Supporting the Contribution of Higher Education Institutions to Regional Development

The OECD Programme on Institutional Management in Higher Education (IMHE)

Self-Evaluation Report

Northern Parana

Secretaria de Estado da Ciência, Tecnologia e Ensino Superior do Estado do Paraná

Universidade Federal do Paraná
Programa de Pós-Graduação em Desenvolvimento Econômico

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Curitiba, September 2006

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FOREWORD

This research was launched in the middle of the year 2005, with the specific purpose of evaluating the socioeconomic impact of those institutions of higher education within the state of Paraná which belong to the state government. The general goal was to search for clues for the elaboration of policies on science, technology and higher education within the state. It is our conviction that institutions of higher education (HEIs) have a significant role to play in formulating these policies.

The research itself was a product of an agreement signed between the Paraná State Secretariat of Science, Technology and Higher Education (SETI), the Foundation of the Federal University of Paraná and the Federal University of Paraná through its Post-graduate Program in Economic Development (PPGDE/UFPR).

The initial research project planned to cover all institutions of higher education belonging to the state government and intended to evaluate their impact on aggregate demand within the state (short-term impact) as well as long-term impact on the economy with regard to an increase in the state´s economic competitiveness. A portrait of the structure of the state HEIs systems of government was also within its scope. This proposal was presented to the State Secretary of Science, Technology and Higher Education, Prof. Aldair Tarciso Rizzi, and to the Council of Deans of Paraná State HEIs.

Each part of the research was to employ a specific methodology. The analysis of short-term impact was to follow a methodology that had been consecrated within the existing literature, that is, applying input-product analysis and models of applied general equilibrium. Analysis of long-term impact was to follow a methodology based the OECD/IMHE thematic review project entitled **Supporting the Contribution of Higher Education Institutions to Regional Development w**hich was launched in 2004.

Given the complexity and novelty of the topic, assistance from OECD Secretariat was solicited. In response to that request, the project coordinators were invited to participate in a seminar that took place in Karlstad, Sweden in October 2005. The conference brought together the regional coordinators from the range of countries involved in the OECD project. This was followed by another meeting which took place in OECD headquarters in Paris, which included the presence of the Vice-director of Education and the Director of the Center for Cooperation with non-member nations, in which Paraná state's secretary Aldair Rizzi formalized the request for OECD assistance for the implementation of the project. And this was how Brazil, through the state of Parana's involvement, become the only non-OECD member nation to participate in the project.

From the moment that the state of Paraná began to take part in the OECD project, its initial proposal required re-formulation. The analysis of short-term impact and of governing structures had to be carried out separately and taking all of the state's HEIs into consideration. The two reports resulting from that stage of the project have already been presented and disseminated. Analysis of long-term impact had to undergo modification, since it was now to follow the common methodology applied to all the regions analyzed by the OECD. Given the difficulty in including all the state-run HEIs in such an analysis, the universities pertaining to the Londrina-Maringá axis, the State University of Londrina (UEL) and the State University of Maringá (UEM) were chosen. From the perspective of the state of Paraná, this region would then serve as a

pilot study which would then be applied outside the OECD project - using the same methodology - to the other regions of the state and their HEIs.

Once these reformulations were approved by the SETI and by the Dean's Council, these two entities became members of the regional steering committee, presided over first by Secretary Aldair Rizzi and later by Secretary Lygia Pupatto. Coordinators for working groups in the HEIs of the pilot region were designated, one at the UEL and the other at the UEM, with general coordination at a regional level under UFPR supervision.

The state of Paraná, upon its entrance into the OECD project, was thus given attention both for the perfecting of the results that had been sought through its initial study as well as by the fact that it had now become a part of an international network for sharing ideas and practices that would permit its access to and participation in sources of information previously unknown within the country. Upon becoming part of this OECD project as the only state of a South American country to be included, the Paraná state government –through the SETI – thereby received a significant gain in terms of support for the elaboration and execution of its policies in the areas of science, technology and higher education.

The methodology for the realization of the project included five stages. The first was the presentation of what had been planned to members of pilot-region HEIs and to other regional actors. For these purposes, seminars were organized in Londrina and Maringa, involving the presence of HEIs members and regional actors from the productive sector, politicians, representatives of private institutions of higher education, etc.

During the second stage, information was collected by the universities themselves, as an exercise in self-evaluation. For these purposes, a questionnaire using the basic OECD methodology[1] was applied. This information has been used in the elaboration of the present report.

The third stage was made up of the research project coordinators' visit with the representative regional actors. The latter had been previously chosen by the pilot-region HEIs (UEL and UEM) working group coordinators. The goal of interviews carried out on this occasion was to acquire knowledge of the expectations and experiences of these social actors in relation to the respective HEIs.

The central focus of the fourth stage were the workshops held at the two state universities, the UEM and the UEL, with the participation of members of the academy and the regional community in putting together a SWOT analysis (strengths, weaknesses and opportunities and threats), through the main points on a questionnaire that was filled out by regional HEIs. Both workshops were carried out with SEBRAE support. On this occasion, two representatives of the Peer Review Team were present on mission: Prof. José-Gines Mora and Mr. Francisco Marmolejo.

Report-writing was the last stage and was carried out by the project regional coordinators. The self-evaluation report was sent out to the HEIs' working group coordinators and, through them, to other regional actors. This report was the document that then served as the groundwork for the Peer Review Visit.

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[1] The questionnaire was developed by the working group that elaborated the self-evaluation instruments for the region of Valencia, Spain. It was based on the Aide-memoire for Regions Participating in the OECD project **Supporting the Contribution of Higher Education Institutions to Regional Development, OECD,** February 2005.

The present document is the output of a collective effort that has depended on the collaboration of a wide range of persons and institutions, not all of whom are mentioned herein. Thus, it is much more than a reflection of personal points of view. It is our expectation that this self-evaluation of the Northern Paraná region on the role of its institutions of higher education in providing support for regional development aids in understanding and finding solutions for the problems discussed throughout. We also hope that the experiences of the state of Paraná may contribute to a deepening of international debate on the role of institutions of higher education in regional development, within the context of a knowledge-based society.

ABBREVIATIONS AND ACRONYMS

ACRONYMS	PORTUGUESE	ENGLISH
ACIL	Associação Comercial e Industrial de Londrina	Commerce and Industry Association of Londrina
ACIM	Associação Comercial e Industrial de Maringá	Commerce and Industry Association of Maringá
ADETEC	Associação de Desenvolvimento Tecnológico de Londrina e Região	Association for Technological Development in Londrina and its Region
AMUSEP	Associação dos Municípios do Setentrião Paranaense	Association of Municipalities from the Northern Region of Paraná
ASP	Assessoria de Planejamento	Office of Planning
CAD	Conselho de Administração	Administrative Council
CAPES	Coordenação de Aperfeiçoamento de Pessoal de Nível Superior	Federal Agency for Training and Development of Higher Education Academic Staff
CCA	Centro de Ciências Agrárias	Center of Agricultural Sciences
CCB	Centro de Ciências Biológicas	Center of Biological Sciences
CCE	Centro de Ciências Exatas	Center of Exact Sciences
CCH	Centro de Ciências Humanas, Letras e Artes	Center of Human Sciences, Letters and Arts
CCS	Centro de Ciências da Saúde	Center of Health Sciences
CEAD	Centro de Educação à Distância	Centers for Education at a Distance
CEE	Conselho Estadual de Educação	State Education Council
CEP	Conselho de Ensino e Pesquisa	Teaching and Research Council
CES	Coordenadoria de Ensino Superior	Higher Education Coordinating Committee
CESUMAR	Centro Universitário de Maringá	Maringá University Center
CIEE	Centro de Integração Empresa-Escola	Center for School-Business Integration
CNE	Conselho Nacional de Educação	National Council of Education
CNPq	Conselho Nacional de Desenvolvimento Científico e Tecnológico	Nacional Council for Scientific and Technological Development
CODEL	Companhia de Desenvolvimento de Londrina	Londrina's Development Corporation
CODEM	Conselho de Desenvolvimento de Maringá	Maringá Development Council
CODINES	Conselho de Dirigentes de Instituições de Ensino Superior	Council of Higher Education Institutions' Presidents
COPATEM	Comissão Permanente de Assessoramento ao Desenvolvimento de Inventos	Permanent Commission for Advising the Development of Products
COU	Conselho Universitário	University Council
CSD	Coordenadoria de Serviços e Desenvolvimento Regional	Coordination of Services and Regional Development
CTC	Centro de Tecnologia	Center of Technology
DCU	Departamento de Cultura	Department of Culture
DITT	Divisão de Informação e Transferência de Tecnologia	Division of Information and Transfer of Technologies

EAJ	Escritório de Assessoria Jurídica	Bureau of Legal Counsel
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária	Brazilian Institute for Agricultural Research
EN	Escritório de Negócios	Business Office
FADEC	Fundação de Apoio ao Desenvolvimento Científico e Tecnológico	Agency for the Support of Technological and Scientific Development
FAUEL	Fundação da Universidade de Londrina	Foundation of the State University of Londrina
FIEP	Federação das Indústrias do Paraná	Federation of Industries of the State of Paraná
FINEP	Financiadora de Estudos e Projetos	Federal Financing Agency for Studies and Projects
FJP	Fundação João Pinheiro	João Pinheiro Foundation
FPM	Fundo de Participação dos Municípios	Fund for Municipal Participation
GDP	Produto Interno Bruto (PIB)	Gross Domestic Product (GDP)
GEMA	Grupo de Estudos Multidisciplinares do Ambiente	Multi-disciplinary Study Group on the Environment
GESA	Grupo de Estudos Socioambientais	Socio-environmental Study Group
HDI-M	Índice de Desenvolvimento Humano Municipal (IDH-M)	Municipal Human Development Index
HEIs	Instituições de Ensino Superior (IES)	Higher Education Institutions (HEIs)
IAPAR	Instituto Agronômico do Paraná	Paraná Institute of Agronomy
IBGE	Instituto Brasileiro de Geografia e Estatística	Brazilian Institute of Geography and Statistics
ICMS	Imposto de Circulação de Mercadorias e Serviços	Tax on the Circulation of Commodities and Services
IDR	Instituto para o Desenvolvimento Regional	Regional Development Institute
IEL	Instituto Evaldo Lodi	Evaldo Lodi Institute
INPI	Instituto Nacional de Propriedade Industrial	National Institute of Industrial Property
INTUEL	Incubadora Internacional de Empresas de Base Tecnológica	the UEL International Incubator for Technologically-Based Firms
IPARDES	Instituto Paranaense de Desenvolvimento Econômico e Social	Paraná Institute for Economic and Social Development
IPEA	Instituto de Pesquisa Econômica Aplicada	Institute of Applied Economic Research
IPESE	Instituto de Pesquisas Socioeconômicas	Institute for Socio-economic Research
ITAM	Instituto Tecnológico de Agricultura e meio Ambiente	Technological Institute for Agriculture and Environment
ITEDES	Instituto de Tecnologia e Desenvolvimento Social	Institute for Technology and Social Development
ITM	Instituto Tecnópole de Maringá	Maringá Technopolis Institute
LDB	Lei de Diretrizes e Bases	National Education Law
LPM	Laboratório de Produção de Medicamentos	laboratory for medication production
MBA	-	Master of Business Administration

MCT	Ministério de Ciência e Tecnologia	Federal Ministry for Science and Technology
MEC	Ministério da Educação	Federal Ministry of Education
MERCOSUR	Mercado Comum do Sul (MERCOSUL)	Southern Common Market
NEAD	Núcleo de Educação à Distância	Nucleus of Education at a Distance
NUPÉLIA	Núcleo de Pesquisa em Limnologia, Ictiologia e Aqüicultura	Nucleus for Research on Limnology, Ichthiology and Aquiculture
OTRPC	Órgão de Transferência dos Resultados de Pesquisa para a Comunidade	Office for Transference of Research Outcomes to the Community
PDER	Programa de Desenvolvimento Regional	Regional Development Program
PDI	Plano de Desenvolvimento Institucional	Plan for Institutional Development
PEI	Plano Estratégico Institucional	Institutional Strategic Plan
PEN	Pró-Reitoria de Ensino	Dean's Office of Teaching
PNUD	Programa das Nações Unidas para o Desenvolvimento	United Nations Development Program
PPGDE	Programa de Pós-Graduação em Desenvolvimento Econômico	Post-Graduate Program in Economic Development
PPPI	Projeto Político-Pedagógico Institucional	Institutional Political-Pedagogic Project
PREAD	Pólos Regionais de Educação à Distância	Regional Offices of Education at a Distance
PROEX	Pró-Reitoria de Extensão	Dean's Office of Outreach
PROPLAN	Pró-Reitoria de Planejamento	Dean's Office of Planning
PROPPG	Pró-Reitoria de Pesquisa e Pós-Graduação	Dean's Office of Research and Post-Graduate Programs
R&D	Pesquisa & Desenvolvimento (P&D)	Research & Development
REPARTE	Rede Paranaense de Incubadoras e Parques Tecnológicos	Paraná Network of Incubators and Technological Parks
RMC	Região Metropolitana de Curitiba	Greater Curitiba Metropolitan Area
SEBEC	Serviço de Bem Estar da Comunidade Universitária	Service for University Community Well-being
SEBRAE	Serviço Brasileiro de Apoio às Micro e Pequenas Empresas	Brazilian Agency for Small and Medium Size Companies
SESU	Secretária de Educação Superior	Secretariat of Higher Education
SETI	Secretaria de Estado da Ciência, Tecnologia e Ensino Superior	State Secretariat for Science, Technology and Higher Education
SINAES	Sistema Nacional de Avaliação da Educação Superior	National System for Evaluation of Higher Education
SUS	Sistema Unificado de Saúde	Brazilian National Public Health System
SWOT	Pontos fortes, Pontos fracos, Oportunidades e Ameaças	Strengths, Weaknesses, Opportunities and Treats
TECPAR	Instituto de Tecnologia do Paraná	Technological Institute of Paraná
UEL	Universidade Estadual de Londrina	State University of Londrina
UEM	Universidade Estadual de Maringá	State University of Maringá
UEPG	Universidade Estadual de Ponta	State University of Ponta Grossa

	Grossa	
UFPR	Universidade Federal do Paraná	Federal University of Paraná
UGF	Unidade Gestora do Fundo Paraná	Management Unit of the Paraná Fund
UNESPAR	Universidade do Estado do Paraná	State University of Paraná
UNICENTRO	Universidade Estadual do Centro-Oeste	State University of Central West
UNIOESTE	Universidade Estadual do Oeste do Paraná	State University of West Paraná
UNOPAR	Universidade Norte do Paraná	University of Northern Paraná

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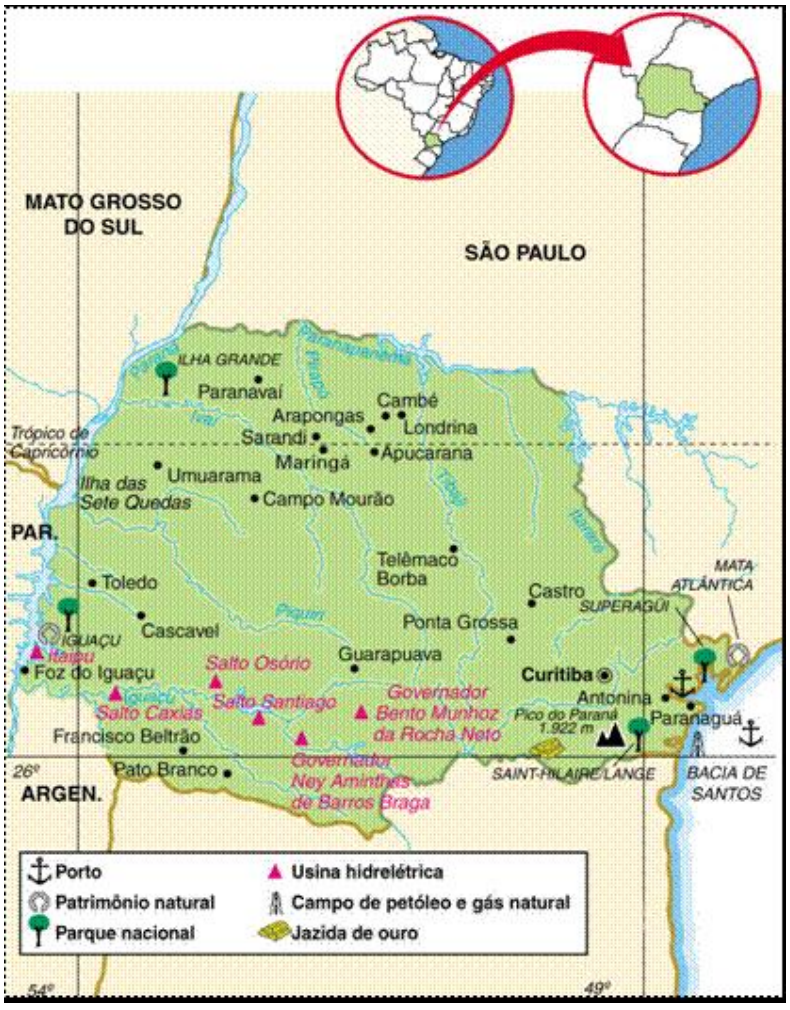
CHAPTER 1 THE STATE OF PARANA WITHIN THE BRAZILIAN FEDERATION

1.1 Geographic Location

The state of Paraná belongs to the Brazilian federation. Situated in the southern of the country, it shares its northern border with the state of São Paulo (the country's most developed state); its southern boundaries with the state of Santa Catarina and its northeastern border with the state of Mato Grosso do Sul. Paraguay lies on its western border and Argentina on the southwestern one (see figure 1.1). Its territory covers 199,554 square kilometers, which corresponds to two thirds of Italy and makes up 2.35% of all Brazilian territory. The state's GDP is equivalent to 6% of the total Brazilian GDP.

Figure 1.1 The Brazilian State of Paraná



According to IBGE (Instituto Brasileiro de Geografia e Estatística, or Brazilian Institute of Geography and Statistics), the population of Paraná is approximately 9,563,458 inhabitants, thus making up 5.45% of Brazil's population total. It is highly concentrated in the Greater Curitiba, the greater metropolitan area (RMC) surrounding the state's capital city. The GDP of the RMC experienced accelerated growth over the last decade, due to the large influx of

private investment, led by the automobile industry. Today it represents close to 38% of the Parana state GDP. The North Central meso- region of the state that is the object of the present study represents about 16% of the state's GDP.

The state of Paraná has a history of recent colonization. During the 16th century, when the colonization of Brazil began, its population was restricted to the coastal zones and the region where the state's capital is located today. The northern region of the state did not become the object of intensive occupation until 1940, as a consequence of the expansion of the coffee plantations from São Paulo. It is a well-known fact that the coffee crop was the motivating force behind the development of the state of São Paulo, beginning in the mid-nineteenth century. Until its recent past Parana's northern region was one of the most prosperous areas of the state. The occupation of its southeastern region began only during the second half of the last century, as a result of the influx of immigrants from the southernmost state of Rio Grande do Sul where family-based subsistence agriculture still prevailed.

In effect, the settlement of Paraná occurred via three different sources of migration, representing movement from different parts of the country and each occurring at a particular historical moment. This fact generated a complex problem for state administration, since on several occasions there were attempts at emancipation made, originating in different parts of the state's territory. Put in other terms, the way in which occupation was carried out became a force that worked against the creation of a territorial identity. Thus, we can say the historical occupation of the state ran against the grain of state cohesiveness and identity.

Paraná has frequently been characterized as an agricultural state, and over the last 15 years one of the country's most modern agricultural systems has emerged therein. Given the fact that Brazil is an agricultural power, with levels of productivity that have made it into an international standard of reference, we can also assert that Paraná has one of the world's most dynamic agricultural sectors. On the other hand, the state capital city of Curitiba's industrialization process – together with other cities that are part of the greater metropolitan area – took place during the 1970s. Beginning in traditional sectors linked to wood and food industries, the process then turned toward more modern and dynamic sectors of the economy, with emphasis on the metal-mechanical sectors and the production of electrical and electronic material. In general terms, these new industries were extensions of national and multi-national firms that spread outward from the Greater São Paulo metropolitan region. In more specific terms, we can mention the case of the Volvo firm, which set up plants in the Greater Curitiba during the seventies, and the establishment of other firms, such as Renault and Audi-VW, which during the nineties led to the region's consolidation as a center of the automobile industry. In addition to local factors of attraction, the state government's expansionist policies of fiscal incentives were an important factor contributing to the RMC's industrialization.

In synthesis, the state of Paraná can be characterized by the co-existence of two large economic segments: one under the aegis of agro-business and the other of the urban-industrial economy[2].

The Northern Region of the State of Paraná and the North Central Meso-region

For the purposes of institutional statistics, Brazil is divided into geographic meso-regions. These meso-regions are in turn subdivided into geographic micro-regions. The smallest territorial unit in the composition of these sub-divisions is the municipality, which constitutes a political and administrative entity. Thus, a set of municipalities come together to form a micro-region and a series of micro-regions form a meso-region. Each state of the Brazilian federation is subdivided into meso-regions. There are no meso-regions that belong to more than one state or municipalities that belong to more than one micro-region.

Macro-regions are defined according to three dimensions:

[2] Rolim (1996).

"The social process, as determinant, the natural setting, as a conditioning factor, and the network of communications and places, as an element of spatial articulation. These three dimensions make it possible for the space that has been defined as a meso-region to acquire a regional identity. This identity is a reality constructed by the society that has formed there" (IBGE, 1990, p.8).

Micro-regions, in turn, have been defined through specificities regarding productive, agro livestock, industrial, mining and fishing structure. The idea of productive structure that is implemented here includes, beyond production itself, commercialization and consumption in both urban and rural milieu.

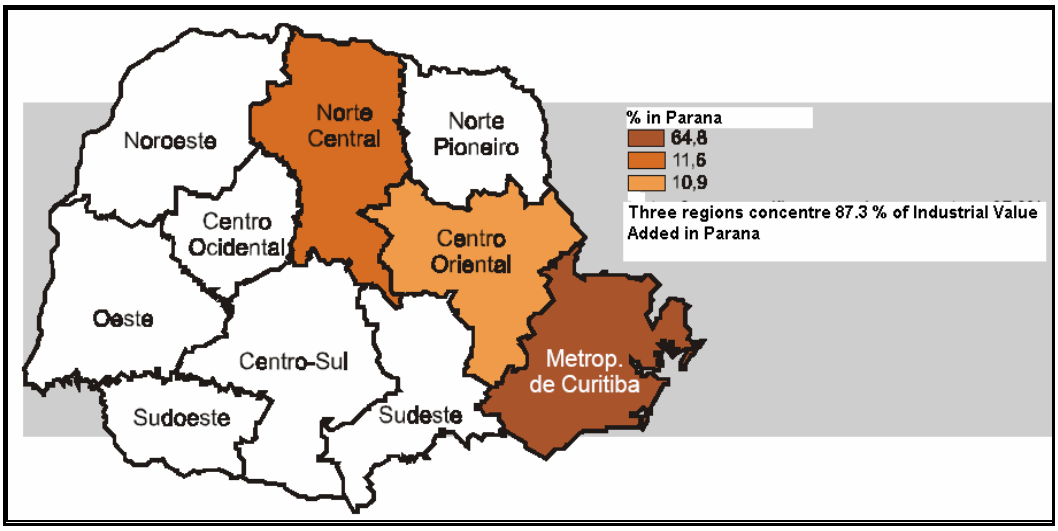
The state of Paraná is subdivided according to these criteria and the Meso-region of North Central Paraná constitutes one of its ten meso-regions (figure 1.2). Table 1.1 presents some general information that enables us to characterize these macro-regions. It should be noted that the Greater Curitiba Metropolitan area holds almost one third of the entire population and generates almost half of aggregate state fiscal value. The North Central region occupies second place.

Table 1.1 Selected Indicators for the Meso-regions of the State of Paraná 2000

Meso-regions	Number of Municipalities	Total Population	Rate of Population Growth (1991-200)	Degree of Urbanization	Participation in the Aggregate State Fiscal Value	Rate of Unemployment (%)
Northeastern	61	641,084	-0.25	77.3	3.7	10.7
Western Central	25	346,648	-1.24	72.6	2.2	13.7
North Central	79	1,829,068	1.24	88.4	14.3	12.4
Northern Pioneer	46	548,190	-0.15	75.1	2.8	11.9
Central Eastern	50	623,356	1.46	81.2	7.6	14.1
Western	14	1,138,582	1.28	81.6	13.8	12.8
Southeastern	37	472,626	-0.13	59.9	3.5	8.4
Southern Central	29	533,317	0.69	60.9	3.9	11.5
Southeastern	21	377,274	0.89	53.6	2.3	9
RMC	37	3,053,313	3.13	90.6	45.9	14.7
Paraná	399	9,563,458	1.4	81.4	100	12.8

Source: IBGE and SEFA.

Figure 1.2 The Ten Meso-regions of the State of Paraná



Source: APUD IPARDES, 2003. 1) Northeastern Paraná Meso-region; 2) Western Central Meso-region; 3) Northern Central Meso-region; 4) Northern Pioneer Meso-region; 5) Central Eastern Meso-region; 6) Western Meso-region; 7) Southeastern Meso-region; 8) Southern Central Meso-region; 9) Southeastern Meso-region; and 10) Greater Curitiba Metropolitan Area Meso-region.

