⁹⁴ The faculty was meant to be

engaged in full time research, 'that would work on higher forms of science and leave the practical chores to the professional schools.'⁹⁵

However, in order to fulfil such goals, well-trained personnel were required. Therefore, foreign lecturers were recruited in Europe, predominantly France, to teach and to engage in scientific research in the new university.⁹⁶ These foreign lecturers worked and helped in the establishment of postgraduate units, and opened high quality courses in a wide range of fields.⁹⁷ According to the words of one participant in the creation of the University of Sao Paulo:

We wanted to make use of the best, not just from one advanced country but from all advanced countries. Thus, Italy was to provide professors of mathematics, geology, physics, palaeontology, and statistics; Germany would provide those in zoology, chemistry, history and perhaps psychology; and for France would be reserved the chairs of pure thought: sociology, history, philosophy, ethnology, geography, and perhaps physics. It was not always possible to meet this plan.⁹⁸

Administratively, also, the University of Sao Paulo differed from the other national universities. It was given the status of university in spite of being controlled by the local authorities of the state of Sao Paulo and not by the federal government. The new university was to be public and free of religious influence. Its statutes were aimed at financial autonomy.

According to Schwartzman, the University of Sao Paulo is the 'most important institutional space for Brazilian academics and scientists', result of the influence brought

about by the talent and competence of the University's first faculty formed by foreign visiting scholars.⁹⁹

Conclusion

This chapter has described the circumstances that shaped the creation of the first institutions of higher education in Brazil, from colonial to republican times. The historical processes that contributed to the rise of the first universities were summarised into three distinct phases, namely; religious, secular and institutional. It was argued that foreign influences permeated the educational scene and that this reinforced the custom of going abroad for advanced education among the upper classes.

The review of the historical processes shaping the emergence of the first universities indicated that the most visible turning points in the changes that occurred in the establishment of institutions of higher learning were inspired by foreign influences and by people educated in Europe. This was the case, for instance, with the initial process of secularisation of education. The expulsion of the Jesuits from the colony and the adoption of lay teachers were primarily triggered by political reforms adopted by the Marquis of Pombal who wanted to modernise Portuguese education and who banished religious teaching from Portugal and its colonies. Thus, political processes that took place

in foreign territories, and not the changes that occurred in the hearts and minds of the Brazilian colonial society, influenced the adoption of secular principles in education.

The creation of the first institution of research and higher learning, (e.g. National Museum, the Botanical Garden, and royal societies and the professional schools) were also framed by imported views brought about by the Portuguese Emperor and his cultural vision embedded in the European way of life. In this period of time, there was a closer identification between colony and Portuguese court that diminished the gap between what was considered native and what was foreign. The adoption of European customs in the Brazilian territory was the common practice. In the nineteenth century, also, the establishment of the first schools of professional education was framed by the world vision of French society. And finally, while the creation of the University of Sao Paulo is regarded as a mark in the institutionalisation of the natural sciences in the Brazilian context, and thus a mark in the change in values of the Brazilian society, this happened mainly because of the work of foreign visitors.

Therefore, it is possible to say that the practice of going abroad in traditional Brazil was a phenomenon closely linked to the historical processes faced by the nation. Despite the improvements in education achieved over time, the flow of people to foreign universities did not stop. This suggests that, firstly, foreign education was rooted in the way Brazilian society evolved and, secondly, that there is something intrinsic to foreign education that was not provided in the Brazilian context.

The lack of well-developed universities, however, is also a theme that has permeated the issue of foreign education in Brazil in the past, as in the present. As will be seen in the next chapter, the need for improving the federal system of universities became central to the policies of developing high-level human resources adopted from the fifties onwards - and economic themes were at the heart of the policies for higher education and postgraduate education.

Endnotes to Chapter II

¹ This chapter draws heavily on the classic text of Simon Schwartzman. 1991. *A Space for Science - The Development of the Scientific Community in Brazil*. Pennsylvania: The Pennsylvania State University Press.

² 'Custom' is used here to mean a traditional and widely accepted way of behaving or doing something that is specific to a particular society, place or time. *New Oxford Dictionary of English*. 1998. Oxford: Oxford University Press.

³ 'Foreign paradigms' means that the basic ontological and epistemological assumptions that guided the creation of the first higher education schools in Brazil were copied from a foreign culture. For more on 'paradigms' see Thomas S. Kuhn. 1963. Op.cit.

⁴ The term 'academic science' means the idea of pure science as this is traditionally expressed in the universities, and 'scientific community' means those persons who, as a central part of their professional activities, are directly engaged in extending systematic knowledge. M.J. Mulkay. 1977. *Sociology of the Scientific Research Community*. In *Science, Technology and Society*, edited by I. Spiegel-Rosing and D. de Sola Price. London: Sage Publication, p. 93.

⁵ Systematic studies on the education of Brazilian upper classes in Europe started to be done in the eighteenth century and refer mainly to the training of people in the liberal professions. In the nineteenth century, however, the role of overseas training is well recognized as relevant for the education of Brazilian natural scientists. For more on the habit of studying in Europe see, Fernando de Azevedo, ed. 1994. *As Ciencias no Brasil [Science in Brazil]*. Rio de Janeiro: UFRJ, Fernando de Azevedo. 1996. *A Cultura Brasileira [The Brazilian Culture]*. 6th ed. Rio de Janeiro: Editora UNB/UFRJ, and Simon Schwartzman. 1991. Op.cit.

⁶ J.E. Goldthorpe. 1996. *The Sociology of Post-Colonial Societies*. Cambridge: Cambridge University Press.

⁷ See Seymour Martin Lipset and Aldo Solari, ed. 1967. *Elites in Latin America*. New York: Oxford University Press, and also Caio Prado Jr. 1963. *Formacao do Brasil Contemporaneo [The Formation of Contemporary Brazil]*. 7th ed. Sao Paulo: Brasiliense.

⁸ Ana Maria Fernandes. 2000. *A construcao da Ciencia no Brasil e a SBPC, 1948-1980 [The Scientific Community and the State in Brazil - The Role of the Brazilian Society for the Advancement of Science, 1948-1980]*. 2nd ed. Brasilia, DF: Editora Universidade de Brasilia, p. 80.

⁹ Translated by the researcher from Fernando de Azevedo, ed. 1994. Op.cit., p. 25.

¹⁰ Azevedo, Fernando de. 1996. Op.cit.

¹¹ For more on the influence of Christianity on education, see Witold Tylasiewicz and Colin Brock, eds. 1988. *Christianity and Educational Provision in International Perspective*. London: Routledge.

¹² The Jesuits were not the only religious order in colonial Brazil. There were also the Franciscan, the Benedictine and the Carmelite Orders that taught courses in areas such as Arts or Theology. These other Orders' teaching, however, were for the education of their members only. In Luiz Antonio Cunha. 1980. *A Universidade Tempora [The Late University]*. Rio de Janeiro: Civilizacao Brasileira, p. 19. For more on the Brazilian culture during the colonial period, see Fernando de Azevedo, ed. 1994. Op.cit., Part II and III.

¹³ In Maria de Lourdes de A. Favero. 1980. *Universidade & Poder - Analise Critica/Fundamentos Historicos: 1930-45*. Rio de Janeiro: Edicoes Achiame, p. 32.



¹⁴ Ratio Studiorum is a short version for 'Ratio atque Instituto Studiorum Societas Jesu', a letter of procedures for Jesuit teaching. In Luiz Antonio Cunha. 1980. Op.cit., p.25.

¹⁵ The lower level consisted of basic skills in reading, writing and number plus a religious introduction, Luiz Antonio Cunha. 1980. Op.cit., pp. 24-36.

¹⁶ Ibid.

¹⁷ The lower level consisted of basic skills in reading, writing and numbering plus a religious introduction. Ibid.

¹⁸ Luiz Antonio Cunha. 1980. Op.cit., p. 28.

¹⁹ Stuart Hall and Bram Gieben, eds. 1992. *Formation of Modernity*. Cambridge, UK: Polity Press.

²⁰ Simon Schwartzman. 1991. Op.cit., p.35.

²¹ The school of Evora was also founded by the Jesuit Order. Luiz Antonio Cunha. 1980. Op.cit., p. 31.

²² Luiz Antonio Cunha. 1980. Op. Cit., pp. 31-33.

²³ The University of Sao Domingos was founded in 1539, the University of Mexico in 1553. Although the University of Manaus was created in 1909 and the University of Parana was created in 1912, the University of Rio de Janeiro which was founded in 1920 is considered the first Brazilian university officially recognized as such. In Manfredo Berger. 1977. *Educacao e Dependencia [Education and Dependency]*. 2a. ed. Rio de Janeiro: Difel, p. 13 and Maria de Lourdes de A. Favero. 1980. Op.cit., pp. 35-36.

²⁴ There are a variety of views on the late creation of universities in Brazil. One interpretation stresses the political interests of Portugal. Others, however, argue that the delay in the establishment of Brazilian universities, when compared with other Latin American colonies, was rather a consequence of the distinct characteristics of the colonizers themselves and the conditions they encountered. Spain, for example, had a better educational system than Portugal. It had well established universities by that time and teachers could be sent to work overseas without affecting the institutions at home. Spain had, in the seventeenth century, eight universities that were prestigious in Europe. The University of Salamanca had 6.000 students and 60 chairs. In the same period of time, Portugal had only the University of Coimbra. Moreover, Spanish expeditions found indigenous people that were far more culturally developed than the inhabitants of Brazil at the time of the Portuguese discovery. Manfredo Berger. 1977. Op. Cit., pp. 11-14. See also Daniel C. Levy. 1986. Op. Cit.

²⁵ Jose Murilo de Carvalho. 1982. Political Elites and States Building: The Case of Nineteenth-Century Brazil. *Comparative Studies in Society and History* 24 (3):383.

²⁶ The request was from the captancy of Minas Gerais. Jose Murilo de Carvalho. 1982. Op. Cit., p. 384.

²⁷ See Luiz Antonio Cunha. 1980. Op. Cit., p 12.

²⁸ See Maria de Lourdes de A. Favero. 1980. Op.cit., p.33.

²⁹ The Marquis of Pombal, Prime Minister of Portugal, implemented a reform in the educational system of Portugal, following the principle of the Enlightenment. According to Schwartzman:

Pombal's reform sought to free the state from the authority of the church while maintaining an authoritarian and centralized political system. The introduction of modern science into Portuguese culture was essentially a political and administrative act, a kind of 'revolution from above, and it encountered resistance. Portugal did not

experience the spontaneous growth of scientific activities and institutions which was so characteristic of Italy, France or England, from the sixteenth to the eighteenth centuries. There was no scientific community within which science could grow. The purpose of the reform was primarily practical and it made no provision for free experimentation, speculation, and research.

In Simon Schwartzman. 1978. Struggling to Be Born: the Scientific Community in Brazil. *Minerva* XVI (4):547.

³⁰ Pombal banned the scholastic teaching of philosophy and theology and stimulated the teaching of mathematics, chemistry, physics, pharmacy and anatomy. Ibid.

³¹ Luiz Antonio Cunha. 1980. Op. Cit., pp. 36-61.

³² Luiz Antonio Cunha. 1980. Op. Cit., pp. 51-52.

³³ Luiz Antonio Cunha. 1980. Op. Cit., and Luiz Antonio Cunha. 1978. *Educacao e Desenvolvimento Social no Brasil [Education and Social Development in Brazil]*. 3rd ed. Rio de Janeiro: Francisco Alves.

³⁴ Translated by the researcher from Fernando de Azevedo. 1996. Op. Cit., p. 362.

³⁵ For more see Thomas E. Skidmore. 1998. *Uma Historia do Brasil [A History of Brazil]*. Translated by Raul Fiker. Sao Paulo: Paz e Terra. p.75.

³⁶ Luiz Antonio Cunha. 1980. Op. Cit., p. 72.

³⁷ Simon Schwartzman. 1991. Op. Cit., pp.45-46.

³⁸ For a study on the Brazilians students in Belgium see Eddy Stols. 1974. Les Etudiants Bresiliens en Belgique. *Revista de Historia L* (100):653-692.

³⁹ The enrolment of people studying engineering in Belgium, for example, increased during the mid-nineteenth century and also in the first decades of the twentieth century. Such a rise matches economic changes in Brazil. Eddy Stols. 1974. Op. Cit., p. 662.

⁴⁰ Luiz Antonio Cunha. 1980. Op. Cit., pp. 62-63.

⁴¹ Luiz Antonio Cunha. 1980. Op. Cit., pp.63-64.

⁴² Luiz Antonio Cunha. 1980. Op. Cit., p.133.

⁴³ Simon Schwartzman. 1978. Op. Cit., p. 546.

⁴⁴ Simon Schwartzman. 1991. Op. Cit., p. 76.

⁴⁵ It is interesting to note, in the Brazilian literary work of this time, the description of how the Brazilians used to behave and to dress themselves in accordance with European customs and the striking contrast between the heavy and dark clothes and the sunny and hot tropical environment.

⁴⁶ If there was not a national tradition in natural science, the same was not true for the humanities. Brazilian culture was generally influenced by European trends and ideas. Nevertheless, there was a significant number of productive intellectuals who pictured and described the eighteenth century Brazil with great originality and talent. See Fernando de Azevedo. 1996. Op. Cit., Chapter II.

⁴⁷ For a study on D. Pedro II see Lilia Moritz Schwarcz. 1999. *As Barbas do Imperador: D. Pedro II um monarca nos tropicos [The Emperor's Beard: D. Pedro II a monarch in the tropics]*. Sao Paulo: Companhia das Letras.

⁴⁸ Simon Schwartzman. 1978. Op. Cit., p. 550.

⁴⁹ Luiz Antonio Cunha. 1980. Op. Cit., p. 91.

⁵⁰ For more on 'grande ecoles', see B.R. Clark, ed. 1993. *The Research Foundation of Graduate Education – Germany, Britain, France, United States, Japan*. Berkeley: University of California.

⁵¹ Engineers were the teachers of chemistry, mathematics and physics in the elementary schools. In Luiz Antonio Cunha. 1980. Op. Cit., p. 103.

⁵² There is an anecdote related to Alexandre Rodrigues Ferreira, the first known Brazilian natural scientist. When Ferreira was asked about the viability of adapting tea herbs to the tropical climate, he answered dryly: "We don't have bread but we talk about tea", in Emilio A Goeldi. 1982. *Alexandre Rodrigues Ferreira*. Brasilia, DF: Editora UnB/CNPq, p.65. Luiz Antonio Cunha. 1980. Op. Cit., p. 103.

⁵³ Luiz Antonio Cunha. 1980. Op. Cit., p. 124.

⁵⁴ Luiz Antonio Cunha. 1980 Op. Cit., p. 88.

⁵⁵ Luiz Antonio Cunha. 1980. Op. Cit., pp. 86-87.

⁵⁶ Luiz Antonio Cunha. 1980. Op. Cit., pp. 63-64.

⁵⁷ Luiz Antonio Cunha. 1980. Op. Cit., p. 198.

⁵⁸ Luiz Antonio Cunha. 1980. Op. Cit., p. 123.

⁵⁹ According to Schwartzman, this precarious situation was mainly because Brazil lacked 'significant social sectors that judged scientific activities worthwhile and important enough to warrant interest and investment'. Simon Schwartzman. 1991. Op. Cit., p. 66.

⁶⁰ Simon Schwartzman. 1991. Op. Cit., p. 67.

⁶¹ Luiz Antonio Cunha. 1980. Op. Cit., p.132.

⁶² In this period of time many institutions were created: Sao Paulo's Polytechnic School [Escola Politecnica de Sao Paulo] (1893), the School of Engineering of Sao Paulo and Porto Alegre [Escola de Engenharia de Sao Paulo e de Porto Alegre], both founded in 1896; School of Pharmacy of Rio de Janeiro [Faculdade de Farmacia] and Rio's Superior School of Agriculture and Veterinary [Escola Superior de Agricultura e Medicina Veterinaria], founded in 1898 and in 1901, in Simon Schwartzman. 1991. Op. Cit., p. 76.

⁶³ For an analysis on the role of the state in educating an elite in the republican period, see Carlos Roberto Jamil Cury. 2001. *Cidadania Republicana e Educacao [Republic Citizenship and Education]*. Rio de Janeiro: De Paulo Editora.

⁶⁴ In Simon Schwartzman. 1991. Op. Cit., p.72.

⁶⁵ Simon Schwartzman. 1991. Op. Cit., p. 73.

⁶⁶ According to Schwartzman, Brazil often transplanted distorted versions of intellectual and institutional models from France and Germany, frequently with some delay. Brazil's intellectual elite also flocked to

study in these two nations, especially France. Many scientists and researchers who were to head Brazil's research institutions came from these countries. Simon Schwartzman. 1991. Op. Cit., p. 74.

⁶⁷ Luiz Antonio Cunha. 1980. Op. Cit., p. 132.

⁶⁸ The Institute Butantan [Instituto Butantan] was founded in 1899 and the Instituto de Manguinhos [Manguinhos Institute] in 1900. For more see CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico [National Council for Scientific and Technologic Development]. 2001. *Cinquentenario do CNPq: Notícias sobre a pesquisa no Brasil [Fifty years of CNPq: scientific research in Brazil]*. Brasília, DF: CNPq, pp. 123-135.

⁶⁹ Some of the institutions created in this period are: Agronomic Institute of Campinas [Instituto Agronomico de Campinas] in 1887; the Institute of Vaccine [Instituto Vacinogenico], for the development of vaccines in 1892; the Bacteriologic Institute [Instituto Bacteriologico] in 1893; the Museum of Sao Paulo [Museu Paulista] in 1893; the Museum of Para [Museu Paraense] in 1894; as already mentioned, the Institute Butantan, for research on antidote of snake venom, and The Institute of Manguinhos [Instituto de Manguinhos] of biomedical research. New higher education institutions also were created. For more see Simon Schwartzman. 1991. Op.cit, p. 76.

⁷⁰ Luiz Antonio Cunha. 1980. Op. cit., p. 179.

⁷¹ Luiz Antonio Cunha. 1980. Op. cit., p. 188.

⁷² Ibid.

⁷³ Ibid.

⁷⁴ Luiz Antonio Cunha. 1980. Op. cit., p. 189.

⁷⁵ According to Cunha, there were thirty attempts to create a university in Rio de Janeiro. Ibid.

⁷⁶ Luiz Antonio Cunha. 1980. Op. cit., p. 190.

⁷⁷ Simon Schwartzman. 1991. Op. cit., pp. 105-113.

⁷⁸ For the concept of identity, see Colin Brock and Witold Tulasiewicz. 1985. The Concept of Identity. In Colin Brock and Witold Tulasiewicz. eds. 1985. *Cultural Identity and Educational Policy*. London: Croom Helm.

⁷⁹ Anísio Teixeira, the mentor of CAPES, was part of this group. Other participants were Lourenço Filho from Ceará, in 1923, Francisco Campos and Mario Casassanta from Minas Gerais, in 1927 and Fernando de Azevedo from the Federal District in 1928. Luiz Antonio Cunha. 1980. Op. cit., p.196.

⁸⁰ Simon Schwartzman. 1991. Op. cit., p. 105.

⁸¹ Anísio Teixeira, founder of CAPES studied with Dewey at the Columbia University in the United States. Luiz Antonio Cunha. 1980. Op. cit., p. 194-198.

⁸² See Alan Ryan. 1998. Deweyan Pragmatism and American Education. In *Philosophers on Education*, edited by A. O. Rorty. London: Routledge, p.405.

⁸³ For more see CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico [National Council for Scientific and Technologic Development]. 2001. Op. cit., pp.141-145 and Luiz Antonio Cunha. 1980. Op. cit., p.196.

⁸⁴ Luiz Antonio Cunha. 1980. Op. cit., p. 196.

⁸⁵ For more on the 'Francisco Campos reform', see Simon Schwartzman. 1991. Op. cit., pp. 113-118.

⁸⁶ Ibid.

⁸⁷ Translated by the author from Luiz Antonio Cunha. 1980. Op. cit., p.265.

⁸⁸ Luiz Antonio Cunha. 1980. Op. cit., p. 261.

⁸⁹ Ibid.

⁹⁰ Maria da Consolacao de Magalhaes Figueiredo. 1986. Academic Freedom and Autonomy in the Modern Brazilian University - A Comparative Analysis, unpublished Ph.D thesis, Department of International and Comparative Education, University of London/Institute of Education. London, p. 128.

⁹¹ Simon Schwartzman. 1991. Op. cit., p. 127.

⁹² For more on this theme see Walter Colli, ed. 2001. *Paschoal Senise: uma carreira dedicada a educação* [Paschoal Senise: a career dedicated to education]. Brasília, DF: Paralelo 15/CAPES.

⁹³ Simon Schwartzman. 1991. Op. cit., p. 127.

⁹⁴ According to its statute, see Simon Schwartzman. 1991. Op. cit., p. 131.

⁹⁵ Simon Schwartzman. 1991. Op. cit., p. 129.

⁹⁶ There is no register of the exact number of persons invited, those who actually came or the duration of their stay. For the names of lecturers that came to work at the University of Sao Paulo, see Simon Schwartzman. 1991. Op. cit., p. 134.

⁹⁷ Most of them worked from 1932 to 1942. However, many stayed in Brazil after their contract had expired. See Luiz Antonio Cunha. 1980. Op. cit., pp. 240-241.

⁹⁸ Cited in Simon Schwartzman. 1991. Op. cit., p.132.

⁹⁹ Simon Schwartzman. 1991. Op. cit., p. 137.

Chapter III

The Creation of CAPES and the Policies of Scholarships Abroad (1950 – 1980)

The purpose of this chapter is to describe the policies adopted by the Brazilian government to develop high-level manpower that gave rise to the funding of scholarships abroad. It will be argued that, from the 1950s onwards, the rationale for the investment in the education of Brazilians in foreign universities was framed by national political projects linked to economic themes.

To develop this argument, this chapter will be divided into two parts. In the first part, the narrative will highlight the emergence of an institutional infrastructure to train high-level human resources in Brazil and abroad. The main focus will be on the broader political, and economic context in which the creation of CAPES was embedded. The second part of the chapter will describe the political agenda of the military government from the mid-1960s up to the late 1970s, when the building up of a scientific and technological capability brought about a sharper delineation of the principles for the training of people in foreign universities.

Introduction

The creation of an institutional infrastructure to develop high-level human resources, in the 1950s, represents a shift in the way knowledge was regarded by the Brazilian authorities.¹ Greater involvement of the State in educational policy making began to take place with the creation of the Ministry of Education and Health in the 1930s. From this period of time onwards, education started to be seen as a key element in the process of achieving a better standard of life for the Brazilian people. Such a shift in vision can be partially understood in view of broader international context of the 1950s.²

A major influence in the adoption of policies for training people abroad in Brazil was the increasing role of the United States of America as the leader nation in the West. The greater interest of the government of the United States of America in their neighbouring nations in Latin America brought about a state of affairs that had implications for policy making in the region. The American political project was based on the idea that economic progress was a key element in the fight against communism. If underdeveloped nations were helped to overcome the state of poverty and backwardness that had afflicted them for so many centuries, their societies would be less vulnerable to ideological influences.³ Consequently, a variety of policies of financial and technical aid was offered to the governments of South American nations.⁴

The policies for Latin America were influenced by the mood of the 1940s when a valorisation of 'knowledge' at the service of society was a major concern in the industrialised world. This trend was most visible with the creation of the United Nations Organisation for Educational and Cultural Reconstruction – UNESCO in 1945.⁵ The section of the inaugural speech of President Harry S. Truman, the so-called 'Point Four', reflects a new phase in international affairs in terms of the recognition by the industrialised nations of their responsibilities to less developed societies:

Fourth, we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas. More than half the people of the world are living in conditions approaching misery. Their food is inadequate. They are victims of disease. Their poverty is a handicap and a threat both to them and to more prosperous areas. For the first time in history, humanity possesses the knowledge and the skill to relieve the suffering of these people...I believe that we should make available to peace-loving peoples the benefits of our store of technical knowledge and life. And, in co-operation with other nations, we should foster capital investment in areas needing development.⁶

Within this context, the priority of American policies in Latin America was the education of personnel in areas related to education and health.⁷ Programmes and projects for technical assistance and financial aid were made available from the American government and from private foundations to help the education of human resources in these fields. A common feature of these programmes was the sponsorship of scholarships for professional up-grading in American universities and hospitals.⁸

Cultural and educational influences from the industrialised nations brought about the rise of an ideology of economic development in Latin America from World War II

onwards, where the main concern was with matters linked to the economy in order to achieve a standard of living compatible with the industrialised nations.⁹

Such an economist approach to development was based on the belief that a key factor in the progress of the advanced societies was the level of industrialisation of their economy: if the economy of a country expanded, improvements in the quality of life would inevitably follow. However, the state of poverty of these societies did not permit economic activity sufficient to permit savings that in turn would be re-invested in the creation of industries.¹⁰ Therefore, the state had to act as major investor to foster the development of those sectors regarded as essential for the expansion of the economy, so that the nation could industrialise rapidly. The strategies for this to be done, however, varied.¹¹

The Policies for 'Industrialisation' in Brazil

In Brazil, policies for development emphasised the protection of domestic industry and the building up of an internal infrastructure.¹² State intervention consisted basically in reinforcing the process of changes in the economic system, the so-called import-substitution model which had already been initiated after World War I. This policy was an attempt to reproduce, rapidly and in different historical circumstances, the experience of industrialisation of the advanced nations. In practical terms, it meant the

participation of the state, through investment, in sectors of the economy that were considered crucial for the development of national industries such as energy and transport.¹³

In order to change the economic system, however, a series of other types of investment were also required. The new technology that was being imported for the manufacturing of the products in the national industries called for a new type of skill and technical expertise that was alien to the national workforce.¹⁴ The Brazilian labour force was formed, predominantly, of rural workers. People working in the urban areas were predominantly employed in the service sectors, not in production line type activities. There was a lack of people able to deal with the new types of job that were being created.

A major concern of Brazilian policy makers was, however, related to the deficit of people with higher education degrees.¹⁵ The proportion of graduates in relation to the economically active population was regarded as very low and, thus, inadequate for a nation in process of economic change.¹⁶ In other aspects, too, the profile of the qualified workforce was unsatisfactory. The low number of people with some kind of advanced technical-scientific training such as specialised engineers or chemists, working in the secondary sector of the economy was seen as indicative of the backwardness of the Brazilian industry.¹⁷

From this perspective, the education of people in higher levels of education and in technological fields was regarded as a primary issue in the efforts to develop a modern workforce. However, the training of these types of professionals in post-war Brazil was a problematic task.¹⁸

As already described, (Chapter II, pp. 39-45) Brazilian universities were created in the first half of the twentieth century and were predominantly for the education for the liberal professions. The system was not developed enough to train the type of workforce thought necessary for a rapidly expanding economy.¹⁹ Within this context, it was necessary to invest in the training of the type of people necessary for economic growth. To do that, the government needed to improve higher education. Consequently, institutions were created to deal with the training of high-level human resources in a variety of areas.

Two of these institutions founded in the 1950s have great relevance for this thesis, namely, the National Campaign for the Training of Higher Education Personnel – CAPES, and the National Council for Research – CNPq.²⁰ These two agencies were founded with distinct purposes and to act in different areas. CNPq was conceptualised as a body to invest in scientific research predominantly in the natural sciences while CAPES was meant to train lecturers at postgraduate level for the universities. However, because scientific activity in Brazil is carried out mainly in the universities, the actions of these two agencies eventually converged and overlapped one another.

CAPES and CNPq were given high status within the public bureaucracy and were directly linked to the President's cabinet. Also, these two agencies included the participation of representatives of various segments of society on their committees. In the case of CNPq, the scientific community took part actively in the decision making process on the allocation of resources for scientific research. Similarly, the academic and intellectual community was also part of the committee of CAPES. Of more significance for this study is that CAPES and CNPq took on the awarding of scholarships for studies in Brazil and abroad as part of their strategy for training people in advanced research.

The Council for National Research - CNPq

The scholarships abroad provided by CNPq were mostly for the natural sciences, with the purpose of initiating people into scientific activity. The agency was created on the model of the American National Science Foundation.²¹ It was firstly founded as a body to deal with strategic policies related to science, specifically with research in atomic energy.²² It was linked to the president's cabinet and headed by a military officer. According to Morel:

The creation of the CNPq was oriented by the needs of Brazil to keep up with other nations in research on nuclear energy as a essential factor for national security, made evident by the World War II conflict. It also was an expression of a nationalist concern, inspired mostly by the armed forces in the post war period, that intended to protect the monopoly of fissionable material as a element of great interest for atomic policy in the industrialised nations.²³

The activities of CNPq encompassed a variety of strategies for the development of national scientific capability. Basically, CNPq was to deal with the allocation of resources for the development of the natural sciences. In 1951, for instance, physical sciences received 65,5% of the resources available and biological sciences the remaining 34,4%.²⁴ Education overseas was mostly in fields that were considered as priorities for national interests, namely, Agronomy, Biology, Physics, Geology, Mathematics, Chemistry and Technology.²⁵

The Creation of CAPES – Co-ordination for the Improvement of High Level Manpower

The scholarships abroad provided by CAPES were to educate liberal professionals in various areas and mostly to up-grade the academic skill of faculties of the federal universities. CAPES was initially conceptualised as a national campaign, run by representatives of the public and private sectors, to deal with the training of people in general. According to its statute of creation, its main objective was ‘to improve teaching in higher education and to promote the training of qualified faculty, technicians, scientists and humanists to respond to the public and private enterprises linked to the economic and cultural development of the nation’.²⁶ One of the ways to do that was to finance the studies of ‘talented individuals – who could not afford advanced education, to give them

professional or scientific training at a superior level'.²⁷ In other words, CAPES was to improve teaching and research in the universities through the training of lecturers, other academics and scientific personnel in accordance with priorities established by the needs of socio-economic development.²⁸

As a committee, CAPES did not have an institutional configuration. Rather it was like a think-tank task-force group with the mission of defining broad priorities for action. The main emphasis was on assessing the national condition in terms of high-level personnel and providing an overall picture of the types of manpower required. These studies constituted the bulk of CAPES' activity in its first years. From 1953 up to 1959, CAPES' activity involved studies dealing with the planning and implementation of a total of 1,630 projects related mostly to 'institution building',²⁹ the creation of new centres for postgraduate education, training personnel linked to scientific activities, sponsoring of seminars, meetings, and reports assessing the needs of high level human resources in Brazil. In the meantime, scholarships (a total of 790) were awarded for education overseas.³⁰

Over time, however, CAPES' activities moved towards the adoption of measures that would improve higher education personnel. There are distinct interpretations about why this has happened. According to official documents, there were great difficulties in establishing priorities for investment in high-level manpower. The nation was going through such a rapid process of transformation that it was not possible to detect the nations' need for qualified technicians.³¹ Therefore, it was suggested that policies should

aim, firstly, at creating more opportunities for better education and in forming a national basis for technical expertise that could be multiplied.³²

A different view, however, sees the changes that occurred with CAPES and a sharper definition of its activities towards the training of higher education personnel as a result of political accommodation among influential segments in Brazilian society. In this respect, Cordova says that:

the main idea for the Campaign (CAPES) was clearly from the scientific community that fought, since the twenties, to consolidate its space in the universities. However, divergent views within the commission responsible for the agency's guidelines gave rise to a split between the scientists and a more pragmatically oriented group, supported by representatives of the productive sector. An agreement between both parts led to more thoroughly study of the national condition being left aside in favour of more rapid and objective actions. Therefore, CAPES should not invest in the training of people only in the scientific fields but in the training of people in higher education in general, including the training of highly specialised professionals.³³

Matters related to the definition of priorities, however, was not the only problematic aspect related to the building up of a well-trained workforce in Brazil in the 1950s.³⁴ The up-grading of the teaching skills of university teachers was a complex task that involved actions at distinct levels. It was also necessary to recruit prospective candidates, to assess them and then to fund their studies. In many cases, depending on the area of study, the training had to be abroad for there were no equivalent courses in national institutions. In the case of postgraduates overseas, there were a series of factors contributing to making the recruitment of people to be trained rather problematic. Difficulties relating to studies in a foreign language restricted significantly the number of candidates. Additionally, people who could master a foreign idiom well enough did not

meet other criteria, such as the lack of personal resources or outstanding professional performance needed for the award of a scholarship. In sum, the training of people in post-war Brazil was rather unsystematic and informal, relying heavily on the recommendations of prestigious academics and scientists.³⁵

Nevertheless, in spite of these difficulties, CAPES started to provide scholarships for training of high level personnel abroad and, as the number of people being trained increased, mechanisms for recruitment and selection also improved. As a result, CAPES became highly regarded within the academic community and started to cooperate with other scholarship sponsoring bodies in the assessment of applications for other types of bursaries.³⁶ Consequently, the award of scholarships, in Brazil and abroad, became the core activity of CAPES in its effort to create a critical mass that would transmit knowledge and expertise.³⁷

There are no data on the number of Brazilians that have studied abroad from the 1950s onwards, neither on their sources of sponsorship. Neither is there any information on the type of training or on the foreign institution itself. Documented evidence, however, suggests that approximately 1,300 Brazilian studied abroad annually.³⁸ The majority of professionals, lecturers and researchers taking postgraduate degrees in foreign universities had either a scholarship or a contract, such as internship or assistantship in hospitals and universities from governmental bodies or private foundations.³⁹ Figure 3.1 gives a notion of the overseas education trend that took place in the 1950s on the basis of scholarships linked to national developmental programmes,

Figure 3.1**Scholarships Abroad offered to Brazilians (1958)**

Source of Funding	Annual Number of Scholarships
Government	
France*	150-200
Germany**	30
England***	30
Italy	20-25
Japan	10-15
Portugal	10
Spain	30
United States****	60-80
Other Countries (Sweden, Norway, Holland, Israel, etc)	10-15
Private	
ICA*****	300-350
Rockefeller, Guggenheim, and other Foundation,	56-60
American hospitals (internships)	30
American universities and research institutes	20
American private enterprises (paid-trainee-programs)	30
International Organisations: UNESCO, OMS,OEA,OSPA,FAO, International Agency for Atomic Energy, UNICEF	80-100
European universities and hospitals	20
Brazil	
CAPES	30
CNPq	50
State of Rio Grande do Sul	24
Ministry of Education	20-30
Privately Funded Scholarships	50
Total	1084-1259

Source: Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. *A Formacao de Pessoal de Nivel Superior e o Desenvolvimento Economico [High Level Manpower and Economic Development]*. Rio de Janeiro: CAPES, p. 60.