There is no clear consensus as to what exactly constitutes the "Northern Paraná". Nonetheless, it can be said that this region refers to the area that is dynamically located along the Londrina-Maringá axis, covering a vast area that extends over at least three meso-regions: Northwestern Paraná, North Central Paraná, and the Northern Pioneer Meso-region. Some would like to include the territory of the Central Eastern region as well.

Figure 1.3 - The Londrina- Maringa Axis Area of Influence

Source: Microsoft Atlas Encarta.

The most important of the meso-regions that make up the Northern Region of the State is the Northern Central region, which we shall focus on in the present section. From here on it will be referred to simply as Northern Central. It can be considered the second-most important region of the state. The two other major cities in Parana after Curitiba, i.e. Londrina and Maringa are located in this region. These cities are host to the major state universities, the Universidade Estadual de Londrina (UEL) and the Universidade Estadual de Maringá (UEM).

The Northern Central Meso-region is located within a radius of 120 kilometers that links the cities of Londrina and Maringá. It constitutes a pole of attraction for other areas of the North of Paraná as well as neighboring areas in the states of São Paulo and Mato Grosso do Sul (see figure 1.3). A population of more than 3 million inhabitants is concentrated in this area

Notwithstanding the importance of the entire northern region, our study focuses on the analysis of Londrina and Maringá, the two main cities of the Northern Central region. Together they cover an area of 24, 419 square kilometers. During the seventies, the Northern Central was responsible for more than 25% of the total value added of the state. Today, it is responsible for only 15%. This loss of relative economic importance can be explained by the high rates of industrial growth in the Greater Curitiba Metropolitan area, which became a locus in the process of the de-centralization of Brazilian industry[3]. Nonetheless, in absolute terms, and due the heavy expansion of its agricultural productivity, the Northern Central has been demonstrating high levels of economic development in recent years, although the dynamism of the past has waned a bit.

This area was colonized and developed through coffee culture. Adverse climate conditions caused severe damage to the coffee crop during the mid-seventies and as a result, coffee plantations almost disappeared from the region. They were largely replaced by other crops, soybean in particular, and by animal husbandry which quickly turned the Northern Central into one the country's most important agricultural areas. The region and the Londrina-Maringá axis in particular, have a noteworthy tradition in the organization of large agricultural cooperatives. It is also the region that hosts the state's second largest industrial concentration. These industries are intimately linked to agro-business and to urban markets. Activities linked to furniture and textile manufacturing, food, plastics and mechanical industries are among the most salient. It is also important to emphasize that given growing rates of urbanization, the service sector is becoming the most significant sector of the economy along the Londrina-Maringá axis.

Comparing the North Central to the Greater Curitiba Metropolitan Area (RMC) meso-region, we note that both maintain high levels of urbanization. The RMC, however, houses more than 30% of the state's population (see table 1.2). In relation to the participation of its economically active population, data is similar to that regarding the participation of the state's population as a whole, yet there is a significant different as far as the RMC meso-region's participation in the state's GDP is concerned. The relative weight of the RMC is in this regard almost four times that of the Northern Central. Another important aspect is its important population structure and high levels of urbanization.

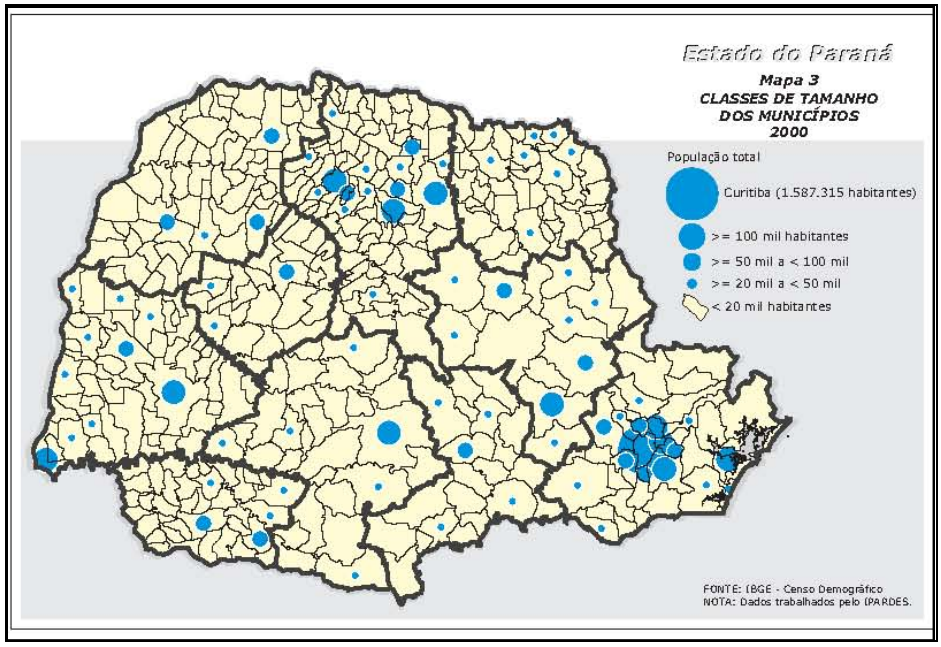
The Northern Central region is situated approximately 600 kilometers from the city of São Paulo and more than 1,500 kilometers from the country's capital, the federal district of Brasilia. There is a good network of railways and both Londrina and Maringá have airports providing regular flights to all the major cities of the nation. They are within a mere one hour flight time from either São Paulo or Rio de Janeiro, from where connecting flights to the rest of Brazil and the world are available.

Figure 1.4 shows the distribution of the state's population according to categories of urban size. In addition to the RMC urban concentration, another urban concentration in the state can be found in the North Central, particularly along the Londrina-

[3] Almost 65% of Parana's industrial sector's fiscal value added is generated by the RMC, while the Northern Central contributes 11.6%.

Curitiba axis. The major cities of the North Central can be located within a category spanning 100,000 to 500,000 inhabitants. Londrina is the largest, followed by Maringá. These cities belong to the category of sub-metropolitan centers (e.g. Londrina) or regional capitals (e.g. Maringá)[4].

Figure 1.4 - Classification of municipalities in the state of Paraná by size



Source: APUD IPARDES, 2003.

1.2 Demographic situation

According to the latest Population Census, the population of the Northern Central meso-region makes up close to 19% of the population of the state of Paraná and 1.1% of Brazil's total inhabitants (see table 1.2). This meso-region claims the second highest level of urbanization in the state, after the Greater Metropolitan area of Curitiba (RMC). On the other hand, it is the only one of the meso-regions of the larger Northern area that has kept growing in population over the last two decades, although it is not among the regions of greatest population growth when the entire state of Paraná is considered (see figure 1.5).

As we have already mentioned, northern Paraná has been undergoing a process of population loss since the 1970s. However, the Northern Central meso-region has received a large part of this population as well as part of the influx of migrants coming from other parts of the state. Although the largest migratory flows have been directed toward the greater Curitiba metropolitan area, the Northern Central can be considered the state's second major center receiving migrants. Figure 1.6 illustrates this process.

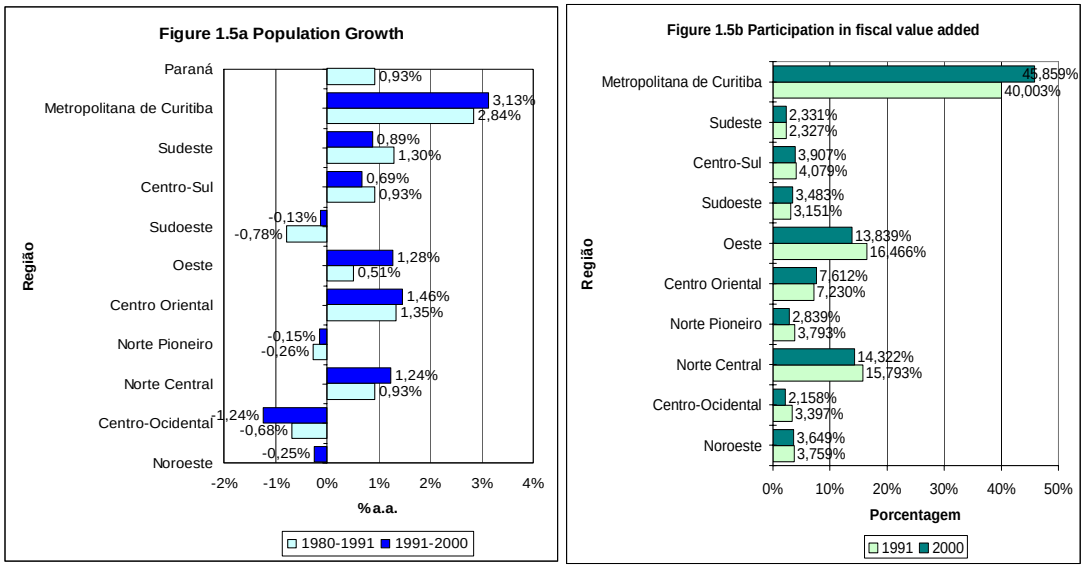
Table 1.2 Population Figures for the State of Paraná and for Brazil, 2000

[4] IBGE/MHU (1987), A região de Influência das Cidades, Rio de Janeiro.

AREA	POPULATION			
	Total Population	Degree of Urbanization (%)	Population of Paraná (%)	Population of Brazil (%)
Northern Central	1,829,068	88.4	19.1	1.1
RMC	3,053,313	90.6	31.9	1.8
Paraná	9,563,458	81.4	100.0	5.6
Brazil	169,799,170	81.3		100.0

Source: IBGE, 2000.

Figure 1.5 Population growth and participation in value added at the state level 1991/2000



Source: Ipardes, 2004.

Figure 1.6 Paraná state internal migration flows 1986/1991

Source: APUD, Kleinke et alli (1999)[5]

This is, however, a process that directs population toward relatively few municipalities. Although the region contains 71 municipalities, 70% of the Northern Central meso-region's total population was concentrated in only 10 of them, located along the Londrina-Maringá axis (see table 1.3).

Table 1.3 - Total population of the main municipalities of the Northern Central meso-region

Municipality	Total, 2000	Total (%)
Londrina	447,065	25.6%
Maringá	288,653	16.5%
Apucarana	107,827	6.2%
Cambé	88,186	5.1%
Arapongas	85,428	4.9%
Sarandi	71,422	4.1%
Rolândia	49,410	2.8%
Ibiporã	42,153	2.4%
Ivaiporã	32,270	1.8%
Mandaguari	31,395	1.8%
Total	1,243,809	71.1%

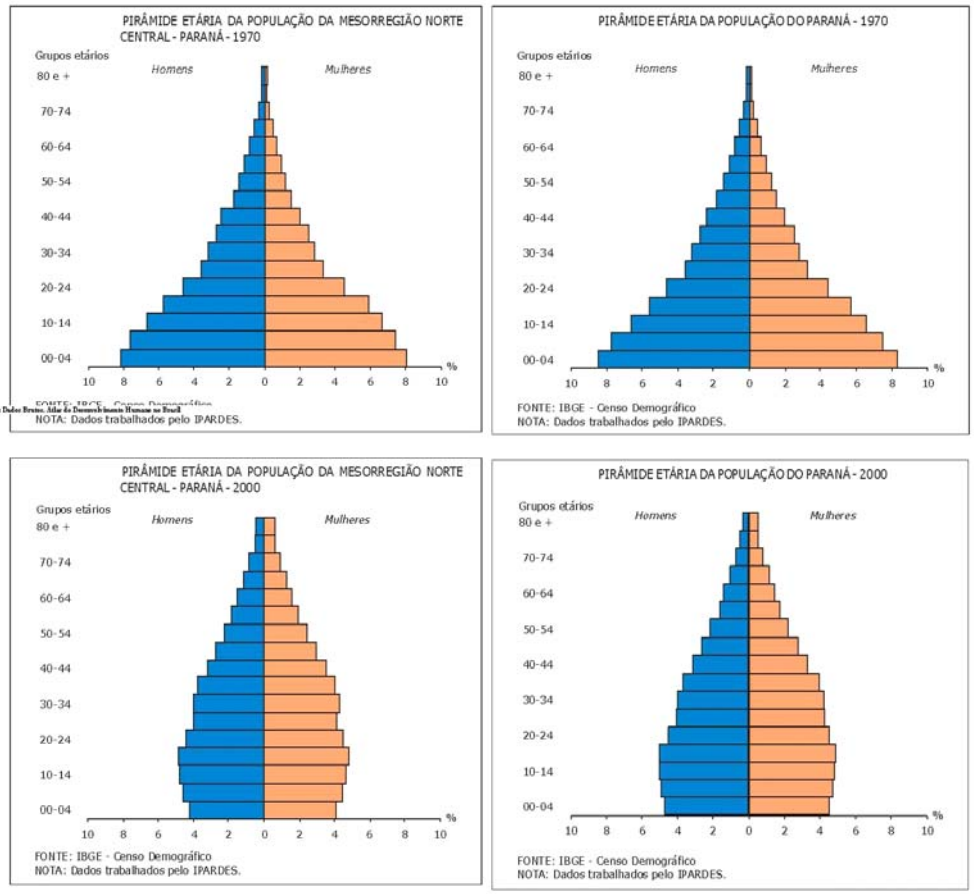
Source: IPARDES, 2004.

Figure 1.7 shows the transformations in the age structure of t state of Paraná and the Northern Central meso-region. The final result for the Northern Central meso-region is very similar to that of Paraná as a whole. In both cases we observe aging population with its respective pressure-relieving effects on lower age groups. In terms of education, this has lessened the pressure on the earlier educational levels, but has increased pressure at the higher end, as is particularly the case regarding university education.

[5] Kleinke, M.L.U.; Deschamps, M.V.; Moura, R Movimento migratório no Paraná (1986-91 e 1991-96) origens distintas e destinos convergentes. Revista Paranaense de Desenvolvimento, Curitiba, n. 95, jan/abr. 1999.

This same phenomenon can be observed in table 1.4, which summarizes gross rates of school attendance of 71 municipalities. Although the values cover a wide spread, there is certain evidence that basic education attendance is close to total. Furthermore, a large increase in secondary school attendance can also be observed. The difference between gross rates of attendance for higher education and the percentage of people between the ages of 18 and 22 who have access to higher education is probably indicative of a larger demand for higher education among people who are more than 22 years of age.

Figure 1.7 – Comparison between the Age Structures of Northern Central Meso-region and the State of Paraná, 1970-2000



Source:APUD, IPARDES (2004)

Table 1.5 presents values for the main municipalities in the meso-region and values for the states of the southern region as well as for Brazil as a whole. Our first observation is that rates for the southern region are considerably higher than national rates. Within the region, the highest rates belong to the state of Rio Grande do Sul, whereas Paraná shows the least favorable results. When we compare the main municipalities of the Northern Central region, we see that many of them do far better than the national average and higher even than the values for the southern region. This is particularly the case for Londrina and Maringá, which are not coincidentally the home of the two largest state universities.

Table 1.4 Educational population statistics for 71 municipalities making up the Northern Central Meso-region 1991/2000

	Gross Rate of Elementary School Attendance (1)		Gross Rate of Secondary School Attendance (2)		Gross Rate of Higher Education Attendance (3)		% of people between 18 a 22 years old who have access to Higher Education (4)	
	1991	**2000**	**1991**	**2000**	**1991**	**2000**	**1991**	**2000**
Mean	100.95	114.99	32.49	94.46	7.00	2.76	2.85	4.73
Median	100.89	115.75	30.66	94.14	5.59	1.87	2.15	3.79
Mode	Nd	116.46	nd	84.78	nd	0.08	0.74	2.53
Standard Deviation	8.45	4.25	14.63	15.41	4.84	2.75	2.79	3.81
Range	46.96	23.17	64.66	80.70	22.18	11.36	11.62	18.95
Mínimum	72.07	99.79	5.73	47.80	0.48	0.00	0.01	0.10
Máximum	119.03	122.96	70.39	128.50	22.66	11.36	11.63	19.05
Significance level (95,0%)	2.00	1.01	3.46	3.65	1.15	0.65	0.66	0.90

Source: Atlas do Desenvolvimento Humano no Brasil, 2003.
(1) Percentage of persons who attend primary school in relation to the total population between 7 and 14
(2) Percentage of persons who attend high school in relation to the total population between 15 and 17.
(3) Percentage of persons who attend higher education in relation to the population between 18 and 22 years.
(4) Percentage of persons between 18 and 22 who attend or have finished a higher education.

This superior performance revealed by educational statistics is also confirmed in the general indicators for social well-being for the Northern Central meso-region. Several Brazilian institutions, the IPEA and the FJP, and international organizations, such as the UNDP, have adopted the Human Development Index for the analysis of Brazilian data and have calculated a Municipal Human Development Index (HDI-M). Although this indicator does not allow for international comparisons, it is possible to obtain a reasonable comparison of developmental conditions among the 5507[6] existing Brazilian municipalities. The data presented below in figure 1.8 shows that the Northern Central can be considered to represent a situation of privilege, occupying almost the same position as the Greater Curitiba. Only about 25% of the total population of the meso-region resides in municipalities with HDI-M below the national average. Although this index has some flaws, it may be considered a reasonable indicator of the quality and conditions of life in the community on the whole. We are able to affirm that within this region, the conditions of living are considerably superior to those that prevail in the majority of the state's meso-regions.

[6] During the period in which this study was being carried out, today, the number is 5562.

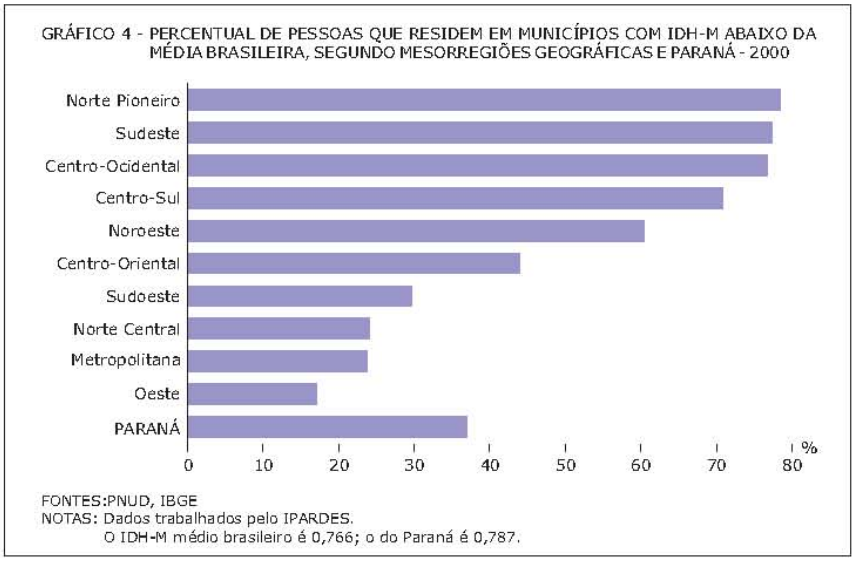
Table 1.5 Values of population education statistics for major municipalities (*)

Municipalities	Gross Rate of Elementary School Attendance (1)		Gross Rate of Secondary School Attendance (2)		Gross Rate of Higher Education Attendance (3)		% of people between 18 a 22 years old who have access to Higher Education (4)	
	1991	**2000**	**1991**	**2000**	**1991**	**2000**	**1991**	**2000**
Londrina	106,57	116.69	50.2	107.93	20.44	34.07	9.9	16.34
Maringá	114.05	115.75	53.79	122.59	22.66	40.15	11.63	19.05
Apucarana	107.72	115.52	38.35	99.31	16.22	19.39	10.16	10.53
Cambé	108.77	117.84	32.92	102.51	6.04	16.37	3.32	7.43
Arapongas	106.56	115.89	40.79	100.31	13.3	20.07	8.33	11.67
Sarandi	99.62	121.31	24.16	80.12	1.13	3.59	0.78	1.18
Rolândia	101.56	117.6	37.06	109.43	12.4	24.62	7.01	12.4
Ibiporã	100.69	115.63	36.79	103.44	8.78	16.79	5.27	8.8
Ivaiporã	99.94	119.04	33.82	116.39	5.02	17.76	2.31	8.68
Mandaguari	109.76	122.96	40.25	109.56	12.65	20.84	7.23	10.24
States of South Region and Brazil								
Paraná	101.77	115.00	35.77	96.36	10.14	22.58	4.99	10.23
Rio Grande do Sul	103.16	120.17	44.72	84.49	16.58	29.04	6.76	12.14
Santa Catarina	97.76	120.12	39.85	84.30	10.72	26.30	4.97	11.46
Brazil	**99.77**	**124.61**	**36.73**	**77.34**	**10.12**	**17.47**	**4.45**	**7.58**

Source: Atlas do Desenvolvimento Humano no Brasil, 2003.
(*) Represented 71,2% of Meso-region's population in 2000.
(1) Percentage of persons who attend primary school in relation to the total population between 7 and 14
(2) Percentage of persons who attend high school in relation to the total population between 15 and 17.
(3) Percentage of persons who attend higher education in relation to the population between 18 and 22 years.
(4) Percentage of persons between 18 and 22 who attend or have finished a higher education.

If for the aggregate of meso-regions these values are positive, the same cannot be said for the values obtained individually by the municipalities. Table 1.6 demonstrates that although there has been an improvement in indicators over the 10 year period, the average falls below that of the state of Paraná on the whole. The modal value lies below that of the HDI-M for the state. When major municipalities are considered, values for the majority of them are well above the national and state averages. This is particularly the case for Maringá and Londrina (see table 1.7).

Figure 1.8 - Percentages of People Living in municipalities with HDI-M below the National Average, 2000



Source:APUD Ipardes, 2004. HDI-M Brazil = 0.766; HDI-M Parana = 0.787

Table 1.6 - HDI-M Statistics for the 71 Municipalities of the Northern Central 1991/2000

	1991	2000
Mean	0.67	0.74
Median	0.67	0.75
Mode	0.65	0.77
Standard Deviation	0.05	0.04
Range	0.21	0.18
Mínimum	0.56	0.66
Máximum	0.77	0.84

Source: Atlas do Desenvolvimento Humano no Brasil, 2003.

1.3 Socio-economic bases

The Northern Paraná, as we have seen, was settled around the middle of the 20th century. This rapid settlement was made possible through the confluence of a range of factors among which the existence of an export crop for international markets – coffee – was fundamental. This dynamic force began to weaken, until the final calamity – the great frost of 1975 – dealt its death blow to the coffee plantations. The coffee crop was substituted for others, and for animal husbandry, and although the region came to life again through the development of agro-business, it never completely regained its lost dynamism. One illustration of this is the population loss that is has been undergoing ever since.

Table 1.7 - HDI-M for the Main Municipalities of the Meso-Region

Municipalities	HDI-M, 1991	HDI-M, 2000
Maringá	0.762	0.841
Londrina	0.766	0.824
Ibiporã	0.723	0.801
Apucarana	0.715	0.799
Cambé	0.702	0.793
Mandaguari	0.705	0.791
Rolândia	0.703	0.784
Arapongas	0.714	0.774
Sarandi	0.696	0.768
Ivaiporã	0.689	0.764

Source: Atlas do Desenvolvimento Humano no Brasil, 2003.

Nonetheless, despite this process, the major cities along the Londrina-Maringá axis have continued to grow, given their character of commercial and service centers. Table 1.8 presents the current situation. The southern region as a whole is responsible for 18.6% of the Brazilian GDP, and the state of Paraná contributes approximately of 6.4%. With regard to the D of Paraná, the Northern Central contributes about 16% and the Greater Curitiba participates with 37%. In other words, these two meso-regions are responsible for more than half of the state GDP and for an equivalent amount of the economically active population. Notwithstanding the Northern Central's loss of dynamism, it is still responsible for an important part of the Paraná GDP.

Table 1.8 – GDP of Brazil, Paraná and Selected Meso-regions, 2003

AREA	GDP, 2003					
	GDP in Current Prices (R$1,000,00)	GDP in US$ (PPP)* (US$1,000,00)	Per capita (R$1.00)	Per Capita in US$ (PPP) (US$1.00)	Brazil (%)	Paraná (%)
Brazil	1,556,181,873	1,375,756,200	8,694	7,686	-	-
South Region	289,252,892	255,716,550	10,998	9,723	18.59	-
Paraná	98,999,740	87,521,586	9,891	8,744	6.36	-
RMC	37,188,938	32,877,206	-	-	2.39	37.56
Northern Central Meso-region	15,974,361	14,122,274	-	-	1.03	16.14

Source: IPEADATA; IBGE; Ipardes.
* The values in US$ (PPP) were obtained applying the same relation US$ (PPP)/R$ verified for Brazil.

From Table 1.9 we are able to obtain the counterpart of this structure, through variables related to the Economically Active Population for the year 2000. Here we find evidence of the importance that agriculture holds for the region. We can also see evidence that

that in terms of commercial and industrial activities, its employment structure is similar to that of the Greater Curitiba.

This heavy presence of primary sector activities is a clear demonstration of their importance in the regional economy. This region is the major producer of sugar cane in the state of Paraná, the second largest producer of soybeans, corn and cattle and the fourth most important meso-region in state production of poultry and dairy. Another indication of the importance of this sector in the regional economy is the significant presence of large industry cooperatives[7].

On the other hand, insofar as urban and industrial activities go, one of the most significant sectors is the chemical industry. One of the major sources of value added in the region comes from the production of agricultural fertilizers and pesticides. There are approximately 19 firms that produce agro-chemical products and more than 50 chemical industry firms that produce perfumes, cosmetics and cleaning and hygiene supplies.

The largest concentration of furniture manufacturing can be found in the Northern Central, and in the city of Arapongas in particular. There are close to 518 industrial plants and between 1995 and 2001, the number of jobs provided in this sector leaped from 7,081 to 10,557.

Nonetheless, the largest source of employment is the clothing industry. Between 1995 and 2001 jobs in this sector increased from 8,331 to 14,575. Its total share in regional employment rose from 11.9% to 16.7%. Other important activities are those related to leather and tanning, including the earliest stages of processing, manufacture of footwear and the production of components used in shoe making. However, it should be noted that there has been a drop in the volume of employment provided by this sector[8].

The most traditional sectors of the economy, such as the food, textile and tanning industries have undergone crises due to declining dynamism. As we have noted, there has been a contrasting expansion in the more modern sectors that reflects the tendency observed in the passed in the RMC meso-region. At present, it is clear that the Northern Central's most dynamic sectors are linked to the sugar, alcohol and agro-chemical industries[9].

Table 1.9 Economically Active Population: rates of activity and unemployment; distribution of the employed by sector of activity, 2000

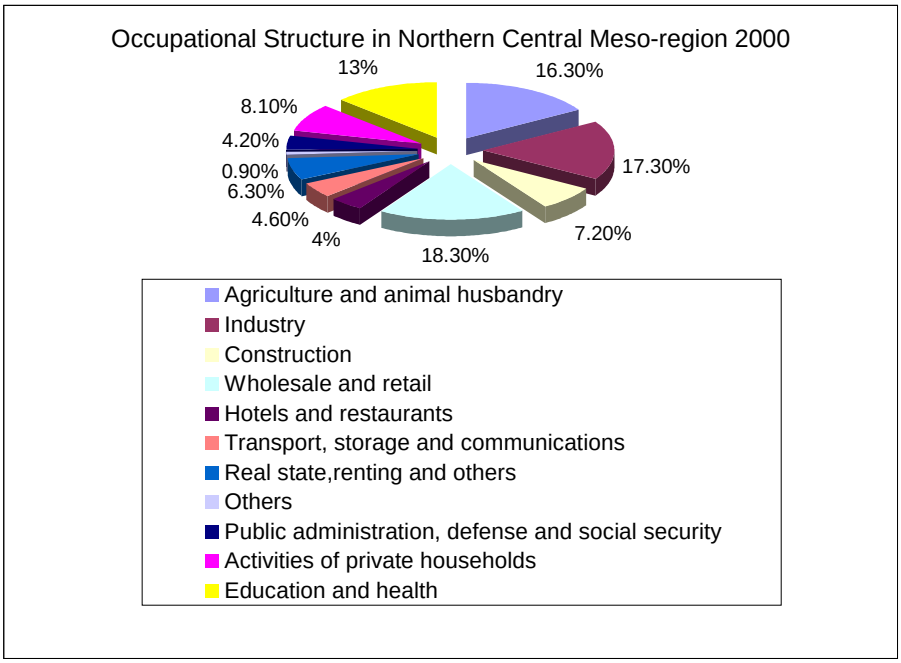
AREA	Economically Active Population	Employed	Rate of Activity (%)	Rate of Unemployment (%)	Distribution of Employed (%)			
					Agrolivestock	Industry	Commerce	Service
Northern Central	922,872	808,455	61.0	12.4	16.3	24.	18.3	40.0
RMC	1,508,845	1,286,980	60.8	14.7	5.5	25.5	19.0	48.0
Paraná	4,651,832	4,055,739	60.0	12.8	20.1	22.3	17.1	39.1

Source: IBGE and Ipardes.

Figure 1.9 presents a more detailed view of the structure of regional employment. The prevalence of activities in the service sphere points to the growing need for qualified labor.

[7] Leituras Regionais , nc. IPARDES p.77 and p. 83.
[8] Leituras Regionais, nc, IPARDES p.85-87.
[9] OPDT-SENAI/FIEP (2005) p.72.u

Figure 1.9 - Occupational structure in the Northern Central Meso-region, 2000



Source: Ipardes, 2004.

Table 1.10 demonstrates the importance of public administration (public administration + education) and of several services belonging to the formal structure of regional employment. Commerce and public administration are responsible for more than 30% of all employment. Despite the persisting importance of the textile industry as well as the food and beverage sector, it is nonetheless revealing to see that the most modern activities are those that show greatest rates of growth, as is the case for chemical, metal and mechanical industries. In other words, just as was the case for the Greater Curitiba, there is a notable tendency of growth in the sectors that are linked to most modern and dynamic sectors of the country.

Table 1.10 Evolution of Formal Employment in the Northern Central Meso-region, 1996/2001.

Activities	1996	2001	Change		Distribution (%)		
			Real	%	1996	2001	
Mining	340	334	-6	-1.8	0.1	0.1	7.2
Non-metallic minerals	1805	2002	197	10.9	0.7	0.6	10.9
Metal industry	3215	5409	2194	68.2	1.2	1.6	23
Mechanical industry	1645	2750	1105	67.2	0.6	0.8	13.3
Eletric and communication material	2085	2157	72	3.5	0.8	0.7	20
Transport equipment	1552	2248	696	44.8	0.8	0.7	10.6
Lumber and furniture	10183	12368	2185	21.5	3.8	3.7	17.9
Paper and publishing	2835	3291	456	16.1	1.1	1	12.3
Rubber, tobacco and leather	3525	3982	457	13	1.3	1.2	30.8
Chemical industry	3868	6861	2993	77.4	1.4	2.1	23.9
Textile industry	16455	22378	5923	36	6.1	6.8	43.9
Shoe industry	509	555	46	9	0.2	0.2	38.8
Food and beverage	23080	23259	179	0.8	8.6	7	26.3
Public utility services	483	498	15	3.1	0.2	0.2	3
Civil construction	14022	13383	-639	-4.6	5.2	4	21.1
Retail trade	40179	56765	16586	41.3	15	17.1	21.9
Wholesale trade	9020	11280	2260	25.1	3.4	3.4	23.3
Financial institutions	5207	5634	427	8.2	1.9	1.7	17.4
Administrative, technical and professional	14552	22766	8214	56.4	5.4	6.9	16.8
Transport and communication	12648	13554	906	7.2	4.7	4.1	14.9
Hotels and restaurants	21833	28998	7165	32.8	8.1	8.7	17.1
Medicine, dentistry and veterinary medicine	10317	12046	1729	16.8	3.9	3.6	22.3
Teaching	15501	18762	3261	21	5.8	5.7	29.3
Public administration	34886	40339	5453	15.6	13	12.2	12.4
Agriculture	17872	19874	2002	11.2	6.7	6	23.6
others/Ignored	278	0	-278	-100	0.1	0	0
North Central Meso-region	**267895**	**331493**	**63598**	**23.7**	**100**	**100**	**19.3**

Source: TEM/RAIS, APUD IPARDES (2004)

In turn, Table 1.11 shows the loss of dynamism that the region has suffered over the last decade, considering fiscal value added. There was a substantial drop in participation on the part of the primary and service sectors, with significant losses in industry as well. Aggregate data limit further inferences on the inter-sectorial dynamics of the region, although they do point to an undeniable process of loss of dynamism.

Table 1.11 - Northern Central Meso-region participation in Paraná Value Added according to sectors of the economy, 1989, 1996 and 2000

Sector	1989	1996	2000
Primary	23.6	18.1	15.8
Secondary	14.6	11.2	10.9
Commerce	22.0	18.4	21.2
Service	22.8	17.9	15.2

Source: SEFA and Ipardes.

Table 1.12 below presents data on the internal structure of the main meso-regions of the state of Paraná. Compared with the state as a whole, the Northern Central provides evidence once again of the importance that the primary sector continues to have within its economy. In a similar fashion, the data provided show the importance that the secondary sector has for the Greater Curitiba.

Table 1.12 - Sectorial structure of the main meso-regions of the state of Paraná 1997/2003

AREA	Fiscal Value added (%)							
	1997				2003			
	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary	Total
North Central	20.3	37.9	41.7	100	22.1	38.6	39.3	100
RMC	1.7	57.4	40.9	100	1.3	66.9	31.8	100
Paraná	17.2	48.1	34.7	100	19.5	51.2	29.3	100

Source: SEFA-PR.

Table 1.13 provides a structural comparison of the composition of firms, between the Northern Central, the state of Paraná and the country as a whole. There is a predominance of firms in the smallest size category, classified according to number of employees. Leaving aside the debate on the definition of what constitutes a small or a medium firm, we can clearly recognize that small firms prevail. In order to facilitate the present exposition, we will refer to them as "small and medium sized firms".

Table 1.13 - Number of establishments according to size, Northern Central, Paraná and Brazil, 2003

	North Central		Paraná		Brazil	
Employees	Establishments	Part. (%)	Establishments	Part. (%)	Establishments	Part. (%)
From 0 to 19	42,223	94.1	187,361	93.8	2,346,718	92.9
From 20 to 99	2,225	5	10,195	5.1	146,303	5.8
From 100 to 499	382	0.9	1,870	0.9	28,258	1.1
500 or more	54	0.1	338	0.2	6,006	0.2
TOTAL	44,884	100	199,764	100.0	2,527,285	100

Source: OPDT-SENAI/FIEP (2005).

Most of these 44,884 firms belong to retail trade (28.1%) and agricultural activity (14.4%). [10]

Table 1.14 shows that more than one-fourth of the industrial GDP of the Northern Central is exported. This is little when compared to the Greater Curitiba, which exports more than half of its industrial GDP and is responsible for almost 60% of the state's industrial exports. The industrial exports of the Northern Central region are concentrated in the food industry (64.1%) In addition to these sectors exportation of leather products (13.2%) and furniture production (7.6%) are also salient [11].

Table 1.14 - GDP and Industrial Sector Exports, Northern Central, RMC and Paraná, 2000

AREA	Industrial GDP (R$ milhões) (*)	Industrial Exports (US$ milhões) (**)	Relation Industrial GDP/ Industrial Export (***)	Percentage of Industrial Exports of Paraná
Northern Central	4,658	439	27.5%	10.0%
RMC	14,830	2,604	51.3%	59.1%
Paraná	31,597	4,407	40.7%	100.0%

Source: IBGE/IPARDES; MDIC/SECEX.
(*)value, industrial sector according to IBGE methodology.
(**) Value of industrial exports was estimated and refers in this case to Curitiba, year 2003.O
(***) For conversion of exportations to Brazilian currency, average annual exchange rates were employed.

Perspectives on the future of the economy in the Northern Central meso-region suggest the following scenario:

I. The maintenance of the relative importance of activities related to agro-business:
   - Incorporation of high technology in activities related to the sugar cane, soy and agriculture;
   - Reduction of participation of those spheres and producers who have lesser capital or lesser ability to innovate;

II. Stabilization of that part of the industrial sector devoted to the production of traditional goods:
   - Difficulties in maintaining relative importance without the incorporation of new techniques of production and, most importantly, of trade.

III. Growth of modern industrial sector:
   - Demand for technological knowledge and integration into national and international production chains.

IV. Growth of the service-producing sector:
   - Particularly within the municipalities of Londrina and Maringá, sectors linked to sophisticated services, Education and Health in particular.

[10] OPDT-SENAI/FIEP (2005) p.80-83.
[11] OPDT-SENAI/FIEP (2005) p.84.

This view is also shared by entrepreneurial organizations in the state of Paraná, as expressed in a study that they have carried out[12]. According to this research, the most promising sectors and areas of technology, medium and long term, for the Northern Central meso-region are the following:

I. Biotechnology applied to the agricultural and forestry sectors:
   - Genetic improvement of crops
   - Genomics
   - In vitro cultivation techniques

II. Energy:
   - Bio-fuels

III. Consumer goods:
   - Design technologies for the consumer sector
   - Production technologies

IV. Agro-food industry:
   - Food processing/preserving and packaging technologies
   - Foods for specific functions

V. Health:
   - Biotechnology applied to health

This study also suggests that within this scenario, the region's technological development should concentrate on three strategic areas: the development of biotechnology related to application in the cultivation of soybeans and energy-efficient crops; creation of a Technological Center for the agro-food industry in the domain of the State; technological modernization in the furniture and clothing industries[13].

1.4 Government Structure

The Brazilian State is made up of three different levels of government: federal, state and municipal. The states, which have their own constitutions, thus maintain a fair level of autonomy in relation to the federal government. Nonetheless, the Brazilian taxation system is complex and centralized at the federal government level. In this regard, a certain reduction of effective state-level power occurs, which in turn renders the federal government more powerful, a de facto rather than legally-determined situation. The relative independence of the municipalities is highly contingent on their size. Most of them are small in size (close to 70% of a universe of 5,562 municipalities). This makes them dependent on transfers from state and federal government. Municipalities have gradually been learning to work in concert with other municipalities, and some of them, usually those that are larger in size, are already able to manage higher education institutions (HEI).

The main federal transfer comes from the Fund for Municipal Participation (FPM**)** and the main state-level transfer comes from the quota-part of the Tax on the Circulation of Commodities and Services (ICMS). The Northern Central meso-region holds 79 municipalities. Table 1.15 shows that since the majority of these municipalities are small, they are almost completely financially dependent. The small (3.8) percentage of self-generated resources is illustrative of the situation. Nonetheless, the greater the municipality, the lesser is dependency. In the case of the three municipalities that have more than 100 thousand inhabitants, which include Londrina and Maringá, average participation of self-generated resources is around 20%.

Given this situation it then becomes clear that under the current Brazilian federation tax structure the vast majority of municipalities are unable to invest either in higher education or in Research and Development (R&D). In this regard, the larger muncipalities do have resources for some expenditure in these areas. However, even in the latter case their

[12] OPDT-SENAI/FIEP (2005) .
[13] OPDT-SENAI/FIEP (2005), p.19-22.

resources are insufficient and R&D strategies tend to be strategies of cooperation with other levels of government and/or the search for synergies with institutions present within the municipalities. It is no coincidence that expenditures in this arena become state and federal government responsibility. When these municipalities possess some type of institution of higher learning, these are necessarily institutions requiring tuition payment.

With regard to Londrina and Maringá, the strategy adopted has been one of providing leadership in the formation of partnerships directed by entities linked to municipal administration – the CODEL in Londrina and the CODEM in Maringá.

Table 1.15 - Average revenues according to primary origin of resources and size of municipalities, Northern Central meso-region, 2002

Origin of Resources	Average Revenues (R$)					
	Until 20 thousand inhabitants (64 municipalities)		between 20 e 100 thousand inhabitants (12 municipalities)		Above 100 thousand inhabitants (3 municipalities)	
ICMS	2,251,912	39.1%	4,484,563	29.2%	30,485,232	27.1%
FPM	2,568,542	44.6%	7,449,591	48.4%	47,039,834	41.7%
Other Revenues	942,840	16.4%	3,446,765	22.4%	35,146,949	31.2%
Own Resources	221,665	3.8%	1,888,885	12.3%	23,249,781	20.6%
Compensation from export and IPVA	151,214	2.6%	1,055,474	6.9%	11,469,100	10.2%
Mananciais and Conservation Unities	133,908	2.3%	456,927	3.0%	428,068	0.4%
Itaipu Royalties	57,699	1.0%	17,111	0.1%	-	-
Financial Compensation from water resources	378,354	6.6%	28,368	0.2%	-	-
TOTAL (*)	**5,763,294**	**100.0%**	**15,380,919**	**100.0%**	**1126,72,015**	**100.0%**

Source: Ipardes, 2004.

CHAPTER II CHARACTERISTICS OF THE NATIONAL SYSTEM OF HIGHER EDUCATION

2.1 The National System of Higher Education: A Brief Overview.

After the promulgation of the 1099 Constitution, there was ensuing debate on the new National Education Law (LDB) governing curriculum and goals for the national educational system. This process culminated in the approval of the Law, known as the Darcy Ribeiro Bill, in the nation's congress on 20 December 1996. In reality, this law provides the pillar of current legislation governing education, and especially higher education, in the country. It is composed of the Law nº 9,394/96, part of Law nº 4,024/61, and a single article, number 16, of the Law nº 5,540/68.

The powers and responsibilities of the different levels of government, that is, the Federal, the State and the Municipal, are defined through Articles 8 and 9 of the new LDB. In this regard, Article 8 establishes that the Union, the States, the Federal District and the Municipalities must collaborate in the organization of their education systems. It should be emphasized that the Union is responsible for coordination of national education policy and that this includes the articulation of different levels and systems as well as the exercise of normative and redistributive functions in relation to the other levels and agencies of education **(**Art. 8º, § 1º, *República*, 1996**).**

It is important to emphasize that Ministry of Education (MEC) is fully responsible for educational matters. It is therefore obliged to formulate and evaluate national educational policy, safeguard the quality of education and ensure the fulfillment of its governing laws. We should emphasize here that the MEC, in carrying out its functions, relies on collaboration from the National Council of Education (CNE) as established through Article 6, Paragraph 1 of Law nº 4,024/61 (*República*, 1961) and Article 9, Paragraph 1 of Law nº 9,394/96 (*República*, 1996).

The CNE is an organ created by law, composed of the Chambers for Basic Education and Higher Education. It has normative, deliberative and advisory attributions in relation to the Ministry of Education; its primary objective is to guarantee societal participation in improving and perfecting the nation's educational system.

One aspect that takes on particular importance is the autonomy of the states and the Federal District. In fact, both of the latter may, as long as they maintain institutions of higher education, " respectively authorize, recognize, provide credentials for, supervise and evaluate the programs conducted by institutions of higher education and the establishments belong to their educational system – as stated in Paragraph IX of Article 9" (*República*, 1996).

The states of the federation have the following attributions:

I. Organization, maintenance and development of the official organs and institutions belonging to their educational systems.

II. Definition, together with the municipalities, of forms of collaboration for supplying basic education. These should guarantee a proportional distribution of responsibilities, according to the population that is to be served and the financial resources available in each one of these spheres of Public Power.

III. Elaboration and execution of educational plans and policies, in consonance with the national guidelines and plans for education, integrating and coordinating actions with those carried out by municipalities.

IV. Authorization, recognition, provision of credentials for, supervision and evaluation of the programs of institutions of higher education and of the establishments of the educational system, respectively.

V. Development of complementary norms for their educational system.

VI. Guarantee primary and middle school education and prioritize the offer of secondary school education.

VII. Provide transportation for State public school students. (Art. 10º, República, 1996).

In accordance with our above item IV, states of the federation are allowed autonomy to concede authorization, recognition, credentials, supervision and evaluation for the programs offered by HEIs and establishments belonging to their educational systems. In truth, items I, IV and V are harmonious with the stipulations made in Article 18 of the Federal Constitution, which guarantee autonomy at all the levels of political-administrative organization of the Brazilian Federative Republic.

Technological innovation, an issue that will be dealt with in chapters to come, has acquired an increasingly important role in processes of regional development, since regions tend to create structures that promote research and innovation and, consequently, generate a favorable environment for their own development. If regions are becoming conscious of the importance of the issue of innovation, the federal government, particularly through the Ministry of Science and Technology (MCT) stands out in its attempts to create a culture of technological innovation within the country.

In this regard, the federal government sanctioned Law nº 10,973[14], of December 2, 2004, known as the "Law of Innovation", which provides for incentives for innovation and scientific technology in the production environment, taking technological training and autonomy and the nation's industrial development as its primary goals. (Art. 1º, *República*, 2004).

In reality, this Law demonstrates the need for legal devices that are efficient in fomenting scientific and technological development and innovation processes. The basic idea underlying this reasoning is to give the national production sector an increasingly competitive role on the international market. For these purposes, the goods and services produced must meet international standards of quality and present a higher technological content, which will then afford them greater aggregate value.

There are three aspects of the Law of Innovation that are extremely important: 1) the creation of a favorable environment for strategic partnerships between universities, technological institutes and firms; 2) stimulating the participation of institutions of science and technology in processes of innovation; 3) incentives to innovation within firms. In fact, the set of measures proposed in the form of this Law aim to increase and thereby facilitate the transfer of knowledge generated in the academic milieu for appropriation by industry and production, which can in turn stimulate a culture of innovation and consequently contribute to the nation's industrial development.

2.1.1 Current Status of the National System of Higher Education

The national system of higher education, according to data from the 2003 census of higher learning (*INEP*, 2005) is made up of 1,859 institutions of higher learning, of which 207 are public and 1,652 are private (see table 2.1). Within the universe of institutions of higher education, the distribution is fairly homogeneous, with federally-run institutions representing 40.1% of the total, state universities at 31.4% and 28.5% run by municipalities. It is interesting to note that a considerable part of the federal and state institutions of higher

[14] *This Law is regulamented by Decree Nº 5,563, dated Oct. 11, 2005.*

education are made up of universities: 53% and 47% respectively. On the other hand, municipal institutions of higher education are made up primarily of colleges, schools and institutes, representing 84.7% of the respective total.

With regard to private institutions of higher learning, 80.12% are profit-seeking institutions while non-profit institutions (religious, community or philanthropic) make up less than 20% (see table 2.1). An important aspect to be emphasized here is the significant representativity of single establishments (colleges, schools and institutes) in both cases: 82.95% of all private profit-seeking and 68.88% of private non-profit institutions.

When analysis of the whole range of institutions of higher learning in the country is carried out, it can be clearly seen that 163 universities is still quite a small number. In fact, universities represent only 8.77% of the total of institutions of higher education (see table 2.1). It is however within the universities that the best quality teaching, as well as a great deal of the research and post graduate programs (Master's and Doctoral Programs) is concentrated.

Table 2.1 - Nº of Higher Education Institutions (HEIs), by Academic Organization and according to HEI Administrative Category - 2003

Adm. Category	Institutions					
	OT	**Univ.**	**Univ. Cent.**	**Integ. Facs.**	**C, S, I.**	**TECs**
BRAZIL	1859	163	81	119	1403	93
Public	207	79	3	4	82	39
▪ Federal	83	44	1	1	6	31
▪ State	65	31	-	-	26	8
▪ Municipal	59	4	2	3	50	-
Private	1652	84	78	115	1321	54
▪ Particular	1302	26	47	95	1080	54
▪ C./R./Ph.	350	58	31	20	241	-

Source: Authors' elaboration using INEP data, 2005.

Observation: OT- Overall total**; Univ –** universities**; Univ. Cent. –** University Centers**; Integ. Facs –** Integrated Faculties; **C, S, I-** Colleges, schools and institutes; **TECs** – Technological Education Centers; **C./R./Ph. -** Community/religious/philanthropic.

An important aspect to be emphasized is the significant growth of the HEI faculty body, both in quantitative and qualitative terms, in recent years. The number of active teaching positions rose from 204,106 in 2002 (*INEP*, 2003) to 254, 153 in 2003, which represents an increase of 26,309 faculty members, of which 4,789 entered public education and 21,520 entered private institutions. In reality, this disproportionate growth in the two sectors can be explained completely by boom of new institutions of higher education that has taken place in recent years.

The level of qualification of the faculty body, both in private and public education, has experienced significant growth over the last few decades. For example, there were 27,753 faculty with master's degrees and 16,939 faculty with doctorates in institutions of higher education in 1990 (*INEP*, 1999) whereas in 2003, there were 89,288 faculty holding master's degrees and 54, 487 holding doctorates in 2003 (see table 2.2). In fact, in thirteen years the proportion of faculty holding master's and doctoral degrees in institutions of higher education went up more than threefold.

It is important to consider how this growth has impacted public and private sectors. Specifically regarding the number of faculty with doctorates employed in the private sector, we see that during the 1998 to 2003 period there was a growth of 155%, with the contingent expanding from 7,529 in 1998 to 19,457 just five years later. On the other hand, the

public sector growth during this same period was not as expressive as that which occurred in the private sector, in which the proportion of doctors grew by 49%, going grom 23,550 in 1998 to 35,030 in 2003 (*INEP*, 1999; 2005).

The numbers given above are very significant and illustrative. In spite of the expressive growth of the number of doctors, the data clearly show that the public institutions of higher education, which represent 34.9% of all Brazilian HEIs, hold 64.3 % of the total faculty with doctorates in the country (see table 2.2). In fact, the expressive concentration of doctors in the public institutions of higher education denotes not only the importance, but also the potential of the public sector for carrying out research. In truth, the progress of post-graduate programs in the country is to a large extent fruit of the efforts made within public institutions of higher education, a progress testified by the growth of regular post-graduate programs. For example, academic master's degree programs grew from 1,298 in 1995 to 1,547 programs in the year 2001, thus demonstrating a 19.2% growth; doctoral programs rose from 685 to 857 during that same period, showing a 25% expansion (*INFOCAPES,* 2002).

It is important to emphasize that the southeastern region continues to be ahead of other regions of the country in this regard. In terms of HEI faculty, we see that in that region, in 2003, there were more than two and a half times the total number of faculty employed in the southern region, the region that occupies second place in this particular matter (see table 2.2).

When we look at the number of doctors, the southeastern region, among others, also harbors the largest contingent: 32, 703 (see table 2.2). This is practically 24 times more than in the northern region, the poorest of all. Our central point is that there is quite a large degree of inequality between the diverse regions of the country, and a clear advantage maintained by the southeast.

Table 2.2 –Total Number of Active Teaching Positions by Degree Held, according to Region of the Country and HEI Administrative Category, 2003.