*Scholarships for cultural, academic and technical co-operation.

**German Government, DAAD, Alexander von Humboldt, and Technical Schools.

***British Council, British Federation of Industries.

****This scholarships refer only to the category of 'students' based on criteria of the IIE-Institute of International Education and of the Fulbright Commission, scholarships given to professional specialists or for other types of short period training are not included.

***** not defined in the document.

Despite the overall effort of the Brazilian authorities to train high-level human resources, the funding of scholarships abroad was drastically reduced and entered a phase

of stagnation in the early 1960s because of the political and economic crises faced by the nation.⁴⁰

Political and Economic Instability of the Early 1960s.

In the late 1950s, the Brazilian economy started to show the negative side effects of the process of industrialisation based on the import-substitution model.⁴¹ Economic growth did not end mass poverty as was expected. On the contrary, increased disparity in income distribution accentuated social inequalities among the Brazilian people. Governmental strategies for investing in national industry attracted great criticism.⁴²

As the economy deteriorated, social tensions increased and the nation went through serious political instability. The national scenario became a battlefield for groups with antagonistic ideological tendencies. The debate on the best alternative to solve the problems afflicting the nation became polarised between the leftists-marxists and the rightist-neoliberals.⁴³ As a result, the nation entered a period of political conflict with increasing internal turmoil, frequent riots and strikes.

In this context, a radical nationalist group emerged in the political arena. Their views were based on the assumption that Brazilian underdevelopment was a consequence of an alliance among private investors, capitalist governments and the exploitative interest of the industrialised nations. The main purpose of such alliances was to maintain the nation in its condition of dependence. Within this perspective, 'any attempt to industrialisation was doomed to fail if it was to be based on the cooperation of the

industrialised nations'.⁴⁴ According to Skidmore, this radical-nationalism was a political reaction against the ruling political elite, rather than a strategy for economic development.⁴⁵

From a broader perspective, the ideological struggle Brazil was going through had implications beyond the national scenario. The government in power was giving clear signs of adopting a leftist stance, opening the possibility of a communist government in South America. At the heights of the cold war, this was a disturbing scenario. Fidel Castro had established his leftist government in Cuba in 1959. President John F. Kennedy who had been elected in the United States in 1960 was determined to stop the spread of communism in Latin America. As a result, growing efforts from capitalists and communists alike to influence political developments in neighbouring nations took place through increasing infiltration into local institutions, such as universities, churches, political parties, and the armed forces. All this had implications for the ongoing political instability in Brazil and reduced greatly the flow of Brazilians abroad paid for from public funds.⁴⁶

Nationally, the scenario were aggravated by a series of interrelated events that had serious political and social repercussions. With an economic background of annual inflation rates that went over 100 percent and increasing political conflict, the newly elected President, Janio Quadros, adopted a severe plan for economic stabilisation that attracted great political criticism and ideological opposition.⁴⁷ As a result, Quadros resigned in 1961, leaving the presidency to his deputy, Vice-President Joao Goulart. The

new President, however, was seen by the armed forces as a representative of the radical leftist sector of the political leadership. Eventually, motivated by an incident that was seen as a threat to the military hierarchy, the armed forces intervened and took control of the government.⁴⁸

Educational Reforms in the Military Government and its Implication for the Funding of Scholarships Overseas (1964-1986)

From 1964 onwards, there occurred a series of educational reforms in Brazil. These changes were part of the political project of the military regime that ruled Brazil up to the early 1980s. Such an agenda was framed by a broad ideological doctrine in which the building up of a scientific and technological capability was crucial to the fulfilment of national interests. The doctrine, based on the concepts of 'national security' and 'economic development', legitimated the establishment of an authoritarian regime.⁴⁹ The rationale for policy making in this period of time originated in the Superior War College-ESG [Escola Superior de Guerra] modelled on the American National War College. The doctrine provided a justification for the military government in the sense that ideological struggle and economic backwardness in underdeveloped societies constituted a threat to democracy.⁵⁰ To guarantee internal order, it was necessary not only to adopt strategic control over economic matters, but also to minimise internal tensions caused by political conflicts.⁵¹ Within this view, when the main goals of social stability and economic

development had been achieved, the state of political repression or 'exception' would be lifted and democracy would be restored. Such a political vision was translated in the media through the design of Brazil as a world power, a 'grand Brazil' or, in economic terms, the idea of the 'Brazilian miracle'.⁵²

To ensure the conditions necessary to make Brazil a world power, economic reforms became the top priority in the military agenda. Consequently, a series of grand plans for investment in areas considered to be strategic were launched. These plans were conceptualised by an emergent group of professionals, the so-called 'technocrats',⁵³ formed by an elite of technicians, economists, planners and administrators, mainly trained overseas, who occupied key positions in the economic spheres of the state bureaucracy. They were responsible for building up a strategic national programme for the stabilisation of the economy.⁵⁴ The policies adopted in this period of time can be broadly described as framed by an orthodox approach.⁵⁵ In practice, this meant a type of authoritarian capitalism that believed in the opening up of the internal market to foreign capital and the modernisation of the financial system.

Investment in science and technology was a key element in this political vision. The building up of an autonomous scientific capability able to free Brazil from foreign dependency fitted well with the nationalistic aspirations of the military government.⁵⁶ Consequently a series of interrelated programmes for the development of science were launched. Within this context, education was also given top priority. As a result, official jargon such as 'science as a productive force' and 'education as the means to form

manpower for the market place' and expressions such as 'the needs of creating a scientific and technological capability in order to accelerate economic development', or 'the needs of building skilled manpower in quantity and quality compatible with the process of development' impregnated official documents and speeches explaining the educational reforms.⁵⁷

A common aspect of the economic, scientific and educational plans to be adopted, however, was the reference to economic theories. Concepts such as 'human capital'⁵⁸ and terms from the economics of education, such as the notion of 'investment', 'rationality', 'efficiency' and 'technical expertise', provided the intellectual basis for the design of policies intended to solve national problems.⁵⁹ The new legislation dealing with changes in education was, therefore, embedded in principles of the economics of education and its emphasis on efficient use of production factors, input/output models, internal rates of return and cost/benefit analysis.

In these plans, postgraduate education was regarded as the means of forming the type of scientific personnel needed for the regime's political project to be accomplished.⁶⁰ Consequently, a set of reforms was implemented in order to adapt the educational system to such an economic view of education.⁶¹ This economic influence in policy making dealing with educational reforms emphasised the importance of an adequate high education sector.⁶²

The Reform of the Higher Education System - 1968⁶³

As already mentioned, the idea of reforming the higher education system was not new in Brazil. Since the first half of the twentieth century, there had been passionate discussions in the national arena about the need to change the Brazilian university. Even the University of Sao Paulo, which was quite unique within the educational context in terms of research activity, was blamed for not being innovative enough for a country going through such a rapid process of social and economic change. Criticisms were mostly based on the fact that the Brazilian universities were a mere copy of the old professional schools of law, medicine and engineering. This model was seen as outdated and not able to respond to the demand of producing the type of people needed by the growing productive sector. Specifically, the organisational feature of the university that was based on the system of chairs and disciplines was strongly opposed. This system meant that each discipline taught in the universities was 'owned' by a senior professor who had absolute control over his [sic] department. Such a practice was regarded as anti-democratic and against the modern conception of a university.

The reform that took place in 1968, was a response to immediate political and economic pressures.⁶⁴ Firstly, there was urgent need for expanding access to higher education. Economic growth gave rise to an emerging urban middle class that regarded a higher education degree as a symbol of social mobility.⁶⁵ However, the number of candidates willing to enter the university was far beyond what the existing system could absorb. Candidates for higher education grew by 120%, while the number of places

available grew by only 50%.⁶⁶ As a result of the lack of places, a great number of candidates who had passed in the access examinations were unable to enter higher education. This brought about great popular dissatisfaction that resulted in violent protests, with students in the streets arguing for more and better education.⁶⁷

The second motivation for reform was the need to make the system more efficient and productive in order to train the qualified personnel required for the public and productive sectors that had been enlarged significantly with the growing intervention of the state in the economy.⁶⁸ As governmental efforts towards economic stabilisation required restriction of public expenditure, it was not possible for the authorities to create new universities to respond to the growing demand for higher education. To release the pressure on the system, a reform was proposed based on the tenets of 'rationalisation and efficiency' of the academic structures, and 'democratisation' of educational opportunity. This was proposed order to educate the highest possible number of students at the least cost.⁶⁹ According to Morel:

...on the one hand the reform of the university came to respond, through technical and operational changes, to the demands of significant political segments of the middle classes, and at the same time gave the government political control over the process of innovation of the universities. On the other hand, the reform was intended to interrelate the university to the economic system, with the mission of forming - with the least cost possible - the elements needed for the market place.⁷⁰

The mission of sorting out the details and technicalities of the new university configuration were given to a commission of experts appointed by the Brazilian authorities from the Ministry of Education and representatives from USAID (The United

States Agency for International Development) in accordance with a bilateral agreement signed between the two governments.⁷¹ In the view of this task group:

Higher education is a priority investment for its high long term economic rentability and for its valorisation of human resources; the (Brazilian) university has been unable to follow the extraordinary progress of modern science, and has proved inadequate to create the know-how necessary to the expansion of the national industry... (The aim of the reform is) to give the university system a type of rationality in terms of efficiency technical professional, that would bring about more productivity of the economic system, making the university a centre for scientific and technologic research able to assure Brazilian industrial growth.⁷²

The close participation of the government of the United States in internal matters was strongly criticised. Nevertheless, in 1968, the recommendations provided by this group was approved by the Brazilian Congress and became a federal law and the new legislation was implemented throughout the nation.⁷³

The new system for Brazilian higher education was inspired by the American model of research universities and consisted mainly of a reorganisation of academic structures.⁷⁴ Universities were now to promote a close link between the activities of teaching and research and to promote better integration between the faculties so that teaching would be rationalised and more efficient. In order to facilitate the development of research, a change in the work schedules of lecturers was implemented and teachers had to work on a full time basis and were expected to undertake research. Also, the system of chairs was abolished and replaced by departments and institutes to be administered by a central senate. A credit and module system were adopted for two

distinct cycles of teaching, basic and professional, instead of the old system of disciplines. Additionally, postgraduate education was to be part of the university's activities.⁷⁵

Some of the goals of the reform were indeed achieved. There was great expansion of enrolments in the 1970s. In 1960, there were 96,700 enrolments in undergraduate courses. This number increased to 425,500 in 1970 and to 1,377,286 in 1980. Between 1960 and 1970, the public sector (state and federal universities) grew from 53,600 enrolments to 210,600 and to 492,200 in the next decade.⁷⁶ Research activities also grew significantly. Enrolments in postgraduate courses grew 127% between 1969 and 1970. The number of people with master's and doctor's degrees grew rapidly from 261 in 1969 to 5,369 in 1981. In the same period of time, the number of postgraduate courses increased from 125 in 1969 to 1,021 in 1981.⁷⁷

Nevertheless, the type of reform implemented also provoked distortions that hindered the fulfilment of other aims.⁷⁸ Efficiency and democratisation of access, for instance, were only partially accomplished.⁷⁹ The emphasis on a research university made the federal system extremely costly, specially for a nation in the process of economic development. In the advanced countries, the expansion of the public sector was partially financed by the diminishing of the costs per student caused by the massive expansion in the number of enrolments and the rise in the number of student per lecturer.⁸⁰ In Brazil, the opposite took place.⁸¹

Moreover, in spite of the expansion of enrolments achieved, places were still insufficient for the demand. As a result, access had to be restricted through the adoption of a selective mechanisms, known as 'vestibular'. Restricted access, however, created a surplus that gave rise to a private and commercially driven sector that, today, accounts for more than 60 % of the total of enrolments in the country.⁸² According to Freitag:

the legislation made clear that the reform aimed at forming high-level human resources with efficiency, that is, minimum financial resources to obtain a maximum of access opportunity for higher education. In this respect, terms such as 'rationality' meant less wastage in order to achieve more efficiency of the system in order to respond to demands of the labour market for trained workforce, at the same time to maximise the use of resources available to provide access to the largest number of students possible. However, the reform's rationale brings contradictions to its results because the political and economic motives underlying the legislation provoked a trade off between quantity for quality. In order to expand the number of enrolments, quality assurance mechanisms were lower down, giving rise to new instruments in order to guarantee the quality standards in the public universities. The result was the expansion of the private sector.⁸³

Consequently, the Brazilian higher education became divided into two tiers.⁸⁴ The public sector, where most scientific research takes place, provides free access, with quality control assured through restrictions to access. On the other hand, in the private sector, where access is subject to the ability to pay high fees, quality assurance mechanisms are virtually non-existent. With the exception of a few private religious institutions, advanced research is not practised. Therefore, the aims of rationality and democratisation were not accomplished. Access to higher education remained restricted to a minority and financial resources for the federal universities continued to be a major problem.

Another major implication related to the type of university proposed in the reform was the lack of high-level personnel in numbers sufficient to teach and engage in research activities.⁸⁵ The expansion took place with improvised teachers or with lecturers with low qualifications. This had negative implications for the intended goal of uniting the activities of research and teaching.⁸⁶ More significant, however, 'the hiring of unprepared personnel for the expanding higher education sector hindered the development of academic ethos essential for the organisation and internal functioning of a university based on research activity.'⁸⁷ To address the lack of qualified faculty, and other types of distortions, new policies for postgraduate education were adopted.

Postgraduate Education in Brazil

Postgraduate studies in Brazil up to the 1950s was incipient, taking place mostly outside the university in independent research institutes and mostly for utilitarian purposes.⁸⁸ In the first decades of the twentieth century, the creation of new institutions involved with scientific research, such as the Brazilian Academy for Science (ABC) and the Brazilian Society for the Progress of Science (SBPC), in 1924 , stimulated some kind of postgraduate studies. There were some individual initiatives, e.g. small groups of researchers physically located within an university, but there was little further intellectual integration.⁸⁹ With the exception of the University of Sao Paulo, which managed to

integrate graduate studies into its activities, postgraduate training for Brazilians, in general, was either rather restricted in terms of fields and institutions or based mostly on study in foreign universities. Claudio de Moura Castro says that:

Foreign connections were very important. Progressively, the number of scientists trained abroad increased. Each returnee created an intellectual environment and opened new opportunities for the training of a larger number of people – usually in the same university – fostering ‘dynasties’ of researchers linked to a particular foreign institution. In a way, continuity in the Brazilian science was achieved from abroad, especially in Europe, since the weight of the American influence takes place only in the post War years.⁹⁰

The opportunities for advanced research within the boundaries of higher education started to improve dramatically from the post-War period onwards. This was mainly caused by the expansion of higher education that demanded trained personnel to teach in the new institutions that were being created. As a result, a postgraduate sector started to develop rapidly. However, a striking growth of postgraduate studies in Brazil would take place in the late 1960s and in the 1970s as a consequence of new norms created by the authorities to guide the expansion of courses.

Brazilian postgraduate studies were officially recognised as a necessary type of education in 1961, when a broad law giving guidelines for the national educational system was approved. In 1965, the Federal Council of Education established new legislation with the purpose of promoting changes concerning three main aspects: a) to train competent faculty to respond to the quantitative expansion of higher education; b) to stimulate scientific research through the training of researchers; and c) to assure adequate

training of technicians and intellectuals at the highest levels, to meet the needs of national development.⁹¹ Subsequently, other norms were created to differentiate two types of courses for graduate studies after the American model of postgraduate education. The ones known as *stricto sensu* were regarded as research and academic degrees. The others, *lato sensu*, provided a type of professional up-grading diploma. Later on, instructions relating to credentials for the postgraduate courses and also to the structure of postgraduate degrees for teaching in the federal universities were created.⁹²

These efforts by the authorities to formally organise and develop graduate education, however, were greatly helped by the return of the first batches of people who had studied abroad. People who had achieved their degrees in foreign universities in the late fifties were enthusiastic about the challenges of engaging in advanced research in their own country. New groups of academic researchers began to be formed and, with the help of governmental funds, had the opportunity to proliferate.⁹³ According to Cordova, Luna and Divonzir there were various factors that contributed to the remarkable growth of postgraduate studies in Brazil:

daily contact with foreign scholars, struggle for institutional space, demands of professional groups, political ideas, educational trends gave rise to a boom in the development of scientific activity in the next decades and in the first surges of postgraduate education.⁹⁴

In 1969, a new fund for scientific research was founded, the National Fund for Scientific and Technologic Development – FNDCT [Fundo Nacional de

Desenvolvimento Científico and Tecnológico] that, later on, was transformed into another funding agency, FINEP- The Research and Project Funding Agency [Financiadora de Estudos e Projetos]. Investments made with this fund played a significant role in facilitating the proliferation of postgraduate groups through the allocation of resources.⁹⁵ At the institutional level, a new programme was created under CAPES management, the PICD- Institutional Programme for the Training of Teachers [Programa Institucional de Capacitacao de Docentes] for the award of scholarships for postgraduate studies exclusively for the training of lecturers. Within this context, the Brazilian postgraduate education sector initiated a period of remarkable expansion. In the period of one year, from 1969 to 1970, enrolments in postgraduate courses grew 127%. After such a remarkable boom, enrolments decreased but still grew by an average of 31 % in the next decade. This is shown in Table 3.2.

Table 3.2
Number of Students in Postgraduate Courses
1969-1981

Year	No. of Students	Growth %
1969	1,342	--
1970	3,068	127
1971	5,690	85
1972	8,960	57
1973	10,887	22
1974	15,212	40
1975	22,245	46
1976	26,255	18
1977	31,532	20
1978	33,034	5
1979	36,608	11
1980	38,609	5

Source: Adapted from Claudio Moura Castro. 1985.
Ciencia e Universidade [Science and University].
Rio de Janeiro: Jorge Zahar Editora, p. 14.

The number of lecturers involved in activities linked to postgraduate education also grew significantly. In 1973 there were 7,830 lecturers working in postgraduate courses. In 1981, the number of lecturers increased to 16,531.⁹⁶

Nonetheless, in spite of the rate of growth, the number of lecturers in postgraduate education was insufficient when compared to the growing demand for this type of training. Additionally, the rapid growth of postgraduate courses produced unintended results. The expansion in the number of courses, for example, was not planned, apart from broad guidelines for training to be focused on areas related to technological fields. The unsystematic growth of courses and enrolments gave rise to concerns about quality control. In order to correct these distortions, governmental plans for postgraduate education were launched.

These plans were part of a broader scheme that attempted to link, strategically, policies for advanced research with planning in interrelated areas such as education and culture, science and technology and economic development. They constitute the only explicit attempt to plan overseas education, hence their relevance for this research. In spite of the training of people abroad being marginal within the overall objectives of the plans, there were some efforts to forecast in quantitative terms the training of Brazilians in foreign universities. These plans resulted in a significant increase in the number of people trained overseas in the late 1970s and early 1980s. For instance, CAPES awarded 70 new scholarships in 1974. This number grew to 1,400 in 1979.⁹⁷ Considering that

these plans are the only source of an official attempt to forecast the needs of people trained overseas, they will be commented on in the next part.

The National Plans for Postgraduate Education - PNPG

There were three national plans for postgraduate education, in 1974/1979, 1982/1985, and 1986/1989. A striking characteristic in all of them is the heavy use of economic and bureaucratic jargon. The documents are not only written in excessively technical language but also within a repetitive style. Extensive introductory remarks described the main characteristics of postgraduate studies in Brazil and highlighted theoretical assumptions underlying the goals and the guidelines given in the documents. The principles justifying each plan varied slightly in format, but little in content. They were mainly based on the needs of high-level human resources for higher education in order to help the economic development of the nation.

According to the first national plan (I PNPG), for instance, higher education's function was 'to disseminate and widen society's knowledge and culture, to transform it in terms of its social and economic growth, to educate, to train, and to qualify high-level human resources, in accordance with the demands of the national productive sector and of the education system itself.'⁹⁸ In this respect, postgraduate training (master's and doctor's degrees) needed to respond to challenges brought about by the quantitative

expansion of the university system and prepare professionals for the job market in both the public and private sectors.⁹⁹

The main problems to be dealt with related to the need for more effective planning in terms of expanding the postgraduate system quantitatively, of assuring quality standards, of funding in a more rational manner, and of integrating academic research and scientific activity to industrial needs.¹⁰⁰ According to the plans, the most visible characteristic of the process of growth occurring in Brazil at that time was the lack of co-ordination among governmental initiatives. Insufficient policy guidelines from governmental bodies combined with a great diversity of sources for funding gave rise to bottlenecks that caused negative implications for the development of the whole system.¹⁰¹

This meant that the non-articulation or the lack of formal links between courses and the universities caused an imbalance in areas of scientific work, as well as great institutional heterogeneity. These problems gave rise not only to institutional instability but also enhanced the vulnerability of postgraduate courses to budgetary cuts. Also, efficiency indicators of master's and doctoral courses were considered unacceptable. The majority of students did not complete their credits and, in master's courses in particular, only 15 % of all students were likely to finish their degrees.¹⁰² Moreover, from a broader perspective, there were other matters of concern, such as an undesirable process of migration of postgraduate students from the interior of the country to the big capital cities, without the subsequent return of postgraduates to their place of origin.¹⁰³

In order to overcome these negative tendencies, measures to be taken at distinct levels were proposed, namely national, institutional and normative. Therefore, to improve the performance of the whole postgraduate system at the national level, the funding agencies responsible for policy making were meant to fund and advise and to be responsible for the credential and validation of courses, institutions and degrees.¹⁰⁴ At the institutional level, the establishment of programmes for professional upgrading was the main objective to be accomplished, mostly through internal and external exchange programmes through funded scholarships. Therefore, a series of quantitative targets were proposed. Within the period between 1974-1979 (II PNPG), a total of 6,800 masters and 1,400 Ph.D.'s were to be trained.¹⁰⁵ Another quantitative aim was to expand the number of places available in master courses from 7,000 to 11,700 and in Ph.D. courses from 500 to 1,200 in the same period of time.¹⁰⁶

To achieve these aims, programmes for the award of scholarships were given a significant role. In global terms, the number of scholarships granted by the federal agencies covered 40 % of all postgraduate students and, during the period established in the I PNPG, the number was to increase to 60 % of annual demand.¹⁰⁷ A total increase of 52,000 scholarships per year was to be funded for studies in national institutions for full time master's and doctoral students. Mainly, these bursaries were meant to complement the salaries of people who were already working as lecturers, or to recruit new ones.

Within this context, overseas scholarships were also included in the strategy for improving rapidly the number of people with higher degrees. Thus, a total of 3,500 new

overseas scholarships were to be awarded, mostly for training at Ph.D. level. Emphasis on the training of people overseas was justified by the urgent need to establish new research centres in technological areas.¹⁰⁸ Criteria for institutions and countries of destination for scholarship recipients were to be established taking into account the international context of scientific production. Also, specific conditions related to the work to be done by the candidates on their return and reintegration in Brazilian institutions were to be considered.¹⁰⁹

According to the third plan for postgraduate education (III PNPG) launched for the period 1986/1989, despite the efforts made to supply the needed human resources, the nation did not have scientists in number sufficient to allow it to reach its full scientific and technological capabilities in the short term. Postgraduate activities had not met the demand for the training of researchers and lecturers with Ph.D. degrees, as approximately 50 % of the lecturers working in postgraduate courses did not hold a doctorate degree.¹¹⁰

Postgraduate courses kept proliferating faster than the system's capacity to supply the demand for trained personnel. The number of master's and doctoral courses evaluated by CAPES nearly doubled in the 1990s. (See Appendix II, Graph II-1)

Conclusion

This chapter provided a description of the main policies adopted by the Brazilian government to build up high-level manpower from the 1950s onwards. The narrative highlighted the creation of CAPES, as part of an institutional infrastructure to train people at postgraduate level and, also, the reforms adopted in the higher education and postgraduate sectors that had implications for the training of people overseas during the military government. It was argued that the rationale for the funding of scholarships overseas was framed by national political projects at different periods of time.¹¹¹

The evidence on the context of the policy of scholarships overseas indicated that the creation of CAPES, and its funding of scholarships for postgraduate studies was a turning point in the way the practice of studying abroad evolved in Brazil. Until the first half of the twentieth century, the opportunity of studying in a foreign country was restricted to a wealthy elite and, thus, was a matter of personal privilege. From the 1950s onwards, however, overseas education became accessible to different segments of Brazilian society as a result of public policies.¹¹²

The evidence suggests that the idea of scholarships abroad as a mechanism for training specialised personnel was accepted by the highest levels within the Brazilian governmental structure. It is possible, however, to delineate distinct views and the

purposes of overseas education in the Brazilian context in the two periods of times examined in this chapter.

In the 1950s, as already shown, the creation of CAPES was a consequence of efforts towards industrialisation. The modernisation of the economy was based on a model of economic transformation (the import-substitution model) that required a type of manpower that was considered scarce in post-war Brazil.¹¹³ In this context, the lack of people with higher education degrees was regarded as a major bottleneck for industrial growth.¹¹⁴ Consequently, the Brazilian authorities invested in the training of manpower needed by the nation.¹¹⁵

However, the types of training and the professionals trained abroad in the initial years of CAPES suggested that the primary aim at that time was the building up of a critical mass in all fields of activities. High-level human resources at that time had a broader scope of training such as in-house training in American hospitals, short term technical training, and doctor and master's degrees in foreign universities. From this perspective, the type of knowledge that governmental actions suggested as relevant in the 1950s can be defined as by both the professional training and the cognitive power required for the building up of a critical mass.

In the period of the military government, however, the opposite appears to be true. The underlying principle behind the governmental investment in science and technology was the idea of science as a factor in economic development.¹¹⁶ To ensure the conditions

necessary to make Brazil a world power, grand plans were launched for investment in areas considered to be strategic. In these plans, education was accorded top priority as a means of forming the type of scientific personnel needed for the regime's political project to be accomplished.¹¹⁷ As a result, the educational re-structuring in higher and postgraduate education done during the military government was pragmatically committed to the ideological vision of economic development framed by the concepts of 'efficiency' and 'rationality'.¹¹⁸

These reforms indicate a closer relationship between the vision of the government expressed in its ideological doctrine and the building up of scientific manpower. Therefore, for the first time, the funding of people studying abroad was planned and explicitly acknowledged as a policy. Also, greater delineation of purposes is discernible in terms of the transfer of know-how. The definition of priority areas for study abroad, for example, can be described as the type of knowledge required to train human resources for the so-called knowledge-intensive industries, such as electronics, computing, aerospace, and communications. This had implications for the type of people trained overseas. The number of scientists, including specialised engineers and high level technicians trained in this period of time increased significantly.

These two distinct perceptions of the usefulness of knowledge converged in some aspects. They were sustained by economic themes and associated to developments in higher education. Additionally, in different ways, the training of postgraduates in foreign universities was relevant for political projects in both period of times. This indicate the

relevance of the policy of overseas scholarships at the federal level. However, the account provided in the analysis of these two phases of the policy of overseas abroad do not provide information on what this policy is in reality. To do that, the scheme of scholarships abroad of CAPES will be explained in the next chapter.

The description so far was revealed the broader context of the policy of scholarships abroad. This account did not, however, provide much information on these scholarships in detail. To do so, in the next chapter a distinct style of narrative will be adopted and what these bursaries constituted in reality will be explained and the scheme of CAPES' scholarships abroad will be described.

Endnotes to Chapter III

¹ The creation of CAPES and CNPq in the 1950s is regarded as a milestone in the process of the institutionalisation of scientific policy in Brazil. See Regina Lucia de Moraes Morel. 1979. *Ciencia e Estado - a politica cientifica no Brasil [Science and the State- scientific policy in Brazil]*. Sao Paulo: T.A.Queiroz, Chapter II.

² According to Fernandes, the association of education and science with economic growth gave rise to a 'nationalistic' vision of science by the Brazilian government, as defined by:

a conception of science as an activity that must be oriented to the needs of the nation. Scientific enterprise was to be done with the purpose of being transformed in technology that would be used in the industries and, thus, be a factor of economic development and progress of the country... in such conception, scientists were seen as citizens, a special type of citizens, with greater social responsibility for being scientists in a country with such alarming illiteracy rates.

In Ana Maria Fernandes. 2000. Op.cit., p. 83.

³ For more on the influence of the United States on Latin America politics see Benjamin Keen, ed. 1996. *Latin American Civilization: History and Society, 1492 to the Present*. Boulder, Colorado: Westview Press, chapter 21.

⁴ See CNPq - Conselho Nacional de Desenvolvimento Cientifico e Tecnologico . 2001. Op.cit., pp. 141-149, and also James S. Coleman. 1984. Professorial Training and Institution Building in the Third World: Two Rockefeller Foundation Experiences. In *Bridges to knowledge - Foreign Students in Comparative Perspective*, edited by E. G. Barber. Chicago: The University of Chicago Press.

⁵ David G. Scanlon, ed. 1960. Op.cit., p.18.

⁶ David G. Scanlon, ed. 1960. Op.cit., pp.143-144.

⁷ This was the main rationale stated by American private agencies for their work in non-industrialised nation. See James S. Coleman and David Court. 1993. *University Development in the Third World - The Rockefeller Foundation Experience*. Oxford: Pergamon Press.

⁸ Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op.cit.

⁹ For an analysis of the political processes related to development in Latin America, see Fernando Henrique Cardoso. 1973. Op.cit., Chapter I.

¹⁰ Charles W. Anderson. 1967. *Politics and Economic Change in Latin America*. New York: Van Nostrand Reinhold Company, Chapters 1 and 2.

¹¹ For a theoretical analysis on 'structuralist' and 'neo-liberal' approaches see Tom Hewitt, Dave Wield and Hazel Johnson, ed. 1992. *Industrialization and Development*. Oxford: Oxford University Press/ Open University, Chapter V.

¹² Tom Hewitt, Dave Wield and Hazel Johnson, ed. 1992. Op.cit., Chapter V.

¹³ Brazil was not the only country to adopt import substitution strategy to promote economic development. Many other countries in Latin America in the second half of this century adopted the same model. Maria da Conceicao Tavares. 1972. *From the Import Substitution Model to Financial Capitalism [Da Substituicao de Importacoes ao Capitalismo Financeiro]*. Rio de Janeiro: Zahar Editores, pp. 29-57.

¹⁴ Luiz C. Bresser Pereira. 1979. *Desenvolvimento e Crise no Brasil [Development and Crisis in Brazil]*. 8th ed. Sao Paulo: Editora Brasiliense, p. 47.

¹⁵ Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op.cit., p.16.

¹⁶ Ibid.

¹⁷ Specialised engineering, including areas such as Electronics, Mines and Metals, Mechanic, and Chemistry, represented 1,5 % of the working force in the secondary sector of the economy. Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op.cit., p. 19.

¹⁸ The overall level of education of the Brazilian population in the 1950s was below what was expected of a nation going through a process of rapid industrialisation. Bradford Burns. 1980. *A History of Brazil*. New York: Columbia University Press, p. 452.

¹⁹ The training of professionals for the primary sectors - agriculture and agronomy - reflected a discontinuity between the rapid process of change that was taking place in the industrial sector and a stagnated agriculture. Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op.cit., p. 36.

²⁰ The names of these agencies have been translated by the author. In Portuguese they mean Conselho Nacional de Pesquisa – CNPq founded in 15.01.51 by Federal Law no. 1.310, and Campanha Nacional de Aperfeiçoamento de Pessoal de Ensino Superior – CAPES founded in 11.07.51 by Federal Law no. 29.741. The creation of these two agencies was of great relevance for policies related to the training of people overseas. Nevertheless, there are others bodies and programmes that similarly to CNPq and CAPES promoted the training of people in advanced research in various areas in Brazil and abroad. The Comission for the Supervision of the Plans for the Institutes – COSUPI [Comissao Supervisora dos Planos dos Institutos] and the Programme for the Expansion of Technological Teaching – PROTEC [Programa de Expansao do Ensino Tecnologico] PROTEC, for example, were autonomous programmes linked to the Ministry of Education that were incorporated into CAPES (in 26.05.64 by Federal Law no. 53.932). COSUPI and PROTEC also aimed at promoting the training of people in engineering and in technological areas. Regina Lucia de Moraes Morel. 1979. Op.cit., p.46 and p. 49.

²¹ Elionora Maria Cavalcanti de Barros. 1998. *Politica de Pos-Graduacao - Um Estudo da Participacao da Comunidade Cientifica [Postgraduate Policy - A Study of the Participation of the Scientific Community]*. Sao Carlos: Editora da UFSCar, p. 80.

²² Ibid.

²³ Regina Lucia de Moraes Morel. 1979. Op.cit., p.45.

²⁴ Regina Lucia de Moraes Morel. 1979. Op.cit., p. 46.

²⁵ In Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op.cit., p. 52.

²⁶ In Regina Lucia de Moraes Morel. 1979. Op.cit., p. 46.

²⁷ Translated by the author from documents of creation of CAPES, Decree no. 29 741.

²⁸ Regina Lucia de Moraes Morel. 1979. Op.cit., p. 47.

²⁹ ‘Institution building’ is the ‘creation of a critical mass of well-trained indigenous scholars who could assume the intellectual and scientific leadership in building strong, high-quality universities in less developed countries’. In James S. Coleman. 1984. Op.cit., p. 33.

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- ³⁰ Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op.cit., pp. 53-54.
- ³¹ BRASIL. CAPES. 1954. Sua organizacao e Realizacoes [CAPES - Its Organisation and Achievements].. Rio de Janeiro: CAPES, p. 15.
- ³² BRASIL.CAPES. 1954. Op. cit.
- ³³ Rogerio A. Cordova, Divonzir, A. Gusso, and SergioV. Luna and. 1986. Op. cit., p.17.
- ³⁴ Based on the accounts of people interviewed by the researcher. There are no documents explaining why CAPES adopted a policy for the award of scholarships.
- ³⁵ Based on the accounts of people interviewed by the researcher.
- ³⁶ See Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op. Cit., p. 52.
- ³⁷ CAPES also provided financial aid for improving the infrastructure related to advanced research of federal universities.
- ³⁸ Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op. cit., p. 60.
- ³⁹ It is worth noting that scholarships for studies in American universities predominated despite the fact that in many European universities fees were not charged. Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op. cit., pp.58-59.
- ⁴⁰ In the early 1960s a great number of Brazilian scientists left Brazil to work in foreign universities and institutions. This is not to be confounded with 'brain drain' in the traditional sense of people that opted to live overseas after finishing their studies in foreign universities. The migration of Brazilian scientists in the early 1960s was mostly a result of the national political context. See H. Moyses Nussenzveig. 1969. Migration of Scientists from Latin America. *Science* 165 (3888):1328-1332.
- ⁴¹ These distortions were a combination of various factors such as great disparity in the level of income that accentuated social inequalities, increasing concentration of industries in the south region of the country, increased under-utilisation in the agriculture sector, an uncontrolled inflationary process, and a lack of administrative staff for state bureaucracy, etc. For more see, Georges-Andre Fiechter. 1975. *Brazil Since 1964: Modernisation Under a Military Regime*. Translated by Alan Braley. London and Basingstoke: The Macmillan Press, p.22.
- ⁴² Rhys Jenkins. 1992. Theoretical Perspectives. In *Industrialization and Development*, edited by Tom Hewitt, Hazel Johnson, and Dave Wield. Op. cit., p. 133.
- ⁴³ For more on this topic see Thomas Skidmore. 1969. *Politics in Brazil, 1930 -1964 [Brasil: De Getulio a Castelo-1930-1964]*. 2 ed. Rio de Janeiro: Editora SAGA, pp. 117-121.
- ⁴⁴ Thomas Skidmore. 1969. Op. cit., p. 120
- ⁴⁵ Thomas Skidmore. 1969. Op. cit., p. 121.
- ⁴⁶ Thomas Skidmore. 1969. Op. cit., p. 212.
- ⁴⁷ Riordan Roett. 1999. *Brazil - Politics in a Patrimonial Society*. Westport, Connecticut: Praeger, p. 113.
- ⁴⁸ According to the literature, in Brazil, the armed forces had always played an active role in the nation's political life, from the independence from the Portuguese rule, through the change from monarchy to republican system of government, and later on during the events that gave rise to the dictatorship

government of Getulio Vargas. This time, however, there was a shift in their attitude towards a more prominent role in face of the economic and political crisis Brazil was going through. For more on this theme see Georges-Andre Fiechter. 1975. Op. cit.

⁴⁹ Sergio Mascarenhas. 1985. Comunidade Cientifica como Fator de Seguranca Nacional [Scientific Community as a Factor of National Security]. *Ciencia e Cultura* 37 (7):1061-1069.

⁵⁰ ESG had an extended curriculum concerning public affairs, psychology and social affairs, economic affairs, military affairs, logistics and mobilisation, intelligence and counter espionage, doctrine and co-ordination. It represented a framework for a new role to be played in determining national objectives. About fifty percent of the participants were civilians, representing many sectors of the nation's life such as civil servants, industrialists, doctors, journalists, intellectuals and members of the catholic clergy. Georges-Andre Fiechter. 1975. Op. cit., p. 28.

⁵¹ Georges-Andre Fiechter. 1975. Op. cit., p. 29.

⁵² In the period of time between 1968 and 1972, Brazil's GNP increased greatly, hence the term 'miracle'. For more, see Peter McDonough. 1981. *Power and Ideology in Brazil*. Princeton, New Jersey: Princeton University Press, p. 131.

⁵³ According to Bresser Pereira, these were mainly economists and high-level technicians that left intermediate positions as advisers to become policy makers. In Luiz C. Bresser Pereira. 1979. Op. cit., p. 162.

⁵⁴ Luiz C. Bresser Pereira. 1979. Op. cit., pp. 162-163.

⁵⁵ The strategy adopted to tackle economic problems was based on an orthodox approach that would open up the internal market to foreign capital, together with the modernisation of the financial system (The Brazilian Central Bank was created in this period). This approach was justified as politically neutral, based on principles of rationality and efficiency, to respond solely to public interests. This strategy succeeded, in the first years of the military government, and the main goals of lowering inflation and renegotiating external debt in order to resume economic growth were achieved. From 1968 onwards, there was a positive period in which the rate of economic growth grew significantly. Thomas E. Skidmore. 1998. Op. cit., p. 249.

⁵⁶ Other relevant issues were ignored in the government's agenda of building up a scientific and technologic capability. According to McDonough, in this context, "population planning is accorded the status of non-problem". In Peter McDonough. 1981. Op. cit., p. 266.

⁵⁷ Regina Lucia de Moraes Morel. 1979. Op. cit., p. 57.

⁵⁸ The idea of 'human capital' was frequently mentioned in official documents of the period. In the first broad national plan for economic stabilisation launched when the first military president, Castello Branco, took office in 1964, this economic approach was introduced in educational planning in expressions such as: "Brazilian education needs to help the creation of human capital in order to accelerate economic development". Barbara Freitag. 1978. *Escola, Estado e Sociedade [Education, State and Society]*. Sao Paulo: Edart - Sao Paulo Livraria Editora, p. 23. See also Betty Antunes de Oliveira. 1980. *O Estado Autoritario Brasileiro e o Ensino Superior [The Brazilian Authoritarian State and Higher Education]*. Sao Paulo: Cortez Editora/Autores Associados. For the concept of 'human capital' see Gary Becker. 1975. *Human Capital: a theoretical and empirical analysis, with special reference to education*. New York: National Bureau of Economic Research, and T.W. Schultz. 1968. *Investment in Human Capital*. In *Economics of Education*, edited by M. Blaug. Middlesex, England: Penguin Books.

⁵⁹ For an analysis of the policies of the military government for higher education see Betty Antunes de Oliveira. 1980. Op. cit.

⁶⁰ Regina Lucia de Moraes Morel. 1979. Op. cit., p. 57.

⁶¹ For a critique of such an economic and technical view of education in the educational reforms implemented during the military ruling see Barbara Freitag. 1978. Op. cit.

⁶² Barbara Freitag. 1978. Op. cit., p. 121.

⁶³ The reform took place in 28/11/1968 by Federal Law no. 5.540. It was later complemented in 11/11/1969 by Federal Law no. 464.

⁶⁴ Barbara Freitag. 1978. Op. cit., p. 76.

⁶⁵ The expansion in the demand in higher education that occurred in the 1960s has been regarded as a world-wide phenomenon. Nevertheless, in Brazil's case, the aspirations of the middle classes to ascend socially constituted a relevant aspect in the social and political crisis that motivated the military government to adopt educational reforms. See Regina Lucia de Moraes Morel. 1979. Op. cit., p. 57.

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ According to Barbara Freitag, the tenets of 'efficiency', rationality and democratisation were mere rhetoric. In practice, these objectives were not achieved and access to higher education was not facilitated to the great majority of Brazilian students. Barbara Freitag. 1978. Op. cit., pp. 76-78.

⁷⁰ Translated by the researcher from Regina Lucia de Moraes Morel. 1979. Op. cit., p.58.

⁷¹ Barbara Freitag. 1978. Op. cit., p. 75.

⁷² Translated by the researcher from Regina Lucia de Moraes Morel. 1979. Op. cit., p. 59.

⁷³ Barbara Freitag. 1978. Op. cit., p. 76.

⁷⁴ The main changes of the reform had been already adopted in the University of Brasilia, created by Darcy Ribeiro. Ribeiro's project for this university represented an attempt to establish a genuine type of university that would escape from foreign models and be able to address and discuss the problems of the nation from a national perspective. The project was extremely original and revolutionary in its orientations, and was drastically repressed when the military government took office, in 1964. See Darcy Ribeiro. 1968. *A Universidade Necessaria [The Necessary University]*. Sao Paulo: Editora Paz e Terra.

⁷⁵ Regina Lucia de Moraes Morel. 1979. Op. cit., p. 59.

⁷⁶ Eunice Durham. 1996a. Subsidios Para Discussao de Uma Nova Politica Para o Ensino Superior Brasileiro [Subsidies for a Discussion of a New Policy for the High Education System in Brazil]. *Infocapes* 4 (4): 42.

⁷⁷ Claudio Moura Castro. 1985. *Ciencia e Universidade [Science and the University]*. Rio de Janeiro: Jorge Zahar, p. 13.

⁷⁸ See Miguel Reale. 1974. Realidade e Perspectiva da Universidade Brasileira [Reality and Perspective of the Brazilian Universities]. *Revista de Historia L* (100):693-405.

⁷⁹ The reform had several contradictory results. It did not provide greater opportunity of access. On the contrary, the great majority of students in higher education pay heavy fees in the private sector. For more see Barbara Freitag. 1978. Op. cit., p. 78. See also Betty Antunes de Oliveira. 1980. Op. cit.

⁸⁰ Eunice Durham. 1996a. Op. cit., p. 43.

⁸¹ Ibid.

⁸² Eunice Durham. 1996. Op. cit., p. 42.

⁸³ Translated by the researcher from Barbara Freitag. 1978. Op. cit., p. 82

⁸⁴ Daniel C. Levy. 1986. Op. cit.

⁸⁵ Eunice Durham. 1996a. Op. cit., p. 42.

⁸⁶ Ibid.

⁸⁷ According to Durham, 'the idea of a research university to be implanted in Brazil did not take into account the tradition of independent schools for professional qualification. As a result, the reform failed in promoting the necessary distinctions between institutions with different purposes – or institutions for professional training in and out of the university and those other institutions concerned exclusively with scientific research. The ideal of a university in which research is associated to teaching for all the national system was as unreal as inadequate.' Eunice Durham. 1996. Op. cit., p. 43.

⁸⁸ See Rogerio A.Cordova, Divonzir, A. Gusso, and Sergio V.Luna . 1986. Op. cit., Chapter I.

⁸⁹ Claudio Moura Castro. 1985. Op. cit., p. 8.

⁹⁰ Ibid.

⁹¹ Regina Lucia de Moraes Morel. 1979. Op. cit. , p. 59.

⁹² The credential norms were adopted by the Federal Council of Education [Conselho Federal de Educacao], by Measure no. 77. Federal Law no. 456 in 11.02.69. These norms define the needs of postgraduate degrees for teaching in higher education institutions, see Regina Lucia de Moraes Morel. 1979. Op. cit., p. 60.

⁹³ Claudio de Moura Castro. 1986b. O Que Esta Acontecendo Com a Educacao no Brasil? [What is Happening With the Education in Brazil?]. In *A transicao Incompleta: Brasil desde 1945 [The Incomplete Transition - Brazil since 1945]*, edited by Edmar Bacha and Herbert S. Klein. Rio de Janeiro: Paz e Terra.

⁹⁴ Rogerio A.Cordova, Divonzir A. Gusso, and Sergio V.Luna. 1986. *A Posgraduacao na America Lantina: O Caso Brasileiro [Postgraduate Education in Latin America: The Brazilian Case*. Brasilia, DF: UNESCO/CRESALC/MEC, p. 11.

⁹⁵ The FNDCT- National Fund for the Development of Science and Technology was created by the Law no. 719 of 1969. In Claudio Moura Castro. 1985. Op. cit., p.13.

⁹⁶ Claudio Moura Castro. 1985. Op. cit., p. 14.

⁹⁷ Elionora Maria Cavalcanti de Barros. 1998. Op. cit.

⁹⁸ MEC/Conselho Nacional de Pos-Graduacao. 1977. I Plano Nacional de Pos-Graduacao [I National Plan for Postgraduate Education]. Brasilia, DF: Ministerio da Educacao e Cultura, p. 17.

⁹⁹ Ibid.

¹⁰⁰ The adoption of the practice of peer review was recommended in the II PNPG: ‘ the measurement of quality involves a complex process which is not always devoid of controversy. Thus, it is indispensable to count on the active participation of every component of the system. An important instrument in this process will be the use of scientific advisors for each specialisation, whose opinions as well as criteria should be systematically reported to the programmes being assessed’ MEC/Conselho Nacional de Pos-Graduacao. 1982. II Plano Nacional de Pos-Graduacao [II National Plan for Postgraduate Education]. Brasilia, DF: Ministerio da Educacao e Cultura.

¹⁰¹ MEC/Conselho Nacional de Pos-Graduacao. 1977. Op. cit., p.12.

¹⁰² Ibid.

¹⁰³ MEC/Conselho nacional de Pos-Graduacao. 1977. Op. cit., p. 14.

¹⁰⁴ Elionora Maria Cavalcanti de Barros. 1998. Op. cit., p. 122.

¹⁰⁵ MEC/Conselho Nacional de Pos-Graduacao. 1977. Op. cit., p. 44.

¹⁰⁶ It is not clear in what basis these predictions were established. See MEC/Conselho Nacional de Pos-Graduacao. 1977. Op. cit., p. 48.

¹⁰⁷ Ibid.

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

¹¹⁰ MEC/Conselho nacional de Pos-Graduacao. 1986. III Plano Nacional de Pos-Graduacao [III National Plan for Postgraduate Education]. Brasilia, DF: Ministerio da Educacao e Cultura.

¹¹¹ Jacques Therrien. 1980. Research Policies and Productivity in Brazilian Higher Education Institutions and Funding Agencies. Cornell University, unpublished Ph.D. Thesis, p. 19.

¹¹³ Such a deficit was based on a comparison with indicators suggesting a positive relationship between the number of engineers and the expansion of the American economy at the turn of the twentieth century with the condition of Brazil in the year of 1945. Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op. cit., p.92.

¹¹⁴ Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op. cit., p.16.

¹¹⁵ Americo Barbosa de Oliveira and Jose Zacarias Sa Carvalho. 1960. Op. cit., pp.50-61.

¹¹⁶ For distinct interpretations of the role of science and technology within political projects. See Herbert Marcuse. 1972. Technological Rationality and the Logic of Domination and Jurgen Habermas. 1972. Science and Technology as Ideology. In *Sociology of Science*, edited by B. Barnes. Middlesex, England: Penguin Books, pp. 331-352 and pp. 353-375 respectively. For a Brazilian perspective on the relationship between science and development in a capitalist society, see Paulo Flavio Silveira. 1983. Consideracoes Preliminares Sobre uma das Relacoes entre Ciencias Basicas e Desenvolvimento no Capitalismo Atual [Preliminary Considerations About one of the Relationships Between Basic Sciences and the Development in Present Capitalism]. *Ciencia e Cultura* 36 (4):577-580.

Chapter IV

The Scheme of Scholarships Abroad of CAPES¹

This chapter will describe the programme of scholarship abroad of CAPES. The purpose is to provide more detailed information on how the scheme of scholarships abroad works in practice and who is the 'Brazilian student overseas'. It will be argued that it is possible to identify well-defined patterns in the data related to the award of scholarships by CAPES.

The strategy adopted in this chapter to develop this argument will be, firstly, to describe how the scheme of scholarships abroad of CAPES works within its institutional bureaucratic arena.² This will be followed by a description of the types of scholarships granted in terms of degrees, preferred destinations and topics of studies, and personal characteristics of the people trained overseas.³ Secondly, the identified patterns will be compared with the major trends in the international flow of foreign students and with the main patterns related to 'brain drain', a major concern related to education abroad.

The Programme of Scholarships Abroad of CAPES

The Programme of scholarships abroad of CAPES grants scholarships for master's and doctoral degrees, post-doctoral attachments, "doctorate-sandwich",⁴ and a type of professional trainee, known as *especialisacao*.⁵ These bursaries are for research and training in fields for which research cannot be satisfactorily accomplished at national institutions. Also, the topic of research must be of national interest.⁶ This means that studies undertaken at foreign universities must be relevant to the Brazilian context. The restrictions upon the themes of research to be undertaken abroad are based on the idea that overseas training is for research that cannot be done in Brazilian universities.⁷

The complementary character of overseas training is evident when it is compared to the number of scholarships awarded for study in Brazil. In 2000, there was a total of 59,979 scholarships for graduate studies at national institutions. Of these people, 47,517 have bursaries from CAPES and CNPq. These two major funding agencies are responsible for over 80% of the scholarships granted for studies in Brazil. If other sources and types of funding are added, the number rises to a total of 70,934 students engaged in scientific research with some kind of financial support from a governmental source⁸. In contrast, there was a total of 2,744 students overseas.⁹ Of these, 2,036 students had CAPES scholarships and 708 scholarships from CNPq. There were an additional 355

people studying overseas with scholarships from other state funds. In total, there were 3,099 Brazilians overseas who had some kind of non-private funding. (Table 4.1)

Table 4.1

**Distribution of Scholarships in Brazil and Abroad by National Agencies
2000**

Agency	Brazil	Abroad	Research in Brazil	Total	%
CAPES	17,386	2,036	*	19,422	26.2
CNPq	30,131	708	9,780	40,619	54,9
FACEPE	155	*	39	196	0,3
FAPMIG	896	*	60	956	1.3
FAPERGS	1081	*	26	1,107	1.5
FAPERJ	532	*	470	1,002	1.3
FAPESP	8,948	355	580	9,883	13.3
Others	850	*	*	850	1.2
Total	59,979	3,099	10,955	74,033	100.0

Source CNPq * The agency do not provide this kind of scholarship** CAPES and CNPQ are federal agencies.

FACEPE-Fundacao de Amparo a Ciencia de Pernambuco

FAPMIG-Fundacao de Amparo a Pesquisa de Minas Gerais

FAPERGS-Fundacao de Amparo a Pesquisa do Rio Grande do Sul

FAPERJ-Fundacao de Amparo a Pesquisa do Rio de Janeiro

FAPESP-Fundacao de Amparo a Pesquisa de Sao Paulo

While the number of Brazilians overseas funded by the government appears quantitatively insignificant, in relative terms it is not. A survey conducted on the people trained by the national funding agencies revealed that over 40% of all Brazilians holding doctor degrees had been trained overseas.¹⁰ This survey also indicated that the higher the level of study, the greater the proportion of people with foreign degrees. Eighty percent of the Brazilians awarded scholarships to study at foreign universities are taking doctoral degrees. The rest are spread among other kinds of graduate education, such as sandwich-doctorates, master's degrees and professional training at post-graduate level. In general, these people leave Brazil with some experience in research. The great majority of them

already hold a master's degree from a national institution. Also, contrary to the award of scholarship for study at Brazilian universities, the award of bursaries for studies abroad are centralised at CAPES and managed by its staff members, as it will be explained next.¹¹

How Scholarship Abroad are Awarded by CAPES¹²

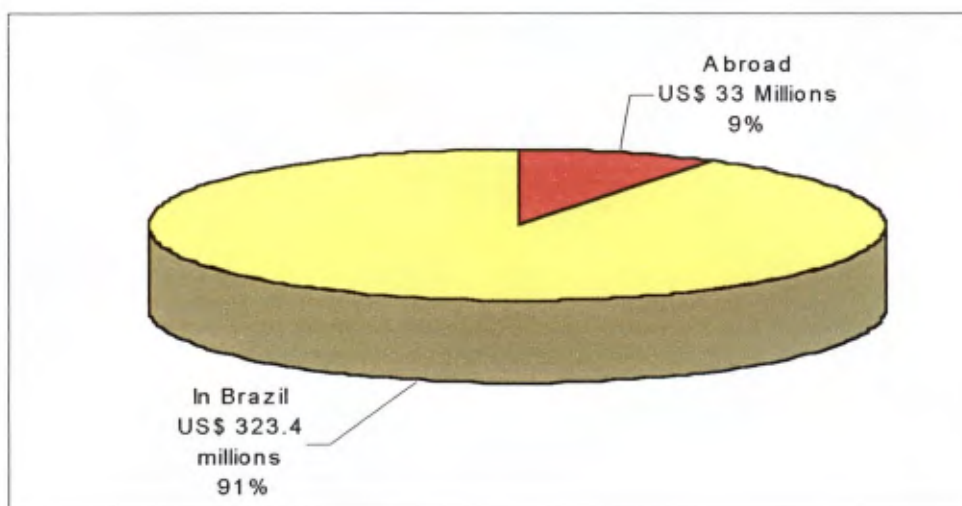
CAPES is responsible for the management of all administrative tasks related to the implementation of the scholarships abroad. This encompasses the bureaucratic procedures related to the advertisement, the recruitment, the selection and the maintenance of stipends abroad. Scholarships are advertised throughout the nation in private and public higher education institutions and research centres. To apply, candidates must fill in forms and provide information on research experience, published works, and give a curriculum vitae. Additionally, a detailed research proposal with the methodological procedures to be adopted, a literature review of the field of study and a justification for the investigation to be done overseas are also required. Other types of written evidence are also necessary such as letters of recommendation, evidence of acceptance at the foreign institution and proof of proficiency in the foreign language. Candidates are interviewed and rated in terms of 'highly recommended', 'recommended' and 'not recommended'.

The final approval of the selected scholarships is made upon budgetary availability. In 1998, 33 million dollars were spent with scholarships abroad or 9 % of the total budget of CAPES and 323.4 million dollars were spent with scholarships for studies in Brazilian institutions, or 91% of the total budget of the agency. (Figure 4.1) The remaining 1% of the budget was spent with administrative expenses.

Figure 4.1

CAPES' Expenses with Scholarships in Brazil and Abroad in 1998

US\$



Data from the Report of Activity of CAPES/1998.

The recruitment of candidates is done in a ‘free’ and “horizontal” manner.¹³ This means that there are no restrictions for application. Every one with a higher degree can apply for a scholarship overseas. Nor are there restriction in terms of disciplines or subject to be studied abroad, nor any preferences for a particular discipline or foreign institution. CAPES does not provide information about foreign universities, types of degrees, institutional requirements, academic standards, or teaching methods. Thus, applicants are expected to find out for themselves, in terms of where to go overseas, the kind of research to be undertaken, and also in terms of its applicability to his/her professional life.¹⁴ Durham reports that:

despite some recent efforts on the part of governmental agencies to give ‘hard’ sciences a certain priority, scholarships are very dispersed; they cover all areas of knowledge and are basically intended to respond to individual demands, with candidates selected by *ad hoc* committees created for each area.¹⁵

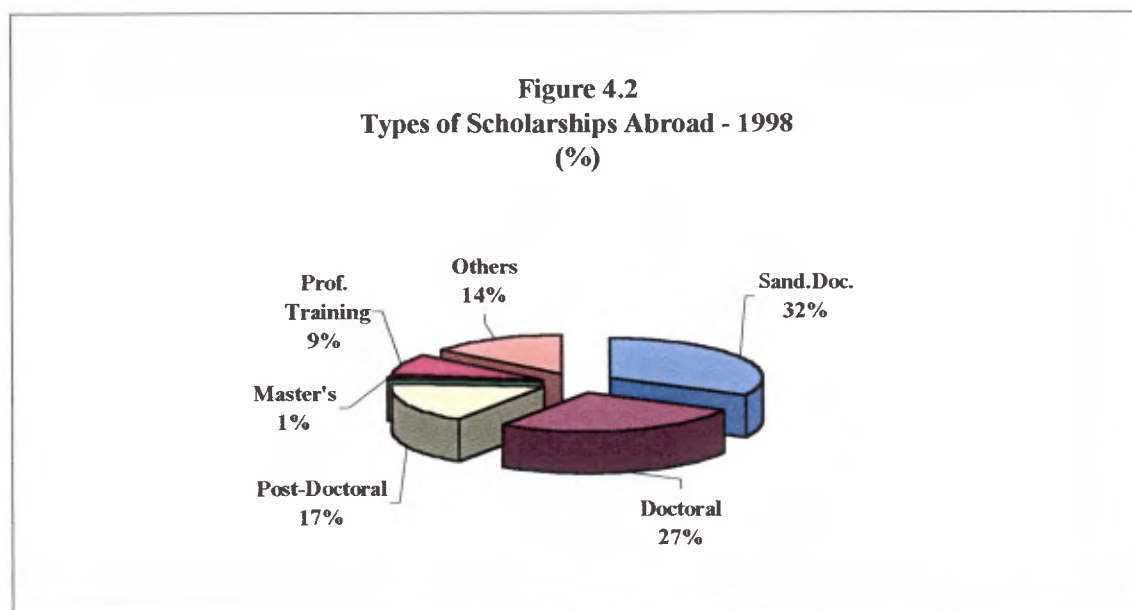
CAPES does not provide academic support for the participating students beyond administrative support. While the student is overseas, follow-ups are restricted to periodic demands for reports of activities every six months and letters of evaluation from the supervisors. Failure to provide evidence on the development of the research may lead to the cancelling of the stipend. CAPES correspondence with the host foreign institution is limited to matters related to the enrolment of the students in the foreign university and the payments of fees and stipends.¹⁶ All reports, letters of evaluation or any type of constraint are usually dealt with via the students themselves. In cases of problems of a more academic nature, such as changes in the research topic, in the methodology to be adopted, the matter is again appraised by peer review.¹⁷ The links with a student trained abroad

ends when the student returns to Brazil, after a maximum of four years of study overseas.¹⁸ The requirements are a copy of the certificate or diploma and of the thesis for the agency's files.¹⁹ There is no involvement with the reintegration of trained personnel in their professional environment or in the job market in general.

Greater emphasis, however, is given to the selection of candidates. This is done mainly by the assessment of the merits of the research proposal by a system based on peer review. A group of non-remunerated external consultants is appointed and selected by their peers. Every two years, a pair of representatives from each area of study is chosen to participate to the evaluation of matters related to scientific research at CAPES. The main criteria for these analyses are the relevance of the research proposals to the national context and whether it cannot in fact be done at a national institution, and on the scientific aspects of the research to be done abroad. There are no written guidelines from CAPES on these aspects. The agency expects its experts to know what is a nationally relevant project of research, to be well informed on the quality of the foreign institution, and to be able to evaluate the proposal of projects based on scientific criteria. The results of the work done by these experts will be described in the next section.

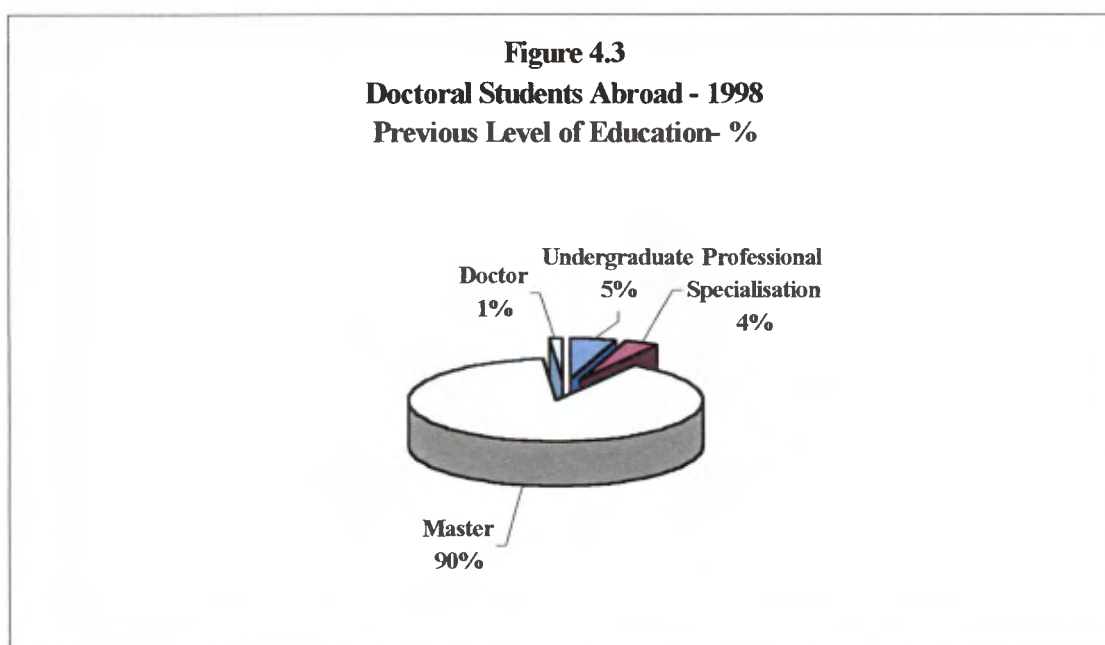
The CAPES' Student Overseas

Students with CAPES bursaries show a well-defined pattern in terms of types of training. In bursary training, the award of grants favours degrees at doctoral, post-doctoral and sandwich-doctorate levels. The balance was that 32% of people (265 students) sponsored by the agency were doing sandwich-doctorate degrees, 27% (223 students) doctoral degrees, 17% (139 students) post-doctoral degrees, 9% (70 students) were in some kind of professional graduate study and 1% (5 scholarships) master's degrees.²⁰ (Figure 4.2)



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

A closer examination of the profile of the students in each of these types of training reveals that most CAPES students already have some sort of introduction to research. For example, from the total of 223 students taking doctoral degrees, 90% (200 students) had masters degrees before going overseas, while 4% (9 students) had some kind of professional postgraduate training. Three students (1 %) already had a doctoral degree. There were only 5% (11 students) whose main qualification was an undergraduate degree (Figure 4.3).



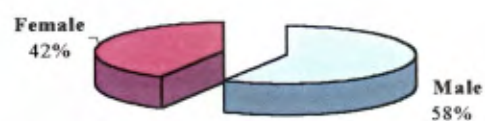
Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

The data suggest that people studying overseas with governmental funds have academic qualifications above the average.²¹ The profile of the Brazilians holding scholarships overseas is also well defined in other aspects, such as gender, age and marital status.

In relation to gender, Brazilians studying overseas follow the international tendency. The majority of them are male. Of every three scholarships awarded, two are given to men. The average number of female students varies according to the country of destination.²² These variations, however, are determined by the area of study rather than by the characteristics of the host country.²³ The differences in gender follow the tendencies of the Brazilian higher education system where there are some traditional fields in which the majority of students are males and some others in which females predominate. The outflow of Brazilian graduate students overseas follows this pattern. Thus, males dominate absolutely in Engineering (87%) and in the Natural Sciences and Agriculture (74%). The majority of males are in areas such as Social Sciences (62%) and Health (59%). The dominance of males diminishes in Biological Sciences (53%). Women become the majority in fields linked to Letters and Linguistics (77%) and Humanities in general (57%).²⁴ Overall, male CAPES students overseas predominate in the groups taking doctoral and post-doctoral degrees. In 1998, among the total of 233 students taking doctoral degrees, 135 (58%) were males, as against 98 (42%) females. Similarly, data from the same year shows that from a total of 139 students taking post-doctoral degrees 86 (62%), were male and 53 (38%) female (Figures 4.4 and 4.5).