Region of the Country/	**Active Teaching Positions**					
Adm. Category	**Total**	**W/G**	**G**	**S**	**M**	**D**
BRAZIL	**254,53**	**23**	**35,641**	**74,714**	**89,88**	**54,487**
Public	**88,795**	**3**	**12,807**	**16,726**	**24,229**	**35,030**
▪ Federal	47,709	-	7,854	5,826	13,336	20,693
▪ State	33,580	2	4,127	7,742	8,278	13,431
▪ Municipal	7,506	1	826	3,158	2,615	903
Private	**165,358**	**20**	**22,834**	**57,988**	**65,059**	**19,457**
▪ Particular	91,410	-	11,827	35,640	35,410	8,526
▪ C./R./Ph.	73,948	20	11,007	22,348	29,642	10,391
North	10,453	-	1,613	4,232	3,367	1,241
Northeast	40,363	-	6,185	13,493	13,739	6,946
Southeast	130,215	16	19,161	33,722	44,613	32,703
South	51,164	7	5,183	15,214	20,445	10,315
Center-West	21,958	-	3,499	8,053	7,124	3,282

Source: Authors' elaboration using INEP data, 2005.
Observation: C./R./Ph. - Community/Religious/Philanthropic.; **W/G** – With no graduate; **G** – Graduate; **S** – Specialisation; **M** – Master; **D** – Doctorate.

2.2 – The Regional System of Education: the case of Paraná State

The SETI is responsible for coordinating higher education in the state of Paraná. In this regard, the Higher Education Coordinating Committee (CES) exercises leadership, given the specific attributes that it is awarded, through article 15 of the SETI regulations, as follows

I. Coordination of activities developed in the area of higher education, involving the planning, supervision and evaluation of the educational system with regard to its means and ends activities, in consonance with the institutional plans and guidelines established through the Council of Higher Education Institutions' Presidents (CODINES) and the policies of higher education, science and technology outlined by the State Government;

II. Supervision of the State Government, and of the Council of Higher Education Institutions' Presidents (CODINES) and of state institutions of higher education in matters pertaining to the educational system in higher education, including the proposal of whatever reformulations are deemed necessary for its management;

III. The production of basic statistical information and the elaboration of studies on policies and management of higher education in its diverse aspects;

IV. Articulation, at the institutional level, elaboration and implementation of programs, seeking to integrate actions in higher education with those of primary and secondary school education;

V. Articulation of actions for higher education with those developed by the Science and Technology Coordinating Committee;

VI. Elaboration of programs of support for teaching at the undergraduate and post-graduate levels, as well as for university outreach programs;

VII. The elaboration and implementation of support programs for state institutions of higher education aimed at the further qualification of faculty, through "updating" and specialization courses, as well as the provision of financial support for these programs;

VIII. Promotion of events geared toward cultural, educational, scientific and technological exchange between different university institutions;

IX. Coordinating elaboration of state plans for faculty qualification and perfection of the mechanisms regulating the development and promotion of faculty and technical and administrative staff;

X. Approval and application of norms and guidelines regulating higher education; and

XI. The development of other correlated activities (*GOVERNO DO ESTADO DO PARANÁ*, 1998: 9 e 10).

In addition to the SETI, through its CES, there is another organism that also fulfills a relevant role in Paraná state educational policy, the Paraná State Education Council (CEE-PR), an organ with normative and collective deliberating functions, as provided for by Federal Law nº 4,024/61 and created through State Law nº 4,978/64.

With specific regard to the technical aspects, attributions, according to article 17 of the CEE-PR are as follows (*GOVERNO DO ESTADO DO PARANÁ*, 1980: 6 and 7):

I. Emit norms, evaluations and deliberations regarding all matters for which federal and state laws, norms and acts explicitly or implicitly attribute them power;

II. Promote and disseminate studies on the State Educational System;

III. Propose measures aimed at the expansion and perfection of education, especially regarding productivity and results as related to costs;

IV. Deliberate on and emit evaluations on issues submitted to it by the Governor of the State and the State Secretary of Education;

V. Pass judgement on teaching regulation, at whatever level and modality of education that pertains to the state system;

VI. Institute norms for the cancellation of authorization or credentials for operation of establishments belonging to the State Educational System, as well as to promote investigations, whenever deemed necessary, given the need for the strict observance of governing norms and regulations.

The Paraná state educational system, in 2003, was made up of 151 HEIs, of which 22 are public and 129 private (INEP, 2005). These numbers are significant and their importance can be better perceived when situated within a wider context. In this regard, Paraná holds almost 50% of the total of HEIs in the southern region of the country, and in reality this percentage is even more expressive when we look specifically at public institutions, given the fact that 61.1% of the latter are located within the state (see table 2.3).

Table 2.3 Number of HEIs by Academic Organization according to the Federative Unit and by HEI Administrative Category – 2000 and 2003.

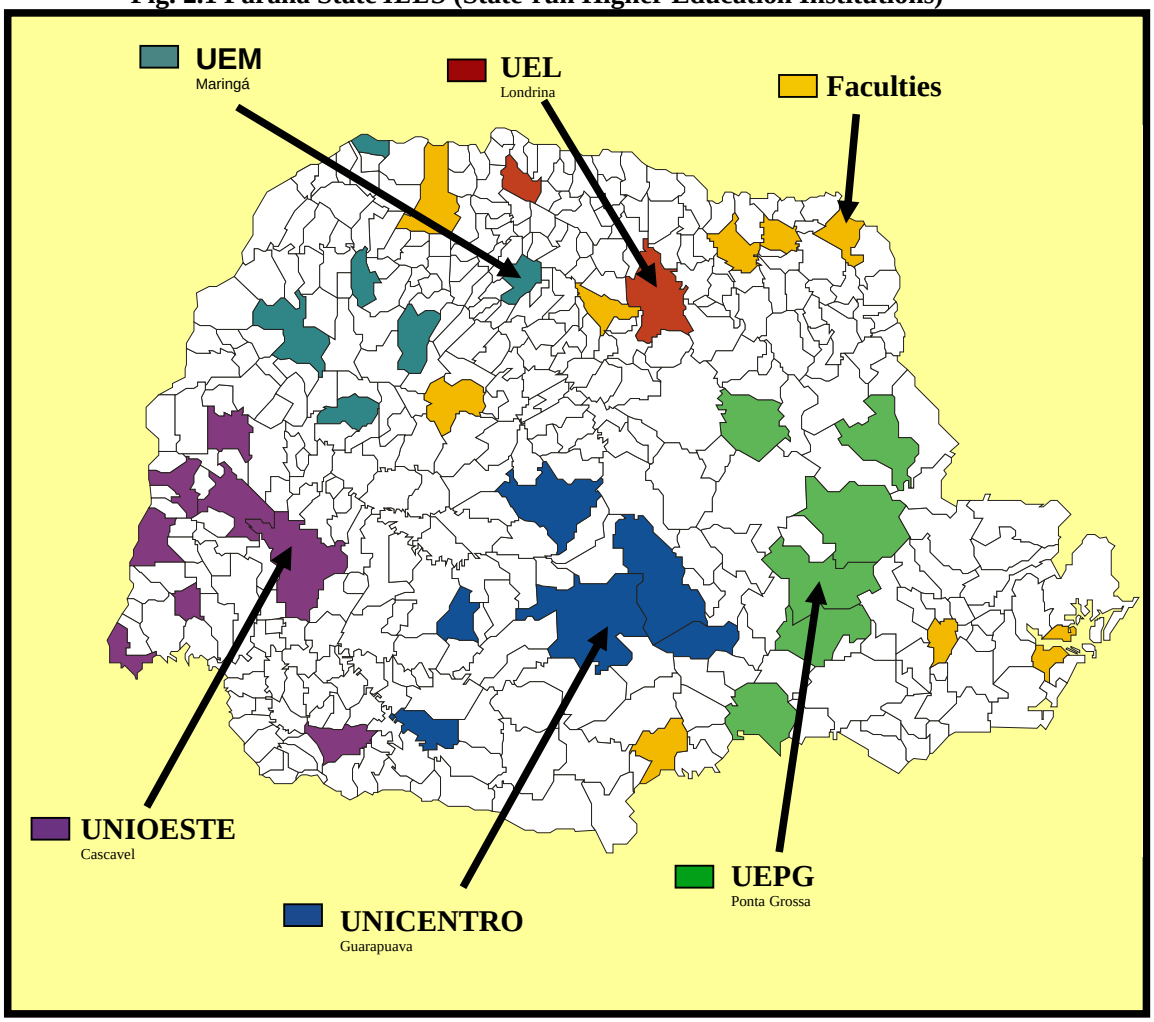
Federative Unit/ Adm. Category	INSTITUTIONS											
	2000						2003					
	OT	Univ	Univ Cent	I. F.	C. /S. /I.	TECs	OT	Univ	Univ Cent	I. F.	C. /S. /I.	TECs
BRAZIL	1180	156	50	90	865	19	1859	163	81	119	1403	93
SOUTH	176	36	6	8	123	3	306	37	11	12	223	23
PUBLIC	34	13	-	-	18	3	36	15	-	-	16	5
▪ Federal	10	6	-	-	1	3	12	6	-	-	1	5
▪ State	17	6	-	-	11	-	18	6	-	-	12	-
▪ Municipal	7	1	-	-	6	-	6	3	-	-	3	-
PRIVATE	142	23	6	8	105	-	270	22	11	12	207	18
▪ Particular	83	5	2	7	69	-	201	4	4	11	164	18
▪ C. /R. /Ph.	59	18	4	1	36	-	69	18	7	1	43	-
PARANÁ	87	10	2	5	69	1	151	10	4	8	124	5
PUBLIC	23	6	-	-	16	1	22	6	-	-	15	1
▪ Federal	2	1	-	-	-	1	2	1	-	-	-	1
▪ State	16	5	-	-	11	-	17	5	-	-	12	-
▪ Municipal	5	-	-	-	5	-	3	-	-	-	3	-
PRIVATE	64	4	2	5	53	-	129	4	4	8	109	4
▪ Particular	53	3	2	5	43	-	111	3	3	7	94	4
▪ C. /R. /Ph.	11	1	-	-	10	-	18	1	1	1	15	-

Source: Authors' elaboration using INEP data, 2001 and 2005.
Observation: OT- Overall Total**; Univ –** Universitities**; Univ. Cent. –**University Centers**;** **I. F. –** Integrated Faculties; **C, S, I**- Colleges, Schools and Institutes; **TECs** – Technological Education Centers; **C./R./Ph.** - Community/religious/philanthropic.

We need to emphasize that the growth in number of HEIs, during the 2000 to 2003 period, was almost the same in the state of Paraná and for the entire southern region, in other words, approximately 74%, thus superior to that of the country as a whole, which did not achieve a 60% level (see table 2.3). The private sector was principally responsible for this growth, since the growth of the public sector has remained basically unaltered over this period of time.

Another aspect that is important to emphasize is the weight of Paraná state public institutions (see figure 2.1). In fact, 94.44% of all state-run public institutions of the southern region are situated within this state (INEP, 2005). We refer here to 17 Paraná IEES, which are made up of the following: 5 state universities – *UEPG, UEL, UEM, UNIOESTE e UNICENTRO* - and 12 state colleges - Jacarezinho (3); Curitiba (2); Apucarana; Bandeirantes; Campo Mourão; Cornélio Procópio; Paranaguá; Paranavaí; and União da Vitória which together make up the *UNESPAR.*

Fig. 2.1 Paraná State *IEES* (State-run Higher Education Institutions)



Source: SETI (2005).

The Paraná state educational system had 14,130 faculty members in 2000, which represented 35.2% of the total faculty of the southern region (INEP, 2001). Within just

three years, this percentage went up to 39.4% (INEP, 2005) a growth which clearly demonstrates the importance that higher education holds within the state.

It is important to emphasize the considerable weight that public state HEIs have within the universe of the Paraná state system of higher education and particularly within Paraná's public institutions. In the year 2000, of the 14,130 faculty members in the state, 7,953 (or 39.5%) belonged to the ranks of public institutions (INEP, 2001). In 2003, this percentage rose to 41% (INEP, 2005). Furthermore, 70.2% of all faculty of public institutions within the state worked within state-run institutions (INEP, 2001), with this percentage increasing to 73.2% in 2003 (INEP, 2005).

With regard to the number of faculty holding doctoral degrees in Paraná, it is interesting to observe that in 2000, there were 2,488 within the state (INEP, 2001) which means that 35.2% of the total of people holding doctorates in the southern region was allocated within HEIs in Paraná. In 2003, this percentage went up to 37.6% (INEP, 2005). Within the state, the number of doctorate-holding faculty in the public HEIs is far superior to that of private universities, and this holds for the years 2000 and 2003. In fact, 77.8% of faculty members possessing doctoral degrees were, in the year 2000, within public institutions (INEP, 2001), which led to a concern on the part of private HEIs regarding the improvement of faculty qualification.

The number of faculty holding doctoral degrees in the public state-run HEIs was 1,935 in the year 2000, which made up a total of 61.2% of the total of all public institutions of higher education in Paraná (INEP, 2001). However, this percentage increased to 63.9% in the year 2003 (INEP, 2005) which shows that there is a clear concern on the part of the Paraná state IEES with the improvement in levels of professional qualification of faculty members. It should be noted here that in both years, 2000 and 2003, the number of faculty members holding doctoral degrees within state-run public HEIs is higher than that of private institutions, in spite of the fact that the expansion of higher education within the country has been based on growth within the private sector.

2.3 The Northern Region of the State of Paraná

Although there are some private colleges within the northern region of the state of Paraná, there are two state universities, the UEL (State University of Londrina) and the UEM (State University of Maringá), that exercise a most significant influence as well as greater integration within the region.

The importance of the both of them within the context of state institutions of higher education in Paraná can be verified in table 2.4. In fact, both the UEL and the UEM together are responsible for 36.7% of the total number of undergraduate courses offered; for 79.3% of the Master's Degree programs and for 100% of the doctoral programs in state-run public universities. With regard to the faculty of state-run public HEIs in Paraná, both these universities show a higher number of the most highly qualified faculty, since 69.1% of faculty with doctoral degrees and 46.5% of faculty with Master's Degrees are employed by these two state-run universities.

As mentioned above, the state-run universities, among which the UEL and UEM are found, are financed by the Paraná state government, whose financial resources are destined primarily to the payment of salaries and wages for professors, researchers and technical and administrative staff. Resources devoted to research and development, an issue that will be developed in the following chapters of this report, are obtained through a foundation, Fundação Araucária, and sporadically from some of the state ministries (secretariats) and other funds, such as federal ones. In truth, public resources are acquired through participation in bidding or competition for grants from public sources.

Table 2.4 Undergraduate, Postgraduate and Faculty Population at the UEL and UEM, 2004

Institutions	Undergraduate		Post-Graduate				Faculty Population				
			Master		Doctorate						
	Nº of Courses	Enroll.	Nº of Courses	Enroll.	Nº of Courses	Enroll.	U	S	M	D	Total
UEL	39	13,954	24	522	10	75	73	155	575	601	1,.404
UEM	42	12,576	22	833	8	298	77	72	430	622	1,.201
Total of IEES-PR	255	72,255	58	1.836	18	373	342	979	2.159	1,771	5,.251

Source: Authors' elaboration using INEP data, 2005.

Observation: Enroll- Enrollment**; U –** Undergraduate**; S –**Specialization**; M** – Master; **D** – Doctorate.

The two state-run public universities that we are looking at here, the UEL and the UEM, play an important role in the development of Paraná's northern region. The difficulties involved in making their contribution to regional development more effective have been significant, ranging, as we shall see, from internal bureaucracy to reluctance in opening up to the external environment. Nonetheless, some concrete steps have been made to overcome these obstacles, although perhaps not at the necessary or desired pace.

CHAPTER 3 CONTRIBUTION OF RESEARCH TO REGIONAL INNOVATION

3.1 Responding to regional demands and necessities.

Over the course of the last few decades, Brazil has made considerable effort to stimulate research and development (R&D) within the country. The Federal Ministry for Science and Technology (MCT), the principal actor in this process, together with its important agencies of foment, the CNPq (National Council for Scientific and Technological Development) and the FINEP (Federal Financing Agency for Studies and Projects) are concrete examples of this federal government effort. Table 3.1 provides clear information on the disbursements that have been made in Brazil on R&D, which – although far from ideal, especially considering expenses in relation to the GDP - are significant for a developing country. In reality, national R&D expenses, in absolute terms, are greater than those of developed countries such as Israel, Spain, Australia and Portugal.

Table 3.1 National disbursements on R&D for countries selected, in relation To GDP, for most recent available years

COUNTRY	YEAR	Disbursements on R&D (millions of US$ at PPP*)	Disbursements on R&D in relation to GDP (%)
Germany	2003	57,.065.30	2.55
Argentina	2003	1,825.70	0.41
Australia	2002	9,165.10	1.62
Brazil	2003	13,509.20	0.95
Canada	2003	18,709.20	1.94
China	2003	84,618.30	1.31
Singapora	2003	2,239.00	2.13
South Korea	2003	24,379.10	2.64
Spain	2003	11,031.60	1.1
USA	2003	284,584.30	2.6
France	2003	37,514.10	2.19
Israel	2003	6,611.20	4.93
Italy	2003	17,698.60	1.16
Japan	2003	114,009.10	3.15
Mexico	2001	3,623.70	0.39
Portugal	2002	1,827.10	0.94
United Kingdom	2003	33,579.10	1.89
Russia	2003	16,926.40	1.29

Source: Authors' elaboration using MCT data, 2006.
Observation: PPP – Purchasing Power Parity.

This government effort has rendered important results to the extent that regions and states of the federation have sought to structure their systems of science and technology in the best possible way, with Paraná as a good example. According to Table 3.2, the increase in Paraná state government R&D spending can be clearly appreciated. In fact, the rise of state spending on R&D is intrinsecally related to the perception of the importance that the maintenance of an efficient state system of science and tecnology has as a lever for regional development. One important factor to be mentioned here is the fact that Paraná has six public

state-run universities, an impressive number in terms of the country if we consider that São Paulo, the hegemonic state of the federation, has only three public state-run universities.

Table 3.2 R&D Disbursements made by Paraná State Government, 2000-2003.

Government	R&D (thousands of current R$)			
	2000	2001	2002	2003
Paraná	50,865	56,963	93,383	105,153
Treasure	23,520	24,202	54,034	57,147
Higher Education	27,345	32,701	39,349	48,006

Source: Authors' elaboration using MCT data, 2006.

Table 3.3 Percentages of State Government Disbursements on Science and Technology in relation to Total State Revenue, 2000-2003.

Great Regions and Federative Units	2000	2001	2002	2003
TOTAL	0.86	0.91	0.79	0.77
NORTH	0.27	0.23	0.19	0.24
Acre	0.67	0.48	0.74	0.69
Amapá	0.83	0.95	0.65	0.38
Amazonas	0.29	0.17	0.04	0.27
Pará	0.24	0.19	0.19	0.2
Rondônia	0.02	0.05	0.05	0.07
Roraima	0.13	0.05	0.04	0.07
Tocantins	-	0.08	0,1	0.12
NORTHEAST	0.5	0.65	0.59	0.69
Alagoas	0.23	0.43	0.17	0.3
Bahia	1.13	1.07	1.12	1.2
Ceará	0.19	0.26	0.39	0.54
Maranhão	0.1	0.83	0.24	0.59
Paraíba	0.33	0.26	0.3	0.33
Pernambuco	0.64	0.96	0.71	0.74
Piauí	0.03	0.04	0.05	0.13
Rio Grande do Norte	0.21	0.25	0.49	0.22
Sergipe	0.17	0.29	0.26	0.35
SOUTHEAST	1.13	1.17	1.02	0.93
Espírito Santo	0.5	0.24	0.2	0.14
Minas Gerais	0.46	0.54	0.34	0.26
Rio de Janeiro	1.18	0.78	0.72	0.56
São Paulo	1.38	1.61	1.39	1.37
SOUTH	0.96	1.11	1.06	0.95
Paraná	1.53	1.89	2.18	1.76
Rio Grande do Sul	0.89	0.94	0.44	0.44
Santa Catarina	0.06	0.09	0.56	0.69
CENTER-WEST	0.28	0.21	0.07	0.12
Distrito Federal	0.05	0.05	0.02	0.06
Goiás	0.99	0.63	0.1	0.08
Mato Grosso	0.05	0.05	0.07	0.12
Mato Grosso do Sul	0.06	0.07	0.13	0.27

Source: Authors' elaboration using MCT data, .2006.
Observation: Does not include estimates of spendings on post-graduate education.

Table 3.3 serves to illustrate the Paraná state government´s concern with the creation of an efficient structure of Science and Technology, providing data on Brazilian state government spending on these items in relation to total state revenues. The table shows that state government spending in the 2000 to 2003 period are not only higher than the total for the southern region as a whole (to which the state belongs) but also in relation to other states of the country. We see that during the period of time in question, Paraná is the state that made the highest proportional investments in science and technology.

This is also reflected in the relationship between the regional GDP and R&D expenditures. In 2003, the latter represented 1% of the Paraná state GDP. North central region spending on state universities (UEL + UEM) made up 2.88% of the region´s GDP. The only countries with higher percentages of investment in this área are Israel, Japan and Korea (see table 3.4 and 3.1).

Table 3.4 Regional spending (UEL + UEM) on R&D proportionate to Regional GDP - 2003.

	Spending on R&D (R$ 1.000,00) (1)	GDP (R$ 1.000,00) (2)	(1)/(2)
North Central	4,607.5	15,974,361.00	2.88
UEL	1,636.8		
UEM	2,970.7		
Paraná		98,999,740.00	

Source: IBGE, UEL and UEM.

After examining this general scenario we turn now to analyze the situation of each of the two major state universities located in the North Central meso-region of Paraná,the UEL and UEM.

State University of Londrina - UEL

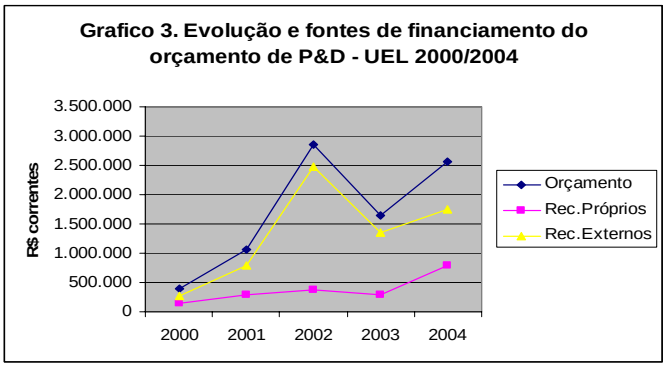
Table 3.5 and Graph 3.1 show that although there has been a substantial increase in the resources destined to research and development in the UEL, most of these resources come from funding sources outside the university. During the period under consideration, the proportion made up by the university´s own resources declined, and only in 2004 returned to the levels enjoyed at the beginning of the period.

Table 3.5 Evolution of the budget and sources of financing of Research and Development activities – UEL, 2000-2004

Years	Budget	Financing (R$)			
	(R$)	Own Funds (a)		External Funds (b)	
2000	397,864.00	137,274.00	34.5%	260,590.00	65.5%
2001	1,068,919.00	286,092.00	26.8%	782,827.00	73.2%
2002	2,859,678.00	383,416.00	13.4%	2,476,262.00	86.6%
2003	1,636,854.00	291,213.00	17.8%	1,345,641.00	82.2%
2004	2,553,342.00	801,028.00	31.4%	1,752,314.00	68.6%

Source: Proplan – UEL.
a)University´s own funds have their source in the university internal budget
(b) External funding comes from sources of financing outside the university.

Graph 3.1 Evolution and sources of R&D Financing - UEL



Source: UEL

Table 3.6 Evolution and origin of external funding used to finance R&D activity- UEL.

Year	Public Financing				Private Financing		
	(Millions of R$)				(Millions of R$)		
	Regional/ State	National	International	Total	Regional/ State	National	International
2000	69,949.0	121,327.00	--	191,276.00	--	--	69,314.00
	36.6%	63.4%		100.00			
2001	640,310.00	94,961.00	--	735,271.00	--	--	47,556.00
	87.1%	12.9%		100.00			
2002	2,237,776.00	202,864.00	--	2,440,640.00	--	--	35,622.00
	91.7%	8.3%		100.00			
2003	1,127,481.00	155,867.00	--	1,283,348.00	--	--	62,293.00
	87.9%	12.1%		100.00			
2004	1,058,152.00	693,586.00	--	1,751,738.00	--	--	576,000.00
	60.4%	39.6%		100.00%			

Source: Proplan – UEL.

These resources from external sources are, in the case of the UEL, basically national public resources, with the exception of the year 2004 in which there was a contribuiton of private international resources equivalent to 33% of national public resources. R&D financing through public resources has in turn oscillated between state government and federal government resources.

Table 3.7 Distribution of research budget by areas of knowledge/ UEL 2004

Knowledge Area	Percentage (%)
Human Science	27.41
Exact and Natural Sciences	21.84
Applied Social Sciences	5.99
Tecnological Sciences	6.39
Helth Sciences	23.06
Agrarian Sciences	15.31
Total	100.00

Source: Proplan-UEL.

The numbers on display in table 3.6 show that with the exception of the year 2004, the UEL had pratically no private sector financing of research and development contracts. On the other hand, the greater part of these resources was applied in the area of Human Sciences and Health Sciences. In the latter case, this was due primarily to the importance of the University Hospital, as table 3.7 shows.

The main agreements that the UEL established with other institutions were those signed with the major grant and financial assistance providers in Brazil, linked to the federal goverment: the CNPq, the FINEP and the SEBRAE (in the latter case, an agency that provides support and financing for small and medium-sized enterprises). At the state-level, there are two major agencies, the *Araucária* Foundation and the *REPARTE* **(**in the latter case, a state network of technology incubators) (see table 3.8).

Table 3.8 Main agreements established with other institutions – UEL.