Figure 4.4

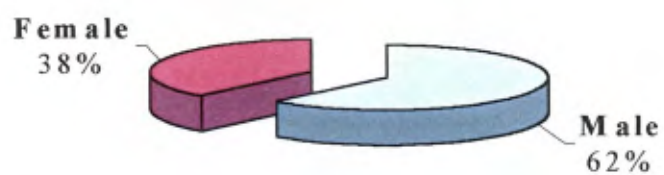
Doctoral Study Abroad by Gender - 1998



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

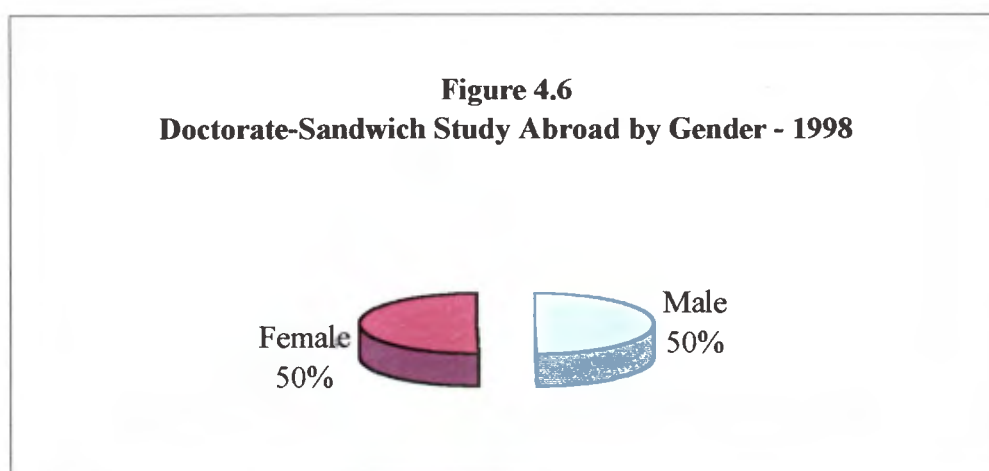
Figure 4.5

Post-Doctoral Study Abroad by Gender - 1998



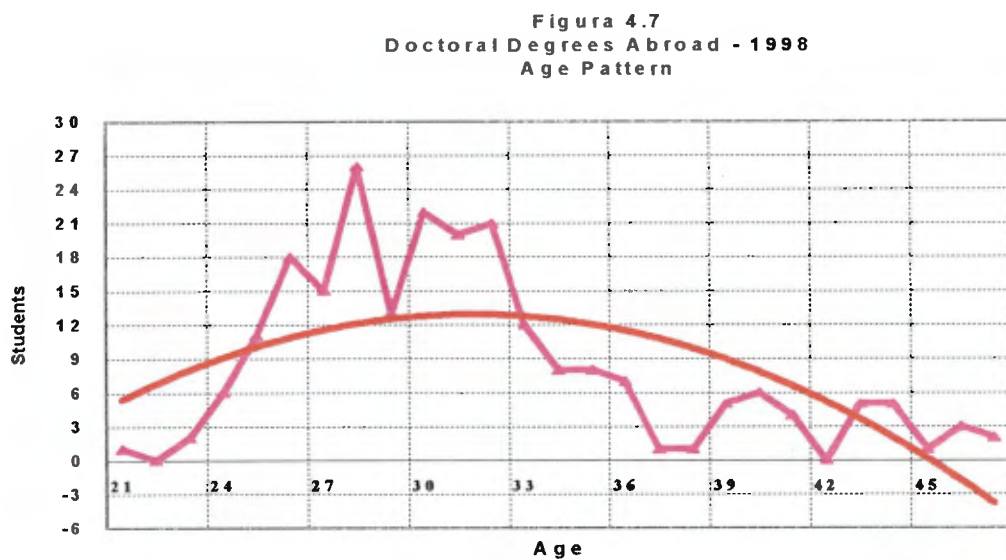
Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

However, students doing the sandwich-doctorate break this pattern. Among holders of such scholarships, in 1998, 134 were females and 133 were males, showing an equal proportion of 50% for each sex (Figure 4.6).

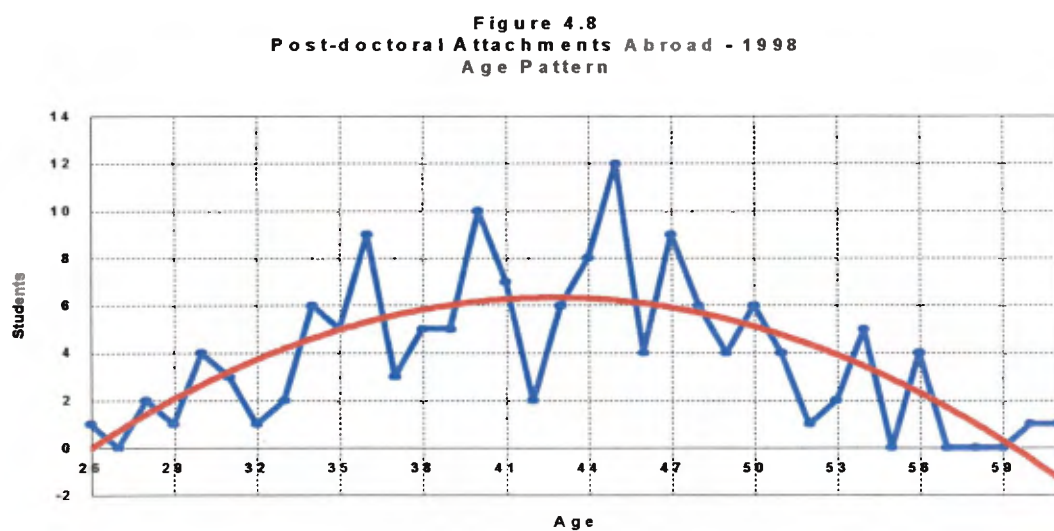


Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

Data on the age pattern of students holding scholarships from CAPES show that they are mostly mature individuals with an average age of 34 years. The youngest was 20 years old and the oldest 64 years old. There are, however, variations in age depending on the type of degree. The great majority of CAPES students studying for doctoral degrees are in their late twenties and early thirties (a median of age 34 years), with decrease in the number of people over 35 years (Figure 4.7). CAPES students taking post-doctoral degrees are in their forties (the median is approximately 44/45 years) (Figure 4.8). Students in the sandwich-doctorate have an average age of 39.5 years. (Figure 4.9).

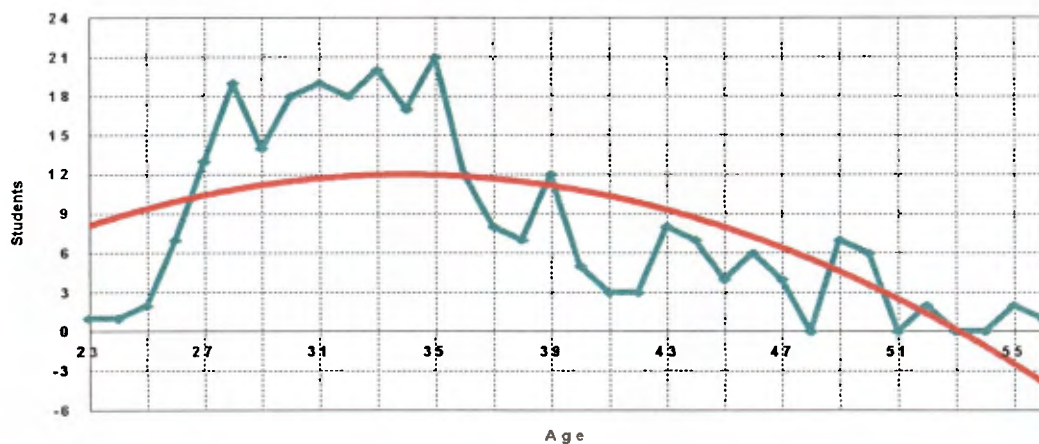


Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

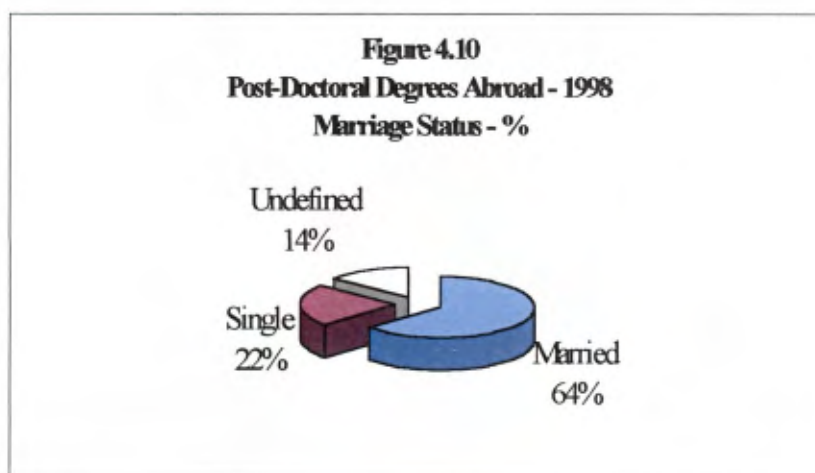
Figure 4.9
Sandwich-Doctorate Abroad - 1998
Age Pattern



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

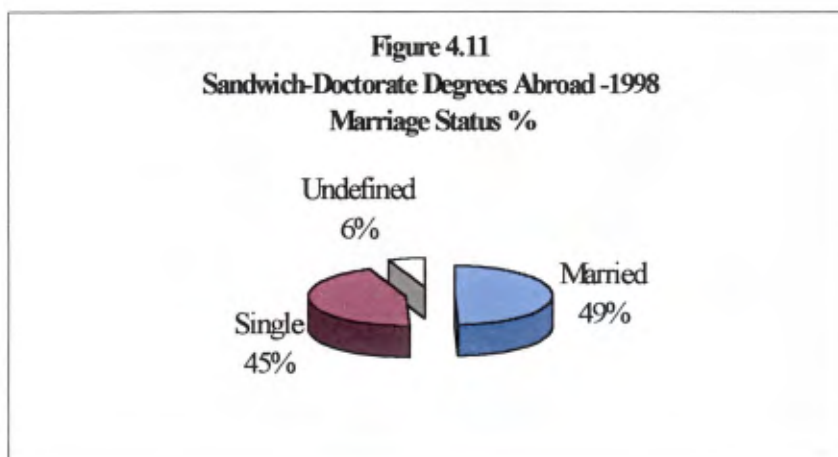
The marital status of Brazilians overseas, however, does not follow the international trend which is a large majority of single people.²⁵ Sixty percent of Brazilians studying overseas financed by the national agencies are married, and usually take their family while studying overseas.²⁶ The tendency to travel accompanied by the family is predominant among males. Fifty four percent of female studying overseas are without a partner or family, against 30% of males who are alone. Also, females are the group with the highest percentage of persons travelling only with offspring. Excepting those taking doctoral degrees, students financed by CAPES are mostly married. The proportion of married people is higher among people taking post-doctor degrees, where from a total of 139 students, 88 were married, 31 single, and 20 of an undefined status

(people not officially married or who were married but living separated). Expressed in percentages, of post-doctoral students 64% were married, 22% were single, and 14% were of undefined status, (Figure 4.10).



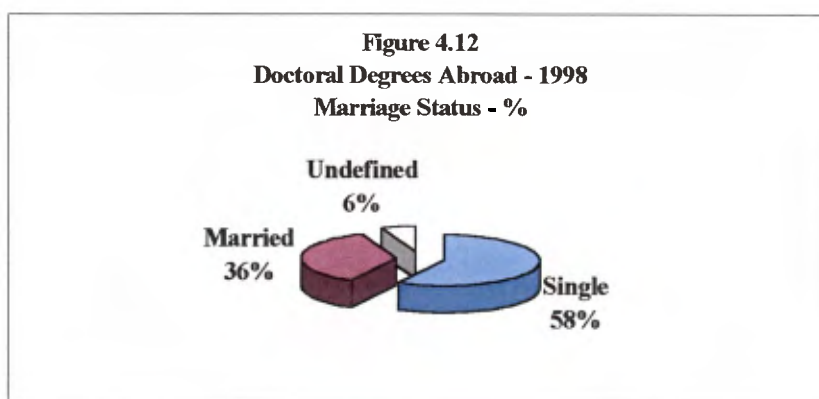
Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX)

Similarly, the majority of those on the sandwich-doctorate scholarships were also married. Of a total of 267 students, 132 were married, 119 single and 16 were in the undefined category, corresponding respectively to 49% who were married people, 45% single, and 6% of undefined marital status, (Figure 4.11).



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

The pattern is broken, however, with the students taking doctoral degrees, where a significant majority are single. From a total of 223 students, 129 were single, 81 were married and 13 were in an undefined marital condition. This means that 58% were single students against 36% married, and 6% were of undefined marital status (Figure 4.12).



Data From CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

Data on age and marriage indicate that Brazilians studying overseas are not youngsters, newly graduated and starting an academic career. On the contrary, they are mature students, with family responsibilities and have had some previous working experience.²⁷

There is no longitudinal research on the career history of these people in terms of their professional upgrading or their productivity over time. It is not possible to know with certainty, for example, what people trained overseas are doing after returning home. Nor is there any information on how many have stayed or left the academic world to work in industry or in jobs not linked to scientific research.

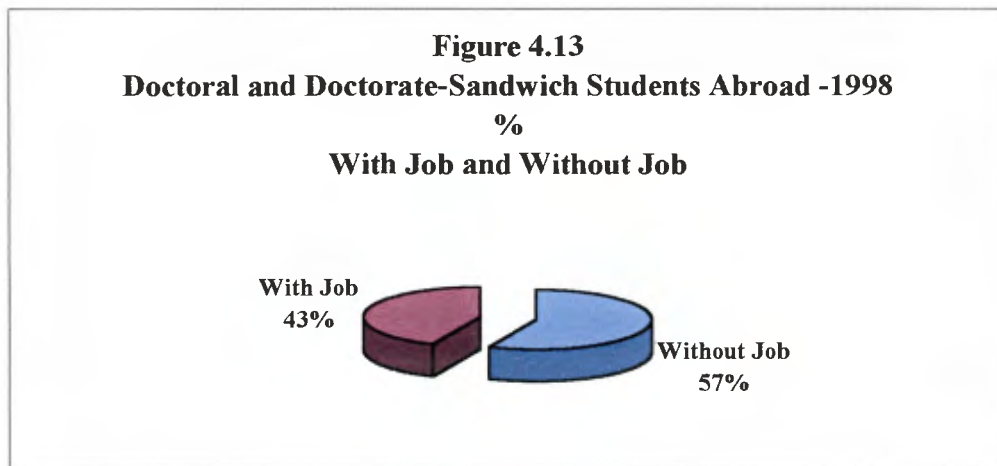
There have been, however, some attempts to evaluate the impact of the training taken overseas which provide indications of trends and tendencies.²⁸ One of these studies was a cost/benefit analysis of the training of biochemists who had studied in Brazil compared to peers trained overseas. According to Meis and Longo, the study shows

the surprising finding that the performance of the biochemists who obtained a Ph.D. in Brazil and never went abroad for formal training was essentially the same as that of those who went to advanced centres in the United States and Europe. Those who studied in Brazil took a little longer to obtain their degrees, but the scientific productivity defined by the number of papers and from the impact of the journals where these papers were published was essentially the same, both during Ph.D. training and during the subsequent professional life.²⁹

With rare exceptions, most research available on the professional characteristics of the people trained overseas, however, is based on data collected before or during the foreign sojourn.³⁰ These studies reveal that the great majority had working experience

before going abroad.³¹ 68% of those with previous working experience were employed at universities or higher education institutions, mainly as lecturers. 18% percent worked for the civil service and 10% for the private sector. Previous professional experience, however, does not mean that the students kept their jobs while studying overseas. Often, the decision to study abroad means quitting a job.³²

This is the case for the overwhelming majority of CAPES students. In contrast to the pattern of previous years, students taking doctor degrees overseas in 1998 with agency scholarships were mostly without employment. From the total of 223 people, 127 of them (57%) were not working at the time they applied for the scholarship and 96 people (43%) maintained some kind of job. This is also the case with students in sandwich-doctorate training, with 151 (57%) students without formal work and 116 (43%) students with a job (Figure 4.13).

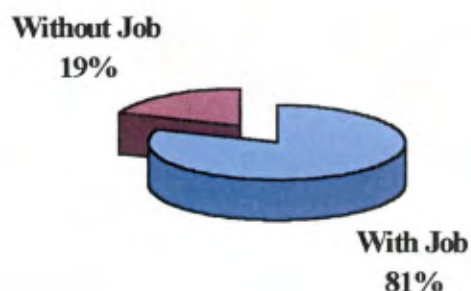


Data from CAPES (Programme of Follow up of Scholarships Abroad-PAEBEX).

Greater contrast can be found in the professional profile of those taking post-doctoral degrees. A great majority (81 % or 112 students) had a job at the time they

applied for a scholarship, and only 19% (27 students) did not have a job. This fact is not surprising given the other data concerning age and marital status. Nevertheless, in general, Brazilians trained overseas do not have job problems. 68% percent said that their job condition was related to their own professional qualification in connection with the training achieved abroad. Only 6% of those with overseas training said that they had experienced a serious problem in finding a job.³³ (Figure 4.14)

Figure 4.14
Post-Doctoral Attachments Abroad -1998
% Students with Jobs and Without Jobs

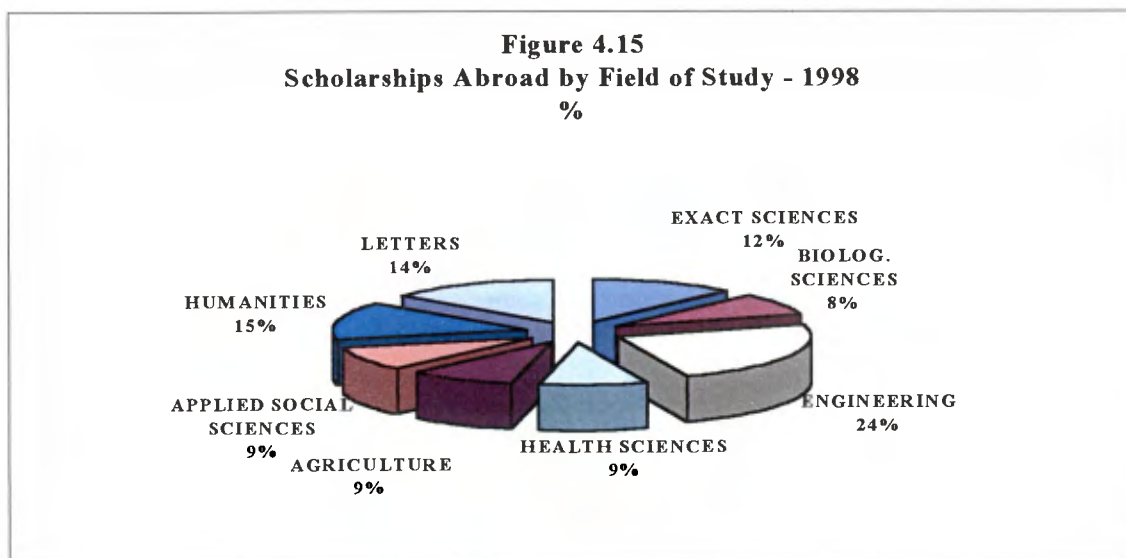


Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

These professional characteristics can be better understood when the social status of the student overseas is known. Brazilians studying overseas form a homogenous group in their social class profiles. The great majority of them come from high-income families settled predominantly in urban centres, mostly from the Centre-South region of Brazil.³⁴ The concentration of overseas students in the upper-middle classes can be partially explained in view of the selective character of the Brazilian educational system and of higher education in particular.³⁵ In general, this group has well-educated parents predominantly linked to the liberal professions.³⁶ These parents consider themselves able to give a similar or superior education than their own to their offspring.³⁷

Brazilians overseas, however, do not tend to follow their parents' professions. The majority of them are trained in the so-called technological areas.³⁸ Seventy percent of those studying overseas with scholarships are taking courses in fields linked to the natural sciences. Within this broad category, Physics, Chemistry, Engineering, and Health are the main areas of study. Overall, Computer Science is the dominant field, one fourth of the scholarships awarded overseas.³⁹ This fact is not surprising in view of the policy adopted by the funding agencies in the seventies to favour studies in these areas. The proportion of CAPES students in each area varies slightly depending on the type of degree. Nevertheless, among the three predominant types of scholarships (doctoral, post-doctoral and sandwich-doctorate) most scholarships (62%) are granted in fields related to the natural sciences. This means that 24% are on Engineering courses, 12% are in a cluster of areas called Exact Science by CAPES as that includes Physics, Mathematics, Chemistry

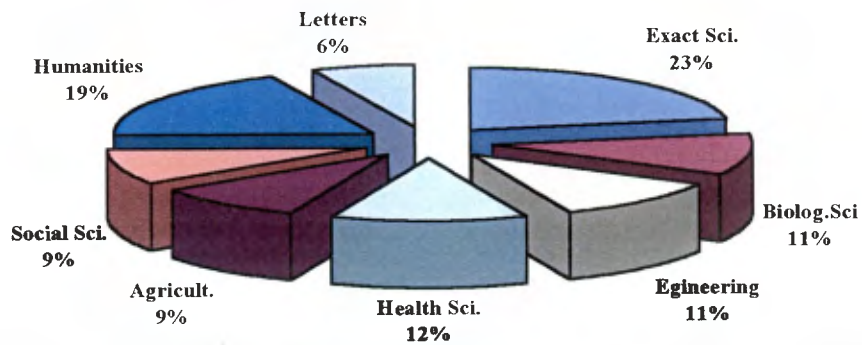
and Computer Science, 8% in the Biological Sciences, 9% in areas related to Health and 9% in Agronomy. The rest are scattered among Letters with 14%, Humanities with 15%, and Applied Social Science with 9% of students.(Figure 4.15)



Data from DAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

Of the people taking post-doctoral degrees there is a major concentration of 23% in the area denominated by CAPES as the Exact Sciences. The second largest concentration for post-doctoral scholarships is in the Humanities with 19%. The area with a significant minority of students is in Letters and Arts. The other scholarships are evenly distributed between Applied Social Sciences and Agronomy with 9% of students each, Engineering and Biological fields with 11% each, and 12% in Health related fields, (Figure 4.16).

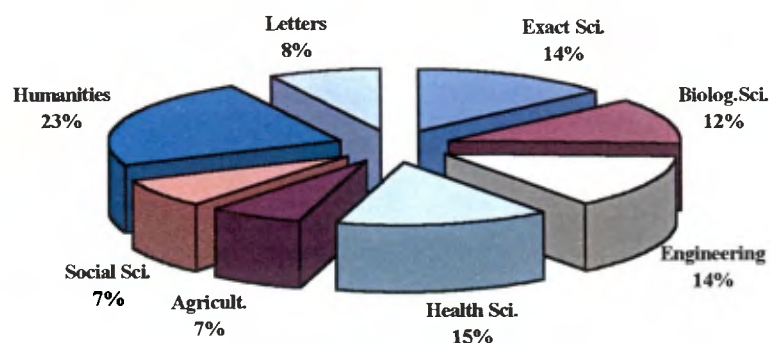
Figure 4.16
Post-Doctor Scholarship Abroad - 1998
By Field of Study - %



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

In the sandwich-doctorate scholarships, 14% of students are in the Exact Science, 12% in Biological Sciences, 14% in Engineering and 15% in Health related fields. 23% of students are in the Humanities. Letters, Social Sciences and Agronomy are the fields with the smallest proportion of students doing sandwich-doctorates, with 8%, 7% and 7% respectively. (Figure 4.17).

Figure 4.17
Sandwich-doctorate Scholarship Abroad - 1998
% By Field of Study



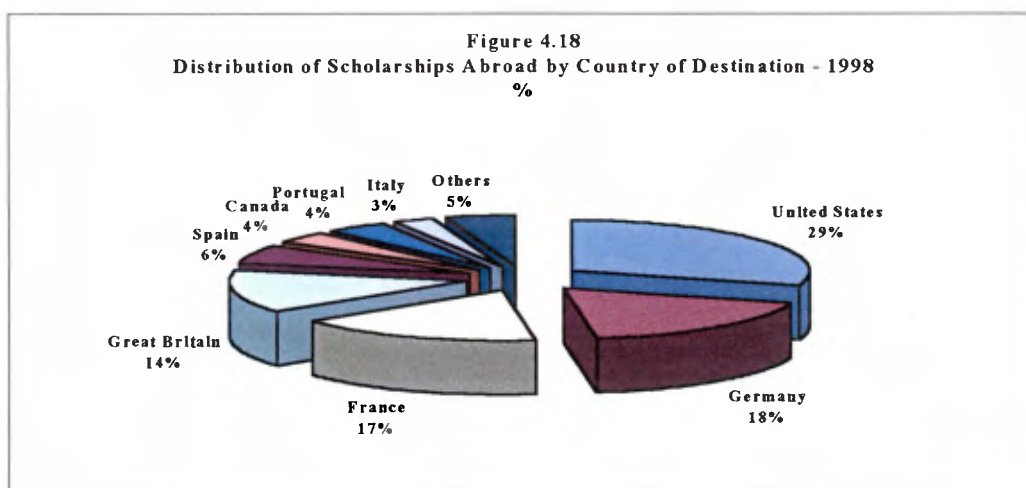
Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

These data, however, must be seen as general tendencies. To have a precise idea of the patterns and implications of people studying in each field, deeper investigation is required. For example, Chemical Engineering and Veterinary Studies are included in the Exact Sciences, the group of specialities with the most students overseas as a whole. However, Brazilians taking degrees in Music outnumber those in Chemical Engineering or Veterinary Studies.⁴⁰

The destinations of the governmental funded Brazilians in pursuit of these types of specialisation follow the international pattern in the flow of student abroad.⁴¹ The great majority of them are in the United States. France and the United Kingdom are the second and third most chosen nations for graduate education. These three nations receive three quarters of all Brazilian students overseas. Other countries, Germany, Canada, and Spain

have smaller numbers of Brazilians. Thus 90% of Brazilians studying overseas are concentrated in these six advanced countries.

Specifically, the United States hosts nearly one third of CAPES students, with 245 people. The second most popular country of destination among CAPES students is France with 140 people or 17% of the total. A different pattern, however, occurs in Germany, which breaks a trend shown in previous years. In 1998, Germany hosted 148 Brazilians, 18% of the total of scholarships overseas. In the same year, Great Britain hosted 114 people, or 14% of the total. This tendency, however, is mainly due to a new programme of scholarships overseas for Engineering undergraduate students. If these undergraduate students are excluded, Great Britain is the third host nation for students from CAPES. Spain, Canada, Portugal and Italy are the other three main receiving countries of CAPES students, with 47 students (6%), 34 students (4%), 33 students (4%), and 24 students (3%) respectively. The rest are distributed among other eleven nations, representing 5% of the total of CAPES students overseas, (Figure 4.18).

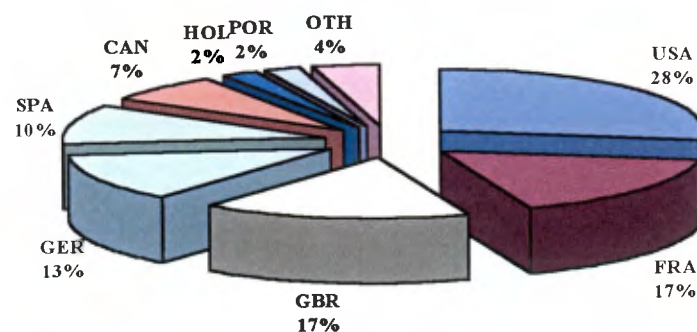


Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

Nevertheless, the distribution of people among these countries can vary depending on the type of studies intended. CAPES' students taking doctoral degrees are overwhelmingly placed in the United States, with a total of 62 students studying at that level at American universities, which represents 28% of the total. The United Kingdom and France each host 37 people (17%) taking doctoral degrees with CAPES' scholarships. Germany hosts 29 doctoral students funded by CAPES, or 13% of the total. Spain hosts 23, or 10% of CAPES doctoral students. There are also 16 students in Canada, corresponding to 7% of the total of all doctoral scholarships. The Netherlands and Portugal share the same number of CAPES doctoral students with 5 people each, or 2% of the total. The remaining 4% of doctoral scholarships are in Australia (3 students), Italy (2 students), New Zealand (2 students), Belgium (1 student) and Denmark (1 student). (Figure 4.19)

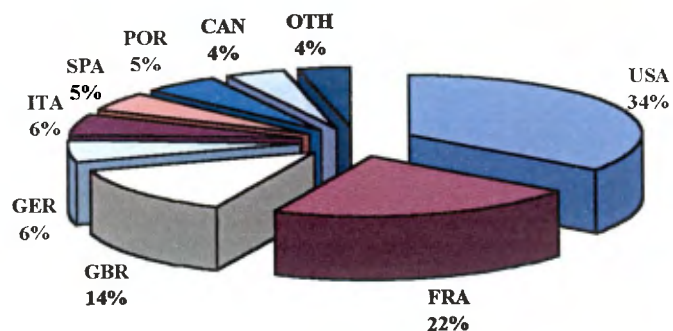
Students doing post-doctoral degrees are also concentrated in the United States which attracted 49 people (34%). In France there are 30 students, 22%, at this level of graduate study. Great Britain hosts 19 people (14%). Germany and Italy host 8 students – about 6% of the total in each case. Spain and Portugal share the same number of post-doctoral students (7) and thus the same proportion of the total (5%). Canada also has 7 post-doctoral students (4%). The rest of post-doctoral scholarships are equally scattered in Denmark, the Netherlands, New Zealand, Sweden and Switzerland with one student (4%) in each of them. (Figure 4.20)

Figure 4. 19
Distribution of Doctoral Scholarship Abroad by Country of Destination - 1998
 %



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

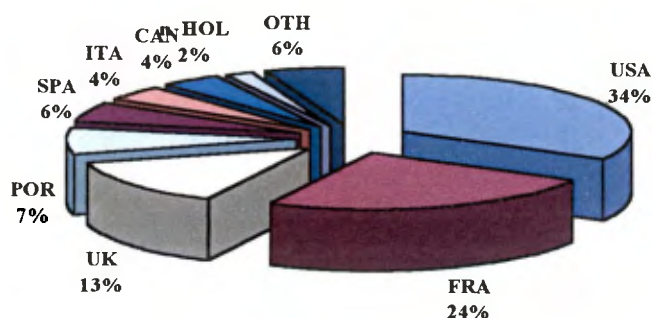
Figure 4.20
Distribution of Post-Doctoral Attachments Abroad by Country of Destination - 1998
 %



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

CAPES students doing the sandwich-doctorate follow nearly the same pattern described above, with the majority of 88 students (34%) being in the United States. France comes next with 65 students (24%) and then the United Kingdom with 36 students (13%) of the total of sandwich-doctorate scholarships. The main difference is that, in contrast to the other two types of degrees, Germany has only 2 students in this category. Portugal has risen to a fourth place in the number of students with CAPES scholarships doing sandwich-doctorate, with 20 students, or 7%. Spain, Italy and Canada have a similar number with 15 (6%), 12 (4%) and 11 (4%) students respectively. The Netherlands (5 students) has 2% of the total of sandwich-doctorate scholarships. The remaining 6 % of people doing sandwich-doctorate are in Australia (4 students), Belgium (3 students), Cuba (1 student) and Mozambique (1 student). (Figure 4.21).

Figure 4.21
Distribution of Sandwich-doctorate Scholarships Abroad by Country of
Destination 1998
%



Data from CAPES(Programme of Follow up of Scholarships Abroad-PAEBEX).

The preferred institutions in the main host countries are usually the ones with high prestige internationally. In the United States, for example, universities with the highest number of Brazilians include the Harvard University, the University of California and the Massachusetts Institute of Technology. In Great Britain, the preferred institutions are The Universities of Oxford, Cambridge and London and its colleges, among which Imperial College, the London School of Economics, and the London School of Hygiene and Tropical Medicine are the most often chosen. In France, Brazilians tend to study at the *Ecole des Hautes Etudes en Science Sociales* and the various parts of the University of Paris.⁴²

Surveys of the perceptions of Brazilians studying overseas about the general conditions of study at these foreign institutions revealed that 90% considered the quality of the academic orientation which was received to have been excellent or very good.⁴³ The main concern of Brazilians studying overseas relates to the proficiency in a foreign language and emotional aspects and difficulties in adapting to a foreign culture. In general, their problems do not include worries about their career or financial matters.⁴⁴

Nevertheless, there are some aspects that deserve attention. The opinion of Brazilians on the research infrastructure offered to overseas students varies not only in terms of host country but also depending on the area of study. The United States and Germany were judged to be the best nations in terms of the infrastructure for postgraduate studies. Canada and, again, the United States were rated as the best nations

in terms of living conditions and campus infrastructure.⁴⁵ The United States was the country best rated in the following aspects: material conditions, quality and availability of lecturers, followed next by Germany.⁴⁶ There are also variations among areas or disciplines and among countries. For example, in the United States, students of Medicine rated the quality and material condition of their department on the highest ranking, followed by Natural Sciences, Biological Sciences, Engineering and Agriculture. In contrast, in the United Kingdom, students rated their department of Medicine as the worst in terms of material conditions offered in the courses.⁴⁷

There were also divergences on the perceptions of the students on the academic environment of foreign universities.⁴⁸ In Gunther's research, those students who saw themselves as having a 'clear idea'⁴⁹ of what they intended to research while abroad had different perceptions in comparison with those who were not sure about their overseas research project. Those with a 'clear idea' tended to rate their academic environment more positively. These perceptions, however, varied according to their years of residence abroad. Those students who had lived longer overseas tended to evaluate their academic environment less positively.

The perception of Brazilian students on the applicability of their study to the Brazilian context indicated that this aspect of the training obtained abroad rated relatively lower in comparison with other issues related to the overseas academic environment. Also, students who considered themselves to have a 'clear view' rated rather positively in this aspect than those without a 'clear view'. However, those who had a longer stay in the

foreign environment tended to show a less favourable attitude to the usefulness to the Brazilian context of their study abroad.⁵⁰ Students from the field of Education considered their courses as the ones best connected with the needs of Brazil, followed by the students in Social Science and Agriculture. Fields that are most favoured by the funding agencies, such as Biological Sciences, engineering and Natural Sciences, received only an average rating from the students working in these areas.⁵¹

After returning to Brazil, most of the people who had obtained their degrees abroad are likely to work in the federal university system.⁵² As already mentioned, there is no data on the career of people educated overseas. However, because Brazilian science is predominantly done in the universities, the job market for this people is primarily linked to academic activities.

If, however, the scope of analysis is broadened up and the Brazilian student overseas is inserted into an international perspective, the patterns that emerge coincide with the main trends of destination and field of study of the students taking degrees in foreign universities worldwide. These patterns, however, are different and atypical in relation to 'brain drain', the immigration of talent. These will be discussed in the next section.

The International Flow of Foreign Students and the Brazilian Case⁵³

The worldwide mobility of students is noteworthy.⁵⁴ Data from 1995 indicate that there are over 1.5 million students enrolled in higher education in a foreign country.⁵⁵ This international flow of overseas students is a complex phenomenon. There are great distinctions according to numbers, student profile, and preferred types of education that can be found among sending nations and among receiving countries as well. A general pattern, however, is an overwhelming concentration of students from less developed countries, especially from Asia, studying in the higher education institutions of three major host countries: the United States, France and the United Kingdom.

In absolute numbers, the United States is the single dominant host country for foreign students in higher education, with approximately 30% of all international students at that level. In 1999, American institutions of higher education received nearly half a million foreign students.⁵⁶ Over 40% of these foreign students come from Asian nations. China and Japan have the highest number of nationals studying at American institutions, with a total of 51,001 and 46,406 students, respectively.⁵⁷ Korea, India and Taiwan are the next three major sending countries for foreign students. These five nations together account for 201,000 international students at American universities.⁵⁸

The impact of these foreign students at American universities is significant in many aspects. At the highest academic levels, for example, non-Americans represent

10.4% of all graduate student enrolments. Furthermore, in some fields foreigners have earned over 50% of all degrees conferred in the United States. The greatest concentration of foreign students in the United States is in science and engineering. In 1994, for example, 31% of all science and engineering master's degrees and 41 % of all science and engineering doctoral degrees were conferred on foreign students. Foreign students earned close to 50% of the doctoral degrees conferred in mathematics and engineering.⁵⁹ According to Young, "foreign graduate students were more likely to study Science and Engineering than U.S. students and have become the dominant population in some Science and Engineering fields."⁶⁰ Over 20% percent (22.2%) of Brazilians at graduate level are taking degrees in business administration. The second most popular field of study for Brazilians in the United States is engineering with 14.5%.⁶¹

The financial side of this phenomenon is also relevant, as the primary source of funding for these students comes overwhelmingly from outside the United States.⁶² Income from personal and family sources count for 81.4% of undergraduates, and 48.9 % of graduate students. Grants from American colleges or universities are responsible for 7.2% of undergraduate funding and 36.0% of graduate funding. Scholarships from the home government or universities provide funding for 5.4% of undergraduates and 6.8% of graduate students. The government of the United States supports 0.7% of undergraduate and 1.0% of graduates. Private American sponsors fund 2.6% of undergraduates and 2.2% of graduates, in contrast to foreign private sponsors who fund 2.0% of undergraduates and 3.3% of graduates. Currently, employment finances 0.7% of undergraduates and 1.2% of graduates. International organisations help financially 0.2%

of undergraduates and 0.8% of graduates. Finally, other financial sources are responsible for 0.2% of undergraduates and 0.1% of graduates. This inflow of foreign revenue has turned the international market for foreign students into a highly competitive business among host nations⁶³ (Table 4.2).

Table 4.2
Sources of Funding of Foreign Students in USA*
By Academic Level
1997/98
%

Primary source of funds	Undergraduate	Graduate	Other
Personal & Family	81.4	48.9	69.7
U.S. College or University	7.2	36.0	5.9
Home Govt/University	5.4	6.8	4.8
U.S. Government**	0.7	1.0	0.4
Private U.S. Sponsors	2.6	2.2	1.6
Foreign Private Sponsors	2.0	3.3	1.7
Current Employment	0.7	1.2	15.8
International Organisation	0.2	0.8	0.4
Other Sources	0.2	0.1	0.6
Total	100.0	100.0	100.0

Source: Open Doors 1997/98 - Report on International Educational Exchange, 1998. Todd M. Davis, ed. New York: Institute of International Education, p. 35.

* Over 80% of undergraduate students are self-financed. At postgraduate level, however, less than half of them finance their own education in the USA.

** U.S. Government grants refer only to those awarded directly to the student; other U.S. government funds may be received indirectly through grants to U.S. universities.

The attractiveness of the United States for foreign education is not limited to Asia students. The majority of Brazilians studying overseas are also in that country. In 1999, there was a total of 8,052 students from Brazil in the United States, among whom 2,585 were studying at graduate levels, and 245 of those enrolled in graduate courses held scholarships sponsored by CAPES.⁶⁴ The total number, which includes privately funded students enrolled in all types of education, was less than 2% of the overall number of foreign students in that country. In comparative terms, Brazil ranks fourteenth in the total enrolments of foreign nationals at American higher education institutions.⁶⁵ Two advanced nations are ahead of Brazil in the number of students; Canada and Germany with 22,746 and 9,568 students respectively. Immediately behind Brazil is Great Britain, which in 1999 had 7,765 students at American higher education institutions. In Latin America, Mexico is the major sending nation with more students in the United States than any other country from the region, with a total of 9,641 students, or 2.0% of the total of students.⁶⁶ These data, however, must be broken down, because they include a very diversified group of foreign students, with different funding sources and also distinct levels of academic study. (Table 4.3)

Table 4.3

**Place of Origin of Foreign Students in the U.S.A.
1997/1998 & 1998/1999**

Place of Origin	1997/98	1998/99	% Change
World Total	481,280	490,933	2.0
China	46,958	51,001	8.6
Japan	47,073	46,406	1.4
Korea	42,890	39,199	8.6
India	33,818	37,482	10.8
Taiwan	30,855	31,043	0.6
Canada	22,051	22,746	3.2
Thailand	15,090	12,489	17.2
Indonesia	13,282	12,142	8.6
Malaysia	14,597	11,557	20.8
Mexico	9,559	9,641	0.9
Germany	9,309	9,377	3.3
Hong Kong	9,665	8,735	9.6
Brazil	6,982	8,052	15.3
United Kingdom	7,534	7,765	3.1

Source: Todd M. Davis. 1998. Open Doors 1997/98 - Report on International Educational Exchange. New York: Institute of International Education.

Graduate studies count for a greater proportion of students for some sending nations. One third of students from Latin America who study in the United States are taking master and doctoral degrees.⁶⁷ Mexico has a relatively high proportion of students in graduate programmes with 37.4%. Brazil has 33.6% of its nationals enrolled in American graduate courses.⁶⁸ Argentina has a smaller total number of students, but many are at graduate level, with 53.5% of students at that level.⁶⁹ West European students are also well represented at graduate level with 38.7%.⁷⁰ Germany has 46.2% of students taking graduate degrees, and the United Kingdom has nearly one third enrolled in graduate programmes (32.6%).⁷¹ The pattern of students at graduate or undergraduate levels varies greatly within the same region. Japan, Malaysia, Indonesia and Hong Kong,

for example, enrol a greater number of undergraduates, but 80% of Chinese students at American universities are at graduate level (41,237). Similarly, in 1999, India had 70% of its students (26,590) enrolled in graduate courses in American institutions.⁷² Table 4.6 provides an overview of the percentage of graduate degrees in science and engineering given to foreign students in the United States.

Table 4.6

**Percentage of Graduate Degrees in Science and Engineering Conferred to Foreign Students, by Degrees and Field of Study
1994**

Field of Study	Master's	Doctor's
Total	12.0	26.7
Total science and engineering	31.3	40.9
Natural sciences	25.4	33.5
Life sciences	18.0	27.5
Physical sciences	31.1	35.6
Mathematics	26.7	48.5
Computer sci. & engineering	33.5	52.3
Computer & information sci.	37.5	44.8
Engineering	32.1	53.3

Source: U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics - 1996 cited in Todd M. Davis. 1998. Open Doors 1997/98 - Report on International Educational Exchange. New York: Institute of International Education.

Nevertheless, if distinct criteria are adopted for analysing the foreign education data, different patterns emerge. For instance, the proportion of non-nationals enrolled in a nation indicates the extent to which its higher education system is internationalised. When the number of non-nationals is considered as a percentage of university enrolment, for example, the United States is no longer at the top of the list.⁷³ International students in this country constitute about 3% of the total of the American higher education population

- about 5% if only four-year college and university enrolments are considered. This places the United States about on a par with Australia and Canada. Various nations, however, have a far higher degree of internationalisation. The nation with the highest proportion of international students is Lebanon with 22.4% of non-national enrolment, followed by Switzerland with 17.0%.⁷⁴ France, Germany and the United Kingdom have a greater proportion of foreigners in relation to overall university enrolment than the United States.⁷⁵ 'This very complexity and size make direct comparisons with other nations difficult.'⁷⁶ The problematic aspects of comparisons among nations are most visible in the issue of the emigration of highly educated people, the phenomenon called 'brain drain'.

The Phenomenon of 'Brain Drain' and the Brazilian Student Abroad ⁷⁷

According to the literature, '“brain drain” is a significant large movement from one country to one or various other countries of persons having a high degree of education, mostly obtained in the formal educational systems of a country of residence prior to the last migration. Usually, it includes only persons with a first university degree from the country of last or previous residence.'⁷⁸ The movement of scholars from one country to another has been a practice since ancient times.⁷⁹ 'Learning from the curricula and faculties of other societies has long been considered an asset for both the individual and his country'.⁸⁰

In contemporary times, however, a great increase in the emigration of talent has brought concerns over the negative effect of the 'brain drain' on the economies of home countries.⁸¹ It is thought that 'brain drain' constitutes a transfer of financial resources that are scarce in less developed nations to richer countries, through the investments in the education of the people that have emigrated. The argument is that advanced nations benefit from a larger qualified manpower stock, at little cost to themselves, while developing countries had their process of economic growth hindered by the loss of their specialised personnel.⁸² As Thomas explains:

the highest grades of professional manpower are expensive to produce and they take a long time to train; they play a far more crucial role in the process of growth than they did in the 19th century, as the pace is now set by science-based industries. The international flow of these skills is heavily influenced by the rate of growth in the largest and richest sector, North America; the magnetic pull is felt right down to the poorest of countries. Human capital is highly mobile internationally and is attracted to areas where real private productivity is highest. It constitutes a gift from the areas which incurred the costs of investment and a return flow of benefits to the investors is not inherent in the process. Because of the increasing demand for educated manpower in the technologically more progressive economies and the externalities yielded by education-intensive investment through the stimulation of innovations, there is keen competition between advanced countries for limited supplies of top skills.⁸³

However, this 'nationalistic' view of 'brain drain' is challenged.⁸⁴ From an 'internationalist' perspective, the increasing flow of human capital is seen as a beneficial process that eventually will promote overall economic growth in developed and less developed countries alike. Within this 'cosmopolitan' view, 'brain drain' is just one more trend towards closer integration of the world economy of contemporary times.⁸⁵ This is so because an international market for educated people has emerged, and like the market

for commodities, brings about economic pressure towards an 'equalisation of prices for professional work'.⁸⁶ According to Johnson:

these pressures, reinforced by the increase in demand for educated people as professionals and as university teachers associated with the advance of technology and the increase in demand for education as living standards rise, imply a sharp increase in the scarcity value of educated people in most countries, the sharper the increase, the lower the average level of income in the particular country. This in turn implies serious economic and social disturbance, because not only are the national economic, educational, health, and other productive systems built on traditional assumptions about the relative value and cost of educated labour as compared with ordinary labour and capital, but the social fabric is built on the assumption that economic power and social status derive ultimately from the ownership of property, rather than the possession of educated talent.⁸⁷

Johnson argues that, in this case, policies in countries affected by 'brain drain' should consider this new higher value of educated people and pay them accordingly, otherwise, international pressure will, inevitably, force such adjustments. In Johnson's view, in the short term, 'brain drain' may aggravate economic problems in less developed societies, but in the long run and from a broader perspective, it is a trivial factor in the issue of developing underdeveloped regions of the world. It is suggested that doing something about 'brain drain' is less important than increasing the flow and efficiency of development programmes, in order to help less developed countries to participate in the world's economic growth through international trade.⁸⁸

Nevertheless, despite differences in approaches, it is vital to view this phenomenon from a comparative perspective. Permanent loss of trained manpower has

not been a problem restricted to less-developed countries. There are some advanced nations, such as Canada and the United Kingdom in the early 1960s, which experienced 'brain drain'.⁸⁹ Furthermore, 'brain drain' differs greatly among affected nations, as in the case of India where the emigration of highly trained manpower is a problematic aspect of overseas education.⁹⁰ Therefore, the consequences of losing educated people from each nation, in particular, is not only a matter of quantity, but also of the kind of workforce lost.⁹¹ Consequently, the 'severity of emigration can be judged only by studying the volume, composition, and consequences of flows from each individual country'.⁹²

'Brain drain' among Brazilians

In the case of Brazil, evidence indicates that 'brain drain' is not a phenomenon of great significance among Brazilian students. For a better understanding of the phenomenon of 'brain drain' in Brazil, further qualitative research is required.⁹³ The lack of long-term follow up on people trained overseas has prevented a precise identification of the determinants behind the decision to emigrate.⁹⁴ There are, however, studies trying to explain and, even, predict 'brain drain' and its effects that can contribute to illuminate the case in Brazil.⁹⁵

According to this literature, 'while the phenomenon of student mobility is largely the result of individual decisions, these private choices occur within national contexts.'⁹⁶

These studies have given rise to an approach known as the ‘push-pull’ model of student mobility.⁹⁷ This model suggests that there is a wide range of determinants in both sending and receiving countries that can coincide at a certain time and provoke more or less migration. ‘The ‘push’ factors can be thought of as the conditions of the originating country. These factors create a generalised interest in overseas education but do not give specific direction to individual students. The ‘pull’ factors are specific to a host country and define the attractiveness of a particular destination for students.’⁹⁸ As these ‘push-pull’ determinants can change over time, so does the decision about remaining, or not, in a foreign country.⁹⁹ Apparently, in Brazil, some of the determinants affecting ‘brain drain’ have worked positively to minimise the loss of manpower.¹⁰⁰ Difficulties in getting adapted to a foreign country, for example, suggest cultural factors as a strong component influencing the decision of Brazilians to return home.¹⁰¹

Although there are no official statistical data on the overall emigration of well educated Brazilians, estimates from the funding agencies point to less than a ten percent rate of loss of trained professionals.¹⁰² This trend is also confirmed in other studies.¹⁰³ According to Glaser, ‘Brazilians were a nationality with very high intentions to return and they are the group of stay-ons most likely to return.’¹⁰⁴ Other inquiries also indicate that the rate of non-return among Brazilians is one of the lowest and a generalised tendency of returning home has been found.¹⁰⁵ This tendency is hardly surprisingly given that – as indicated earlier - the majority of Brazilians overseas are professionals with defined career prospects and, that another majority of 78%, have non-private funding.¹⁰⁶ Nevertheless, if the incidence of the ‘brain drain’ among Brazilians appears to be

insignificant in quantitative terms, there are other types of failures related to the training of people overseas that might also bar a successful contribution of the training of people abroad to the nation.

Internal 'brain drain' and 'brain waste',¹⁰⁷ for instance, are themes related to overseas education that raise concerns but that have not being fully studied. Some data show that some regions in Brazil has lost significant number of professionals."¹⁰⁸ According to Durham, this is so because scientific mobility in societies of the periphery tends to replicate internally the international pattern. As such, researchers, scientists and highly trained manpower are attracted to the more economically developed centres, where better opportunity of work exists.¹⁰⁹

Conclusion

In this chapter, the scheme of scholarships abroad of CAPES was described. In order to do this, information on the types of bursaries granted and the profile of the Brazilian student overseas were given. It was argued that the data on the scholarships abroad suggested well-defined patterns.¹¹⁰

The patterns identified in the data indicate considerable homogeneity in the profile of people trained abroad. The analysis of this information suggests that people

who have received a scholarship from CAPES come from similar sociological background. This is discernible in their educational qualifications which are above the average. As already shown, most of them had achieved a master's degrees before leaving for a foreign country. This means these people are part of the very privileged social group, a characteristic of the Brazilian educational system.¹¹¹

Another aspect that deserves attention is that most people are trained in the so-called technological areas. Their destinations of study followed the international patterns of studies in the internationally prestigious institutions. Although it cannot be affirmed that these people will be employed in their specific areas of study after returning to Brazil, it is most likely that due to their high qualifications, they will not face job problems in the Brazilian context. In this respect, the tendency of Brazilians to return home and not to emigrate can also be explained in view of the expansion of higher education and post-graduate studies in Brazil in the last decades. The increase in the need of people to work in higher education institutions has continued to attract Brazilians back home.

Another reading of the data suggest more subtle meanings. The role of CAPES as a mere bureaucratic manager of the scholarships overseas indicates that there is a complex process of interaction between governmental administrators and the academic community. Otherwise such homogeneity in the profile of the groups of people trained would not be possible. Although these patterns throw light into the administrative culture of CAPES programme of scholarships overseas, they left many other aspects unclear.

Further insights on this culture will be given in the next chapter, when the analysis of the field work is provided.

Endnotes to Chapter IV

¹ The term 'scheme' means a systematic arrangement for attaining a particular purpose within which every activity has a specific place. The use of this word is not intended to suggest something illegal or wrong. *New Oxford dictionary of English*. 1998. Op. Cit. The term 'programme' will not be used because the idea of a scheme encompassed the programme and other activities related to the funding of scholarships abroad.

² The 'institutional arena' consists of the administrative setting, legal mechanisms, and bureaucratic infrastructure that permit policy keepers and interest groups to interact and to bargain over the goal of putting in practice the policy's objective.' For more, see Ian Gordon, Janet Lewis and Ken Young. 1993. *Perspectives on Policy Analysis*. In *The Policy Process: A Reader*, edited by M. Hill. New York, London: Harvester Wheatsheaf, p. 6.

³ The statistical information provided in the first section of this chapter reflects mostly students sponsored by CAPES. However, because most Brazilian funding agencies follow the same criteria, the characteristics found in this group of people will be generalised for the whole group of students abroad financed by the Brazilian government.

⁴ This kind of scholarship, also known as 'sandwich-doctorate' or split Ph.D. is designed for students enrolled in a national doctoral programme with a period of study abroad (usually one year) for research linked the thesis. The final examination is taken in Brazil.

⁵ There is also another type of scholarship that is tailored for undergraduate students of engineering. This is a new programme that has a different purpose and format.

⁶ Another major federal agency involved in research is FINEP, an institution concerned with the financing of projects dealing with research and development. This agency manages a special fund for research in prioritised areas in conjunction with loans from the International Bank for Reconstruction and Development (IBRD) and from the Federal budget. EMBRAPA [Empresa Brasileira de Pesquisa Agropecuaria] which is linked to the Ministry of Agriculture and thus mostly concerned with research and development of matters related to agriculture. For details, see J. A. Guimaraes and Marta C. Humann. 1995. Training of Human Resources in Science and Technology in Brazil: the Importance of a Vigorous Post-Graduate Program and its Impact on the Development of the Country. *Scientometrics* 34 (1):101-119, p.104/105.

⁷ There is no document specifically dealing with the fundamentals of the policy of training people overseas.

⁸ This total includes funding from state agency and scholarships from CNPq for senior and junior investigators for research in national institutions. CAPES do not provide funding not linked to graduate training.

⁹ CAPES. 1996. *Relatorio de Atividades - 1996* [Report of Activities - 1996]. Brasilia, DF: CAPES.

¹⁰ Fernando Spagnolo and Hartmut Gunther. 1986. 20 Anos de Pos-graduacao: o que fazem nossos mestres e doutores? Uma visao geral [Twenty years on: what our masters and doctors do? An overview]. *Ciencia e Cultura* 38 (10):1647.

¹¹ In the case of scholarships for studies in Brazilian universities, CAPES follows a decentralised system and delegates to the institutions of higher education and universities the tasks of selecting the candidates.

¹² The account on this section is mostly based on the personal experience of the author.

¹³ 'Free' and 'horizontal' means to train as many as possible. These terms were used and defined in interviews.

¹⁴ According to Moravcsik, although information on research degrees varies in respect to different disciplines, there are some general advice that should be provided to most foreign students. There may be an 'information gap' between the literature available on such questions and students' full understanding of these matters. See Michael J. Moravcsik. 1973. Op. cit., p. 46.

¹⁵ Eunice Ribeiro Durham. 1996b. Academic Mobility and Exchange in Brazil. In *Academic Mobility in a Changing World - Regional and Global Trends*, edited by Peggy Blumenthal, Crauford Goodwin, Alan Smith and Ulrich Teichler. London: Jessica Kingsley, p. 251.

¹⁶ There has been some attempt by CAPES to monitor their students, in terms of frequent visits by CAPES staff to host countries to meet with academic staff of these institutions. The practice has been to visit students and to listen to their problems without, however, greater involvement with the host institution.

¹⁷ There are, however, some issues that do not fit either CAPES' bureaucratic activities nor an analysis by peer review. This is the case of problems related to supervision or with the adaptation in foreign environment. Despite the relevance of these matters to the successful accomplishment of the degree, these matters are dealt with by CAPES' staff, case by case.

¹⁸ Four years is the maximum period of stay abroad authorised by CAPES. After that, the students must finance privately their personal and academic expenses, or return to Brazil. In the cases of a non-completed degree, CAPES allows the return to the foreign country in order to undertake final examinations.

¹⁹ CAPES has recently adopted the system of micro filming all theses done overseas. The printed copies are sent to the Brazilian National Library in Rio de Janeiro.

²⁰ As mentioned on note no. 5, the remaining 14% (139 scholarships), were granted for a new type of scholarship for undergraduate study overseas in engineering of a new programme launched by CAPES in 1999.

²¹ Simon Schwartzman. 1972. Projeto Retorno - Avaliacao do Impacto de Treinamento, no Exterior, de Pessoal Qualificado [Project Returnee - Evaluation of the Impact of Training Human Resources Abroad]. Rio de Janeiro: Instituto Brasileiro de Relacoes Internacionais - IBRI, p. 30.

²² In France, Belgium and Italy more than 40% are women. In all other countries Brazilian women represent less than 30%.

²³ This is a general trend within international students as a whole. Sex distribution of international students in the United States shows that males are a majority in fields such as agriculture (66.6%), business & management (60.8%), engineering (83.8%), physical & life sciences (62.4%) and mathematics & computer sciences (70.2 %). Females are majority in education (67.2%), fine & applied arts (58.7%), humanities (52.2%). The majority of Brazilians in the United States are male (56.5%). In Open Doors. *Profiles - Field of Study and Sex by Nationality* [on the web]. Institute of International Education, 2000 [cited 1998/1999].

²⁴ Fernando Spagnolo. 1999. Bolsistas Brasileiros no Exterior: Caracteristicas Pessoais e Profissionais [Brazilians Overseas: personal and professional characteristics]. *INFOCAPES*, Vol. I, p. 7.

²⁵ The great majority, 92.9%, of foreign students in the United States, for example, are single. This proportion drops to 72.9% in the case of graduate students. In Todd M. Davis. 1999. Open Doors 1997/98 - Report on International Educational Exchange. New York: Institute of International Education, p.70.

²⁶ Regarding Brazilian students, no positive correlation was found between the period of stay overseas and the decision to take the family abroad. In Fernando Spagnolo. 1999. Op. cit., p. 8.

²⁷ Fernando Spagnolo. 1999. Op. cit., p. 9.

²⁸ Simon Schwartzman. 1972. Op. cit.

²⁹ Leopoldo de Meis and Paulo H. Longo. 1990. Op. cit., p. 183.

³⁰ Schwartzman's survey on Brazilian overseas students is an exception to this point for it offers some information on job prospects from the returnees' point of view. See Simon Schwartzman. 1972. Op. cit., pp. 29-33.

³¹ Simon Schwartzman. 1972. Op. cit., p.46.

³² The proportion of people with and without a job varies over time and according to each funding agency. Currently, data from CAPES show that most people with a scholarship from that agency did not have any job link. See Figure 4.13 and 4.14.

³³ Simon Schwartzman. 1972. Op. cit., p. 61.

³⁴ Simon Schwartzman. 1972. Op. cit., p.18.

³⁵ See Jerry Haar. 1977. Op. cit.

³⁶ Around 80% of parents had Brazilian nationality. The level of instruction of the parents of overseas students corresponds to 66,2% with higher education degrees. Simon Schwartzman. 1972. Op. cit.

³⁷ Ibid.

³⁸ The funding agencies roughly define some priority areas to award scholarships. These areas are: biotechnology, computer sciences, new materials, precision mechanics, chemistry, and engineering. In CAPES. 1987. Programa Nacional de Formacao de Recursos Humanos [National Program for the Training of Human Resources]. Brasilia: Comissao Interministerial de Educacao, Ciencia e Tecnologia, p.2

³⁹ Fernando Spagnolo. 1999. Op. cit., p.11.

⁴⁰ Ibid.

⁴¹ See Todd M. Davis. 1999. Op. cit.

⁴² Fernando Spagnolo. 1999. Op. cit.

⁴³ Fernando Spagnolo. 1999. Op. cit., p. 13.

⁴⁴ According to Schwartzman survey, 43% said they had problems with fluency in a foreign language. Simon Schwartzman. 1972. Op. cit.

⁴⁵ Fernando Spagnolo. 1999. Op. cit., p. 11.

⁴⁶ Harmut Gunther. 1982. Op. cit., p. 71.

⁴⁷ Harmut Gunther. 1982. Op. cit., p. 72.

⁴⁸ 'Academic environment' is defined as a combination of various aspects. They included laboratories, administrative support, area for study, copy machines, quality of teaching, relevance of research done in the department in relationship to the student's interests, availability of books and journals, availability of lecturers, thesis orientation, frequency of meeting with adviser, relationship with other lecturers in the of other departments or courses, possibility of attending courses in other departments, discipline of relevance for the Brazilian reality, incentives from advisers towards research on topics relevant to the Brazilian reality and a last item concerned with the perceptions of overseas students on matters related to proficiency in the foreign language, integration in academic life, interrelationship with teachers, administrative staff, health service, etc. In Harmut Gunther. 1982. Op. cit., p. 68.

⁴⁹ Gunther does not define 'clear idea'. See Harmut Gunther. 1982. Op. cit.

⁵⁰ Harmut Gunther. 1982. Op. cit., p. 80

⁵¹ Harmut Gunther. 1982. Op. cit., p. 73.

⁵² As will be seen, a tendency of change in the jobs links of people trained abroad. In the present, about 50% percent of them are people with no jobs. This, however, does not necessarily mean that they will no work in the academic sector.

⁵³ In this section, information on the Brazilians overseas with scholarships are based on surveys that include grantees from the two major funding agencies, CAPES and CNPq. Whenever data from one of them differ significantly, it will be acknowledged.

⁵⁴ For an international overview, see Todd M. Davis. 1999. Op. cit. pp.77-88.

⁵⁵ Todd M. Davis. 1999. Op. cit., p. 80.

⁵⁶ In 1998, there were 490,933 foreign students in the United States. This number corresponds to 3% of the total of the American higher education enrolment of 14,350,000. Todd M. Davis. 1999. Ibid.

⁵⁷ Todd M. Davis. 1999. Op. cit., p. 4.

⁵⁸ Ibid.

⁵⁹ In Todd M. Davis. 1999. Op. cit., p. 73.

⁶⁰ Ibid.

⁶¹ Ibid.

⁶² See for example, C. D. Throsby. 1991. The Financial Impact of Foreign Student Enrolments. *Higher Education* 21:351-358.

⁶³ There are a series of studies dealing with cost/benefit analysis or strategies to attract foreign students. In the case of the United Kingdom, for example, see Peter Williams. 1982. *A Policy for Overseas Students - Analysis, Options and Proposals*. London: Overseas Students Trust, or, in the American case, see Hans N. Weiler. 1984. The Political Dilemmas of Foreign Study. In Elinor G. Barber, Philip G. Altbach and Robert G. Myers. Op.cit., pp. 184-195.

⁶⁴ Todd M. Davis. 1999. Op. cit., p. 21.

⁶⁵ Korea had 42,890 students in 1997/98 and 39,199 in 1998/99 (a of reduction 8.6%), and India had 33,818 students in 1997/98 and 37,482 in 1998/99 (an increase of 10.8%). Todd M. Davis. 1999. Op. cit., p. 4 and pp. 98-99.

⁶⁶ Venezuela (5,133 students), Colombia (5,041 students) and Argentina (2,636 students) are the next South American nations with considerable numbers of students in the United States. Todd M. Davis. 1999, p. 4.

⁶⁷ Todd M. Davis. 1998. Op. cit., p. 21.

⁶⁸ Ibid.

⁶⁹ Ibid.

⁷⁰ Corresponding to 51.4% enrolled in undergraduate courses.

⁷¹ Todd M. Davis. 1999. Op. cit., p. 21.

⁷² "Of the students from the leading sending countries of Southeast Asia, 82% of Malaysians and 69.5% of Singaporeans are enrolled as undergraduates. Conversely, 64.8% of Thais are enrolled at the graduates level." Todd M. Davis. 1999. Op. cit., p.20.

⁷³ At graduate level, however, and specifically in certain fields, some departments are 50% international in some institutions. Belgium (10.95%) and Austria (10.8%) are the next most internationalised higher education systems. Todd M. Davis. 1999. Op. cit., p.85.

⁷⁴ Ibid.

⁷⁵ Ibid.

⁷⁶ European data on student mobility are being gathered and consolidated by the Academic Co-operation Association (ACA), an independent Brussels based organisation dedicated the analysis of higher education in Europe. However, "information available on international students in Europe is less than satisfactory. Currently, several sets of data are published regularly on student mobility, focussing on or including Europe, by organisations such as OECD, UNESCO or EUROSTAT, the European Union's statistical office. Due to considerable differences in data collection procedures, as well as in underlying definitions of key descriptors, these data are not always comparable." Todd M. Davis. 1999. Op. cit., p. 86.

⁷⁷ There is extensive literature on the 'brain drain' phenomenon and the emigration of talent is certainly the most studied aspect of foreign education in both sending and receiving nations. This literature, however, is rather disappointing in terms of its quality, as Glaser says:

"on close inspection, only a few publication offer firm data and conclusions of wide application. The paucity of theory and of systematic research about persons' decisions characterises the entire field of migration. Much of the literature about the migration of professionals consists of essays specifying the nature of the problem, offering hypothesis about the causes and consequences of migration, and citing some national statistics on behalf of an argument. Many studies summarise the statistical magnitude of specialities between pairs of countries. Some estimate the consequences for the losing and gaining countries, by estimating the cost of the professionals' training and the value of their work. Some losing persons and the attractions of other countries gaining them; but the authors can do no more than make wise guesses, since they lack questionnaire responses from the professionals themselves. "

In William Glaser. 1978. *The Brain Drain, Emigration and Return*. Oxford, UK: Pergamon Press. Glaser, p.5/6. For an introduction to the theme see Walter Adams, ed. 1968. *The Brain Drain*. New York: The Macmillan Company.

⁷⁸ In Enrique Oteiza. 1968. A Differential Push-Pull Approach. In W. Adams, Ed. Op. cit., p. 121.