Agencies	Origin of the agencies (regional, state, national, international)	Joint action of R&D	Year of beginning of the action
CNPQ	NATIONAL	agreement established	2000
FINEP	NATIONAL	agreement established	2000
SEBRAE	NATIONAL	agreement established	2000
FUNDAÇÃO ARAUCÁRIA	STATE	agreement established	2000
REPARTE	STATE	Partnership	2000

Source: Proplan-UEL.

Although the UEL claims to have an agency devoted to the transfer of research results to the community (OTRPC) and sees this stage as part of research activities, the values that the OTRPC has received from the budget in recent years is not given. Nonetheless, the UEL has stated that in terms of relations with firms and institutions, the largest amount of the OTRPC's time has been devoted to its relations with regional entities (see table 3.9).

Table 3.9 Percentages of ORTPC time devoted to other institutions (UEL)

Level	**Percentage (%)**
Regional	60
State	20
National	15
International	5

Source: Proplan-UEL.

On the other hand, although there is a dearth of precise information, the UEL had stated that close to 32% of research carried out by the university is oriented toward the state of Paraná and/or the Londrina region. This statistic can be considered significant since there is no specific incentive given for research that focuses on themes of regional or state influence.

State University of Maringá - UEM

Although the UEM does not dispose of detailed information on its own budget, the tables presented below (3.10 and 3.11) supply some data regarding how much the university disburses on research. Table 3.10 gives us a specific view of the general budget of the UEM and its disbursements for research, which in this case have no other sources of financing. In this regard, it can be noted that in spite of the increase in the overall budget and the almost- doubled funds spent specifically on research in the 2001-2005 period, the percentage spent on research in relation to the university budget has changed very little, that is, in 2001 it constituted 3.1% and in 2005, 3.3%. Something that is worth emphasizing is the fact that this percentage decreased between 2002 and 2004.

Table 3.10 Evolution of the Overall Budget and of Spending on Research at the UEM, 2001-2004.

YEARS	BUDGET	RESEARCH
2001	110,449,421.00	3,404,399.21
2002	143,289,418.00	3,838,621.83
2003	157,874,448.00	2,970,729.23
2004	172,969,980.00	3,703,674.49
2005	194,148,429.00	6,331,798.65

Source: Authors' elaboration using UEM data.

According to table 3.10, the UEM devotes part of its overall budget to research activities. However, this is a small percentage and insufficient for the realization of all the research that is necessary. For these reasons, the university draws on external sources of funding, according to data displayed below in table 3.11. The first aspect to be emphasized is the fact that the UEM has no international financing, neither private nor public. The second aspect deals with the issue that the R&D activities carried out at the university are financed with public resources from the region, and from the state of Paraná, mainly through the *Araucária* Foundation and the Management Unit of the Paraná Fund (*UGF***),** as well as from the federal government, through its support agencies. It should be emphasized here that resources from the region and from the state of Paraná make up almost half of all funds coming from federal sources (see table 3.11).

Table 3.11 Evolution and Origin of External Financing for R&D Activities at the UEM, 2000-2004.

	Public Financing (Millions of R$)			Private Financing (Millions ofR$)		
Year	**Regional /State**	**National**	**Internacional**	**Regional/ State**	**National**	**International**
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	1,243,773.54	7,533,536.25	-	-	-	-
2003	4,700,669.27	9,488,383.12	-	-	-	-
2004	7,096,942.33	13,220,991.98	-	-	-	-

Source: Authors' elaboration using UEM data.

Research activities at the higher education institutions in the Maringá sub-region are carried out only by the UEM, a public state university that not only maintains a

physical infrastructure but also human resources that are far superior to those of the private institutions of higher learning in the region. Private institutions of higher learning tend to focus their interest on the supply of undergraduate programs, post-graduate "specializations" and programs of "education at a distance", all of which favor short-term return on investments. This is certainly the case for the CESUMAR, the largest and most important institution or private higher learning in Maringá. R&D investments demand time and heavy investment, aspects that frequently conflict with the short history of existence that characterizes private HEIs today. This is certainly the case for the CESUMAR itself, which has been in existence for just 16 years.

Although the UEM does not have data regarding the portion of its budget destined to each one of the scientific areas to which it is devoted, in itself a sign of the institution´s fragility regarding management capacities, information obtained from university authorities indicates that somewhere around 40 % of the research carried out deals with issues of regional and state interest. The basic explanation for this percentage lies in the areas that the state government agencies of support for research prioritize, through the *Araucária* Foundation and the UGF, both of which are accountable to the SETI. These agencies finance research in such specifica areas as agriculture and animal husbandry, family farming, cooperativism, local productive arrangements, public health and genetic development of livestock and crops.

It is certainly no easy job to determine to what extent the research developed at the UEM is responsive to the region´s socioeconomic demands. In spite of the lack of available data in this regard, the information that we obtained shows that the university has devoted significant effort to attend to regional needs, and the above-mentioned areas of research serve as testimony of this, to the extent that they are identified with local and regional demands. Further testimony is provided by the fact that entities working in the area of geography have been the ones to sign contracts with the UEM for the development of R&D projects. In this regard, table 3.12 is clearly demonstrative of the significant synergy connecting the UEM to local and regional agents.

Table 3.12 – Number of R&D Project Contracted by Public and Private Entities, 2000-2004.

	Enterprises and Private Entities			Public Entities		
Year	Regional/ State	National	International	Regional/ State	Nacional	Internacional
2000	80	18	-	178		-
2001	204	-	-	33	37	-
2002	12	-	-	10	6	-
2003	85	-	-	21	20	-
2004	69	-	-	37	22	-

Source: Authors' elaboration using UEM data.

The numbers is the table above show that the UEM is concerned with responding to regional needs. Nonetheless, it is important to emphasize that those who head the university have recognized that, in general, the research projects developed within the UEM take regional demands into account only to the extent that this is demanded by agencies providing financial assistance or by university institutions. Another important issue that must be emphasized is that there are no institutional incentives for professors and researchers to do work on topics that are of regional interest.

3.2 Structural conditions for the promotion of research and innovation.

In Brazil, there are two general structures for the promotion of research and innovation: one at the national level, which is the Ministry of Science and Technology (MCT) which through its support agenciues, CNPq and FINEP, develops a fundamental role; secondly,

there are those that exist at the state level, where most often the state secretariats of science and technology are those that are primarily responsible for the elaboration and implementation of Science and Technology policies.

At the federal level, the MCT has played an extremely relevant role in providing leadership for the country´s Science and Technology policy. Areas of priority are established and financial resources are provided in order to meet established goals. Usual MCT procedures involve the creation of public calls for projects, for areas that are considered preferential, with the projects selected from the pool of what is received chosen according to criteria of scientific pertinence and relevance. Although these researches are usually related to specific themes of national interest, there are cases of convergence of interests in which national themes are also relevant to specific regional problems.

In the case of the state of Paraná, the SETI is the organism that is responsible for the conception and implementation of state Science and Technology policy and in order to reach its specific goals, makes use of two particular agencies of support: the above mentioned *Araucária* Foundation and the *UGF***.** The SETI, in establishing Science and Technology policies, determines the priority areas for the State; support agencies must provide the necessary financial assistance for the projects that are considered essential for regional development. In this regard, the areas of governmental interest, the rules that are to be followed and the values that are pertinent to each of these areas of research are made explicit in public calls, which are elaborated and disseminated to researchers of all institutions based in the state of Paraná. The research projects that are chosen are selected by the scientific committees of support agencies according to scientific criteria that are established and stated in the public calls.

It is within this context that researchers at the institutions of higher learning of the northern region of the state of Paraná (and of the HEIs in the rest of the state) carry out their researches and, at the same time, establish a relationship with their milieu. In regard to this issue, there are two common instruments, university-enterprise collaboration and patent production, that either remain unexplored or are only considered very minimally. Regarding the first case, there is no specific program in existence designed to facilitate exchange between university and private firm researchers.

The State University of Londrina - UEL

The way in which universities deal with the problem of patents is illustrative of the internal incentives to research group creativity. In the case of the UEL, resolution number 1312/88 establishes the rules and the treatment given to intellectual property within the institution. Article 2 of the resolution disposes of the financial benefits in the following manner: 33% for authors, 14% of the UEL central management, 20% for teaching, research and university outreach, 33% to the departments or units to which the authors belong. See Table 3.13.

Table 3.13 Proportional distribution of resources originating in patents, UEL

Authors	33.0
UEL Central management	14.0
Teaching, research and university outreach	20.0
Department/units to which the authors belong	33.0
Total	100.0

Source: Resolution nº 1312/88, UEL.

On the other hand, since 2003 there has been a resolution that is additional to and complements resolution 1312/88 regulating intellectual property (covering patents of

invention and models of utility, registry of industrial design, brands, copyrights, etc.) at the UEL (CA nº 251/2003). This determines the participation of professors, technical and administrative staff and students in the financial benefits resulting from projects and activities developed during the exercise of functional activities or with the resources, data, means, information, material, infrastructure of equipment of the institution that belongs to the University, reserving the condition of author, inventor or improver of a work or product. This position, in turn, may be shared with other institutions, according to formal juridical instruments.

In addition to these resolutions regarding the attribution of intellectual propoerty at the UEL there is also an organ that has specific responsibility for the area. The Bureau of Protection of Knowledge in the UEL was created in 1997 and since the year 2000 enjoys resources from the CNPq/FINEP and since 2002 from the TIB Call for Project. It maintains the following goals:

- Cultivate awareness regarding the importance and need for intellectual protection;
- Provide orientation regarding the forms and procedures for the protection of intellectual work.
- Provide technological information and incentive for the development of new technologies and;
- Stimulate and promote the application of competences that exist in the UEL, for greater interaction with society.

The target public is the UEL community of faculty, students and technical and administrative staff. At present the Bureau for the Protection of Knowledge has 4 team members: a coordinator, 2 technical staff members and a secretary.

From the situation that we have described above we are able to perceive that intellectual production in the UEL is more linked to the institution than to its authors, insofar as its financial benefits are concerned. On the other hand, support for the safeguarding of this production still seems insufficient (given the fact that the organism providing such support has only 4 staff members

On the other hand, incentives for and obstacles to the relationship between the University of Londrina and firms are seen differently according to regional actors. The UEL considers as incentive the infra-structure it offers for R&D (researchers, laboratories, information resources, etc.) in alliance with the respect and reputation it maintains among the Londrina area population. As far as obstacles, the UEL names its organizational deficiencies, such as the precarious nature of activities carried out by the Division for Information and Transfer of Technologies (DITT), the department that is responsible for interaction with firms. The DITT lacks both the human and financial resources it would need to become truly effective, notwithstanding the efforts that the UEL administration has been making.

In spite of administrative and organizational obstacles, there are also cultural barriers that are encountered within the institution. For example, for the majority of researchers and technical and administrative staff, knowledge that is produced must be disseminated under any circumstances, even when the research results in technological development. It does not seem to be understood that this knowledge has a value that can and should be appropriated by the university or by those who finance it. Another cultural barrier regards the relationship between researchers and entrepreneurs, which is not seen as a business venture. Thus, this relationship is treated in the same way as the partnerships existing between different departments of the UEL itself which as we have just pointed it, is a cultural problem. Furthermore, it is recognized that the existing legislation in this area is almost always used to facilitate bureaucratic procedures surrounding research within and outside the university, that is, applied to goals and means but not to the ends of research.

When speaking with entrepreneurs, the answers regarding the UEL and its self-image are somewhat conflicting. For all of them, the university is an important partner and enjoys great prestige. Nonetheless, when questioned regarding the activities that they have carried out in partnership and the concrete experiences that they had in dealing with UEL procedures, most gave the response that they have not yet had such experiences and would not know how to proceed in order to engage in a cooperative venture or carry out a joint project. The general doubt that arises from these answers is what then could be the real importance of such a partnership between university and entrepreneurs?

With regard to those few that did have experiences to report, their complaints are more reminiscent of the UEL's own self-evaluation of existing cultural obstacles: operational difficulties from the very first contacts, the enormous amount of bureaucracy involved in the writing of contracts; not meeting deadlines and so forth.

The University of Londrina has some programs whose goal is cooperation with private sector firms. Each has its own characteristics but one point that they have in common is a common reference to the low availability of resources.

One of the most important programs is the INTUEL (the UEL International Incubator for Technologically-Based Firms). This program has obtained a number of things from the university: physical space, electric power, telephone, internet, water, security, resources for the organization and realization of events, collaboration and supervision provided by faculty members. It is also providing for a gradual centralization of other programs existing at this university.

Another program is that of the "Junior Entrepreneur", destined for university students. It also receives physical space, electric power, telephone, Internet, water, security, resources for the organization and realization of events, collaboration and supervision provided by faculty members from the institution for the students who participate in the program.

The DITT offers the "Disque Tec" information service to the entrepreneurial community. Disque Tec offers technical information (solutions to technical problems) to small and medium-sized firms, or potential entrepreneurs. This activity makes use of UEL faculty, in particular researchers from different areas and information resources, such as the CAPES Gateway Access to Publications. This service brings the entrepreneurial community closer to the university and tends to generate new demands. Attempts to access this division were unfruitful. There is no sign of its existence through the IEL website and none of the entrepreneurs who were interviewed made reference to it.

ITEDES (Institute for Technology and Social Development) is a private non-profit organization and declared institution of public utility that has its headquarters at the UEL. Its goals include the integration of various UEL departments, as well as the integration of the UEL with other HEIs and research institutions and with the community at large.

There is also the FAUEL (Foundation of the State University of Londrina). Its role is to provide assistance to the UEL in dealing with papers and partnerships with other institutions and social actors. As a "foundation" it is albe to act with more legal and administrative agility in the establishment of contracts. Nonetheless, although more flexible than the university structure, these foundations still face problems regarding bureacratic functions.

On the other hand, there is no concrete program of exchange between UEL professors and researchers and firms in different sectors of the economy. The UEL has no program of this sort.

The State University of Maringá – UEM

As far as patents go, the UEM has created a specific committe e to deal with requests for the registration of intellectual property, whether patents or brands. In 1998, the patenting of inventions was regulated through Resolution nº 264/98 of the Administrative Council (CAD) of the UEM. This resolution provides for the way in which intellectual property is registered, the percentage of values resulting from patents, etc. In this regard, the Dean's Office of Research and Post-graduate Programs (PROPPG) established (through the official document nº 007/99) a Permanent Commission (COPATEN), made up of one representative of each University center or area, each of whom is made responsible for three tasks: 1) transmission of all information on intellectual property to the university community; 2) execution of all necessary procedures for patent deposit at the National Institute of Industrial Property (INPI); and 3) follow up on procedures of patent registration until final registry is obtained. The goal of this commission is to coordinate procedures for requesting patents, models of utility and the concession of industrial registry for products and works developed by UEM faculty.

During the period covering May 1998 to May of 2006, UEM faculty deposited a total of 26 patents. According to table 3.14, patent registration underwent a significant increase as of 2004, which seems to indicate that there has been a certain "raising of consciousness" of the researchers regarding the importance and need for intellectual protection, beyond the fact that the university is supposedly improving its channels of communication and incentives for the development of new technologies.

Table 3.14 - Nº of UEM Patents, 1998-2006

YEAR	Nº. of PATENTS
1998	1
1999	1
2000	3
2001	-
2002	2
2003	1
2004	5
2005	10
2006 (until May)	3
TOTAL	**26**

Source: Authors' elaboration using UEM data.

There are some important issues that should be emphasized regarding university-enterprise collaboration. Information obtained through our research reveal that the exchange is considered positive and desirable on both sides. From the university's point of view, the most salient gains are the acquisition of extra resources to finance new research, the incorporation of undergraduate students that stimulates practical learning and facilitates future entrance into the labor market, extra remuneration for researchers and the facilitation of new forms of cooperation as well increased practical knowledge of technologies used in the productive sector.

The relationship between universities and firms always involves problems and information obtained in our research confirms the existence of several types of obstacles that make greater collaboration between the HEIs of the region and the productive sector difficult. Among the major obstacles, the following stand out:

- Different "world views" in the two types of institutions regarding the realization of R&D projects, since their notions of time and of costs tend to be quite distinct. Furthermore, the firms seem to harbor a strong notion that the research carried out within the university is meant only to serve the academic world and is therefore not applicable to the "real world" in which practicity is essential;
- The low value that firms tend to place on researchers' work. This difficulty is associated with the fact that the small and medium-sized firms (which make up the majority) in the region have a budget which is not flexible enough to deal with onerous expenses, such as those pertaining to research;
- There are legal impediments within the universities that do not allow researchers who are full–time faculty to receive additional earnings beyond that which is stipulated by state law (nº 11,5000). Most researchers at the UEM seem to agree that the "entrepreneurial spirit" was greater before such legislation was implemented;
- Excessive university bureaucracy has slowed the course from R&D project approval to execution;
- Communication between regional HEIs and the world beyond is weak, to the extent that information on the existing potential as well as activities developed within the gates of the university does not reach the rest of society. The UEM's "**Guia de Fontes" (**Sourcebook) is an attempt to improve channels of communication with the rest of society. It aims to make the UEM abilities, services and consulting known to the community.

3.3 Instruments facilitating knowledge, exploitation and transfer.

State University of Londrina – UEL

Although UEL has an interest in promoting technology transfer and the commercialization of knowledge with other socioeconomic actors, the UEL has practically no mechanisms to facilitate this. The only instrument of this sort is the firm incubator, INTUEL. Even so, this incubator which began with 17 firms in 2001, four years later it had only 4 firms (see table 3.15).

The most flexible mecanism that the UEL has at its disposal is the FAUEL, a foundation associated with the university. The university does not have science or technology park.

Table 3.15 Instruments for promoting transfer of technology, UEL, 2000-2004.

Instruments – Atividade Total	**2000**	**2001**	**2002**	**2003**	**2004**
R&D contracts					
Technological Support and consultance					
License for patents					
Establishment of firms*		17	04	05	04
Contracts for activities with little demand					

Source: Proplan – UEL.
*Firms incubated in the INTUEL.

There is no structured offer of technology at the UEL. To promote its technological offer the UEL uses its website (http://www.uel.br) and the calls that are published in newspapers with local and national circulation, including, when the legislation permits, publication in the official government press (*Diário Oficial da União*). However, when consulting the site the only relevant information available is the INTUEL link. The rest of the site deals primarily with internal university matters.

The INTUEL was created with the support and cooperation of a variety of institutions and private enterprise. On the other hand, cooperation with other actors has been largely restricted to government support agencies, among which we can mention:

National Council for Scientific and Technological Development (CNPq) - This organ provides project development to entrepreneurs and technological centers through the concession of grants and fellowships to researchers for approved projects.

Brazilian Agency for Small and Medium Size Companies (SEBRAE) - This organization incorporates an entrepreneurial view in the partnerships it establishes, with a history of market experience primarily geared toward micro and small firms and for the potentialization of emergent ones. It has put out calls for and approved important projects such as one which aims at the commercial leverage and business expansion and involvement of stakeholders interested in acquiring the innovative products offered by the firms that belong to the UEL's International Technological Incubator.

Federal Financing Agency for Studies and Projects (FINEP) - A federal government partner that has played an important role with calls for projects geared toward technological innovation in the areas of Biology, Medicine and Fuels as well directly related to technological innovation, including production of games and software development.

Araucária Foundation – A State Government partner that has demonstrated a wide range of interests through its calls and has contributed directly to disseminating and developing entrepreneurial consciousness and technological innovation, participating with resources destined to mobilize incubators and technological parks through the investment of non-reembursable resources for the realization of entrepreneurial events and workshops. It has thus worked at a national level in the service of a network of incubators and technological parks.

Representative Luiz Carlos Hauli – as municipal and state level representative, Hauli has demonstrated the importance of this partnership, working for joint actions together with the federal government that will strengthen the bonds between government and technological and academic institutions like the INTUEL and the UEL. He has been present in events promoting entrepreneurial and technological vision and contributing to the work of the above-mentioned institutions by liberating non –reimbursable resources that have been used by these institutions for developments involving entrepreneurs, researchers, professors, collaborators and sectors of society linked to the incubator and the university.

Paraná Network of Incubators and Technological Parks (REPARTE) - A civil network that receives support from the State Government, whose goal is to collect and disseminate existing experiences from the state of Paraná, providing opportunities for new knowledge, training and exchange of experiences with other incubators and technological parks. It has also contributed for the transfer of knowledge and the widening of entrepreneurial vision.

Strictly speaking there is no efficient mechanism in the region that enables the universities of the area to disseminate the results of their research and/or of their competence and potential. Anyone who wishes to know how a particular university may help her/him in solving a problem will encounter major difficulties in receiving an answer.

There are two major institutes for research in the area of agro-business operating in Londrina, the IAPAR and the EMBRAPA/SOJA,[15] both of which are quite influential in the generation of technology and incentives to innovation in economic activities in the region. The IAPAR (Paraná Institute of Agronomy), an institution belonging to the state government, is linked to the state´s secretariat of agriculture and provisions. This institution coordinates all agricultural research developed within the dominion of the secretariat. It employs around 145 professionals in the area. 80% of them hold masters or doctoral degrees.

[15] ADETEC,

The EMBRAPA/SOJA is a unit of the Brazilian Institute for Agricultural Research, a federal government institution devoted to research on the soy crop. It employs around 70 researchers, all of whom hold masters and doctoral degrees.

These two institutions are always used as examples of the possibilities for public institutions working together with the productive sector and for the importance of their laboratories in providing service to the community. These entities, given their character, are noted by entrepreneurs for their visibility. Although it is known that they maintain a certain degree of interaction with the UEL this was not made clear to us during our research

State University of Maringá - UEM

The UEM has made considerable efforts over the last few years in order to improve its channels of communication with society. Although, as we have mentioned above, there are a number of obstacles that have made a better relationship between universities and firms difficult to achieve, it is also true – and is worth emphasizing - that the institution is aware of these problems and has acted in such a way as to overcome them.

One mechanism that facilitates the transfer and exploitation of knowledge that exists in the UEM is an organ for the transfer of research results to the community, the OTRPC, or Bureau of Business, which has been recently created. In spite of the lack of data related to this newly-created bureau, the fundamental issue here is that its creation is in fact a response to the UEM's need to have more intense contact with the external milieu.

In addition, the UEM has also developed another mechanism i.e. the technological incubator. The basic idea here is to develop new facilities with the goal of offering better services. The Maringá technological incubator works in two phases: pre-incubation and incubation. The first is destined to provide support to entrepreneurs in the implementation of new businesses, a stage that can last as long as 24 months in which firms set up business in a shared physical space and use services made available at very moderate cost. The second stage (incubation) has as its goal the provision of necessary support for generating and developing processes, goods and services based on technologies, in which entrepreneurs receive all the supervision they need in terms of marketing, sales, consulting and training so that after 24 months of incubation they can act independently in the market.

At present the UEM technological incubator has one firm in the pre-incubation phase, 10 in incubation phase and 9 that have reached the final "graduate" phase which means that they have left incubation, having reached sufficient maturity to enter the market and act independently and with competence.

Another existing mechanism is the Maringá Technopolis Institute (ITM) that is in its final stage of implantation and was jointly created by 12 entitities, in addition to the UEM and Maringá City Hall, with the goal of establishing and promoting the development of the Technological Park of Maringá, which is called Technopark. The Technopark covers such areas as bio-technology, fine chemistry, information technology and agro-business, and its infrastructure (basically, an area where firms, incubators and laboratories can be set up) was built with the goal of attracting technology-based firms to Maringá. One important aspect here is the fact that the UEM not only participated in the creation of the ITM but that it will also occupy physical space within the Technopark.

3.4 Conclusions

State University of Londrina - UEL

Although the discourse is one of collaboration and partnership with the UEL and other regional organs and actors geared toward contributions to regional development through research, in reality serious barriers to this collaboration have emerged. In spite of these problems, there are some examples of attempts to overcome them do, as is the case of the

approximation to the IAPAR with the intention of a future partnership in projects of support for innovation; the Londrina Technopolis project, focusing on the "Francisco Sciarra Technological Park", represents a partnership between the UEL, Londrina City Hall other entities.

In the UEL´s own evaluation, its strengths and weaknesses related to the forms in which its research contributes to regional and state innovation are as follows:

- **Strengths/opportunities:**
  - Largest university in the northern region of the state of Paraná
  - Credibility in teaching, research and university outreach benefitting the entire region
  - Great social and economic potential for the whole Londrina area
  - Development of nationally-recognized research
  - Highly qualified researchers
  - Research groups registered in the national research agency CNPq, in a variety of areas
  - Information resources available at the University (library, digital library) and available for on-line access (national and international data banks and bases; CAPES electronic gateway for access to periodicals
- **Weaknesses/potential threats:**
  - Insufficient resources for research and innovation
  - Lack of interaction with firms
  - A culture that is geared primarily towards scientific communication
  - Researchers' lack of interest in staying informed on legislation regarding innovation and intellectual property
  - Researchers' relationship with private enterprise is based on "exchange of favors"

The second workshop carried out with the participation of members of the UEL and its community of users made the following points regarding the contribution of UEL research activities for regional innovation:

- **Strengths:**
  - Wide variety of courses
  - Centers of innovations (INTUEL and others)
  - High number of researches
  - Center of research and technology development
  - Consolidated institution, human resources and infrastructure
  - Development of methodologies appropriate for regional development
- **Weaknesses**
  - Scientific production "placed on the back burner"
  - Lack of a "culture of innovation"
  - Neglected infra-structure
  - Structures not prepared to deal with private initiative
  - Lack of programs able to attend to market demands (public administration, chemical engineering, mechanical engineering, food industry engineering)
  - Low level of interaction with the productive sector
  - Cumbersome and corporatist structure
  - Lack of interaction between public and private universities
  - Lack of interaction of post-graduate programs (research) with other regional R&D institutions

- **Opportunities:**

- University transforms regional reality
- Law on innovation
- Federal innovation law
- State law on innovation under discussion
- Creation of free software
- Market need for the search for innovation
- Form of putting public universities to work in service to community
- Pro-active ways of participating in the *Arco Norte* project
- UEL participation in regional integration movements (Forum on "Development and Purple Earth")
- Broadening the relationship between UEL and the productive sector
- Autonomy

- **Potential Threats:**
  - Other public and private institutions occupying UEL space
  - Dependence on public resources
  - Loss of human resources that migrate to other centers
  - Duplication of research

There are no great discrepancies between the evaluation produced by the UEL itself and the one produced in the users' workshop. Both cite the number and high level of qualification of researchers as providing great potential. On the other hand, both coincide in their observation that there are difficulties regarding cooperation with the community, resulting from bureaucracy and institutional culture. Furthermore, in answers on questions regarding potential threats, we perceive an emerging awareness that if the university is not able to comply well with what is expected of it, other institutions will come in to take its place.

State University of Maringá – UEM

- **Strengths:**
  - The UEM has grown stronger over the last years. It has a qualified faculty body that has produced applied and basic research, gaining national and international recognition in a number of areas.
  - The UEM has provided consulting services and has acted very intensely within the region.
  - The UEM, conscious of its difficulties in relating to enterprise, is making an effort to overcome existing obstacles, improving existing channels of communication with the exterior.
  - The UEM has been evolved in local and regional issues (within its area of influence).

- **Weaknesses:**
  - Mechanisms for the transfer of research results are only incipient.
  - Paraná state legislation geared toward public universities exercises limitations on its researchers' initiatives, insofar as they do not feel stimulated to establish partnerships with private initiative.
  - A model and structure for providing incentives for and facilitating collaboration between the UEM and private firms remains to be put together.
  - Collaboration with firms is, in most cases, limited to supplying services.

- **Opportunities:**

- A greater integration with the external environment can generate new possibilities for research, as well as increasingly attend to regional demands.
- Science and Technology policies implemented by the SETI can stimulate the UEM to maintain a larger number of R&D projects, widen collaboration with the productive sector and, consequently, make it clear to all that R&D activity is an essential part of university production.

- **Potential Threats:**
  - Tendency for disencounters between the need for ever greater scientific production, as demanded by the MEC itself through the CAPES, the support agency that regulates all post-graduate education in the country, and regional demands. This instability is linked to the difficulties involved in reconciling academic production with tne need to attend to specific demands.
  - Pre-conceived notions existing on both sides, that is, in the university regarding the productive sector and vice versa, can emerge if an effort to combat them is not made. This would in turn become a major obstacle for UEM integration with the external milieu.
  - Uncertainty of future financing can interrupt or delay efforts made to improve scientific infrastructure and the number of R&D projects, the majority of which are geared toward regional demand.

CHAPTER IV CONTRIBUTION OF TEACHING AND LEARNING TO LABOR MARKET AND SKILLS

4.1 General Portrait of Learning Processes

Higher education, particularly in relation to professional training, is divided along four major axes: a) undergraduate programs;b) two year specialization courses; c) extension courses and d) post-graduate programs. As far as undergraduate work is concerned, the main goal of existing programs is to form professionals both for academic careers and the labor market, with three types of degrees awarded: 1) the "bachelor´s degree" that enables the graduate to exercise a liberal or scientific profession at that first level; 2) the title of **"***licenciado***"** which is a degree that includes teaching certification and enables the graduate to work at a variety of educational levels, ranging from early childhood and primary school education to junior high and high school teaching; 3) a "vocational" or technical degree, involving less than the four years of undergraduate higher education and qualifying its bearers to work within specific areas of the labor market. The two year "post-secondary" courses or continuing education programs have as their goal the widening of knowledge or professional qualification of those who possess a high school diploma. The Secretariat of Higher Education (SESU)[16] emphasizes that the latter type of program should not be confused with traditional undergraduate programs, but rather seen as an alternative in continuing education for those who do not desire or feel they do not need a traditional undergraduate program of study. There are two basic types of programs of this sort in existence: a) those in a specific area, which require MEC authorization and recognition and which award diplomas and b) Continuing Education, which does not require MEC authorization and recognition and awards only certificates, which do not hold academic value. Extension courses, in turn, are of an eminently social character, must be offered through HEIs and emit only certificates of non-academic value. For this reason, they require no MEC credentials or authorization, and require only that HEIs assume responsibility for their implementation.

Post-graduate work is divided into two distinct categories: a) *Lato sensu (broad sense)* and b) *Stricto Sensu (strict sense)***.** The first category includes "specialization courses", courses for professional improvement and courses designated as MBA (Master of Business Administration) or equivalent. These courses have as their primary goal academic or professional improvement, must cover a minimum of 360 credit hours, and award certificates to those who have completed them. Although these programs do not require MEC authorization and recognition and renovation of credentials, they are obliged to meet with criteria put forth by CES/CNE resolution n.1/2001 which establishes the norms for their functioning

The primary goals of "strict sense" post-graduate work are to continue scientific and academic training of students who already possess an undergraduate degree. In this regard, each Master´s or Doctoral Program is evaluated separately, every three years, by the CAPES (Federal Agency for Training and Development of Higher Education Academic Staff), an agency which is under indirect management by the MEC. The academic Master´s Degree lasts two years and the doctoral degree, four; all programs must obtain a minimum evaluation of 3.0 on the CAPES scale of one to seven, in order to obtain and maintain recognition.

In 2004, public universitieis in the state of Paraná absorbed a contingent of 72,225 students, of whom 13,954 were registered in undergraduate programs at the UEL and 12,576 in undergraduate courses at the UEM representing 19.3 and 17.3 % of the total, respectively. Taking into account the fact that the UNESPAR is actually a conglomerate of 12 state colleges and not a university, we can assert that the UEL has the highest number of undergraduate students registered and that the UEM ranks first in number of undergraduate courses offered. It should be noted here that the UEM and the UEL together offer 31.8% of the

[16] The SESU is the branch of the MEC that is responsible for planning, orientation, coordination and supervision of the processes of formulating and implementing national higher education policy.

total of existing programs for the six public state-run universities and 36.7% of the total of students registered at these universities (see Table 4.1).

Table 4.1 - Number of Undergraduate Programs and Student Registration in Public HEIs in Paraná, 2004

Universities	Courses	Number of Students enrolled
UNIOESTE	35	10,088
UNICENTRO	31	8,078
UEL	39	13,954
UEM	42	12,576
UEPG	30	9,119
UNESPAR	78	18,440
TOTAL - IEES-PR*	**255**	**72,255**

Fonte: SETI, 2005.
Obs: IEES-PR –State-run Higher Education Institutions - Paraná

State University of Londrina – UEL

The undergraduate programs at the UEL are not structured according to basic and complementary cycles. Each course has its own Political-Pedagogical Project, with activities geared specifically toward its development from the start. In general terms the programs last for four years. In the year 2004, almost half of all matriculated students were in programs in the Human Sciences and Applied Social Science programs (Table 4.2).

Table 4.2 Students Matriculated by Major Areas of Knowledge – UEL-2004

Area	Number of Students enrolled	%
Humanities	4,275	30.3%
Exact and Natural Sciences	1,203	8.5%
Applied Social Sciences	3,428	24.3%
Technological Sciences	2,667	18.9%
Health Sciences	2,559	18.1%
Total	14,132	100.0%

Fonte: UEL-Proplan.

On the other hand, Table 4.3 shows the distribution of student matriculation in 2004 by programs. The programs with the largest number of students are Law (8.8%) in first place, Physical Education in second place (6.1%) and Business in third place (5.7%) Agronomy,

a program which attends to one of the region´s primary sectors, is 11th in ranking with only 3.0% of the total of matriculated students.

Table 4.3 Students registered by Programs – UEL, 2004

Courses	Number of Students enrolled	Percentage of Students enrolled
Administration	810	5.7
Agronomy	423	3.0
Architecture and Urbanism	329	2.3
Archivology	155	1.1
Scenic Arts	139	1.0
Biblioteconomy	209	1.5
Biomedicine	81	0.6
Computer Science	181	1.3
Science of the Sport	120	0.8
Biology	307	2.2
Accounting	623	4.4
Economics	585	4.1
Social Science	434	3.1
Journalism	173	1.2
Public Relations	172	1.2
Graphic and Product Design	89	0.6
Law	1,247	8.8
Arts	184	1.3
Physical Education	867	6.1
Nursing	245	1.7
Fashion	128	0.9
Civil Engineering	351	2.5
Electrical Engineering	198	1.4
Pharmacy	308	2.2
Philosophy	159	1.1
Physics	236	1.7
Physiotherapy	246	1.7
Geography	429	3.0
History	314	2.2
Letters	650	4.6
Mathematics	282	2.0
Medicine	503	3.6

Veterinary Medicine	418	3.0
Music	83	0.6
Dentistry	309	2.2
Pedagogy	686	4.9
Psychology	422	3.0
Chemistry	378	2.7
Executive Secretaryship	163	1.2
Social Work	375	2.7
Zootechny	121	0.9
Total	14,132	100.0%

Fonte: UEL – Proplan.

Information on student origin is obtained when university entrance exams are given. Table 4.4 which shows the characteristics of the student body reveals that over half of them come from the municipality of Londrina. Considering those who come from the region and from the rest of the state of Paraná, an additional almost 20% of students of local origin can be observed. Although the UEL is the university that has the highest number of out-of-state students (25.6%), we can thus say that its main sphere of influence is in the area surrounding Londrina. Table 4.4b shows the situation for the year 2005 and seems to indicate a tendency toward a growing number of students from out of state. This can be interpreted as an indication of the dissemination of this university´s positive image.

Table 4.4 Origin of Students – UEL, 2003

Origin	(%)
Local	53,63
Region	16,79
State	3,01
Rest of Brazil	25,60
Rest of world	-
Total	100

Source: UEL Profile of Student Body, 2003**.**

The UEL tries to offer assistance to out-of-town and out-of-state students. For this purpose, it runs the SEBEC (Service for University Community Well-being), made up of Social Workers, Doctors, Dentists and other helping professionals, responsable for the selection of students who will be allowed to reside in the UEL student residence while studying at the institution. In addition to housing for needy students who have proven their low-income family situations, all students are eligible for medical and dental care.

In general term program structure is rigid and students have little freedom to complement course work within their area with electives in other areas. Furthermore, the transit between Brazilian and foreign universities, albeit possible, in practice almost never occurs.

Table 4.4b - Origin of Students – UEL, 2005

Origin	(%)
Local	46.51
North Region of Paraná	15.73
State of Paraná	2.11
South of São Paulo	4.36
Other regions of São Paulo	27.85
South of Mato Grosso do Sul	0.17
Other regions of Mato Grosso do Sul	0.36
Rest of Brazil	2.78
Total	100

Source: UEL Profile of Student Body, 2005.

Until the year 2004, all undergraduate programs curriculum required 5% of the minimum of total credit hours to be filled – according to existing legislation – in Complementary Academic Activities, which included student participation in projects, academic monitoring, special courses, elective courses and other activities approved by undergraduate course guidelines. As of 2005, program curriculum has been undergoing a restructuring, retaining the credit hours for Complementary Academic Activities but including elective courses as well. At this point it is not possible to quantify such activities in terms of credit hours, both because they vary from one program to another and because reforms are currently in progress. Elective courses are offered according to the availability that departments and faculty qualifications can provide. Courses taken in other institutions are accepted as long as their syllabi and number of credit hours coincide with those offered by the UEL. Academic Mobility agreements facilitate transfer between the UEL and the Federal University of Paraná, Middlesex University in England and the National Polytechnical Institute in Toulouse, France.

The creation of new courses in the UEL follows a standarized routine for all areas. The process may originate in a particular department, though the creation of new programs must be proposed by comissions belonging to "Centers of Study" (a group of departments similar to university "schools"). Initial approval comes from the Center´s council (made up of the Center´s Director, Department Heads, Coordinators of Undergraduate Study programs from the programs belonging to the Center, and student and technical-administrative staff representatives.) After this, an evaluation of resources necessary for program implantation is made, carried out by the Dean's Office of Planning (PROPLAN), which is studied by the University´s Administrative Council and finally, by the Council of Teaching, Research and Outreach.

In turn, changes in the curriculum are proposed by the Undergraduate Studies Committees, which are made up of one faculty member responsible for each course offered in the program (corresponding to 70% of all members) as well as student and technical-administrative staff representatives (corresponding to 30% of all representatives), head of undergraduate studies committee and coordinator of apprenticeships, elected by the committee. All changes must be approved by the committee and, depending on their scope, approved as well by the Undergraduate Studies Chamber (for example, in the case of a simple change in course description; changes may in some cases have to follow all the procedures corresponding to the creation of a new program if they involve na increase in credit hours, length of program

or periods in which program is offered). The superior council that must approve both the creation and the re-structuring of the Political-Pedagogical projects of undergraduate studies programs is the Council of Teaching, Research and Outreach.

Proposals for changes, particularly those of a more radical nature, often mean changes in the legislation surrounding the established "minimum curriculum" of undergraduate programs. Programs that have a "minimum curriculum" determined by the MEC (federal government) are expected to make all the necessary adaptations when changes in this minimum curriculum are made.

In general terms this is the larger motivation for changes in curriculum structure. Since in the UEL, as well as in the majority of Brazilian universities, there is no organ that analyzes the skills that graduates need for the local entrepreneurial environment, this evaluation remains the responsibility of the Committee of Undergraduate Studies. Although it is presumed that this committee is in tune with community concerns, this may not always really be the case. There is often great inertia or lack of engagement, although perhaps due primarily to the fact that mechanisms for the expression and communication of community concerns have not been created.

Programs of professional training elaborated especially to attend to specific regional needs are practically inexistent. Whatever little does exist in this vein has been developed by the Dean´s Office of University Outreach (PROEX) **.** This takes shape in the offer of "specialization courses" which correspond to what we described above as "*lato senso"* postgraduate programs.

There are no apprenticeship programs that aim specifically at facilitating UEL students´ entrepreneurial ability. Nonetheless, there are 6 junior firms within the INTUEL framework. They are listed in Table 4.5.

Generally speaking, these firms use only the university´s physical space and are able to rely on university-provided operational support (electricity, water, telephone, e-mail etc.). There are no specific funds for this program, especially because the prevailing notion is that, as an entrepreneurial activity, these firms should be financially self-sufficient. On the average, there are between 10 to 20 students involved in each. Most are devoted to matters linked to firm management and planning, and even the firm linked to the Psychology program deals primarily with issues regarding management of human resources within firms. Those linked to the area of Biology are primarily devoted to environmental issues.

Table 4.5 Junior Firms at the UEL

Name	Course	Foundation
Business Consultancy	Administration	1990
Cop Junior	Computing	1997
ECAE-UUEL	Economics	1999
Elo-Consultancy	Psychology	2003
Bioma- Environmantal Consultancy	Biology	2003
Geossistema Consultancy	Geography	2004

Source**:** www.uel.br

In 2006 there were 93 specialization programs offered at the UEL. These programs are considered to be *lato senso* post-graduate programs and usually require tuition payment. They are generally programs that demand 360 credit hours, with courses taught on Fridays from 14:00 to 22:00 and on Saturday mornings. They usually last around one year.

Students are made up of professionals with university degrees interested in some type of "re-cycling".

Although there has not been extensive market research carried out, to some extent it can be asserted that these programs reflect existing demands. They are self-financing and once offered, can be cancelled due to low enrollment. The numbers presented in Table 4.6 show that the majority of the programs offered in 2006 (around 40%) refer to Leisure and Others (basically courses in the Humanities). Just three programs in Agro-business were offered. Given the importance of the latter for the region´s economic base, we could expect a larger demand to exist. This limited number may, however, be associated with the high costs of organizing programs in this area, the inadequate nature of what is offered, or perhaps even with a simple lack of interest in offering them on the part of the university. This implies that the institution is only attending to a part of the existing demand for continued professsional studies and training.

Information on the type of students who enroll in these programs and their origin is not available. In general terms, according to statements made by professors, they include both the recently graduated and professionals working in private firms and government agencies located within the region.

Table 4.6 Specialization Programs at the UEL (*lato senso* postgraduate programs), 2006

Areas	Number of Courses	Number of Credits	Number of Students
Agribusiness	3	360 hours The Lectures, in general, are given on Fridays and Saturdays.	The number varies between 20 and 70 students
Industrial Technologies	7		
Information and Communication Technologies	7		
Construction and Civil Engineering			
Environment	1		
Tourism			
Public and Entrepreneurial Management	16		
Health and Social Work	23		
Leisure and Sports	6		
Others	30		
Total	93		

Source: www.uel.br

On the other hand, the postgraduate programs are those with greater academic content.

Table 4.7 Master´s Degrees Programs at the UEL 2006.

Course	Number of places	hours	Level assigned by CAPES (*)
- Administration	12	900	-----
- Agronomy	45	1,500	4
- Behavior Analysis	10	930	3
- Biotechnology	15	900	4
- Veterinary	20	1,260	5
- Nutrition	16	1,125	5
- Biology	14	1,200	4
- Social Science	15	960	-----
- Business Law	20	780	4
- Pedagogy	30	720	3
- Sports	13	720	3
- Electrical Engineering	14	960	3
- Civil Engineering	12	960	3
- Science and Mathematics	20	960	4
-Portuguese	10	870	4
- Physics	10	1,500	5
- Genetics	20	1,125	3
- Geography and Environment	23	1,050	3
- Languages	20	810	4
- Medicine	20	1,125	3
- Microbiology	15	1,200	4
- Pathology	13	870	4
- Chemistry	36	1,125	3
- Public Health	16	1,035	4
- Social Services	14	945	3

Fonte: www.uel.br (*) Institution of the Ministry of Education that evaluates undergraduate programs. On a scale in which the highest value obtained is 7.8/25.

Table 4.8 Master´s Degree Programs at the UEL by Thematic Area

Areas	Number of Courses	Anual number of places
Agribusiness	3	81
Industrial Technologies	5	95
Information and Communication Technologies		
Construction and Civil Engineering	1	12
Environment	1	23
Tourism		
Public and Entrepreneurial Management	2	32
Health and Social Work	5	78
Leisure and Sports		
Others	8	132
Total	25	453

Source: Elaborated from Table 4.7

It is not possible to determine whether the post-graduate programs ("strict sense" master´s degrees) were created to cover specific regional demands. However, analyzing their composition through tables 4.7 and 4.8, we note a greater pertinence to the regional economic base. For example, more than 30% of the programs pertain to the area of Agro-business and Industrial Technologies. The same can be said regarding the doctoral programs presented in Table 4.9 and 4.10. In the latter, links to the area of Agro-business are even greater.

Table 4.9 - Doctoral Programs at the UEL

Course	Number of places	hours	Level assigned by CAPES (*)
Agronomy	25	2250	4
Veterinary	10	2400	5
Nutrition	14	2100	-
Letters	10	2385	4
Physics	6	2280	5
Literature	7	3405	4
Medicine	10	2940	3
Microbiology	10	3000	-

Fonte: www.uel.br

Table 4.10 Doctoral Programs at the UEL by Thematic Area, 2006

Areas	Number of Courses	Anual number of places
Agribusiness	3	49
Industrial Technologies	1	6
Information and Communication Technologies	-	-
Construction and Civil Engineering	-	-
Environment	-	-
Tourism	-	-
Public and Entrepreneurial Management	-	-
Health and Social Work	2	20
Leisure and Sports	-	-
Others	2	17
Total	**8**	**92**

Source: Elaborated from Table 4.9

Table 4.11 presents a synthesis of UEL post-graduate programs in existence in 2006. There are an expressive number of specialization programs that can be described as "continuing professional training". However, a large number of these programs pertain to the area of Health, a consequence of their link to the University Hospital. Since this hospital receives funds from other instances of government, it has a dynamic that distinguishes it from the rest of the University.

Table 4.11 - Synthesis of the Post-graduate Courses at the UEL, 2006

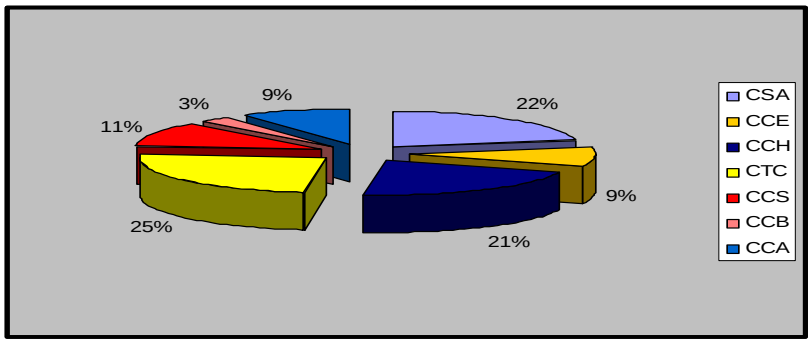
Types of Courses	Number of Courses	Total of Students enrolled in May, 2006
Specialization	96	2046
Master	25	880
Doctorate	8	251
Specialization – Medicine	30	100
Specialization – Veterinary Medicine	4	30
Specialization – Physiotherapy	2	8
Specialization – Nursing	5	No data
Specialization – Odontopediatrics	1	No data
Total	**171**	**3.315**

Source: www.uel.br

The State University of Maringá – UEM

Figure 4.1 presents the distribution of students enrolled in undergraduate programs at the UEM by area of knowledge. From the total of 12,802 enrolled, it can be observed that the large part of this contingent is absorbed by three areas: the Center of Technology (CTC) with 25%, the Center of Applied Social Sciences **(**CSA) with 22% and the Center of Human Sciences, Letters and Arts (CCH) with 21%, which together make up 68% of total undergraduate student enrollment. In relation to the programs with lowest demand, the Center of Biological Sciences (CCB) is in the worst situation, with only 3% of total enrollment, followed by the Center of Exact Sciences (CCE) and Agricultural Sciences (CCA), with 9% of the total enrollment each, and slightly better, the Center of Health Sciences (CCS) enjoys 11% of total enrollment.

Fig. 4.1 – Distribution of Student Enrollment in Undergraduate Programs by Area of Knowledge, 2005.



Source: Authors' elaboration with UEM data, 2005.

Table 4.12 shows that the majority of UEM students are from the municipality itself. It is interesting to note that there are more students coming there from other parts of the country than from other corners of the state. Furthermore, there are two more issues that should be emphasized: a) the greatest demand for the university is local and regional and b) this demand is declining, given the fact that it dropped from 79% in 2003 to 73% the following year, at the same time that there was an increase in number of students coming from other parts of the country.

Table 4,12 Origin of UEM students, 2003 and 2004.

Origin	**2003 %**	**2004 %**
Local	49	44
Region	30	29
State	7	9
Rest of Brazil	13	17
Rest of the World	1	1
TOTAL	100	100

Source: Authors' elaboration from research data**.**

An important aspect to be emphasized is the creation of new programs in response to regional demands. In fact, the UEM has created some programs in order to attend to

some specific demands. Some concrete examples are, as follows: Trilingual Administrative Secretary, created in virtue of the consolidation of the MERCOSUR; Mechanical Engineering, Food Processing Engineering and Production Engineering, originating in the request made in this regard by the Maringá Development Council (CODEM) and the Commerce and Industry Association of Maringá (ACIM) as well as programs implanted in the cities of Cianorte, Umuarama and Cidade Gaúcha, established in response to the requests made by municipalities and professional and business organizations. Modifications of curriculum are determined by the National Curriculum Guidelines**,** as specified for each program, and also by changes in the profile of the type of professional that is needed and wanted.

A request made by a city hall, association of municipalities or professional or business organization is forwarded to the Department, which elaborates a pedagogical project under the supervision of the Dean's Office of Teaching (PEN) and the Office of Planning (ASP). In general, there is a comission that is responsible for the discussion of project details, in which department heads, Center directors, and the advisor of undergraduate and technical affairs of the Planning Office participate.

Programs of professional training are elaborated in order to cover the specific needs of the region, with the following as examples: three technological programs in the areas of Foods, Civil Engineering and the Environment in Umuarama; the Textile Engineering Program , one of the four of its kind in the whole country, opened in Goioerê; a Fashion Design course set up the city of Cianorte which is one of the poles of the clothing industry in the state of Paraná; and the Agronomy program in Umuarama and Agricultural Engineering in Cidade Gaúcha, set up in response to the specific soil types and agricultural aptitudes of the northeastern region of the state.

Table 4.13 - Distribution of Students Enrolled in Master's and Doctoral Courses in the UEM by Area of Knowledge, 2004

Knowledge Areas	Number of Students enrolled in Master Courses	Number of Students enrolled in Doctorate Courses
Exact and Natural Sciences	171	52
Applied Social Sciences	68	-
Agricultural Sciences	120	107
Health Sciences	115	-
Biological Sciences	58	102
Human Sciences	90	-
Engineering	38	50
Linguistics, Letters and Arts	55	-
TOTAL	**715**	**311**

Source: Authors' elaboration using UEM data, 2005.