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- ⁷⁹ For a historical perspective, see Stevan Dedijer. 1968. "Early" Migration. In W. Adams, ed. Op. cit.
- ⁸⁰ William Glaser. 1978. Op. cit., p. 2.
- ⁸¹ Ibid.
- ⁸² Ibid.
- ⁸³ Brinley Thomas. 1968. "Modern" Migration. In W. Adams, ed. Op. cit., p.40.
- ⁸⁴ For more on both approaches see Don Patinkin. 1968. A "Nationalist" Model. In W. Adams, ed. Op. cit. and Harry G. Johnson. 1968. In Search of an Analytical Framework. In W. Adams, ed. Op. cit.
- ⁸⁵ Harry G. Johnson. 1968. In Search of an Analytical Framework. In W. Adams, ed. Op. cit., p.75.
- ⁸⁶ Harry G. Johnson. 1968. In Search of an Analytical Framework. In W. Adams, ed. Op. cit., p. 90.
- ⁸⁷ Ibid., p.90
- ⁸⁸ Johnson also defends the "lowering of barriers to the immigration of unskilled labour in advanced countries, thereby allowing poor people more direct and immediate access to the high living standards of the developed countries than is afforded by present policies of supporting development programs in their own countries, designed to bring them in the very long run to the standard of living that the poor in the developed countries already enjoy" Harry G. Johnson. 1968. In W. Adams, ed. Op. cit., p. 91.
- ⁸⁹ F.H. Harbison and C.A. Myers., 1969. Strategies of Human Resource Development. In *Economics of Education*, edited by M. Blaug. Middlesex, England: Penguin.
- ⁹⁰ William Glaser. 1978. Op. cit., p. 28.
- ⁹¹ Schwartzman expresses his worry about the quality of the Brazilian 'brain drain'. In Simon Schwartzman. 1972. Op. cit.
- ⁹² William Glaser. 1978. Op. cit., pp. 14/15.
- ⁹³ According to Oteiza, 'existing theories on internal and international migrations deal in most cases with the problem of the movements of the low economic and social population stratum, and thus are not effective for explaining the much more complex nature of the migrations of highly educated, middle and upper class persons, both in the country of origin and in the country of destination'. In Enrique Oteiza. 1968. Op. cit., p. 120. Castro suggests that the lack of brain drain among Brazilians is partially due to the comparatively low number of people studying abroad. The low number of Brazilian in foreign universities has negative implications in terms of international network and access to the main centre of research. See Claudio de Moura Castro. 2001. O Drama da Evasao de Cerebros [The Drama of Brain Drain]. *VEJA*, 28 de novembro, p. 22.
- ⁹⁴ According to J. A. Guimaraes and M. C. Humann, up to 1992, 95% of the students who graduated outside the country returned to Brazil, indicating that "the brain drain phenomenon has, so far, a different shape when applied to Brazilians. In J.A. Guimaraes and Marta C. Humann. 1995. Op. cit., p.115.
- ⁹⁵ For more on the determinants of 'brain drain', see William Glaser. 1978. Op. cit.
- ⁹⁶ Todd M. Davis. 1999. Op. cit., p. 77.

⁹⁷ For more on the 'push-pull' approach see Enrique Oteiza. 1968. *Op. cit.*, pp. 120-134. According to Glaser, 'interpretations of the data of immigration from the United States' authorities show that the brain drain phenomenon follow certain determinants beyond the factor from each nation. These factors must be linked to market change, change in policies for immigration and cultural ties". Also, there were indications that the level of economic development of countries has a limited relation to brain drain, contrary to the common perception that problems are linked to economic growth, such as low job supply. In William Glaser. 1978. *Op. cit.*, p. 29.

⁹⁸ For example, 'major host countries do not uniformly attract students from the world's regions. Regional and national preferences for particular host countries are apparent. Between the early and mid 1990s the number of internationally mobile student world-wide increased by over 280,000. Most of these students were from countries in Europe (138,000) or Asia (114,000). The percentage growth in student sending from these regions was 51% from Europeans and almost 20% for Asians. During the same period enrolment from Africa actually fell by 8% and North American enrolment remained essentially static(5.2%).' In Todd M. Davis. 1999. *Op. cit.*, pp. 77-81.

⁹⁹ The attractiveness of a particular nation for a foreign student can be enhanced by strategies adopted in the host countries in order to compete for international students. In a survey done in the United States to identify determinants of choice, 10 significant factors emerged: reputation of the institution, personal affiliations in the United states, public relations initiatives, personal affiliations in home country, institutional characteristics, correspondence, sponsor and agency, cost/financial aid and financial incentives. Todd M. Davis. 1999. *Op. cit.*, pp. 77-81.

¹⁰⁰ 'While the phenomenon of student mobility is largely the result of individual decision, this private choices occur within national contexts' In Todd. M. Davis. 1999. *Op. cit.*, p. 77. In Schwartzman's survey it was found that the main concern of Brazilians studying overseas relates to the proficiency in a foreign language, emotional aspects and difficulties in getting adapted to a foreign country, suggesting cultural factors as a strong component influencing the decision of Brazilians to return home. Simon Schwartzman. 1972. *Op. cit.*, p. 28.

¹⁰¹ *Ibid.*

¹⁰² Maria Luiza de Santana Lombas. 1999. *Ha Indícios de Brain Drain no Brasil? [Is There Brain Drain in Brazil]*. Master Dissertaton, Faculdade de Educacao, Universidade de Brasilia, Brasilia, DF.

¹⁰³ Gunther's research shows that the majority of students interviewed intended to return to the same job activity. "Asked whether they pretend to return to the same place of work, 57 % responded yes, 19% possibly, 14% did not answer, less than 1% said that they did not plan to return to Brazil, Harmut Gunther. 1982. *Op. cit.*, p. 49.

¹⁰⁴ William Glaser. 1978. *Op. cit.*, p. 28.

¹⁰⁵ Simon Schwartzman. 1972. *Op. cit.*

¹⁰⁶ According to Glaser, privately funding students are more likely to emigrate than non-privately funded ones. In William Glaser. 1978. *Op. cit.*, p. 28. Data on the source of funding for Brazilians students see Harmut Gunther. 1982. *Op. cit.*, p. 15.

¹⁰⁷ 'Brain waste' concerns other kinds of failures that can also happen in the home country. For, as C.P. Kindleberger remarks, 'even when the student has succeeded at an American university and gone home there is no guarantee that he will be able to apply his training successfully. He may not get the right job, and if he gets the right job, he may not be happy in it.' Charles P. Kindleberger. 1968. *Study Abroad and Emigration*. In W. Adams, ed. *Op. cit.*, p. 141.

¹⁰⁸ According to Schwartzman, 'in the states of Centre-South region, mobility increased or remained the same. In other areas, apart from the States of Ceara, Pernambuco, Bahia and Rio Grande do Sul, where there were no significant change, drain of 70% have occurred.' Simon Schwartzman. 1972. Op. cit., p. 28

¹⁰⁹ Eunice Ribeiro Durham. 1996b. Op. cit., p.249.

¹¹⁰ According to Minogue, 'this is overwhelmingly the case with the public administrative system', in which changes and adaptations can be introduced in one or more components of the mechanisms that have been created to implement a policy. Martin Minogue. 1993. Theory and Practice in Public Policy and Administration. In *The Policy Process: A Reader*, edited by M. Hill. New York: Harvester Wheatsheaf, p.21.

¹¹¹ For a study on the social and economic conditions linked to access to higher education in Brazil, see Sergio Costa Ribeiro. 1983. Quem Vai para a Universidade [Who Goes to the University]. *Ciencia Hoje* 1 (4):50-55.

Chapter V

The Interviews ^{*}

It has been pointed out (Chapter I, pp.12-13) that the conceptual framework of the study determined the research design, as well as the research technique for the collection of data. This was also true for the preparation of the material for analysis. The concepts that originated the research questions served as preliminary criteria for initiating the organisation of the data gathered through the interviews.

However, the sorting out of meaningful information and the choice of bit of texts to illustrate the analysis has not been limited to the research conceptual framework. Many other decisions in the selection of relevant information were made throughout the development of the analysis on the basis of the theoretical sensitiveness of the researcher.¹ This means that the primary aim was not to obtain generalised propositions from the empirical work, but to set out a 'linking up of the evidence gained through research with wider forms of less validated but suggestive knowledge'.² Therefore, the interaction of the researcher with the data, and her perception on what was conceptually

^{*} All interviews were translated to English by the researcher.

relevant were also considered in the final interpretation of the data.³ The results of the analysis are:

- 1) The creation of CAPES was not seen as the result of a government 'vision'.

Rather, the idea of funding agencies to promote the education of lecturers and scientists, such as CAPES and CNPq, was mostly the 'vision' of prestigious members of the academic and scientific community who happened to be in influential positions within the public bureaucracy and managed to have their ideas accepted and put into practice, as noted by a respondent:

The creation of CAPES was the work of educators, especially Anísio Teixeira, who had a clear vision of the importance of education for the nation as a whole, for economic and social development, ... and of the need to improve higher education..., Brazil was reacting to a debate, to an awareness that the nation could no longer remain as it was... It was in this time that a series of programmes with the purpose of creating regular conditions for the development of scientific research were launched. An interface was established among science, technology and the training of human resources. This interface revealed the needs of improving the universities, that at that time were very precarious, so that they could have scientific research as part of their activities.

This, however, was explained in view of the broader international context of the post-war years and of the penetration in Brazil of trends and thoughts going on in the industrialised nations:

The fifties were clearly marked by the debate on the role that human resources and manpower could play for economic development. There were also the rise of technology and the potential use of natural resources for economic growth. The competition between the two super power nations (USA and URSS) brought to front stage issue related to scientific and technological development as a strategy for economic competition and national security. These debates influenced Brazilian policy-making. Brazil was trying to accelerate the process of substitution in the industry and to promote advances in the technological industrial sectors and there was a national debate on education and on the training of human resources.

The notion that Brazil lacked a 'culture' involving 'scientific values' explained the adoption of overseas training as a means of forming high-level human resources:

The Fifties were marked by the efforts of introducing Brazil to an international scientific community. We had to introduce ourselves, to show who we were, to ask for support, to motivate people to receive Brazilian students, in term of who were these students, what they knew... there was an almost nominal recruitment because there was not a programme to stimulate people (to take research degrees). In Brazil, there was not, at that time, a 'culture' or a 'movement' involving, let's say, values such as scientific research, academic activity... There was no such culture in the Brazilian higher education environment. Therefore, it was necessary to find talented people, to recruit them internally, to contact foreign institutions, to place them overseas. All this was done in a very amateur fashion, getting the funding, requiring endorsement of prestigious professional to make the right connections here and there. Moreover, it was necessary to ensure that people trained abroad would return to create new research groups and to foster a chain of events, acting as embryos...

Also,

It was urgent to have a policy to overcome the informal character of the training of people in advanced research. It was necessary to mobilise people, to stimulate demand, to select, to send, to organise a system of funding, a system of recruitment, to do something that could change the scenario. ...how Brazil could form highly specialised human resources to improve postgraduate education and have a national capacity for advanced training created? Only by sending people to study abroad. Thus overseas training was crucial for training people rapidly and efficiently in order to build a postgraduate sector. So, we (Brazilians) had to send people to study overseas, to wait until these people return with new skills and knowledge, to hire them and, also, to open the Brazilian system of education to foreign visitors, expatriates, etc.

2) In reference to the government's 'vision' of Brazil in the present, the answers were not so convergent. Some respondents thought the government does not have a national political project at all. The economy was seen as the major concern in policy making in Brazil in the present. Others, however, said that the main different between past and present Brazil was the consolidation of the postgraduate educational sector and that this has made the policy of scholarship overseas appears out of date. The following statement demonstrate this view:

The problem today is that we don't have any conceptual, philosophical or critical position. I am not part of the government and looking at the problem (of the funding of scholarships abroad) from my perspective, postgraduate studies today became an ordinary thing... there is no identifiable stance from the government, or a policy with clear purpose, (postgraduate education) is floating in space...

Another view was shown in the following answer:

Well, all those problems that existed (when CAPES was created) still remain today, in spite of the improvements achieved in the training of human resources, which relied greatly on overseas training in the beginning. These problems persisted and most of them still annoy us. Although there has been great improvements (in the educational context) we are far from having the critical mass we need. My conviction is that without (good) universities, there is no way out. That is why I believe this effort is still necessary, more than necessary.

- 3) Despite the recognition of a well-established national capacity to train internally masters and doctors, the respondents all agreed that the government must finance scholarships abroad. This was justified in terms of avoiding 'in breeding':

'In breeding' is pernicious. It does not permit innovation, expansion...

The funding of scholarships abroad was also justified as a means of Brazil having access to the new trends in scientific research taking place in the main centres of scientific activity and to foster international connections:

Well, today, I would say that (scholarships abroad) have become a policy instrument. It is a policy that has been re-discussed lately. Why? Because it is necessary to review overseas training as an alternative way of training people...It is also necessary to consider that the nation already has its own capacity - and a large capacity - to train highly qualified human resources in such a way that it is not everything that needs to be trained abroad. Does it mean that Brazil can diminish its training overseas, its cooperation abroad? I say 'no', very much the contrary, because the higher the level of qualification of the academic sector, the more solid, demanding and productive the research environment, the more necessary international connections are.

- 4) Although all respondents were in favour of the maintenance of the policy of scholarships abroad, most of them thought this practice needed to be re-examined and re-structured:

Brazil needs to define more clearly a policy that combines at least three elements: firstly, more pertinent types of scholarships, that is, what kind of training is worth doing overseas, post-doctor, sandwich-doctorate etc.; secondly, better identification of areas and fields to have people trained abroad; and thirdly, more attention should be given to issues of cost/benefit, not only in terms of medium and long term, but also in terms of knowing what is the product of these individuals trained abroad, what is the gain to the university system and to postgraduate system. Also, it is necessary to know whether the financial resources are well used and to use well public money, in this case, means greater coincidence among what the individual is going to do, where he/she is going to and with whom. Why am I saying this? Because, so far, generally speaking, the programme of scholarship overseas is a programme, in fact, free...

In their view, the process of selection must be more tightly defined according to priorities set out by the government. What these priorities should be of, however, was not made clear, for the respondents overwhelmingly thought that the government should not attempt to adopt a prescriptive approach to studies done abroad in terms of determining the fields or the topics of study:

Definetely, I don't like the idea of predetermining fields for studies abroad. ...a field of study may be considered less relevant

for the nation just because practical results in that specific field take long time to become visible... I think that the most competent candidate must go to the best foreign university in all areas of study.

5) When asked whether in their view there was an explicit policy of scholarships abroad, the answers were ambiguous. The majority thought the government did not have any policy at all. Some respondents see the actions of CAPES as the government policy and others thought that the academic community set out the policy through their participation in the selection of candidates at CAPES and CNPq.

... the candidate decides what he/she wants to study abroad, where he/she will study, and what research he/she will do. Of course, there is a growing concern with evaluating the merit of the research proposal. But very often, the intrinsic merit of a proposal, in particular, does not mean that this specific research is relevant to that field in Brazil, in view of the stage of technical, scientific and academic activities the nation needs to develop. Neither does it mean that this person has selected the best place possible to do his/her research. I think it is possible to ...direct the demand. ... CAPES has been trying to do this, asking the representatives of areas of study to map their field and to try to formulate priority for what type of training overseas is worth investing. These are important changes. Although it is not possible to abolish the programme of overseas training, it is possible to reorient it...

and

I would say...what characterises the programme of scholarship overseas today is the conception, in my view, old and outdated of training human resources horizontally. Of course, the committees responsible for the analysis of the proposals have been ever more rigorous. However, while the demand for scholarships overseas

has been reasonably high, this demand has not led to quality. On the contrary, the quality of the research projects proposed is descending. Consequently, the low quality of the demand leads to a relocation of funding. For example, the demand for the full doctorate abroad is low in quality. Candidates are not prepared as they were five years ago. Why? Because the good candidate already can and prefers to study in Brazil, it is easier, it is more practical than to go abroad. Now, the demand for post-doctoral attachments has grown considerably...

According to the interviewees, CAPES provides no guidelines on what is expected from its *ad-hoc* consultants in terms of the types of research or of the topic of study is in the nation's interests. The lack of guidelines was explained in terms of a cultural pattern:

The lack of priorities can be explained in view of the nation's process of industrialisation. We adopted a model of import-substitution to create our industries and, suddenly, everything started to be manufactured in Brazil. We did the same with our science; the building up of a scientific and technological capability was done by a model based on substitution, that is, we needed to do research in all areas.

6) When asked whether in their view the government, the academic community, the institutions of higher education and the students have coincident agendas and expectations in relation to overseas training, some respondents did not see conflict between the interests of government and of academics and argued that the reliance of the government on the analysis by peer review was evidence of such coincidence:

Yes and no. In a way, yes. There is a reasonable convergence, I would say, between the individual demand, that is the consumer,

the student, that in fact is advised by lecturers that say indicate what fields are of more interests for the institutions. Thus for the candidate with a job link, there is a coincidence of interests. In the case of the academic community that evaluate CAPES' proposals, also there is a certain coincidence. Who is part of this community? This community is formed by professors, lecturers, leaders of research groups. All of them know well their area and also the national system of higher education. Although they are not obliged to know about all this because everything is very informal and spontaneous, they are very much aware. When they evaluate an application of a candidate linked to institution 'x', with proposal 'y', they know the background of that individual. It is the same with the candidate with no job links. Lately, CAPES has required letter of recommendation. This has enhanced the responsibility of the lecturer or professional working in the research system with that prospective candidate. The agency (CAPES), in fact, follows the advice of the peers members of its committees.

Many of them, however, did not see greater convergence of interest by the federal universities, as institutions, in participating in the policy making related to the funding of scholarships abroad. This meant that the training of personnel abroad was done on an individual bases and not through a planned policy coordinated by the rectory, and the deans of research and CAPES. This brought about implications for the reintegration of people trained overseas:

yes, there is a certain articulation and, on the other hand, there isn't. Why not? Because of the lack of explicit policy, definition of priorities in term of areas or priorities within a same area, or better definition of countries... There are lots of space to be filled in. I was saying that this articulation (among the actors) is very informal. Very informal articulation can also lead to explicit non-articulation. The lack of more explicit policies, objective, etc. provides an enormous space for – what we can call – a certain arbitrariness in the demand. There is also a certain

fragmentation in the perspective of the institutional interest that some times represent the interest of one department in particular and some times is not in the interest of a department at all. If the only principle guiding the selection of candidates is the merit of their proposal...Well, I'm not saying that the committees make mistakes very often, I think they don't, but this is not sufficient to form a very clear policy. It is possible that those peers, ad hoc consultants, impose their personal vision on a proposal in particular

7) Most respondent argued that the academic community was the most influential on the decision making process within CAPES:

The academic community is very influent for it is inside CAPES. It is from the academy that consultants ad hoc are hired. People responsible for the process of evaluation and selection are representatives of this community...I think it has great influence. Of course the selection of a candidate and his funding by CAPES is not automatic because CAPES has financial restrictions. But in general, considerations are based, let's say, on the results of the evaluations done by peer review inside CAPES. The agency respects the work of the committee. Thus, decisive for the award of a scholarship is, unquestionably, its approval by the committee.

Greater influence of the academic community, however, did not mean that the experts that work for CAPES have an agenda as such. Their power to influence the decision on who goes abroad was rather because of the emphasis on the merit of the research project as the main criteria for granting a scholarship abroad. This system of evaluation had eventually transferred to the academic community the weight of the decision making process, as stated in the following quotations:

... the agenda of the academic community is to do their job well, to select the best candidates, etc. I don't think there is any expectation beyond the selection of the best project for research.

Or

I think the responsibility is shared between the academic community and the government and this penetration of the scientific community into the governmental fabric is one of the most formidable aspect of CAPES and CNPq. The scientific community has great power and it is admirable that it is so.

And,

The international experience has proved that from a cost-benefit point of view, the decision making based on the analysis of the merit is the best option (for this policy). This, however, does not exclude the definition of priorities by the government.... I think that this relationship of mutual trust between academic community and government, this intimacy, or even certain promiscuity, is very positive.

However, a negative aspect of the procedures adopted by CAPES to select the overseas students is described in the following answer:

Very often, the merit of a research proposal and the quality of the foreign institution - that is, the project of research and the university abroad are very good - of a application in particular, but the proposal is not approved because it can be done in Brazil. Well, this can be questioned: the candidate can in fact be ill informed in terms of the possibility of doing that research in particular at national universities. But, on the other hand, it can also be an arbitrary decision that perhaps may be unfair to not give the possibility of studying abroad to a good candidate, with a good proposal to study in a good foreign university that has

potential of having positive impact for the nation. Thus, informality in the integration can also reflect the lack of more defined policies - in order to guide clearly the work of the consultants, etc, - that lead to a series of arbitrariness.

When asked why this is so, one of answer was the following:

Because this is the way we are used to... I think this needs to be discussed and it is being discussed – a vision of this programme as one that must serve the system horizontally in terms of seeing all areas with equal necessities. If all of them have equal necessities, then the merit of the research proposal must prevail.

Nevertheless, some respondents thought that the government was responsible only for the funding and, on this basis, merely defined the number of scholarships granted:

I think the system is dominated by the academy. Thus, in reality, the scientists are defining policies for themselves. It is very difficult to extract the power from the consultant committees working at CAPES and CNPq. If you try to do that, there would be a revolution. These groups of people, these committees ended up defining the policy in fact. Whether this is the policy of the agency or not does not matter much for them, for it is the policy of their groups.

And

The configuration of the programme (of scholarships abroad) is very much compatible with this... the (academic) community is responsible for the evaluation of the merit of the proposals and CAPES for their funding.

8) In relation to what measures should be adopted to maximise the return for the nation of the investment made, the answers referred to the needs of policies to ensure retention of those trained abroad in the less attractive regions of Brazil.

The first thing that must be done is to set priorities in terms of areas and foreign institutions in order to maximise the intended training with the best place to offer it. Then, I think that it is necessary to consider the work of this individual in Brazil and to follow up his performance. It is not enough to have an expensive programme and to take for granted that people will study abroad, get trained and that is it. Are they working well? We don't know, we need to check...I think that there must be greater accountability from the people who have benefited from this investment. The cost of the training of one person abroad is around US\$ 100,000 for four years of training. This is not pocket money for a country with serious problems such as Brazil. There is a curious complicity ruling the system. It is as if these individuals (the grantees) deserved to study abroad for their intrinsic merit and all the gains are natural and spontaneous. I think the way overseas training has been funded must be evaluated.

9) All respondents were in general satisfied with the way the programme of scholarships were operated. There were, however, some divergences in relation to the destinations. Some argued that there should be greater definition of priorities in terms of destination countries. However, there was sharp controversy on post-doctoral attachments. Those in favour of it viewed the sponsoring of people who were already very qualified for attachments to foreign universities as relevant aspect of this policy. The daily routine of academic life in universities does not permit them to be involved in research and keep abreast of the new ideas in their fields of work. Post-doctoral studies abroad, as well as in Brazil, serve as an opportunity for these academics to be up dated:

Post-doctorate abroad is very important...This means a person who has finished his/her thesis, has professional experience, has published in his field, is mature, has his own ideas and know what scientific research is all about.

Others, however, saw post-doctoral training abroad as a waste of public money. As a non-degree type of scholarship, it is unregulated and does not comply to formal obligations. Although post-doctoral scholars are usually expected to publish the results of their work done abroad, there is, in fact, no regulations or any control mechanisms.

10) The respondents were strongly against the adoption of any cost-recovery mechanism:

No, I am against it (cost-recovery mechanisms). I think such model does not work for us (Brazilians), perhaps in the future. Why am I against it, for the same reason I am against charging public universities in Brazil. This would eventually favour the most economically privileged groups...

In their view, the lack of a well-delineated strategy for absorbing people trained abroad makes cost-recovery not viable for Brazil.

Conclusion

The information collected during the interviews pointed to a great level of consensus amongst the respondents. The data collected indicated that it is not clear whether there is an explicit policy of scholarships abroad or not. The maintenance of the funding of scholarships abroad, however, is thought to be necessary in order to avoid 'in-breeding' in the Brazilian academic and scientific community. This is particularly illuminating for the understanding of the culture surrounding the issue of scholarships abroad and for the identification of a rationale for this policy in present times.

The idea of 'in-breeding' suggests that overseas training today serves primarily to maintain the state of excellence of the Brazilian scholarship and, thus, is directed towards very specific groups of people. This points to: a) there is already a body of qualified personnel, b) that young researchers can already be trained at national universities, c) access to foreign academic groups could work as a strategy to improve and strengthen the academic activities that takes place in the Brazilian context.

Another aspect of coincidence of opinion was the need of setting up priorities on the part of the government and also on the need of greater articulation between government and higher education institutions. The definition of priorities to guide the types of research undertaken abroad and the policy for the reintegration of people trained

abroad were regarded as key issues to ensure that the investment in the education of people abroad was returned to Brazilian society.

Also, the lack of priorities, of mechanisms for the absorption of people trained abroad and explicit definition of the purpose of scholarships abroad suggests that the funding of scholarship abroad is based on a policy that is implemented through an administrative machinery that is in place and works well.

Overall, there was little apprehension among the respondents over the lack of policy definition on the part of the government and the penetration of the academy into CAPES' fabric. On the contrary, most of them saw the participation of the academic community as a consequence of the fulfilment of an empty space left by the government, rather than an organised and deliberate action. Moreover, the predominant view was that there is not a clear policy on scholarships abroad because the ad-hoc consultants have a fragmented perception of what is in the interest of the nation. They do not have an overall view of the needs of the nation in terms of highly specialised personnel and, considering that this is a public policy, such a broader perspective is needed. It was clear that most of them viewed the participation of the academic community as a positive aspect. It was said that the funding of scholarships abroad has survived through so many decades and through moments of intense national crisis because of the reliance on peer review that protected this policy from political patronage.

Endnotes to Chapter V

¹ Anselm Strauss and Juliet Corbin. 1990. *Basics of Qualitative Research*. Newbury Park, CA: SAGE, p.42.

² Maurice Kogan. 1999. The Culture of Academe. *Minerva* XXXVII (1): 74.

³ For more on this theme see Charles Hull. 1985. Between the Lines: the analysis of interview data as an exact art. *British Educational Research Journal* 11 (1): 27-32.

Chapter VI

The Conclusion

The purpose of this thesis was to analyse the policy of CAPES for funding postgraduate scholarships abroad as a means of building up high-level human resources in Brazil. The focus of the research was on identifying the changing rationales for this policy within the contemporary Brazilian context and why the Brazilian authorities continue to invest in this type of education.

To address the general problem, the research was conceptualised into two layers of investigation. In the first layer, the motivations that led the Brazilian government to invest in this type of training were examined. Subsequently, in the second layer, the way this policy is handled in its institutional arena, at CAPES, was the main focus. As already explained, this research design was adopted in view of the nature of the subject and of the particularities of the Brazilian context.

Therefore, in order to develop the analysis, the custom of studying abroad among the Brazilian upper classes in colonial times was examined. This was followed by a description of the national political and economic scenario, from the 1950s up to the 1980s,

which gave rise to a demand for increased high-level human resources. The focus of the narrative in this part of the thesis was on the social and economic processes surrounding the adoption of a public policy for the education of people in foreign universities. The argument was that broad national political projects linked to the economic development of the nation framed the rationale for the funding of scholarships abroad.

The study of the historical context of the issue of funding scholarships abroad was useful for the analysis of the government's changing political motivation over time. However, this approach left a range of contemporary issues unexplained, including details on how the policies were implemented. Thus, a set of more specific information was given. The information suggested that there are well-defined patterns in the management of the scheme for scholarships abroad. Thus, in order to understand such patterns and to go beyond the official data, research interviews with people who know the Brazilian academic environment well were conducted.

The evidence, gathered throughout this research, suggests as the main conclusion of this thesis that:

The funding of scholarships abroad in Brazil has been institutionalised as a strategy for the maintenance of excellence in the universities.¹ This means that the funding of scholarships abroad has acquired a social role of its own.²

Such relationship between overseas education and the sociology of the production of knowledge has been shaped throughout time in different ways and in distinct patterns. In

colonial times, for instance, the values involving foreign education were latent, but not yet clearly recognisable. The habit of the upper classes to go abroad for higher learning was shaped by the beliefs and aspirations of these social groups: education in a foreign university was for the acquisition of a culture relevant to these segments of society only. From this perspective, the outward flow of Brazilians in search of advanced knowledge and social legitimisation was peripheral to the broader social systems. In this context, education abroad was linked to specific social level.

From World War II onwards, however, the state adopted the idea that overseas education was necessary for a common social goal. This required, on the one hand, the democratisation of the opportunity for studying abroad. Access to a foreign university was, in theory at least, made possible for different segments of society. On the other hand, the popularisation of this activity, education overseas called for a rationale to justify the financial investment and the high costs of the educating scientific personnel. The state needed to provide the means for this type of education and a political rationale that would frame this practice as a common social goal.

In the 1950s, industrialisation gave rise to a demand of qualified manpower. The purpose of educating academics and scientists in foreign universities was framed by economic purposes. Therefore, studies abroad were necessary in all areas of knowledge in order to form a critical mass. In the 1970s, the aim of the education of people in foreign universities was ideological. The training of scientific manpower abroad was primarily to create a national infrastructure in the so-called knowledge intensive areas that would permit

the accomplishment of a political goal; the building up of a scientific and technological capability.

In contemporary Brazil, however, there occurred a break in the rhetoric linking political projects with the training of specialised manpower abroad and the logic adopted by the state to legitimise the funding of scholarships abroad no longer works. Brazil today has a democratic regime of government and a reasonably stable economy. This means less interference from the state in the practicalities related to the interests of certain groups or segments of society. As a result of these changes, the context of construction of a rationale for the education of people abroad conceptualised at the state level was dismantled.

This does not mean that, in the nineties, overseas training was stopped. On the contrary, scholarships kept being routinely awarded. However, the hierarchy of issues for policy making, while discernible, was not particularly well defined. The lack of a clear purpose initiated a process of ‘insulation’ of the policy of scholarships abroad from broader political agendas. In this context, the training of people abroad appeared unjustified and no longer of interest to the state. As a result, the training of high-level human resources lost its political relevance and specificity, no longer reflecting aims related to national goals.

In practice, the lack of a clear and publicly stated purpose for scholarship abroad at the state level meant that a whole set of interests was threatened. The financial resources for the education of people in foreign universities were susceptible to the whims of the authorities of the moment, and thus vulnerable to actions based on values that were alien to the groups of people most likely to be affected by this practice. This happened, in the early

nineties, when the newly elected government - in its bureaucratic reorganisation - attempted to close down CAPES, and the Brazilian academic community, through an organised movement, lobbied and prevented this happening.³

Although it is not possible to point out the exact moment when an activity becomes institutionalised, the political crisis triggered by the proposed closure of CAPES can be interpreted as a turning point in the acceptance of the 'culture' related to the relevance of scholarships abroad in Brazil.⁴ In defending their beliefs and values publicly, the academic community succeeded in insulating their interests from the broader national context. As a result, the funding of scholarships abroad achieved a social role of its own and became 'ecologically' structured in the power system. In this way, scholarships abroad in the Brazilian context acquired a 'market, a status condition, an independence from specific administrative action. Thus the policy that funds such an activity became autonomous and protected from society which tended to interfere with it.'⁵

The idea of 'institutionalisation' also illuminates the main contradiction surrounding the funding of scholarships at present. The opinions obtained during the interviews revealed an unresolved paradox. Despite the evidence that Brazil has already established a postgraduate system able to respond to the demand for this type of education, Brazilian academics, scientists and policy makers overwhelmingly support the funding of scholarships abroad. Thus, to explain such a paradox, it is suggested that the policy of scholarships abroad be no longer concerned with the building up of an academic infrastructure, but rather with the interests of the academy itself.

It is possible to offer this interpretation in a different way. If a higher level of abstraction is adopted, the evidence hitherto gathered provides material for a theoretical view on what scholarships abroad is about in Brazil. This will be explored in the next section through the concept of Domestic Academic Deficiency.

The Concept of Domestic Academic Deficiency - DAD

Analytically, it is suggested that there were sets of varying conditions in the Brazilian context at different periods of time that required the training of people abroad. While these conditions changed over time, there was always a group of people trained abroad and studies done in foreign universities. The gap between what the Brazilian system could offer and what was offered by foreign universities will be defined as Domestic Academic Deficiency-DAD.⁶

DAD is a theoretical device to interpret the distinct patterns identified in the policy of overseas education in Brazil over time.

As an analytical tool, DAD is multidimensional, flexible and able to suggest the process of change that has occurred over time.⁷ Thus, DAD summarises past and present rationales for the policy of scholarship abroad and the prevalent conditions that have led to the occurrence of the phenomenon under investigation, in distinct phases of the policy of scholarships abroad in Brazil.⁸ The definition of these phases came out of the filtering of

documents, of the insights of people interviewed, and of the researcher's personal perceptions.⁹ The analysis of these phases gave rise to the 'conceptual categories' of DAD.¹⁰ These are defined in the following way:

- Agenda: means a rationale for the funding of scholarships linked to the national political project.
- Arena: refers to the broad context that gave rise to the main problem to be tackled by the policy of scholarships abroad.
- Strategy: means the purposeful set of actions adopted to handle or solve such problems.
- Focus: means the purpose of the policy for scholarships abroad.
- Knowledge: means the cognitive scope of overseas education, that is, the type of education sought.

These categories permit differentiation among phases and, in addition, can be related to the thinking of Joseph Ben-David, described in *The Scientist's Role in Society*.¹¹

Ben-David examines the conditions that have influenced the organisation of scientific activity and the rise of a professional career for scientists in different countries at different period of times.¹² His considerations are framed by an institutional approach that is based on a set of criteria related to the broader social context, such as the different aspects of the economy of the society, the structure of scientific organisation, and the political and religious systems.¹³ Keeping in mind the differences, it is possible to identify the phases of DAD with the patterns described by Ben-David.¹⁴

In the first phase, the international context of the post-war period gave rise to the idea of specialised manpower as a factor of economic changes. To build up the needed workforce, higher education had to be improved. The type of knowledge required for the building up of a critical mass in the universities was postgraduate education. The most efficient and rapid way to do that was to send people to study in foreign universities. The instrument through which the purpose of educating academics could be accomplished was the funding agencies. Thus the *strategy* of creating CAPES is the most relevant category of DAD in this phase.