In 1987, the implantation of the master's program in Biological Sciences and in Chemistry marked the beginning of strict sense post-graduate programs at the UEM, at which point they served as a tremendous stimulus for the creation of new post-graduate programs. Currently, the UEM has 30 post-graduate programs that have CAPES credentials, which is important for the university because it is thus authorized to emit diplomas which have validity and recognition throughout the country. Of these 30 post-graduate programs, 22 are Master's level, distributed among 8 areas of knowledge, and 8 are at the doctoral level, divided among just 4 areas of knowledge. In Table 4.13 we see that there is significant demand for programs in

the area of Agricultural Sciences, both at the master's and doctoral level. This contrasts with the situation at the undergraduate level, as we mentioned above.

Table 4.14 – Number of Master's and Doctoral Programs in Paraná and in Public Institutions of Higher Learning in the state of Paraná, 2004.

UNIVERSIDADES	Master's	Doctoral's
TOTAL - IEES-PR*	58	18
UNIOESTE	4	-
UNICENTRO	-	-
UEL	24	10
UEM	22	8
UEPG	7	-
UNESPAR	1	-

Source: Authors' elaboration using SETI data

Obs: IEES-PR* – Instituições Estaduais de Ensino Superior do Paraná

The expansion of post-graduate programs at the UEM has been the fruit of the institution's effort - with state government support - to stimulate its faculty to seek higher professional qualification. Table 4.14 shows clearly that the UEM and the UEL are responsible for 100% of all doctoral programs and 79.3% of all master's level programs offered by the Paraná state-run institutions of higher learning, which demonstrates the degree of importance that both of these public state-run universities have among the public universities in the state and for the state itself, since these public state run institutions of higher learning are amongst the best in Paraná.

4.2 Student participation in the regional labor market

State University of Londrina - UEL

As far as we are able to see there is no specific service at the UEL to facilitate graduates' labor market entrance at the local or national level. In some programs students need to complete an apprenticeship in a firm, but it is up to the student to arrange it. There are some local bureaus of institutions that seek to intermediate firms' demands for apprentices and the students' demands. Nonetheless, these institutions have a state character, as is the case of the CIEE (Center for School-Business Integration) and even the case for an institution that is of national scope, the *Evaldo Lodi* Institute (IEL) of the Federation of Industries.

Notwithstanding the laudable effort made by these institutions, these apprenticeships have been an object of criticism from students who feel exploited and argue that the businesses use them as cheap labor.

As we have seen earlier, the offer of new programs, modifications in existing curriculum and even the offer of specialization courses respond to intuitive notions regarding the demands of the local labor market, rather than by systematic investigation of real demands and needs. On the other hand, the low concern for the "employability" of graduates has also contributed to a lack of knowledge regarding the matter.

A new issue, albeit still very incipient, is the initiation of a program designed to provide follow-up on the trajectory of UEL graduates. This follow-up is a MEC demand that is linked to the SINAES program (the National System for Evaluation of Higher Education). The UEL is a pioneering university in this regard, having created the "*Portal do Egresso***",** located within the university website and meant to be a channel of communication with those who have graduated. Based on information that is voluntarily supplied there, it is possible to gather some idea of what happens to university graduates. The data base covers students who graduated between 1998 and 2003. Of a universe of 12,000 graduates from that period, 2,253 had responded by August of 2005. Although there may be some bias in the results as result of the fact that it is voluntary both in terms of registration and response to the questionnaires provided, as well as because most of the answers have been provided by graduates from the most recent years, the initiation of this type of data collection can still be considered promising.

Based on this informaion we are able to know that, of the graduates who supplied their addresses, almost 27% continue to live in Londrina. With regard to type of degree, the two most important areas are Human Sciences and Health Sciences, which together represent 71% of the total. Table 4.15 presents this data.

Table 4.15 UEL Graduates (1998/2003) who have remained in the region 2006

Area	(%)
Humanities	45.12
Exact and Natural Sciences	8.34
Applied Social Sciences	12.72
Technological Sciencess	7.15
Health Sciences	26.64

Source: Authors' elaboration using UEL data, 2006.

In spite of attempts such as support for the Junior Businesses, it seems that there is little stimulation for talents who received training at the UEL to remain in the region. The percentage of graduates who have left Londrina (close to 75%) within a period of less than 10 years since date of graduation is quite high. However, since this percentage refers just to Londrina, we are unable to know if these graduates have actually left the region and if they reside in neighboring cities.

A reading of the report "A follow-up report on graduates 2006" reveals a high degree of dissatisfaction on the part of former students with a number of things: the scant opportunities for elective courses within their programs, difficulties of entrance/placement within the labor market, and in a general sense, dissatisfaction with the scarce opportunities to bring theory and practice together over the course of their studies.

The State University of Maringá – UEM

The UEM is recognized throughout the region as the principle source of qualified professional labor. Over the course of its 35 years of existence (which were celebrated in 2005) the institution has made more than 30,000 professionals from the most diverse areas of knowledge available for the labor market. In fact, the UEM has been making a significant effort to increasingly become a nationally and state-renown university. For these purposes, the institution has increased the number of programs offered, created *lato sensu* **e** *stricto sensu* postgraduate programs, implanted new forms of teaching such as the "education at a distance" program, increased enrollment, etc.

In the light of these changes within the university, the issue of students' labor market entrance cannot be ignored; rather, it has become a matter of concern for the institution's central administration. In regard to this specific issue, the UEM has established an Apprenticeship and Training Coordinating Office that is linked to the Dean's Office of Teaching (PEN**),** whose tasks involve connecting undergraduate students to, supervising and formalizing their participation in small or medium-sized firms. Apprenticeships in firms of the region, while not compulsory, are an important work experience in which students receive a stipend and practical learning and establish professional contacts, primarily within the firm. With this purpose in mind, formal contracts are signed between firms and the university, meant to guarantee UEM students a professional labor market experience.

This is the only mechanism that the UEM has at its disposal for student labor market entrance. In conclusion, two comments based on the information obtained must be made: (1) the UEM, despite the contracts signed with firms, has no program to provide formal guidance for students during their professional apprenticeships. Furthermore, there seems to be little concern on the part of the university in collecting student feedback which could provide material for reflection on the content and way in which courses are being taught. (2) the UEM does not have basic information on its student body, e.g. number of students who are involved in apprenticeships and their disciplinary background. This seems to indicate that there has been certain negligence in relation to the issue of student labor market placement, something to which considerable attention should be devoted.

Another important and complementary issue that needs to be emphasized is the fact that the UEM does not offer any specific programs of support for its students in relation to the labor market. It is true that the UEM is in sync with a major part of Brazilian universities which also do not provide their students with enough of the necessary practical information on the labor market. Nonetheless, this does not justify leaving things as they are, since the UEM could easily enough not only offer programs with useful information on careers (employment opportunities, tips for interviewsand putting a cv together, help in locating the firms that are most adequate to the student's needs and abilities, etc.) as well as take advantage of this as an opportunity to keep tabs on its students, and then apply the information obtained in the orientation of the university's own educational policies.

4.3 Promoting lifelong learning, continuing professional development and training.

According to the Ministry of Education and Culture continuing education is a way of promoting, beyond basic education, the continuous academic and professional growth and improvement of an individual. [17]. In this regard, specialization programs, additional training and MBAs are, according to current Brazilian legislation, considered as programs of continuing education.

The State University of Londrina –UEL

The UEL has no specific programs for continuing education and professional training. What comes closest to this would be its Specialization Programs. As we have discussed above, these programs are provided for professionals who want to complement or improve their skills and knowledge. Since these are programs that are self-sustaining and self-

[17] See their website: http//: www.mec.gov.br.

financing and since they serve as a source of additional income for the professors who teach in them, they tend to adapt to market demands.

This type of program has traditionally suffered from the internal constraints of the public university which is immersed in a culture that is opposed to charging fees from its students. Nonetheless, this resistance is gradually being overcome and the attractiveness of extra income, aligned with a more objective dialogue with students, has permitted the expansion of such programs at the UEL.

A multi-institution program of cooperation called the Londrina Forum of Development is currently under way. This Forum, instituted by the Londrina City Hall, plays a fundamental role in local institutions such as the CODEL and the ADETEC. The UEL is a participating member.

State University of Marina – UEM

The UEM offers several Specialization Programs in a wide variety of areas of knowledge. The programs charge tuition and are addressed to an audience of professionals seeking to up-date and deepen their professional knowledge. These programs have been a good source of income for the universities, since the resources that are obtained through them can be used to make improvements within the university. As Table 4.16 shows, in 2004 57 specialization programs were offered, 75% of which pertain to three areas: the Center of Health Sciences (CCS), the Center of Applied Social Sciences (CSA) and the Center of Human Sciences, Letters and Arts (CCH).

Table 4.16 Specialization Programs at the UEM, 2004.

Centers	Number of courses	Enrollments
Center of Health Science (CCS)	14	239
Center of Biological Sciences (CCB)	7	149
Center of Applied Social Sciences (CSA)	14	464
Center of Humanities (CCH)	15	494
Center of Exact Sciences (CCE)	1	14
Center of Technology (CTC)	5	158
Center of Agrarian Sciences (CCA)	1	42
Total	**57**	**1,560**

Source: UEM, 2005.

4.4 Changing forms of educational provision

State University of Londrina – UEL

To date, there does not seem to have been any effort at the UEL to change the standards of education provision. In essence, student presence is still being required. Since the

technologies developed for "education at a distance" are not widely used, there has been no investment in training people to use them.

The largest investment to be made in this area was carried out by a private university, UNOPAR (University of Northern Paraná). This university has based its expansion on the use of education at a distance, via satellite transmission. It is also currently involved in an extensive research program on education-at-a-distance technologies and has a current enrollment of 80,000 students all over the country.

The State University of Maringá – UEM

In its project for flexibilization of the curriculum, the UEM has guidelines for the construction of the pedagogical projects of its programs, which create the possibility of offering courses on a yearly, semester, trimester or modular system, as well as other forms that respond to the needs of the program. In addition to this, the UEM has three other mechanisms aimed at enabling a greater flexibility and variety in course offerings, as follows:

I. Regulations on student transit between state, national and international institutions, that can be found in the following documents: a) Norms for student exchange between national public institutions of higher education (Resolution nº 127/97-CEP); b) Norms for international student exchange and liberation of university students to foreign institutions(Resolution nº 008/99-CEP); and c) Norms for the Paraná program for student mobility (Resolution nº 037/04-CEP).

II. As a function of its commitment to regional development, the UEM, in addition to the programs at its major campus located in the municipality of Maringá, also carries out programs at the level of Primary School Education and Higher Education and activities of teaching, research, outreach and culture at the following campuses and research facilities: a) Campus do Arenito, located in the municipality of Cidade Gaúcha (Resolution nº 036/89-COU, 18/12/89, ratified by Resolution nº 024/03-COU, 01/09/03); b) Regional Campus of the Northwest, located in the municipality of Diamante do Norte (Resolution nº 036/89-COU, 18/12/89, modified by the Resolution nº 044/98-COU, 29/06/98, ratified by resolution nº 024/03-COU, 01/09/03); c) Regional Campus of Cianorte, located in the municipality of Cianorte (Resolution nº 044/98-COU, 29/06/98, ratified by Resolution nº 024/03-COU, 01/09/03); d) Regional Campus of Goioerê located in the municipality of Goioerê (Resolution nº 044/98-COU, 29/06/98, ratified by Resolution nº 024/03-COU, 01/09/03); e) Regional Campus of Umuarama, located in the municiplaity of Umuarama (Resolution nº 024/03-COU, d01/09/03); f) Experimental Farm of Iguatemi, located in the district of Iguatemi, municipality of Maringá ; g) Advanced Center of NUMPELIA, located in the municipality of Porto Rico; and h) Center for Fishery Research located in the Floriano district, municipality of Maringá.

III. The UEM received MEC credentials (through official document nº 3.242 , 18/10/04) to offer "education at a distance" programs, with the main goal of increasing enrollment for programs in higher education, is meant to facilitate university entrance for a greater part of the Brazilian population.

Specifically in relation to the Education at a Distance Programs, the UEM has put an educational structure together that is made up of the NEAD (Nucleus of Education at a Distance) located on the main campus and by regional offices called PREAD**,** and through which Centers for Education at a Distance, spread throughout municipalities and institutions that have received credentials from the UEM, can be brought together.

The NEAD is the agency that is responsible for the organization of education-at-a distance at the UEM. It has implemented an interactive system that not only makes the education-at- a-distance systems possible, but also broadens the possibilities of those who attend classes that require physical present or for participation in continuing education. In addition to organizational functions, the NEAD also provides supervision of faculty, departments and other university organs in the production of teaching materials and the management of technical and technological resources that provide support for the education at a distance programs offered. We should also emphasize here that the infra-structure for programs of education at a distance were made possible by MEC resources. The MEC has supported this type of initiative as way of increasing access to higher learning in Brazil.

Table 4.17 - UEM Credential Regional Offices and Centers of Education at a Distance (CEAD) and Offered Courses, 2006

Municipality in which CEAD is established	Regional Offices	Offered Courses	Municipality in which CEAD is established	Regional Offices	Offered Courses
Alto Paraná	Paranavaí	Pedagogy	**Maringá**	Maringá	Administration
Amaporã	Paranavaí	Pedagogy	**Moreira Salles**	Goioerê	Pedagogy
Assis Chateaubriand	Goioerê	Pedagogy	**Munhoz de Melo**	Sarandi	Pedagogy
Barbosa Ferraz	Goioerê	Pedagogy	**Nossa Sra. das Graças**	Sarandi	-
Bela Vista do Paraíso	Sarandi	Pedagogy	**Nova Aliança do Ivaí**	Paranavaí	Pedagogy
Boa Esperança	Goioerê	Pedagogy	**Nova Cantu**	Goioerê	Pedagogy
Bom Sucesso	Sarandi	Pedagogy	**Nova Londrina**	Diamante do Norte	Pedagogy
Cafeara	Sarandi	Pedagogy	**Paraíso do Norte**	Cidade Gaúcha	Pedagogy
Califórnia	Sarandi	Pedagogy	**Paranapoema**	Paranavaí	Pedagogy
Cascavel	Cascavel	Administration	**Paranavaí**	Paranavaí	Pedagogy
Centenário do Sul	Sarandi	Pedagogy	**Perobal**	Umuarama	Pedagogy
Cianorte	Cianorte	Adm. and Pedagogy	**Planaltina do Paraná**	Diamante do Norte	Pedagogy
Cidade Gaúcha	Cidade Gaúcha	Adm. and Pedagogy	**Ponta Grossa**	Ponta Grossa	Administration
Coronel Vivida	Umuarama	Pedagogy	**Porto Rico**	Diamante do Norte	Pedagogy
Cruzeiro do Oeste	Umuarama	Pedagogy	**Quinta do Sol**	Cianorte	Pedagogy
Diamante do Norte	Diamante do Norte	Adm. and Pedagogy	**Rancho Alegre D'Oeste**	Goioerê	-
Engenheiro Beltrão	Cianorte	Pedagogy	**Rolândia**	Sarandi	Pedagogy
Goioerê	Goioerê	Adm., Pedagogy and Biological Science	**Rondon**	Cidade Gaúcha	Pedagogy
Guaporema	Cidade Gaúcha	Pedagogy	**Santa Cruz do Monte Castelo**	Diamante do Norte	Pedagogy
Guaraci	Sarandi	-	**Santa Fé**	Sarandi	Pedagogy

Guarapuava	Umuarama	Adm. and Pedagogy	**Santa Isabel do Ivaí**	Diamante do Norte	Pedagogy
Indianópolis	Cidade Gaúcha	Pedagogy	**Santo Antônio do Caiuá**	Paranavaí	Pedagogy
Janiópolis	Goioerê	Pedagogy	**Santo Inácio**	Sarandi	Pedagogy
Japurá	Cidade Gaúcha	Pedagogy	**São Carlos do Ivaí**	Cidade Gaúcha	Pedagogy
Juranda	Goioerê	Pedagogy	**São João do Caiuá**	Paranavaí	Pedagogy
Jussara	Cianorte	Pedagogy	**São Jorge do Patrocínio**	Umuarama	Pedagogy
Lidianópolis	Sarandi	Pedagogy	**São Manoel do Paraná**	Cidade Gaúcha	Pedagogy
Loanda	Diamante do Norte	Pedagogy	**Sarandi**	Sarandi	Pedagogy
Londrina	Londrina	Pedagogy	**Tamboara**	Paranavaí	Pedagogy
Mamborê	Goioerê	Pedagogy	**Tapejara**	Cianorte	Pedagogy
Maria Helena	Umuarama	Pedagogy	**Terra Rica**	Diamante do Norte	Pedagogy
Marialva	Sarandi	Pedagogy	**Tuneiras do Oeste**	Cianorte	Pedagogy
Mariluz	Goioerê	Pedagogy	**Umuarama**	Umuarama	Adm. e Pedagogy

Source: Authors' elaboration using UEM data, 2006.

The Regional Offices of Education at a Distance (PREAD) are structured at diverse UEM Campuses and at public HEIs that maintain agreements with the university. They have an infra-structure of support and technological resources and are responsable for the implementation, monitoring and evaluation of the technical, didactic and pedagogical activities developed at the CEAD or Centers for Education at a Distance. The UEM current maintains 12 Regional Offices of Education at a distance, spread throughout the state:: Pólo de Cascavel; Pólo de Cianorte; Pólo de Cidade Gaúcha; Pólo de Diamante do Norte; Pólo de Goioerê; Pólo de Guarapuava; Pólo de Londrina; Pólo de Maringá; Pólo de Paranavaí; Pólo de Ponta Grossa; Pólo de Sarandi; and Pólo de Umuarama.

The Centers for Education at a Distance are articulated with the Regional Offices and make up part of an organizational structure that is responsible for the execution of tasks related to the accompaniment and development of activities requiring individual and collective presence in the educational and learning processes of the students that participate in the program. The primary responsibility of the CEADs is the maintenance of the physical infrastructure needed in order to attend to students.

Table 4.17 shows the PREADS, CEADs and programs of education at a distance that were offered by the UEM in 2006. It can be noted that these courses cover 66 municipalities in the state of Parnaná, with offerings restricted to two specific areas of knowledge: business and education. Maximum enrollment for Administration is 750 students and for an Education degree, 2,100 students, or a total potential enrollment of 2, 850.

It should be emphasized that the UEM, through its Plan for Institutional Development for the 2006-2010 period – a document that covers the philosophy of work, mission, objectives, goals and actions of the institution during that time period – emphasizes the need to guarantee the offer of education-at-a-distance at the undergraduate level and at the same time establish new programs of education-at-a-distance in the áreas of Literature, History, Physics, Biology and Administration. With regard to post-graduate education, goals include the offer of 16 Specialization Courses at a distance (2 offered by the Center of Health Sciences; e by the Center of Applied Social Sciences and 14 by the Center of Technology) as well as the regulamentation of of strict sense post-graduate programs at a distance. Undergraduate programs in Literature, History, Physics and Biological Sciences have had their pedagogical projects approved by the MEC and are currently in the stage of budget evaluation. The courses are expected to begin in 2007.

Information obtained in our research indicates that there is no tension between the conventional courses and the virtual ones. As for the financial aspects, the education-at-a-distance is not in competition with the conventional programs, since it financed through previously approved special MEC projects. It should be made clear that this financing also includes the infrastructure that is necessary for the proper functioning of the programs. The building of the NEAD, acquisition of equipment for production, generation and transmission of vídeo-conferences, computer equipment and teaching materials were all made feasible through MEC resources.

Another important matter captured by our research is linked to the argument that the technological resources acquired and the material produced for the realization of education- at a-distance programs will have a positive impact on the conventional programs, which will gain in quality through the utilization of the information and communication technologies that will be made available through the non-conventional programs.

As for the didactic aspects there was unanimous agreement that there is no competition between the two types of programs, since all the pedagogical projects obey the same overall guidelines established both by the University and the National Council of Education (CNE), notwithstanding the specificities of each. It seems that the key issue is one of the adequacy of program modes and their appropriate pedagogical projects, whether conventional or at a distance.

It should be emphasized here that in the light of a multi-territorial form of providing education, institutional coherence is guaranteed through the adequate development of instruments that provide guidelines for the different programs, that is, instruments of academic, financial and administrative management. These instruments are discussed and approved in the following forums: the General University Council, the Council of Teaching, Rssearch and Extension and the Administrative Council, as well as the normative instructions developed by the University Chancellor´s Office, its advisors and the various Deans´Offices.

4.5 Enhancing the regional learning system

The State University of Londrina – UEL

There is no coherent view of the educational system at the regional level at the UEL. Notwithstanding its consistent participation in several regional forums that are oriented toward the region´s development, it seems that a coherent analysis of the real higher educational needs of the region is yet to be produced. Perhaps this is due to the still incipient phase that the process of building a project of regional development is in.

The State University of Maringá – UEM

The UEM claims to have a coherent view of the regional educational system, demonstrated through its collaboration with the state government, through the SETI. In addition to this, its actions are to a large extent directed toward its areas of influence, with its extension projects aimed at rural areas and its programs for education at a distance facilitating concrete regional engagement.

With regard to supply and demand for programs of higher education in the region, the information that we obtained in our research shows that the UEM does not seem to have a very clear idea of what this process is, since the supply of undergraduate courses in the municipality has been largely determined by what municipal city government have requested. In this regard, the university has used existing data on the demand for higher education within the municipality and, at the same time, attempts to verify if this demand is consonant with its proposal for regional development. In addition to the conventional courses at its campuses, the

UEM is also present in various municipalities offering training and continuing education courses, as stated earlier. The demand for these programs has been expressed by the city governments, municipal associations, and non-governmental associations. It is quite true that attending to this demand is both in the interests of state and federal government.

An important factor to be kept in mind is that cooperation between the universities is practically non-existent insofar as the analysis of supply and demand of higher education is concerned. As mentioned above, contacts are made directly with city governments, municipal associations, etc. as well as with the SETI, thus sidestepping the issue of contact between different Paraná universities. This does not mean that there are no forms of cooperationg between the UEM and other HEIs in Paraná (consortium, terms of cooperation, etc.) with good examples being the training, done within the UEM, of faculty from the State University of the Central-West and the School of Philosophy, Sciences and Letters of Campo Mourão as well as the consortium signed with the School of Sciences and Letters of Paranavaí and the UNICENTRO for the provision of education at a distance.

4.6 Conclusions

One of the positive conclusions to be drawm is that in spite of great difficulties, the universities of the region have contributed to raising the general levels of qualification of the region´s work force. There has been a reasonable degree of cooperation with other institutions, as is the case for the Londrina City government, Association of Municipalities, SEBRAE and even between universities, as is the case of the programs administered jointly by the UEL and the UEM.

However, the program offer and the reformulation of those programs that already exist have not followed a strategy planned either by the universities or by other actors in the region´s development. The knowledge of specific demands that is brought to the attention of the universities leaves much to be desired on the part of its users, as well as on the part of the universities themselves. This is particularly more accentuated in the case of Londrina. The results of workshops carried out in both cities are illustrative of this problem.

The State University of Londrina – UEL

During the second workshop carried out between the UEL and its users, we asked questions about strengths and weaknesses as well as the opportunities and the potential threats regarding the contribution of teaching and learning to the labor market and to the competencies of the region. The results are summarized below:

- **Strengths:**
  - Potentialization of regional competencies
  - Promotion of sustainable development
  - Training for work force specialization – courses
  - Serves as a reference that attracts innovating firms
  - INTUEL support for regional competencies

- **Weaknesses:**
  - Absence of project evaluation – lack of direction
  - Absence of an institutional policy that provides incentive for regional potential

- **Opportunities:**
  - Generation of social and scientific development
  - INTUEL´s existence and operation

- Provision of resources related to specific research that may be useful to firms
- State and federal public policies; resources for project development

- **Potential Threats:**
  - Municipalities´ internal resistance to innovation
  - Lack of political continuity of local powers

The curious fact in the result of the debate on this specific issue is that the majority of the issues raised have little to do with what the group has identified as the key issue. Since it is an eclectic group, made up of representatives of diverse segments of the community and the university, it was our expectation that specific demands would be made explicit. Judging by the answers given, it seems that neither the university, nor, paradoxically, those who demand skilled labor know exactly what they need.

The State University of Maringá – UEM

- **Strengths:**
  - Level of faculty qualification
  - UEM integration with external environment
- **Weaknesses:**
  - Difficulties in making the curriculum more flexible
  - Co-responsibility for regional development

- **Opportunities:**
  - Revision of methods and systems
  - Involvement of the political class and civil society

- **Potential Threats:**
  - Government Policy
  - Lack of university autonomy
  - Internal and external bureaucracy
  - Physical and human resources

CHAPTER V CONTRIBUTION TO SOCIAL, CULTURAL AND ENVIRONMENTAL DEVELOPMENT

5.1 Social Development

In contrast to the first world universities which have better financial and infra-structural conditions and can therefore offer a wide range of services and activities, Brazilian universities in general terms must deal with a series of limitations and constraints. Thus, the scope of their activities is more restricted and their ability to contribute to the social development of the environment to which they belong tends to be more limited.

The State University of Londrina – UEL

Although the community is able to use UEL equipment (libraries, conference rooms, etc.), in practice, the procedures that are required for their use involve a series of difficulties and demand some degree of perseverance on the part of potential users. Libraries, for example, are public and accessible. But for the use of other spaces, such as conference rooms, the procedures vary according to who the users are. When a request comes from another public institution, permission is usually given automatically, providing infrastructure and equipment requested are available. When the request comes from other members of the community, the rooms may be made available through the payment of the maintenance fees as established by university resolutions. The request must first be examined and approved by the Juridical Department and the Administrative Concil, one of the highest ranking decision-making bodies in the university.