Therefore, this first phase of DAD is the result of the shift in values towards scientific activity that occurred in the Brazilian society in the early twentieth century.¹⁵ Such a change is recognisable in the take off of academic science in Brazil in the first decades of the twentieth century. Until then, the conceptual development of empirical sciences was predominantly independent and isolated from social circumstances.¹⁶ The creation of the funding agencies to foster the education of academics and scientists suggests an official recognition on the part of the state on the usefulness of scientists in solving the nation's problems. Thus the creation of CAPES should be understood as a turning point in the perceptions of society on the role of scientists in the national context.¹⁷

In the second phase, the social, economic and political crisis of the Brazilian national context of the 1960s and 1970s framed policy making in the federal sphere within the ideological doctrine of 'economic growth and national security'. The agenda of the government was building up a scientific and technological capability in areas relevant for

this political project. Thus, it was necessary to reform higher education and postgraduate education so that the type of technicians and scientists necessary for this project to be accomplished could be educated in national universities. In order to strengthen the strategic areas necessary for the building up of a scientific and technological capability, people were sent to study in foreign universities. Therefore, in this period of time, the purpose for the scholarships abroad was clearer and directly linked to the governmental agenda. Consequently, the category of *focus* is the one with greater significance in this phase.

This subsequent phase of DAD matches the second evolutionary stages of scientific activity in Brazil, when the initial process of professionalisation of the Brazilian scientist took place in the eighties. This happened mainly because of the investment made by the government in building up national scientific and technological capability.¹⁸ Reforms of the regulations for postgraduate education and the adoption of new requirements concerning the employment of university teachers contributed to the establishment of normative practices and, thus, for the structuring of scientific careers. This had positive implications for the expansion of the academic sector and gave rise to a professional community of scientists and scholars in various fields. As a result, most scientists and academics were employed by the state either in universities, research institutes linked to public enterprises or groups linked to educational institutions, where they began to form a well-defined group of professionals. Within this context, scientific activity started to be structured with formal requirements for qualification and employment.

In the third phase, however, the political context of the late 1980s and early 1990s did not provide a visible purpose, either economic or an ideological, for the education of

people abroad. The political project of re-democratisation and economic stability of the 1990s shifted the priorities for policy making. Apparently, there is no link between the national context and the rationale for the policy of scholarships abroad. Nevertheless, during this period of time, the award of scholarships for postgraduate studies in foreign universities was not stopped. People remained studying abroad with financial support from the federal government. However, when all these phases are compared with each other, the category of *knowledge* appears as the common element among them. Therefore, it will be suggested that the lack of a domestic academic provision able to educate the needed highly qualified personnel is the main theme underlining the policy of scholarships abroad.

Finally, the third phase is the contemporary stage in the development of science in Brazil and relates to the normative structure of scientific work, when the practical organisation of science, such as manpower and financial resources, began to take shape. This happened when ‘some adaptation of social norms in other fields of activity to norms of the given activity’ took place.¹⁹ In this respect, a system of science and technology had been established that made possible a relative independence and autonomy of scientific activity with the rise of a formal structure in the organisation of scientific activity, in terms of career access, research establishments, fields, associations, mechanisms of assessment, and so forth.

However, while it is possible to trace similarities between the phases of DAD and the patterns of the institutionalisation of scientific activity in advanced centres of research, the same is not true for the social processes shaping such organisation. The arrangements involving scientific activity in ‘peripheral’²⁰ nations occur differently from the

decentralised and competitive system of the research units in the main centres of advanced research.²¹ This is so because the competition between the units of research and the definition of role models in these societies follow the trends and innovations made in the core scientific centres. Imitation is only made possible due to the strong support of the state, through allocation of public funds, to scientific enterprise.²² This, however, should not necessarily imply that there is a total absence of the elements encountered in the processes shaping the development of scientific activity in the industrialised societies. The ecology of the production of science is very much the same everywhere.

In the case of Brazil, the pursuit of science is concentrated in the universities.²³ The predominance of scientific research in the universities does not, however, guarantee an equal share of financial investment from the government.²⁴ Such a contradictory scenario, appears not to affect the motivation of Brazilian academics in terms of their performance and productivity. If, on the one hand, most research done in the university relies on funds from the central government, on the other, the lack of sufficient resources forces the leaders of research groups to compete for funds outside their institutions.²⁵ Once in the competitive national market, the ones working in the universities have more advantages, because their academic credentials provide them with more prestige and autonomy in the race for funds compared to other groups organised outside the universities.²⁶ As a result, people leading research groups within the universities have more freedom in choosing research topics and for transmitting the results of their research. Such autonomy is possible not only because of their better qualifications but also because of the support of a set of institutional mechanisms of financing – such as the funding agencies, scholarship schemes, independent institutions – that allow these academics to avoid red tape and centralised control.²⁷

Although academic freedom and autonomy in a centralised system appears to be contradictory, in reality this happens because the federal government does not have clear policies for the sector.²⁸ Policy makers involved with the administration of science policies rely greatly on the judgement as well as on the demand from the academic and scientific communities for the allocation of resources, as in the case of the research projects processed through CAPES.²⁹ The participation of academics and scientists in the decision making process creates an internal market for research activity in which, as regards the differences, there is space for a certain degree of independence and competition among research units.³⁰ Consequently, Brazilian scientists and academics need to compete for the appropriate environment for their scientific research.³¹

In consequence, the success and the productivity of the Brazilian researcher depends greatly on his or her initiative and ability to establish the conditions for work within the university, in terms of funding, infrastructure and personnel, and the processes involving the diffusion of this research.³² There is, however, a crucial aspect of the development of scientific activity in a peripheral society that differs greatly from the way science is done in industrialised nations. This aspect has to do with science and social values.

Science and Social Values

In peripheral societies, scientific activity is heavily dependent on governmental funds.³³ Investment in science is mostly justified in terms of its utilitarian function.³⁴ When this justification for one reason or another fails to happen, scientific activity loses its validity and, consequently, disruption occurs in the level of maximising the social benefit of science. As a result, a feeling of loss of purpose and despair takes place among scientists giving rise to questions about whose interests science has been serving.³⁵ These moral crises between science and social values can be avoided if a set of conditions required for scientific activity exists. These conditions do not generate intellectual ability and moral responsibility; they only provide the appropriate environment for the existence of vigorous and disciplined social thought.³⁶

Therefore, it is suggested that the funding of scholarships abroad has been institutionalised so that the appropriate conditions for the development of scientific research in Brazil can be created. As such, this policy has become part of the national system for the provision of the arrangements required for science to be pursued successfully.³⁷ These arrangements encompass a variety of activities related to the induction of future researchers and university teachers into the academic ethos of the scientific community.³⁸ Within this context, overseas education refers to the up-grading and the maintenance of skills of a specific type of manpower. This up-grading means the training of people in the norms of scientific activity and their induction into the fundamental values and practice of the academic profession.³⁹

This role of the policy of scholarships can be explained through the changing national arena. As the political agendas in Brazil shifted over time, the *rationale* for sending people abroad also evolved: education abroad today is for the reproduction of an elite within an elite.⁴⁰ Such an elite is formed by a restricted group of people that have an active interest in entering the academic profession and who will serve as role models for the national network of intellectuals.⁴¹ Their significance in the national academic context is that these professionals pull up the standard of performance by complying with international levels of academic practice.

The relevance of overseas education in the maintenance of this academic elite is that it works as a regulating mechanism to ensure that the flow of information and communication within the international scientific community is constant.⁴² The way science is organised in peripheral countries puts constraints upon scientific activities in these societies. In this context, contact with professionals from the main centres of research acquires greater significance.⁴³ Such a connection with the mainstream of international science is crucial for the process of transmission and diffusion of scientific knowledge and it essential for the vitality and dynamism of the academic ethos in the academic life of the periphery. CAPES' scholarships are part of the arrangements that provides the means of access to the international community.⁴⁴

As an extension to this conclusion, if this type of investment is to continue in the future - and in the opinion of the people interviewed it should be - the focus for the definition of priorities for the policy of scholarships abroad should be considered,

primarily, from an ‘internal’ perspective of the production of knowledge.⁴⁵ This means an approach related to the normative function of pure science that deals mostly with the *institutional* context, or with the arena where Brazilian scientific activity and academic research takes place. Thus, the strategy to be adopted for the policy of scholarships abroad should be concerned mostly with matters related to the relationship between scientists and their interaction with the process of producing cognitive knowledge, such as the maintenance and dissemination of the academic ethos in the Brazilian environment.

Suggestions for Further Research

The evidence gathered throughout this thesis has illuminated various aspects related to the rationale of this policy in the Brazilian context. However, given the limits on a thesis, it was not possible to explore all issues of significance and there are areas where better understanding is still needed. In the view of the researcher, two other lines of research are necessary for a more comprehensive view of the policy of educating academics abroad:

The first of them is related to the practical outcomes of foreign education on the careers of the people trained overseas. The empirical evidence collected in the interviews suggested that the reintegration into the Brazilian job market of people trained abroad and also their tendency to concentrate in the Southern region of the country were matters of concern. Therefore, an investigation into the changes that have occurred with the careers of people who obtained their degrees abroad in comparison with people trained in Brazilian universities is highly recommended. A comparative study on the negative and positive

implications of education abroad and in Brazil would throw light on an area where knowledge is still scarce and would help in the definition of strategic policies for the training of specialised personnel in the future.

The second worthwhile area for investigation is related to the concept of DAD. It would be especially illuminating to the knowledge in this field to examine whether there are other cases of DAD investigated. An investigation of policies for the education of high-level personnel in foreign universities within different social contexts and its relationship with the patterns identified in DAD would provide substantive material for a comparative analysis on the existence of the concept of DAD in peripheral societies. This would permit the delineation of a more general theory of the notion of the Domestic Academic Deficiency, and how it changes, and how it is changing under conditions of globalisation, and of internationalisation.

¹ 'Institutionalised' means the "integration of such activity (training abroad) both within the wider cultural tradition of the society, and its institutional infrastructure. Talcott Parsons. 1962. Institutionalization of Science. In *The Sociology of Science*, edited by Bernard Barber and Walter Hirsch. New York: Collier-Macmillan Limited, p.14

² The issue of scholarships abroad is consistent with the patterns related to the cultural institutions of the 'social system'. The cultural patterns refer to the acceptance in the social system of the value of an activity. Therefore, in the case of the funding of scholarships overseas, institutionalisation implies that there is a group of people who believe in the "worthiness of such activity as a means of improving knowledge already acquired and yet to be acquired". This conclusion is based on the analysis of the evidence that suggests that the training of people abroad is part of the sociology of the production of knowledge in Brazil. Talcott Parsons. 1952. *The Social System*. London: Tavistock Publications, p. 52, and Talcott Parsons. 1962. Op.cit., p.14. 'Social role' means a "pattern of actions, sentiments and beliefs though by those who perform and experience that pattern and by other persons who perceive it as a distinctive one with a distinctive function of its own and a distinctive appropriateness in particular situations. The social role has a set of norms which are understood not only by the performer but also by other persons or who perceive, appreciate and respond to the performance of the role", in Thomas Schott. 1993. The Movement of Science and of Scientific Knowledge: Joseph Ben-David's Contribution to its Understanding. *Minerva* XXXI (4):460.

³ For more on the closing down of CAPES, see Rogerio de Andrade Cordoba. 1996. Op.cit.

⁴ 'Culture' means the attitudes and behavioural characteristics of a social group. In *The New Oxford Dictionary of English*. 1998. Op. cit. For more on the academic culture see A. H. Halsey and M. A. Trow. 1971. *The British Academics*. London: Faber and Faber, Chapter 9 and Maurice Kogan. 1999. The Culture of Academe. *Minerva* XXXVII (1):63-74.

⁵ Talcott Parsons. 1962. Op. cit., p. 14.

⁶ The Notion of Domestic Academic Deficiency does not mean a judgement of value on the Brazilian academic condition or academic community. This is a concept created for analytical purposes.

⁷ Barney G. Glaser. 1978. *Theoretical Sensitivity*. San Francisco: University of California, pp.95/96.

⁸ The analysis of these phases will be done in the light of a variety of intervening conditions, as defined by 'the broad and general conditions bearing upon action/interactional strategies. These conditions include, for instance: time, space, culture, economic status, technological status, career, history, and individual biography'. Although these phases overlap with each other in reality, for analytical purposes they will be located within the years 1950s-60s, 1970s-80s, and 1990s. Such approximate periodisation will permit the analysis of the differences and the similarities in the phenomenon of scholarship abroad from the moment this activity became a public policy, that is, from the fifties onwards. For more on intervening conditions, see Anselm Strauss and Juliet Corbin. 1990. Op. Cit., p. 103.

⁹ 'Perception' means a reconstruction of 'what is out there' in relation to overseas education. It implies a simplification of the supposed realities beyond schematic statements related to the policy for overseas education and it derives primarily from the correlation of official data and the researchers' impression of the issue under investigation. Such impressions are not based on random information. Rather they are projections formed out of the connections and the relationships among the main elements related to the reality embedding overseas education in Brazil.

¹⁰ These will constitute the conceptual categories of DAD 'Conceptual category' means a classification of the main theoretical abstractions about what is going on in the phenomenon under investigation. See Anselm Strauss and Juliet Corbin. 1990. Op. cit, Chapter 5; and Barney G. Glaser and Anselm L. Strauss. 1967. *The Discovery of Grounded Theory: strategies for qualitative research*. Hawthorne, New York: Aldine Publishing Company, Chapter II.

¹¹ Joseph. Ben-David. 1971. *The Scientist's Role in Society*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

¹² These countries are Italy, up to mid seventeenth century, England, in the second half of the seventeenth century, France, around the turn of the nineteenth century, Germany, in the middle of the nineteenth century and the United States, in the twentieth century. Ibid.

¹³ For a critique of Ben-David's theory, see Thorvald Gran. 1974. Elements from the debate on science in society: a study of Joseph Ben-David's theory. In *Social Process of Scientific Development*, edited by R. Whitley. London: Routledge & Kegan Paul.

¹⁴ According to Ben-David, the relationship between the social conditions that led to the development of a scientific community in different societies is not fixed and immutable. Rather, the social structures that have implication for the rise of a professional role for the scientist are changeable and adaptive 'in the light of the existing constellation of forces in their respective societies'. Ben-David's interpretation also suggests that despite the differences in the organisation of scientific activity among society, the 'ecology' of science is much the same everywhere and 'where there is a good match between a structure and an ecology, the structure will thrive and spread', in Joseph Ben-David. 1971. Op.cit., pp. 18/19.

¹⁵ The emergence of a new role for the scientist implies a change of social values and the recognition of the intrinsic value of the scientific activity as an important social function. This change, that take place more or less at random and in different ways when a variety of circumstances coincide, is a first condition that sets the stage for the development of a national scientific community. See Joseph Ben-David. 1971. Op. cit., p. 75.

¹⁶ This is not to say that Brazilian science before the 1950s was alienated from society. Rather, it means that there was no integration between scientific activity and a recognisable social role.

¹⁷ In this period of time, socially and economically influential groups of people searched for a 'cognitive structure consistent with their interests in a changing, pluralistic, and future-oriented society' and founded institutions to deal with the interests of the scientific and academic classes. Joseph Ben-David. 1971. Op. cit., p. 170.

¹⁸ A second condition identified by Ben-David as necessary for the organisation of scientific activity relates to aspects linked to the organisation of scientific work as a profession. This happens when people can choose science as a career or 'when society seeks the services of scientists or scientifically trained people who are regularly employed in different contexts and who participate as a group in the political and ideological process of that society'. Joseph Ben-David. 1971. Op. cit., p. 75 and p. 169.

¹⁹ Joseph Ben-David. 1971. Op. cit., p. 75.

²⁰ The term 'periphery' means societies which are not located within the areas of high concentration of scientific creation and that usually adopt the values of the main 'centers' as role models. See Edward Shils . 1975. *Center and Periphery: essays in macrosociology*. Chicago: The University of Chicago Press, and Thomas Schott. 1991. The World Scientific Community: Globality and Globalisation. *Minerva* XXIX (4):440 - 468.

²¹ According to Ben-David, a common element encountered in the social processes that have shaped scientific activity in advanced societies is the level of "competition between strong units of research operating in a decentralised common market for researchers, students and cultural products." Where this state of

'decentralised competition' failed to take place for one reason or another, the organisation of science and the definition of role models "occurs not as a result of competition between equal units, but through the imitation of the innovations made in large scientific centres." Consequently, countries where scientific units were organised in a decentralised and competitive system are much more likely to become monopolistic centres of scientific research. In this respect, Ben-David says that:

As a result, scientists from all over the world have made these countries their spiritual home and centre. They adopted the pattern of work prevailing at the centre, because many of them obtained their advanced training there and because the usage of the centre in training, evaluation, and hierarchy of authority became the standard practice of the worldwide scientific community. In a situation where the organisation of science (i.e. manpower and resources) is national, the internationality of science that welds scientists from everywhere into a community centred in one country creates monopolistic advantages.

In Joseph Ben-David. 1971. Op. cit., p.172.

²² According to Bernal, science 'differs from other occupations in that it requires a permanent subsidy, whether from individuals, institutions or the state to continue its operations.' J. D. Bernal. 1939. Op. cit., p. 262. In Brazil, 60% of the research units are located in the universities, 32% in other types of governmental institutions of research and 8% in private and public enterprises. Simon Schwartzman and Claudio Moura Castro, ed. 1986. *Pesquisa Universitaria em Questao [Research in the Universities]*. Campinas, SP: Editora da UNICAMP, ICONE, CNPq, p. 82.

²³ Simon Schwartzman and Claudio Moura Castro, ed. 1986. Op. cit., p. 82

²⁴ According to Schwartzman and Castro, the bulk of funds for research have gone to other types of institutions. This can be explained by the fact that experimental research is usually very expensive and done mostly in institutions outside the universities. Simon Schwartzman and Claudio Moura Castro, ed. 1986. Op. cit., p. 83.

²⁵ Simon Schwartzman and Claudio Moura Castro, ed. 1986. Op. cit., p. 84.

²⁶ The units of research dealing with science in the universities are not only quantitatively larger, but also contain people who are better qualified in postgraduate training. The majority of the leaders of these research units have Ph.D. degrees (78%), while the groups located outside the universities, and in other types of institutions, have a lesser proportion of people with higher qualifications (30% and 6% respectively). Within the research system in the universities, a Ph.D. degree is a pre-requisite for a position of leadership in a research group, and the majority of leaders has studied overseas, while the same is not true for researchers working in other types of institutions. Simon Schwartzman and Claudio Moura Castro, ed. 1986. Op. cit., pp. 81-84.

²⁷ Researchers working in institutes outside a university or in public and private enterprises are more likely to respond to pressures from the financing bodies in terms of the applicability of the results of their research and also of secrecy. As a result, they face less autonomy and flexibility of action, but earn higher salaries and need not compete for funds. Simon Schwartzman and Claudio Moura Castro, ed. 1986. Op. cit., p. 85.

²⁸ Simon Schwartzman and Claudio Moura Castro, ed. 1986. Op. cit., p. 86.

²⁹ Ibid.

³⁰ According to Schwartzman and Castro, this fact contradicts the current assumption that the environment in the university is highly bureaucratised and, thus, has no space for the emergence of natural scientific leadership and individual initiative, in contrast with the idea that the environment of market oriented enterprises are more likely to be productive. Simon Schwartzman and Claudio Moura Castro, ed. 1986. Op. cit., p. 86.

³¹ According to Schwartzman and Castro, the autonomy and independence of the scientists in the universities bring about a series of conflicts and tensions with the central administration of the university and with those in the faculty that are not engaged in advanced research because of differences in work routine and salaries. Ibid.

³² Another aspect of scientific research done in the universities is that, contrary to what is usually assumed, there is no significant distinction in the proportion of applied sciences done in the universities (40%) and in the other institutions of research (50%). Only thirty percent of the units of research in university are predominantly engaged in pure science. Ibid.

³³ In Ben-David's analysis, the economic conditions related to the institutional study of the rise of the scientist's role are regarded as given because "scientific activity has taken place in economically advanced countries and not elsewhere" in Joseph Ben-David. 1971. Op. cit., p. 14.

³⁴ According to Ben-David, the interference of the government in the structure of the competitive system through policies that have 'force-fed' greater expansion of science has caused a disruption in the level of maximal social benefit of science. This has given rise to periods of anxiety and *malaise* in which the value of science is questioned. Ben-David suggested that the acceptance by scientists of financial support from central governments corrupt the intrinsic value of science by introducing purposes external to scientific values, such as military, industrial or ideological interests. If science is viewed as serving specific interest or privileged groups, faith in its values is "eroded by envy and doubt". In Joseph Ben-David. 1971. Op. cit., pp. 177-180.

³⁵ Moral crises between science and social values, however, are not a matter of the type of societies in terms of centralised or non-centralised regimes. Rather, according to Ben-David views, there are indications that these cycles are related to an 'underlying theme of impatience with the inability of science to dissolve basic human anxiety and to solve all social problems.' These crises, however, can be avoided if the following social conditions are achieved:

- a) Political conditions that allow social experimentation and pluralism and that contain some methods for comprehensive institutional change and review of change without recourse to violence;
- b) A permanent attempt to extend scientific thinking to human and social affairs in order to formulate the problems of rapid cognitive and social changes caused by science and to devise empirically investigable procedures for dealing with those problems;
- c) The application of the professional norms of the scientist to the social thinker, which imposes the discipline of not discarding existing tradition except on those specific points where there is a logically and empirically superior alternative.

Joseph Ben-David. 1971. Op. cit., p.184.

³⁶ Ibid.

³⁷ 'System' means the particular way a national scientific community is formally and informally organised within its society. This include the way personal contacts and exchange of information takes place, attendance at national meetings, the mechanism for the transmission and diffusion of knowledge such as the interconnectedness of universities, scientific societies, sources of financial support so on. Thomas Schott. 1993. Op. cit., pp. 460-465.

³⁸ For a discussion of the social role of university teachers and the notion of academic ethos, see Walter Ruegg. 1987. The Academic Ethos. *Minerva* XXV (1-2):393 - 412. Overseas education serves such purposes in other countries in Latin America, see Hebe M.C.Vessuri. 1986. Op. cit., p. 5.

³⁹ The normative process of cognitive knowledge refers in general to the Mertonian norms. For an approach in the sociology of science see Robert K. Merton and Jerry Gaston, ed. 1977. *The Sociology of Science in Europe*. Carbondale, Illinois: Southern Illinois University Press, and M. J. Mulkay. 1977. Op. cit., p. 95.

⁴⁰ Elite within an elite refers to a small group of people who because of their high educational qualification have access to education in a foreign university. For a view of levels of elite within the university, see Ian Winchester. 1992. Elite and Ordinary. *Interchange* 23 (1&2):91-95.

⁴¹ 'Science is communicated and learned over a network comprised of intellectuals who serve as role models.' Joseph Ben-David. 1971. Op. cit., p.19.

⁴² According to Claudio Moura Castro, the 'invisible college' of Brazilian science is linked to the funding agencies, and the rites of initiation [in science] are done through a scholarship for studies in a foreign university. See Claudio Moura Castro. 1985. Op. cit., p. 47.

⁴³ Michael J. Moravcsik. 1975. Op. cit.,

⁴⁴ Eunice Ribeiro Durham. 1996b. Op. cit.

⁴⁵ The 'external' perspective concerns the operational function of science in relation to a broader social context and analyses the exchanges between scientific and to society as a whole, such as industrial science or technology. In a way, the view of the training of people overseas framed by 'economic development' fits the 'externalist' approach. It must be noted that this distinction between an internalist and externalist approaches is on an ideal level and that, in reality, both views are complementary and overlap each other. However, because their social dynamics are different, their sociological analysis requires different considerations. Their audiences, for instance, are not the same. In the case of pure research, the audience is formed by academics. For applied research, the audience is mostly of non-academics. Consequently, the choice of topics of both types of research also differs. Pure research themes are generally chosen according to scientific significance, while applied research topics are related to more utilitarian purposes. For a historical view on the internalist v. externalist debates see Roy MacLeod. 1977. *Changing Perspectives in the Social History of Science*. In *Science, Technology and Society*, edited by Ina Spiegel-Rosing and Derek de Solla Price. London: Sage. See also M. J. Mulkay. 1977. Op. cit., pp. 95-135. For a view of the theme in the context of the periphery see John Ziman. 1971. Op. cit., pp. 33-55. Victor L. Urquidi, ed. 1979. *Science and Technology in Development Planning*. Oxford: Pergamon Press and Stephen C. Hill. 1977. Op. cit.

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A P P E N D I X I (T O C H A P T E R I I)

FIRST GENERATIONS OF BRAZILIAN ACADEMICS AND SCIENTISTS

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First Generations of Brazilian Academics and Scientists

The first Brazilian academics and scientists were mainly trained abroad. Simon Schwartzman has identified the first three generations of scientists involved with the study of the natural sciences in Brazil. Many of them studied in the University of Sao Paulo and the majority had some type of advanced training abroad. Although there is no reference on the methodology applied for the collection of this data, it will be used to illustrate the weight of the training in foreign universities for the education of Brazilian scientists. According to Schwartzman's study, tables I, II and III show the most prominent scientists and academics in the natural sciences, their field of education and the place where they obtained their degrees. The data has been adapted for purposes of clarity and, thus, do not include the information provided on the family background of these scientists.

Table I.1

**1st Generation of Scientists
1892-1907**

Year of Birth	Name	Field of Graduation	Place of Postgraduate Education
1892	Lelio Gama	Astronomer and Mathematician,	Rio de Janeiro
1899	Othon Leonardos	Geologist,	Rio de Janeiro
1906	Francisco M. Gomes	Physicist	Ouro Preto
1907	Mario da Silva Pinto	Geologist and Metallurgist	Rio de Janeiro
1894	Afranio do Amaral	Tropical medicine,	<i>Harvard University, USA</i>
1895	Olimpio da Fonseca	Parasitologist	<i>USA and France</i>
1904	Adolfo Martins Penha	Medicine,	Rio de Janeiro
1905	Otto Bier	Bacteriologist and Immunologist,	Rio de Janeiro
1907	Jose Reis	Bacteriologist	<i>Rockefeller Institute, USA</i>
1907	Amilcar Viana Martins	Zoologist	<i>Rocky Mountain, USA</i>
1889	Gleb Wataghin	Physicist,	<i>Turin, Italy</i>
1900	F. Brieger	Geneticist	<i>Universit of Breslau Germany</i>
1902	Quintino Mingoia	Chemist,	<i>University of Pavia, Italy</i>
1903	Guido Beck	Physicist and Mathematician	<i>Vienna, Austria, Cavendish, UK and Leipzig, Germany</i>
1904	Viktor Leinz	Geologist	<i>University of Heidelberg, Germany</i>
1905	Bernhard Gross	Physicist,	<i>Stuttgart, Germany and Electric Research Association, London</i>

Source: Simon Schwartzman. 1991. *A Space for Science - The Development of the Scientific Community in Brazil*. Pennsylvania: The Pennsylvania State University Press.

Table I.2

**2nd Generation of Scientists
1908 – 1920**

Year of Birth	Name	Field of Graduation	Place of Postgraduate Education
1908	Jose R. Vale	Biochemist	Paulo and USA
1909	Hugh S. Lopes	Entomologist,	Rio de Janeiro
1910	Zeferino Vaz	Geneticist,	Sao Paulo
1910	Mauricio R. Silva	Biochemist,	USA and England
1911	Carlos Chagas Filho	Biophysicist	University of Paris, France
1911	Herman Lent	Entomologist,	Rio de Janeiro
1914	Wladimir L. Paraense	Parasitologist,	Rio de Janeiro
1914	Mario Viana Dias	Neurophysiologist,	National Inst. Med. Res. USA
1919	Crodowaldo Pavan	Geneticist,	Columbia University, USA
1920	Manuel F. Moreira	Physicologist	USA and England
1908	Simao Mathias	Chemist,	University of Wisconsin, USA
1909	Paulus A. Pompeia	Engineer	University of Chicago/USA
1914	Mario Schenberg	Engineer and Physic.	Italy and USA
1914	Marcelo D. Santos	Physicist	Cambridge, England
1917	Pascoal A. Senise	Chemist	Lousiana State University, USA
1918	Jose Leite Lopes	Chemist	Princeton University/USA
1920	Walter B. Mors	Chemist	University of Michigan/USA
1920	Otto Gottlieb	Chemist	England and Israel
1920	Jaime Timono	Physicist	Princeton/USA

Source: Simon Schwartzman. 1991. *A Space for Science - The Development of the Scientific Community in Brazil*. Pennsylvania: The Pennsylvania State University Press.

Table I.3

**3rd Generation of Scientists
1921-1931**

Year of Birth	Name	Field of Graduation	Place of Postgraduate Education
1921	Blanka Wladislaw	Chemist	Sao Paulo
1921	Ernest Giesbrecht	Chemist	Sao Paulo
1922	Oscar Sala	Physicist,	<i>Illinois and Wisconsin, USA</i>
1923	Aluisio Pimenta	Pharmacist,	Mina Gerais
1924	Jacques Danon	Chemist	<i>Paris, France</i>
1924	Cesare Lattes	Physicist	<i>Princeton, USA</i>
1925	Paulo L. Ferreira	Physicist	<i>Rome, Italy</i>
1925	Jean Meyer	Physicist	<i>Ecole Polytechnique, Paris, France</i>
1926	Sergio Porto	Chemist	<i>John Hopkins Univ. and Bell Laboratories, USA</i>
1928	Roberto Salmeron	Engineer	<i>Manchester, England</i>
1928	Jose Israel Vargas	Chemist	<i>Cambridge University, England</i>
1928	Jose Goldemberg	Physicist	<i>Canada</i>
1928	Ricardo Ferreira	Chemist and Physicist	<i>California Institute of Technology, USA</i>
1930	Gerhard Jacob	Engineer and Physicist	<i>Bell Laboratories, USA</i>
1922	Warwick Kerr	Geneticist	Sao Paulo
1923	Paulo E. Vanzolini	Zoologist	<i>Harvard University/USA</i>
1925	Antonio Cordeiro	Geneticist	<i>Columbia University, USA</i>
1928	Francisco M. Salzano	Geneticist	Rio Grande do Sul

Source: Simon Schwartzman. 1991. *A Space for Science - The Development of the Scientific Community in Brazil*. Pennsylvania: The Pennsylvania State University Press.

APPENDIX II (TO CHAPTER III)

GROWTH OF HIGHER AND POSTGRADUATE EDUCATION IN BRAZIL

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Table II.1
GROWTH OF HIGHER EDUCATION IN BRAZIL
1994/1999

	1994	1999	Increase (%)
Number of Courses	5,564	8,878	59.6
Number of Institutions	851	1,097	28.9
Faculty	141,484	173,836	22.9
Enrollments	1,661,034	2,369,945	42.7
Degrees	245,887	300,761	22.3
Applications	2,237,023	3,344,270	49.5
Vacancies	574,135	894,390	55.8

Data from the Instituto Nacional de Estudos e Pesquisas Educacionais-INEP/MEC (National Institute of Educational Studies).

Table II.2

GROWTH OF THE POSTGRADUATE SYSTEM IN BRAZIL

1994/2001

Postgraduate Courses	1994	2001	Increase (%)
MSc	1,159	1,514	30,6
Ph.D.	616	853	38,4
Total	1,775	2,367	33,4

Data from the Instituto Nacional de Estudos e Pesquisas Educacionais-INEP/MEC (National Institute of Educational Studies).

Table II.3

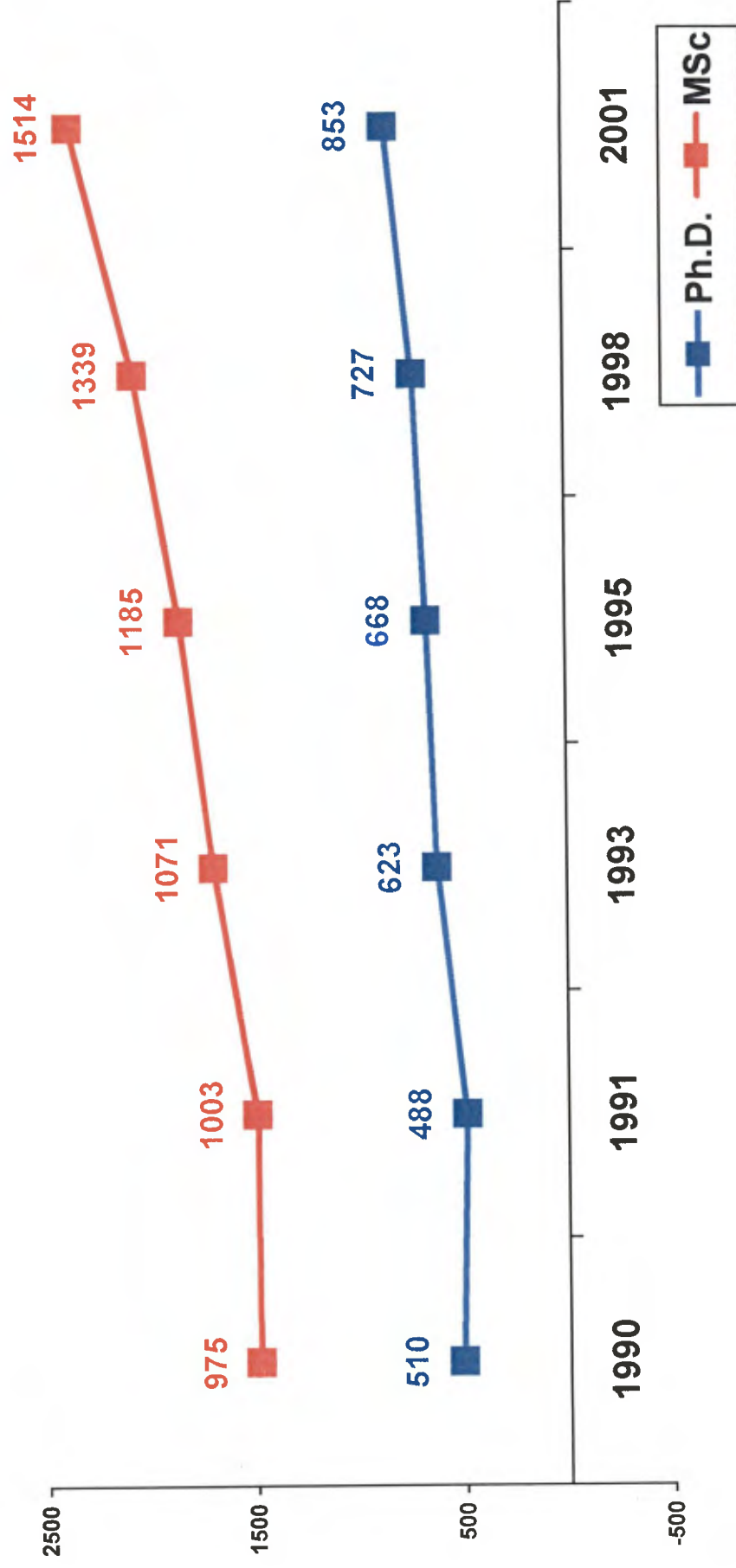
INCREASE IN THE NUMBER OF CONCLUSIONS AND ENROLLMENTS IN BRAZIL

1996-2000

	1996	2000	Increase (%)
MSc			
Enrolled	45,033	63,591	41.2
Titled	10,411	18,374	76.5
Ph.D.			
Enrolled	21,927	33,004	50.5
Titled	2,950	5,344	81.2
TOTAL (MSc + Ph.D.)			
Enrolled	66,960	96,595	44.3
Titled	13,361	23,718	77.5

Data from the Instituto Nacional de Estudos e Pesquisas Educacionais-INEP/MEC (National Institute of Educational Studies).

Graph II.1 - EXPANSION OF POSTGRADUATE COURSES IN BRAZIL / 1990-2001



Data from the Directory of Evaluation of Postgraduate Courses of CAPES.

A P P E N D I X I I I (T O C H A P T E R V)

L I S T O F Q U E S T I O N S F O R T H E I N T E R V I E W S

List of Questions

Question 1- In the fifties, the Brazilian government started to invest in the building up of high-level human resources. In your view, what was the 'vision' of Brazil held by the governmental authorities when CAPES was created and what is the 'vision' today. What has changed?

Question 2 - In view of present Brazil, do you think that the government must continue funding scholarships abroad? Why ?

Question 3- In your opinion, is there a explicit policy of scholarships abroad? Please, explain.

Question 4 – It is possible to identify four active groups of actors in the management of the scholarships abroad, namely, the federal government that funds the scholarships, the academic community that select the candidates, the institutions of higher education that presumably will employ people trained abroad, and the grantee, the customer of this policy. In your opinion, do these groups share the same expectation in relation to the policy of scholarship abroad? Why? Explain.

Question 5 - In your opinion, which of these groups has more influence in the decision making process related to the award of scholarships at CAPES? Why.

Question 6 – The scholarships abroad of CAPES are mainly for doctoral, post-doctoral and sandwich-doctorate. Recruitment is open to candidates in all fields of knowledge and the process of selection of candidates is based a peer review system. Do you agree with the way the policy is handled in practice?

Question 7 - Do you think the government must adopt some type of cost recovery mechanism? Why? What can be done to improve the return to the nation of the investment made?

Question 8 - How do you evaluate Brazilian postgraduate education in relation to the international standards of research training?

A P P E N D I X I V (T O C H A P T E R V)

T H E P R O C E D U R E S A D O P T E D F O R T H E I N T E R V I E W S

The Procedures Adopted for the Interviews

This Appendix provides information on the procedures adopted for the interviews and on the academic principles that have guided the process of gathering the data. This will be described on the basis of the problem under investigation and of the specific aims of the study.¹ In this section, the procedures adopted in preparation and during the fieldwork will be outlined, where issues related to the conceptualisation of the problem, the selection of respondents, the interview setting, and ethical considerations will be clarified.

The Use of the Research Interview in this Thesis²

The main motivation for using the research interview as a tool for data collection in this research was the nature of the subject to be explored.³ As already mentioned, the funding of scholarships abroad is a theme linked to the education of academics and scientists and, thus, it had to be addressed in reference to its social context.⁴ 'To explore the richness of the topic, it was necessary to adopt a type of information gathering that would go beyond the official data.'⁵ The idea was to find out what people who know the Brazilian academic environment well think of the policy of scholarships overseas, in order to make a link between the history and the numerical information. For this to be accomplished, the use of the research interview offered advantages in various aspects.

The research interview is a flexible tool for information gathering, with greater exploratory potential than other forms of data collection.⁶ 'In the process of interviewing, the researcher is able to open up the complexity of the social reality under investigation, and to produce a dialogue in which new conceptions, ideas and insights can be formed.'⁷ Through controlled conversations, facts, experiences and unexpected accounts related to the issue of funding people studying overseas, that otherwise would be unknown, can be revealed. The research interview was particularly applicable to this research because of the lack of documentation, as in the case of the issue of scholarships abroad in the Brazilian context.⁸ Another positive aspect of the research interview as a methodological tool for data collection in this study is its usefulness in forming patterns and delineating hypotheses in the context of the knowledge to be investigated. There were, however, negative aspects of research interviews that were also considered.⁹

The problematic aspects in the use of research interview refer mainly to the verification of trustworthiness or to matters related to 'objectivity' or to the extent that precise meaning has been achieved.¹⁰ There is extensive literature discussing why and how subjectivity in interviewing should be avoided. Steinar Kvale argues that 'issues of verification do not belong to some separate state of an investigation, but should be addressed throughout the entire research process.'¹¹ Nevertheless, issues linked to trustworthiness are conventionally discussed in positivist approaches, specifically with reference to the research interview, in terms of 'validity', 'reliability' and 'generalizability'.¹²

‘Validity’ is a major and persistent problem involving interviews in general and this study in particular.¹³ This is because a major source of bias is thought to come from the characteristic of the interviewer and from the respondent’s.¹⁴ Each person brings to the interview their background characteristics, such as age, sex, religion, personality, and their own history. These personal circumstances can be regarded as a source of attitudes, perceptions and beliefs. Thus, concerns in using the research interview in this thesis related mostly to the tendency of the researcher to contaminate the process of exchange of information with her own assumptions and opinions.¹⁵ Additionally, ‘background characteristics also affect interviewer-respondent interaction through the cues that such characteristics provide to each participant about the other. If, for example, the respondent perceives the interviewer to be of a different race, this perception may have profound effects on his attitude toward the interviewer and therefore on the results of the interview itself.’¹⁶

Nevertheless, bias in interviews can be minimised through detailed planning to reduce the amount of improvisation. The adoption of procedures to increase control over the elements that might contaminate the answers can, however, compromise the very merit of the interview as a means of engaging in a natural and spontaneous interpersonal exchange. If this human element of the interview is prevented and rationalised, validity is not necessarily improved. On the contrary, the more controlled the interview is the more calculated the response is likely to be.¹⁷

Closely related to validity and no less important is ‘reliability’ which has to do

with the consistency of the research findings.¹⁸ 'The accuracy of an interview can be defined by its stability in terms of the results achieved or whether the measuring mechanism applied can be used repeatedly in the same circumstances and by different interviewers and still yield the same results.'¹⁹ As in validity, higher reliability depends on the level of planning and clarity. Exact wording of the questions and firm control of the elements that can evoke unwanted responses enhance the reliability factor. These aspects linked to reliability were carefully regarded by the researcher in view of the needs of doing the interviews and retrieving the information in the Portuguese language and translating them to English.

Finally, another aspect relevant for issues of verification in research interviews is whether their results can be generalised.²⁰ The relevance of generalisation for the results of research rests on the claim that scientific inquiry's primary aim is to produce knowledge that can be universally applied. This view, however, is particularly problematic in relation to case studies and thus concerns this thesis in particular.²¹ The main characteristic of a case study is its singularity and uniqueness. Interview subjects are not selected at random, but by criteria of typicality or accessibility. Although the characteristics inherent to research such as this one greatly reduce their generalising potential, this problematic side of the verification process was intended to be minimised by means of careful contextualisation of the whole study in the Brazilian environment.²² Having clarified the issues of trustworthiness related to the use of research interviews, the next section will provide information on the type of interview adopted in this study.

The Type of the Research Interview Used in this Thesis

In this fieldwork research, an open-ended or semi-structured type of interview was used.²³ This means that the questions set the boundaries of the topic to be explored in order to establish a broad framework of reference for the respondents' answer without restricting or limiting their responses. Several aspects have determined this choice of format for the interviews used in this research. Among them, there were the complexity of the subject to be discussed, the type of questions to be asked, the profile of the respondents and, last but not least, the conceptual structuring of the research.

The Interview Questions

The formulation of the research questions was crucial to the process of data gathering in this study.²⁴ Failure to express ideas clearly would lead to unintended outcomes or to misleading responses from informants and the process of interviewing would be flawed. As Charles F. Cannel and Robert L. Kahn report:

Language is always ambiguous as to the exact proposition, which it indicates. The basic reason for the ambiguity of language is that each individual necessarily interprets spoken or written communication from his own experience and personal point of view. As a result, in some degree the meaning, which an individual attaches to a communication, must be uniquely his own and not shared by others.²⁵

In order to exert maximum control on the elements that may interfere in the communication process, and thus to achieve greater validity of the interview data, the formulation, the format and the content of questions used in this research were carefully considered.²⁶ The format of the question was decided upon issues related to the language to be applied and with the way it was presented to the respondent. In this respect, it was examined, for example, whether the vocabulary and syntax to be used were the most accurate way to communicate the main ideas to the respondents. Similarly, the way a question was elaborated played a relevant part in the question design. Also, whether the wording would result in cueing a response or whether it followed a directive or non-directive form of interrogation were other aspects thought of in order to avoid ambiguity in the responses.²⁷

Concerns with the content of the research questions also referred to the conceptual organisation of the theme to be explored.²⁸ This means that in formulating the questions, a great deal of attention was paid to issues relevant to the objectives of the investigation that were within the frame of reference familiar to the informants. The 'frame of reference' means that a respondent may have information on the topic under discussion, yet he/she may not share with the researcher the same scope of understanding on the subject, thus being less likely to interpret correctly what has been asked.²⁹ In other words, the researcher was aware that if she did not work her concepts adequately and did not formulate her questions appropriately, failure in obtaining meaningful information would follow. Therefore, the formulation of questions for this research has encompassed these aspects of question design; the interview objectives at a conceptual level, the frame of

reference in terms of the respondent information level and, also, the interviewer's knowledge of the informant's characteristics.

Suitable respondents for this research were most likely to be experienced researchers themselves, well used to complex and sophisticated modes of reasoning.³⁰ Having this in mind, a conversational mood that would avoid lack of interest in the interview and would motivate responses was thought of the best choice for this study. This required a careful elaboration of questions not only in terms of pertinence and relevance to the theme under discussion but also attention to other crucial matters such as appropriate vocabulary, clarity of ideas and the sequence in which the questions were introduced. The sequence of questions was defined with the purpose of guiding 'the respondent meaningfully through the process of exploration. This was done by means of the 'funnel sequence,' which proceeds from the broadest and most open of questions to the most specific.'³¹

In addition to these issues related to the format and content of the conversation to be held, the type of information intended also determined the questions for the research interviews. The broadness and complexity of the theme required a mode of response where the informants were invited to recollect historical facts, to form opinions and to provide their own insights in relation to a specific but broad theme. This type of data called for a flexible and unstructured fashion of conversation that would provide plenty of space for the informants to contribute freely. Having this in mind, the open-ended style of question appeared the best choice to explore the narrative potential of the

respondents.³²

Therefore, eight questions were divided into three sets and asked of ten respondents. (For the questions, see Appendix III) Such a division followed the analytical layers proposed in the conceptual framework in the field research. The first set of questions aimed at identifying the rationale for overseas training when it first emerged in the 1950s and today. The intention was to identify the main elements that inspired the launching of a governmental infrastructure to develop high-level human resources and why overseas education was considered. The interviewees were asked what was, in their opinion, the governmental vision of Brazil in the past and in present times. It was meant to find out whether they thought that there was an explicit policy of training of people overseas as a mechanism intended to develop rapidly high-level human resources or if this type of training resulted mainly from individual and isolated actions. This policy theme was further explored with a question on the relevance of overseas training for contemporary Brazil.

The second set of questions referred specifically to the way the scheme of scholarships abroad works. The lack of documentation on overseas training suggests that this practice have been framed by a long established and informal set of norms. In order to understand why this has been so and what these rules are, questions trying to identify how the overseas training scheme works in practice and who set the agenda for this policy were formulated. Thus, this line of questioning referred to the interaction between government and the academic and scientific community at CAPES, the institutional arena

where these interests converge.

The third set of questions related to a more technical and operational aspects of the overseas training scheme. It was intended to find out the views of the respondents on the main technical features of the award of scholarships abroad. Questions on the format of the programme, the criteria for the selection of candidates and possible corrections and adjustments to the scheme were asked. It was asked, for example, if there were a case for the adoption of a cost-recovery mechanism. The procedures for the selection of the people to answer them will be explained in the following section.

The Selection of Respondents³³

In this research, a determining factor in the choice of participants was their professional credentials and their familiarity with the overseas training issue at the two levels of study proposed in this research, the political and the operational.³⁴ Suitable respondents needed to know the national political scenario, the characteristics of the Brazilian academic sector and, specifically, to be well acquainted with the policy for building up high-level personnel through the funding of scholarships abroad. These characteristics led to a profile of informants who shared a highly educated background, and considerable professional experience in areas related to educational policy making in Brazil.

Given that the selection of people to be interviewed was to be determined by their competence as prospective narrators, suitable respondents were characterised as an intellectual elite as defined by their strong educational and professional background.³⁵ The final decision about who were to be interviewed, however, was a more complicated task. This involved not only matters related to the identification of the respondent with the research theme but also logistical issues. Consideration of access to interviewees, their willingness to contribute their views to this study and the costs involved in meeting them personally eventually influenced the process of choice of respondents. Therefore, the final list of the respondents came out of a combination of factors that included peer indication, academic credentials, variety of professional experience and the logistical problems.³⁶

On the number of respondents, the literature recommends that the main criteria should be to interview as many as necessary to find out what was intended.³⁷ This means that the ideal number of subjects depends on the purpose of the research. It is the nature of the theme to be investigated that will determine whether it is necessary to have a large or a small group of informants. Nevertheless, there were other factors influencing the number of respondents for this research. During the pilot trial, it became clear that the type of information sought did not allow a large number of respondents, otherwise the analysis of the material gathered would be impractical. A maximum of fifteen respondents was thought to be sufficient to provide the necessary insights for the study. However, the exact number was defined as the interviews progressed and a sense of saturation in terms of obtaining the required knowledge was achieved.³⁸ This feeling of 'enough' has, in practice, determined the overall number of ten final participants.

Ethical Considerations³⁹

Ethical issues involving scientific research in general are based on the idea that no matter what the purpose of the research is, the researchers' primary ethical concerns must be with those they study. This means that the participants of a study have the right to be protected from any risk or harm as a consequence of the information they have provided.⁴⁰ In the qualitative research interview, however, ethical considerations are problematic. In some types of data collection, such as questionnaires for instance, respondents are less vulnerable. This is not the case with the qualitative research interview. On the contrary, participants are usually asked to give their account of personal issues on matters of high sensitivity. Depending on the nature of the subject, such as medical or judicial matters, they can be exposed to unwanted consequences. To protect participants and to make them feel safe and comfortable so that they can talk without constraint, researchers must follow clear guidelines of conduct. As Sideman explains:

Participants have the right to be protected against such vulnerability. Furthermore, interviewers can protect themselves against misunderstanding through the process of seeking informed consent, which requires them to be explicit about the range and purpose of their studying in a way that makes them clear about what they are doing.⁴¹

To avoid misuse of information gathered during the interviews and thus to protect the right of withdrawal of the respondent, guidelines for interviewing ethically

have been adopted. These guidelines comprise mostly issues of 'informed consent'. The participants should be fully informed of the purpose of the study, the procedures involved and the possible consequences of their participation in the research. This usually takes the form of a written agreement between the interviewer and the respondent, where matters such as who is going to have access to the data and how it will be used in the future, are clearly stated.⁴² A crucial aspect of informed consent, however, deals with confidentiality and anonymity.⁴³ In some types of research it is possible to keep the participant's responses confidential. But in others the very purpose of the interview is to make specific information accessible to others. Therefore, participants must be informed about how the data collected will be used.

In this research there were some crucial points that need mentioning for ethical reasons. It was necessary to inform and to discuss with the participants the status of the researcher as a permanent staff member of CAPES, the agency in focus, and her role within this context. This included not only clarification about the intellectual neutrality of this investigation but also issues related to funding or sponsorship. Interviewers were offered the right of withdrawal since most of them have professional activities linked to the academic environment in which CAPES operates. Other topics related to research ethics were also discussed such as the use of tape recording and the sharing of the transcribed material.

The Research Setting⁴⁴

The success of an interview depends on a series of factors. Planning and clarity, for instance, are fundamental for quality research. There are, however, a variety of procedures of a practical nature that if overlooked can also compromise the whole effort. These factors are related to the research setting or the way the interview will be conducted. There are a series of recommendations for the interviewer to follow in order to promote goodwill and compliance from informants. According to the literature, 'the primary purpose of the interviewer's introductory remarks is to get the prospective respondent 'in role''.⁴⁵ Creating rapport and an appropriate atmosphere are essential for an interview to run smoothly. Nevertheless, despite the usefulness of interview techniques, the task of holding a focused conversation with research purposes is not an ordinary matter. As a social exchange, the act of interviewing constitutes an experience of its own and thus has a great deal of unpredictability. The researcher anticipated being under constant pressure to make on-the-spot decisions that could produce positive, as well as negative consequences for the development of the interview.

Having this in mind, the interviews for this research were meant to be as friendly as professionalism permitted. An informal personal introduction initiated the conversation with the purpose of building the appropriate mood for the interview to take place and to locate the respondent into the research. The interviewer introduced herself, the university that she came from, and the topic of research. Specific remarks on the type and the purpose of the interview were given to set the role of both researcher and

respondent. Ethical considerations were discussed. Reassurance on the anonymity of the respondent's identity was given. Procedures concerning the validity of the material collected were clarified with the promise of the researcher to seek the informant's confirmation of the transcribed text. A range of technicalities was discussed, such as the amount of time expected for the interview to take place, interruptions, and the clarification of questions. In most cases, the interviews were conducted in the choice of place of the respondents. When this was not possible, another location was agreed.

The Organisation of the Data Gathered

The retrieval of meanings from the data involves a series of crucial decisions that will determine the final interpretation of the material gathered. How and why to make these decisions constitute the main problem of making sense of qualitative data.⁴⁶ Each research is unique and the best way to deal with it rests mostly on the researcher's discernment or experience.⁴⁷ There are, however, some techniques for data analysis that facilitate the preparation of qualitative data for posterior analysis, separating and classifying the relevant bits of meaningful information.⁴⁸ One of them is the process of 'coding', defined as:

An abbreviation or symbol applied to a segment of words – most often a sentence or paragraph of transcribed field notes – in order to classify the words. ... they are retrieval and organising devices that allow the analyst to spot quickly, pull out, and cluster all the segments relating to the particular question, hypothesis, concept, or theme.⁴⁹

There are a variety of approaches to coding qualitative data.⁵⁰ Concepts can be predetermined in accordance with the hypothesis to be tested, for example. Another possibility is to identify concepts simultaneously with the process of data gathering. A third option is a combination of styles when analytical stages follow the development of the research. Techniques for labelling the codes also vary. Numbers, letters or words can be used. Despite the diversity in procedures related to coding, it is relevant to note that ‘coding is part of the analytical process, but it does not constitute the analysis itself’.⁵¹ Its main purpose is to organise the information so that the researcher can reread what the data are saying.⁵²

In this research, the term ‘coding’ will have a meaning beyond the conventional view of assigning a label or tag to relevant pieces of text. This is so because the researcher, as a participant in the interviewing process, experienced difficulties in separating the process of coding from the act of interpreting.⁵³ Therefore, coding will rather be seen in terms of exploring and playing with ideas with the purpose of building conceptual categories.⁵⁴ This means that selecting bits of the texts in order to group them for comparisons will be done following a set of interrelated criteria that involves a combination of aspects. These aspects are not only related to the research framework but also to the investigator’s perceptions of the ‘data that cannot be accommodated within re-existing categories’.⁵⁵ Ian Dey explains ‘categorisation’ saying:

Creating categories is both a conceptual and empirical challenge; categories must be ‘grounded’ conceptually and empirically. That means they must relate to an appropriate analytic context, and be rooted in relevant empirical material. Categories, which seem fine ‘in theory’, are no good if they do not fit the data. Categories, which do fit the data, are no

good if they cannot relate to a wider conceptual context. We could say that categories must have two aspects, an internal aspect – they must be meaningful in relation to the data – and an external aspect – they must be meaningful in relation to the other categories.⁵⁶

Having this in mind, the process of making sense of the data was initiated with a full reading of the whole material collected. All interviews were listened to and the transcriptions read several times, until the wholeness of data was internalised and an overall sense of what was significant was achieved.⁵⁷ This meant not only recognising similarities and distinctions among the data gathered, but also the contradictions and subtle meanings. Following the reading of the whole material, broad categories were then extracted from the conceptual framework guiding this research.

The criteria for selecting an interview in particular were based on its meaningfulness and relevance to the knowledge intended. The same principles have also guided other interrelated decisions such as the selection of bits of the text to be highlighted. The sequence of the data presented did not necessarily follow the same order in which it appeared during the interview. As Amanda Coffey and Paul Atkinson reports,

The nature of qualitative data means that data relating to one particular topic are not found neatly bundled together at exactly the same spot in each interview (and field-notes usually have even less predictable organisation). The ability to locate stretches of data that, at least ostensibly, are ‘about’ the same thing is a valuable aspect of data management.⁵⁸

Based on these considerations, the most relevant bit of data were selected and the process of analysis initiated, through a detailed mapping of the most visible conceptual information found in a nearly line-by-line examination of the material gathered.⁵⁹

Endnotes to Appendix IV

¹ In this thesis, 'methodology' will be understood as a range of methods, techniques and procedures used in the process of data gathering. Louis Cohen and Lawrence Manion. 1989. Op. cit., p.42.

² The 'research interview' will be defined as "a two – person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information, and focused by him on content specified by research objectives of systematic description or explanation" In Louis Cohen and Lawrence Manion. 1989. Op. cit., p.307.

³ For more see Steinar Kvale. 1996. Op. cit., p. 95.

⁴ According to Lincoln and Guba, 'it is not possible to understand any phenomenon without reference to the context in which it is embedded'. Yvonna S. Lincoln and Egon G. Guba. 1985. Op. cit., p. 302.

⁵ Holstein and Gubrium argue that 'interviews are interpretatively active, implicating meaning-making practices on the part of both interviewers and respondent'. As such, 'interviews are reality-constructing, meaning-making occasions, whether recognised or not.' In James A. Holstein and Jaber F. Gubrium. 1995. *The Active Interview*. Thousand Oaks, CA: Sage, p. 4.

⁶ Steinar Kvale. 1996. Op. cit., Chapters 1 e 2.

⁷ John W. Creswell. 1994. Op. cit., p.150.

⁸ Moravcsik argues that when formal documented information is scarce, as in the case of science development in countries of the periphery, direct personal evaluation by uncommitted, institutionally (and ideologically) free, but expert individuals is required. In Michael J. Moravcsik. 1975. Op. cit., p. 9.

⁹ For more on the problematic aspect of the interview as a methodological tool, see Louis Cohen and Lawrence Manion. 1989. Op. cit., pp.317-320.

¹⁰ The primary aim of a researcher dealing with an interpretative approach should be to produce such a sound and consistent investigation that the whole matter of trustworthiness is intrinsic and self evident, with no need of further persuasion. Kvale says that:

Ideally, the quality of the craftsmanship results in products with knowledge claims that are so powerful and convincing in their own right that they, so to say, carry the validation with them, like a strong piece of art. In such cases, the research procedures would be transparent and the results evident, and the conclusions of a study intrinsically convincing as true, beautiful, and good. Appeals to external certification, or official validity stamps of approval, then become secondary. Valid research would in this sense be research that makes questions of validity superfluous.

In Steinar Kvale. 1996. Op. cit., p. 252.

¹¹ Steinar Kvale. 1996. Op. cit., p. 235.

¹² For more on this topic see Steinar Kvale. 1996. Op. cit., Chapter 13.

¹³ Louis Cohen and Lawrence Manion. 1989. Op. cit., pp. 317-320.

¹⁴ Charles F. Cannell and Robert L. Kahn. 1968. Interviewing. In *The Handbook of Social Psychology*, edited by Gardner Lindzey and Elliot Aronson. Reading, Massachusetts: Addison-Wesley Publishing Company, p.549.

¹⁵ Cohen and Manion define bias as a 'persistent tendency to make errors in the same direction, that is, to overstate or understate the 'true value' of an attribute'. Louis Cohen and Lawrence Manion. 1989. Op. cit., p. 318. For a study on the fallibility of the interview as a research method see Herbert H. Hyman, William J. Cobb, Jacob J. Feldman, Clyde W. Hart, Charles Herbert Stember. 1975. *Interviewing in Social Research*. 7th ed. Chicago: The University of Chicago Press.

¹⁶ Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., p. 550.

¹⁷ Ibid.

¹⁸ Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., pp.532-534.

¹⁹ Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., p. 535.

²⁰ Steinar Kvale. 1996. Op. cit., p. 231. For a discussion on generalization in qualitative researchers see also Yvonna S. Lincoln and Egon G. Guba. 1985. Op. cit., Chapter 5.

²¹ Steinar Kvale. 1996. Op. cit., p. 233.

²² Issues of trustworthiness based on validity, reliability and generalibility, however, have been questioned within a post-modern qualitative approach. Kvale argues that 'a contrasting humanistic view implies that every situation is unique, each phenomenon has its own intrinsic structure and logic. In a post modern approach the quest for universal knowledge, as well as the cult of the individually unique, is replaced by an emphasis on the heterogeneity and contextuality of knowledge, with a shift from generalisation to contextualisation.' Ibid. The main argument behind the claims of new concepts to deal with trustworthiness in qualitative researches is that the conventional way of testing it are based on a distinct rationale and, consequently, respond to a different research paradigm. Thus, new forms of dealing with trustworthiness are required in relation to interpretative inquiries. Within this perspective, more appropriate criteria have been proposed to verify trustworthiness issues. These can be defined as 'credibility', 'transferability', 'dependability', and 'confirmability'. See Yvonna S. Lincoln and Egon G. Guba 1985. Op. cit., pp. 293-328

For a discussion on generalisation related to case studies, see David H. Tripp. 1985. Case Study Generalisation: an agenda for action. *British Educational Research Journal* 11 (1): 33-43.

²³ There are various types of interviews and each one of them responds to different approaches and purposes. See Louis Cohen and Lawrence Manion. 1989. Op. cit., pp.312-320.

²⁴ Charles F. Cannell and Robert L. Kahn. 1968. Op.cit., p.553.

²⁵ Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., p.555.

²⁶ For more, see Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., pp. 553-571.

²⁷ Ibid.

²⁸ Charles F. Cannell and Robert L. Kahn. 1968. Op.cit., pp. 553-559.

²⁹ Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., pp. 555-558.

³⁰ Louis Cohen and Lawrence Manion. 1989. Op. cit., p.321.

³¹ Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., p.571.

³² Cohen and Manion say that:

open-ended questions have a number of advantages: they are flexible; they allow the interviewer to probe so that he may go into more depth if he chooses, or clear up any misunderstandings; they enable the interviewer to test the limits of the respondent's knowledge; they encourage co-operation and help establish rapport; and they allow the interviewer to make a truer assessment of what the respondent really believes. Open-ended situations can also result in unexpected or unanticipated answers which may suggest hitherto unthought-of relationships or hypotheses.

In Louis Cohen and Lawrence Manion. 1989. Op.cit., p.313.

³³ For more on this topic see I. E. Seidman. 1991. *Interviewing as Qualitative Research*. New York: Teachers College Press, Chapter 4.

³⁴ 'The selection of respondents is another crucial matter in research interviews. Concerns are not with representative aspects of the population of respondents, but rather with the quality and magnitude of their answers. A major criterion for appropriateness is whether the subject of the researcher's study is central to the participant's experience'. In I. E. Seidman. 1991. Op. cit., p.39.

³⁵ For more on the issue of assigning competence to respondents, see James A. Holstein and Jaber F. Gubrium. 1995. Op.cit., pp. 19-29.

³⁶ For example, although gender is not a relevant aspect to be considered in the selection of the respondents for this study, the researcher purposefully chose respondents of both sexes. Another aspect that influenced the final selection was the researcher's view that it was appropriate to have people that have worked in distinct sites, such as universities, government as well as autonomous researchers.

³⁷ Steinar Kvale. 1996. Op.cit., p.101.

³⁸ I. E. Seidman. 1991. Op.cit., p.45.

³⁹ 'Ethical issues involving scientific research in general are based on the idea that no matter what the purpose of the research is, the researchers' primary ethical concerns must be with those they study. This means that the participants of a study have the right to be protected from any risk or harm as a consequence of the information he/she has provided.' I. E. Seidman. 1991. Op. cit., p.49.

⁴⁰ According to the Principles of Professional Responsibility of the American Anthropological Association:

'In research, anthropologist's paramount responsibility is to those they study. When there is a conflict of interest, these individuals must come first. Anthropologists must do everything in their power to protect the physical, social, and psychological welfare and to honour the dignity and privacy of those studied (American Anthropological Association, 1983, p.1' cited in I. E. Seidman. 1991. Op. cit., p.49.

⁴¹ I. E. Seidman. 1991. Op. cit., p. 46.

⁴² Although ethical considerations were fully discussed in this research, written informed consent was not sought because the subject of the interviews did not expose or put the interviewees in risk. In fact some of the interviewees said that they did not consider it necessary to send them the transcription of their interviews.

⁴³ I. E. Seidman. 1991. Op. cit., pp.49-50.

⁴⁴ There are a series of recommendations for the interviewer to follow in order to promote goodwill and compliance from informants. According to the literature, 'the primary purpose of the interviewer's introductory remarks is to get the prospective respondent 'in role''. In Charles F. Cannell and Robert L. Kahn. 1968. Op. cit., p.578

⁴⁵ Ibid.

⁴⁶ Ian Dey. 1993. *Qualitative Data Analysis: a user-friendly guide for social scientists*. London: Routledge, pp. 94-95.

⁴⁷ See Paul Atkinson and Amanda Coffey. 1996. *Making Sense of Qualitative Data*. Thousand Oaks, CA: Sage Publications, Chapter 2.

⁴⁸ For a comprehensive reference see A. Michael Huberman and Matthew B. Miles and. 1984. *Qualitative Data Analysis*. Beverly Hills, CA: Sage Publications.

⁴⁹ A. Michael Huberman and Matthew B. Miles. 1984. Op. cit., p. 56.

⁵⁰ A. Michael Huberman and Matthew B. Miles. 1984. Op. cit., p. 57.

⁵¹ A. Michael Huberman and Matthew B. Miles. 1996. Op. cit., pp. 26-27.

⁵² Ibid.

⁵³ The literature recommends that coding should constitute an exercise of comparison and questioning in preparation for the final analysis. See, Anselm Strauss and Juliet Corbin. 1990. Op. cit., Chapter 6.

⁵⁴ Ian Dey. 1993. Op. cit., pp. 96-99.

⁵⁵ Ian Dey. 1993. Op. cit., p. 97.

⁵⁶ Ian Dey. 1993. Op. cit. p.96.

⁵⁷ In this regard, Ian Dey says that: "category development requires the analyst to become thoroughly familiar with the data, and it is worthwhile acquiring this familiarity at an early stage in the analysis". In Ian Dey. 1993. Op. cit., p.109.

⁵⁸ Paul Atkinson and Amanda Coffey. 1996. Op. cit., p. 35.

⁵⁹ Anselm Strauss and Juliet Corbin. 1990. Op. cit., p. 61