One of the UEL´s particular strengths lies in the area of social service provision. The UEL offers health services, for example, through the University Hospital (HU), the Emergency Services of the Central Hospital (HC) and the University Dental Clinic (COUNP), as well as a legal service, provided through the Bureau of Legal Counsel (EAJ) and other services, offered on a project base or through agreements with other institutions or public organisms, such as City Government.

The University Hospital is a supplementary organ of the UEL. It was founded in 1971 and is currently the only major public hospital in Northern Paraná. In addition to its functions as a teaching hospital, it makes up part of the Brazilian national public health system (SUS). It has an infrastructure which includes 333 beds, 120 examining rooms, 7 surgery rooms, and 24-hour emergency care in a variety of areas of medical specialization. It also maintains several other related services, such as: Regional Blood Bank, Physical Therapy, Intensive Care Units, Milk Bank, Center of Poison Control, Vaccination Center, and Chemotherapy Center. The hospital is well known for several areas of medical specialization [18].

The following numbers provide an illustration of the regional importance of the university hospital. Data on its average monthly provision of care are as follows: 1,150 hospitalizations, 12,000 out-patients, 7,000 emergency visits, and 600 surgeries. Furthermore, the hospital provides a training locale for4 undergraduate and 14 graduate programs.

The UEL also maintains a laboratory for medication production (LPM). It is the largest public laboratory in the state of Paraná and makes a contribution to both federal and state government health policies through the production of low cost basic medications.

The *Colégio Aplicação* and the Rural School are also run by the UEL. The former, an institution for primary and secondary school education, is run by the State Secretariat of Education as a model (laboratory) school. The rural school, in addition to the support it

[18] ADETEC Cadernos setoriais O ensino superior em Londrina.

provides for teaching and research activities at the UEL, also carries out projects in partnership with agricultural cooperatives and firms of the region.

The State University of Maringá – UEM

The UEM is no exception to the general rule of Brazilian universities. Its contribution to social development is practically restricted to making its physical infrastructure available to the local community. This it does, notwithstanding its own large deficits of classrooms, theaters and conference rooms, and in this way is able to contribute to the realization of a wide variety of events.

Although the UEM suffers from a series of limitations and constraints, like other Brazilian universities (and particularly the public ones) it can and should widen the services offered to the community. In this regard, free access to libraries, summer courses, usage of areas and infrastructure for recreation and leisure, volunteer programs and other such things should figure on the list of community services offered by the UEM.

5.2 Cultural development

The State University of Londrina – UEL

The UEL has sought to provide support for cultural, artistic and sporting activities. In addition to the regular undergraduate programs in Theater, Music, Graphic Design and Sports Sciences, there are also art education programs that are being developed within the community, such as the Youth Orchestra Program. The UEL also maintains sports teams that participate in the university games, as well as sports infrastructure and equipment. The campus has a Center for Sports Education, and through an agreement with the Airton Senna Institute, sponsors sports activities for children. The Londrina Historical Museum is linked to the UEL School of Letters and Human Sciences.

Although it does not buy works of art, the UEL does make exhibition space available and provides programs of exhibits by regional artists and artists from the university community.. Furthermore, one of the historic movie theaters of Londrina, the *Ouro Verde*, protected as part of the nation´s historical patrimony, is under UEL responsibility.

There have also been many cultural initiatives developed in partnership with public and private institutions, such as the International Theater Festival and the Music Festival, as well as film events through the UEL *Cine Contour*.

Most of the UEL cultural activity is concentrated in the UEL House of Culture**.** The House was founded in 1971 and was institutionalized as a supplementary organ of the UEL in 1978. At present it has close to 114 staff members, of whom 52 are members of the Symphonic Orchestra. It is made up of specialized divisions: theater, the visual arts, music (which includes the activities of the symphonic orchestra and of Chorus groups) and film (responsible for the *Cine Ouro Verde*)**.**

The State University of Maringá – UEM

The artistic and cultural groups and the Department of Culture (DCU) of the UEM have systematically provided training programs and given support to cultural initiatives. These activities have also provided a space where amateur groups from the city and region can present and disseminate their work. For these purposes, the UEM, through the DCU, has attempted to establish partnerships with City Hall, the Society for Ethical Responsibility, the State and the Federal Department of Treasury, and the Regional Nucleus of Education, with the

goal of realizing artistic and cultural activities but also of providing sponsorship for city and regional artists. This has included the organization of events in sites open to the entire community.

An interesting and important matter to emphasize is that in all artistic and cultural activities offered by the UEM for the benefit of local society, members of the community are involved. As can be noted in Table 5.1, there is impressive community participation in these activities, along with university faculty, staff and student participation

Table 5.1 UEM Cultural and Artistic Activities – 2004

Area	Number of presentations	Audience	Participants			
			Faculty	Students	Staff	Community
Theater arts*	17	883	-	-	-	-
Music*	3	235	-	-	-	-
Chorus	15	5,000	1	14	1	4
University Theater	13	22,000	1	8	-	4
Folk dance	38	55,730	3	17	3	12
Tap dance	22	21,000	1	14	1	4
Visual arts	5	21,500	1	-	-	15
Dance Workshop	28	11,460	1	1	-	19
Industrial arts	-	-	1	2	-	12
" Cantos e Encantos" Project	47	5,000	1	-	2	1
Total	188	142,808	10	56	7	71

Source: UEM, 2005 Obs.: * These groups are not part of the UEM Directorate of Culture, though they do give presentations at the UEM and receive Directorate support.

The DCU sponsors the following regular programs: Basic Drawing, Visual Languages, Basic Ceramics, Advanced Ceramics, Porcelain and Glazes, Classical Ballet (first year), Classical Ballet (V-IX). In addition to these programs, other outreach programs are offered by the UEM and specifically, by the DCU for the community, as follows: "Visual expression – through line and color", Basic Tap Dance Technique, Advanced Tap Dance Technique, Basic Actor Training Workshop; Jazz for Children 2004; Jazz 2004; Folk and Popular Dance for Children and Youth; Ballroom Dance; Speech and Communication; Introduction to Digital Photography.

Table 5.2 presents clear evidence of the courses and events that the UEL provides for the community. As we have stated above, there is participation on the part of community members and of university faculty, students and staff. We should emphasize here that there is a variety of open events with considerable community participation.

Table 5.2 – Realization of Programs and Events at the UEM, 2004

COURSES/EVENTS	NUMBER	PARTICIPANTS			
		Faculty	Staff	Community	Beneficiaries
Symposia	124	146	22	13	2,530
Extension courses	132	168	77	38	2,696
Meetings	76	105	29	26	1,238
Talks	52	48	64	97	2,603
Academic week	183	249	78	53	5,461
SUBTOTAL	**567**	**716**	**270**	**227**	**14,528**
Other events:					
One-Day Courses	8	22	-	-	48
Seminars	62	101	30	21	1,097
Exhibits	1	4	1	1	-
Cycle of Debates	33	284	28	12	1,724
Workshops	4	-	3	-	93
Art shows	5	5	-	-	64
Mini-courses	21	12	17	7	373
Workshops II	4	4	3	-	63
Panels	10	-	-	-	83
Forums	8	40	2	11	308
Conferences	28	19	16	2	761
SUBTOTAL	**184**	**491**	**100**	**54**	**4,614**
TOTAL	**751**	**1,207**	**370**	**281**	**19,142**

Source: UEM, 2005.

5.3 Environmental sustainability

The State University of Londrina – UEL

There is little available information on a system of environmental management on campus. There is a project for waste control which covers chemical residues and hospital waste and an educational project on selective waste collection. These practices are also implemented on the UEL campus.

The UEL participates in the Coordinating Nucleus of the Permanent Forum of Planning for Development in Londrina which involves 40 different entities in direct collaboration with Municipal Government. They are currently carrying out discussions on the *Arco Norte* Program for regional development. The UEL is also engaged in studies involving research on and monitoring of the hydrographic basins of the region.

The State University of Maringá – UEM

Since the northern Paraná region is an agricultural center, environmental issues figure as important concerns on the part of its universities, and in this regard the UEM is no exception to the rule. Environmental management in particular is a constant source of preoccupation. Existing research groups on environmental issues demand accountability from

the institution. For example, laboratory residues have been a recent target of demands for responsibility.

The UEM, specifically at its Maringá campus, has a program called *Pró-Resíduos* that deals with the issue of the waste that is collected. Cleaning staff carry out tasks of separation of waste, and the materials are recycled and re-used within the university itself. Nonetheless, the most important part of this work is the the training and orientation it provides within the university´s region of influence, to the extent that it teaches citizens how to deal with different types of residues and materials.

We should also emphasize the existence of other initiatives of collaboration between the UEM and other actors in the interests of the environmental sustainability of the region. One concrete example is the environmental education program that is being developed in the thirty muncipalities in the Maringá area, in cooperation with the *PRÓ-AMUSEP*, a program that is conducted in conjunction with a CNPq-financed specialization course and promises as its final results a broad environmental diagnosis of the region and a program for the formation of environmental educators. It is worth mentioning that other specialization programs on environmental issues have been conducted by the UEM. In addition to this, we should also mention the major program of research and extension that is being carried out in cooperation with *ITAIPU* around the issue of the sustainability of the large lake that belongs to the hydroelectric plant of Itaipu. This project is being developed by the NUPELIA (Nucleus for Research on Limnology, Ichthiology and Aquaculture) which belongs to the UEM´s Center of Biological Sciences.

The NUPELIA has developed research projects on aquatic environments that have focused on water quality and on the diversity, abundance and ecology of different aquatic and terrestrial communities with the financial help of support agencies such as the FINEP and theCNPq, as well as agencies linked to the electrical sector such as *Furnas Centrais Elétricas S.A., Itaipu Binacional* and *Eletrobrás S.A.* Another matter to be emphasized here is the fact that other groups linked to environmental issues, such as the GEMA (Multi-disciplinary Study Group on the Environment) and the GESA (Socio-environmental Study Group) have dealt with other areas of knowledge and have also received financial support from national organs and agencies.

5.4 Conclusions

State University of Londrina – UEL

The second workshop on the environment carried out at the UEL concluded that from a strategic point of view (strengths, weaknesses, opportunities and threats) related to social, cultural and regional milieu, the following issues could be pointed out:

- **Strengths:**
  - Space and support for the realization of cultural activities
  - Plurality and diversity of ideas
  - The university as a catalyst for the regional cultural environment

- **Weaknesses:**
  - Difficulties in implementing proposals

- **Opportunities:**
  - Closeness to other partners and the third sector
  - Taking advantage of legislation on incentives to culture:
    - Federal level
    - Municipal level – *Promic*
  - Placing value on local culture

- **Potential risks:**
  - Threat of loss of focus and academic excellence

The State University of Maringá – UEM

- **Strengths:**
  - The interest held by the UEM and the municipal government in maintaining partnerships in the cultural arena, something which has been systematically explored and pursued.
  - Existing partnership between the UEM and local governments.

- **Weaknesses:**
  - Difficulty in attracting firms to provide support for cultural activities. This has been discouraging for the sectors that are devoted to culture and makes efforts to foment artistic and cultural production all the more difficult. The result is the unfeasibility of the dissemination of culture and community with limited access to artistic and cultural products.
  - Low levels of collaboration between the UEM and other universities of the region.

- **Opportunities:**
  - People are more aware not only of the activities that the UEM offers but also of the role it plays as promoting institution.
  - New environmental technologies can improve environmental sustainability at the UEM and, at the same time, serve as encouragement for the development of new local technological solutions.

- **Potential threats:**
  - Lack of synergies between university and community.
  - Lack of political will.
  - Political parties influence distribution of resources.
  - Lack of resources for financing in all areas of knowledge.
  - As a result of the lack of coordination between scientific policies and public policies for socio-economic development the existing resources are funneled off by specific demands and prioritized areas of research are determined by commercial interests which, in isolation, do not promote economic and social development.
  - Lack of investment in structures that permit greater university-society engagement.

CHAPTER VI CAPACITY BUILDING FOR REGIONAL COOPERATION

6.1 Mechanisms to promote the university's regional involvement

The State University of Londrina – UEL

The university is not leading the process of regional development. This is a process with much deeper political dimensions and receives contributions from the government of the state of Paraná as well as from local governments, such as the Londrina City government, or contributions made through consortiums among municipalities, as is the case of *Terra Roxa Investimentos*.

The analysis of the local potential has been made in collaboration with the state government, as in the *Leituras Regionais* diagnostics elaborated by IPARDES (a branch of the Planning Secretariat of the state of Paraná), or by local institutions such as ADETEC and *Terra Roxa* Foundation, a private investment consortium.

The key role of the university in these strategies is always noted by other regional institutions. Nonetheless, when questioned about its role, the UEL, though it recognizes its own importance, states that it does not know whether those responsible for the regional strategic planning also acknowledge this.

One of the signs of the importance of this is the expenditure and investment made by the state government (responsible for UEL) by *Fundação Araucária*, a state foundation, and by the federal government through scholarships at both the undergraduate and graduate levels, with the *stricto sensu* scholarship programs.

On the other hand, a project concerned to evaluation of the HEIs (*Sistema de Avaliação das Instituições de Ensino Superior Públicas*) in the state of Paraná is currently being implanted and this phase is scheduled to end in the second semester of 2006.

The identification of regional needs is not one of UEL's direct concerns. Despite the existence of some formal mechanisms, such as formal representations in different regional branches, in general terms, the analysis of the region's needs is almost solely made by individual professors or by a team from a particular project. The UEL has a division in the PROPPG, which works to identify the needs for the production of knowledge through research projects. This, however, is a difficult objective to fulfill. The coordination of UEL's activities related to its regional commitments is carried out through the PROEX, which coordinates those extension activities that correspond to UEL's insertion in the community.

The State University of Maringá – UEM

UEM's commitment to regional development is asserted in its general governance and statutes. The UEM's university council, upon defining the university's new mission and vision for the future made explicit the UEM's commitment with the development of its own region (Resolution n. 21/2005, September 2005). Thus, its mission is to "Produce knowledge through research; organize, articulate and disseminate learning through education and extension, so as to shape citizens, professionals and leaders for society". Its vision for the future is "to transform the UEM, within the next five years, into an institution of excellence in the development of professionals and researchers, able to meet the needs and demands of society, in general terms, and of the community where it is inserted" (UEM, 2005).

Even if the UEM's commitment to regional development may have recently been endorsed, in fact it is nothing new in the history of the university. UEM involvement in the region's affairs has been a reality since the early 1980s. In fact, the UEM consolidated its role in the region as of the late 1980s with the opening of campuses in: Cianorte, Goioerê, Diamante do

Norte, Cidade Gaúcha and Porto Rico. More recently, a new campus has also been built in the city of Umuarama. These campuses are located in the northwest macro region of the state of Paraná, which is also in the university's area of influence.

One must note, above all, UEM's active involvement in three important institutions: CODEM; AMUSEP; and ITM. CODEM is a non-profitable organization created by municipal decree. Its power is only deliberative and consultative and it offers supervisory assistance to the Municipal Secretariat for Industry and Commerce. It is made up of one hundred and four enterprises. Furthermore, the CODEM functions through twelve different chambers, divided by sectors of interest, where matters pertaining to the development of the municipality of Maringá are discussed. AMUSEP, in turn, involves thirty municipalities in northern Paraná, 700,000 people and has its main office in Maringá. UEM participates intensively in the AMUSEP regional development assistance program (PRÓ-AMUSEP), which aims at the region's economic and social transformation and inclusion of all its citizens, as well as works to stimulate the community's involvement in improving quality of life indicators. ITM, however, is a mixed institution, responsible for managing the technology centre in the city of Maringá, known as *Maringá Tecnópole*, which is still in its implantation phase.

The active participation in these three fronts clearly shows the UEM's level of involvement with the region and the "external" mechanisms used in promoting regional development. On the other hand, the UEM also makes use of "internal" mechanisms which promote its greater involvement in external affairs, such as: the Business Office (EN); the PROEX, with its projects, courses and events implemented through its Coordination of Services and Regional Development (CSD) and through the Department of Culture (DCU), which has been able to reach out to a significant public; Agency for the Support of Technological and Scientific Development (FADEC), an autonomous branch created to hasten contracts between UEM researchers and the productive sector; some institutes such as the Technological Institute for Agriculture and Environment (ITAM) and the Institute for Socio-economic Research (IPESE), associated, respectively, with the agricultural sciences sector and the applied social sciences sector, which produce research and offer supervisory assistance to the local community.

It becomes important to emphasize that the UEM's involvement in the region is much more a commitment of the institution than anything else. However, this has still not been totally institutionalized and depends highly on the vision and political willingness of the current dean. In fact, the UEM is involved in regional matters and cooperates with regional agents for local development, but this involvement has never been continuous, for, throughout its history, there have been various interruptions in the interaction between UEM and the outside world, mainly due to the different conceptions held by the various deans.

Financing is an important mechanism in the promotion of UEM's involvement in the region. As was seen in the previous chapters, most resources come from the state of Paraná, through the *Araucária* Foundation and the Management Unit of the Paraná Fund (UGF), both under the SETI. These resources are made available through the participation in government ventures. It must be noted that state funds, though fundamental, are insufficient to keep up with all the demands of the region. Besides these sources, there are others, mainly federal, which assist in the involvement of the university in the region, but these are even scarcer than those provided by the state.

The UEM is undoubtedly considered a key element in the process of regional development. It should be highlighted that all studies made for the region are based on the notion that it is important to take full advantage of the capacity for science and technology present in the university as a means to foster regional development. Therefore, the strategic conception of regional development is centered on the most recent technology, due to the potential already identified and to the possibility of its growth, which may be made possible through regional as well as international cooperation. With this in mind, there are two studies, elaborated by important regional agents, with the participation of UEM, that deserve to be

mentioned: an evaluation of the potential of regional knowledge, elaborated by CODEM with the objective of subsidizing the creation the *Maringá Tecnópole*, currently in its implantation phase; and, a vast survey, elaborated by the Regional Development Institute (IDR), of the capacity to generate and make use of technological innovations in the Maringá region. This study resulted in the Regional Development Program (PDER), which emphasized new technologies.

Besides the traditional mechanisms to promote the university's involvement in the region, there are others of equal importance which must be explored, as is the case of the participation of university representatives in the councils of the regional development agencies, in City Government committees, etc. In fact, these other mechanisms have been well explored by the UEM, which actively participates in CODEM, PRÓ-AMUSEP and many other development forums in the region. Nonetheless, there is another aspect which remains far from ideal, that is, the use of UEM's infrastructure by private individuals. Unfortunately, access to laboratories, libraries, sports facilities, etc. is almost nonexistent, which may be explained by the university's partial neglect of the local community.

6.2 Promoting regional dialogue and joint marketing initiatives

The State University of Londrina – UEL

Communication between UEL and regional actors can rely on institutionalized mechanisms. Thus, for example, there are the university websites, Rádio Universidade, a university-sponsored radio station, and a support office which aids in the communication between UEL and the internal/external community, in order to make its activities known. Furthermore, this communication is also promoted through positive relationships with regional organizations and class organizations. However, this communication appears to be insufficient as a number of regional actors say that they do not know what is produced at the UEL, nor do they know how to access its studies and products. Both employees and employers are present, with deliberative powers, at the university's major administrative body, and there is also the Council for the Integration of University and Society, which has consultative powers, with the participation of organized social institutions.

However, among the various councils in which UEL participates formally, it is also present in a very promising initiative for regional development, i.e. the Londrina Permanent Forum on Strategic Planning for Sustainable Development. This forum is an initiative of the Londrina City Hall and intends to become the city's center for strategic planning. Having been recently created, in November, 2005, it employs an "Implantation Committee" comprising the following institutions: ACIL, ADETEC, CODEL, SEBRAE, SRP, and FIEP.

In addition to this committee, there is the thematic Coordination Nucleus whose function is to coordinate the various Chambers. The UEL is a member of this entity. Therefore, there seems to be great potential for the dissemination of the work of the university within the city of Londrina's strategic planning. Perhaps a mechanism such as this, which has a formal as well as informal character, can be quite efficient in attaining its goals.

Another important mechanism in the dissemination of information has been the university faculty working in different institutions in the public and/or private sector. The different roles have contributed to the establishment of networks between different agencies, which have contributed to the establishment of eventual joint projects. Unfortunately, the UEL has not mapped the extent of the faculty working in and for other institutions. There are also no known joint university-stakeholder initiatives to promote the marketing of the university and the region.

The State University of Maringá – UEM

The UEM's active participation, through its representatives, in the diverse existing forums, especially in those promoted by CODEM, PRÓ-AMUSEP, IDR, and, currently, by ITM, on the development of Maringá, is an important mechanism of dialogue with other actors in the region. In addition to these mechanisms, the EN, which serves as an intermediary in the relationship between the university and the productive sector, in the search of partnerships between both, is also a healthy effort on the part of the UEM to facilitate the dialogue with other regional actors.

Recently, the UEM launched a magazine entitled "A sourcebook: competencies, services and consulting" meant for an external audience. This volume includes a list of laboratories, specialized services and skills existing in the university, with the objective of promoting a more practical and efficient connection with the local and regional society. This example is demonstrative of the UEM's attempt to improve the channels of communication and exchange with the outside world and to overcome internal barriers.

Despite the existence of communication channels between UEM and the outside world, these channels are still insufficient for the promotion of the region. One of the most interesting aspects of this is the fact that there are no bilateral initiatives - from both sides, the productive sector and the university - to negotiate with the state government the possibility of undertaking marketing campaigns to promote the research conducted in the region, the university itself and, consequently, the attractive features of the region.

6.3 Evaluation and mapping the impact of the regional system of higher education

The only evaluation of the direct economic impact of the universities on the regional economy was made directly by the SETI. A classic impact evaluation methodology was used, employing the social accounting matrix of the state of Paraná as its instrument. An evaluation of the economic impact of the universities on the total economy of the state was produced. The total multiplying effect (direct, indirect and induced) of its expenditures was calculated as of the order of 2.34, income multiplier, and of 2.54, employment multiplier or the Paraná[19].

The State University of Londrina – UEL

The UEL is now beginning to prepare itself to evaluate this impact. The first set of information collected is on student origins. This information is obtained from students during enrollment. Furthermore, the graduate destinations are now beginning to be evaluated. The follow-up on students after graduation allows an estimate of around 50% of graduates who remain within the region.

[19] Rolim & Kureski (2006)

The State University of Maringá – UEM

It is important to highlight that the UEM has not carried out any evaluation of the impact of its activities in its own region. This aspect becomes of great importance insofar as it reveals not only that the university does not have a real idea of its own impact on the region, but also shows administrative weakness. As it has been noted above, this corroborates the perception that the UEM's regional involvement is highly dependent on the vision and political will of its current dean. Furthermore, this lack of self-knowledge tends to lead to inefficient university actions.

6.4 Institutional capacity building for regional involvement

The State University of Londrina – UEL

The UEL has taken steps toward improving its commitment in the region, including the creation of the office of intellectual property, the creation of a division for the formation and transferring of technology in the Central Administration, the creation and amplifying of the technological incubator, and in the creation the Council for the Integration of University and Society.

On the other hand, since 2002, the UEL has been engaged in elaborating its Institutional Strategic Plan (PEI). This process has been carried out in a participative fashion with the community around issues of resource allocation, and costs and investments due to its Institutional Political-Pedagogic Project (PPPI). This PPPI, in turn, has been the object of discussions within UEL since 2000. The work group responsible for its elaboration considered - in a document presented to the Research and Teaching Council, in 2002 - the four aspects noted below as key problems that should be addressed through the elaboration of the PPPI.

- The absence of institutional policy that limits the role of service provision and that defines the objectives of extension at UEL, a discussion which is of utmost importance for the acknowledgement of the social commitment which should be established by any public university;
- The unwillingness to discuss the payment of tuition in the graduate courses ministered by UEL, which could lead to the state's inability to comply with its duties of maintaining a free, public and high-quality university;
- The process of teaching-learning exclusively centered in the professor and marked by a vision which is based on isolated subject contents, structured through a web of bureaucracy which makes interdisciplinary dialogue difficult and harms the analyses of learners' daily needs and requirements throughout the course (evaluations, drop-outs, attendance, transfers, etc.);
- The dichotomy between notions of scientific knowledge versus technical knowledge which fragments the formation of a professional and limits his/her possibility to intervene and to transform social reality, a factor which contributes to dissociate teaching from research and extension. This dichotomy compromises professional formation, which should not be resigned to an unpredictable and uncertain job market, subordinated to the rules of a productivity and competitiveness governed by immediate profit, but geared toward the world of work, where a professional reveals

his/her specific competence associating it with critical and ethical conduct.

This discussion, as may be seen, has been quite lengthy at the UEL and the four aspects reflect central questions regarding he university's greater engagement in its relation with the region and with society as a whole. This debate evolved into the making of the PEI. It is not clear how deeply these aspects were discussed; however, the PEI has become involved in a process of continuous planning which materializes in forms for programming UEL expenditures.

Regardless of how the process is developing at the present moment, its sheer existence and the emphasis on the basic topics for the debate are in themselves very important.

The State University of Maringá – UEM

Although the regional question is a strong element within UEM, the university administration has not changed in order to respond to the commitments generated by regional necessities. Of course, certain changes may eventually occur in the administrative staff as a result of the university's internal issues, but have not been responses to specific demands such as regional necessities.

As for the region's strategic plan, there is nothing similar at UEM. What, in fact, exists is the Plan for Institutional Development (PDI), which has to be approved by the University Council. This is the document which identifies the Institution in regards to work philosophy, mission statement and objectives, goals and actions that it is currently developing or intends to develop over a fixed period of time, usually of four years. The major plans for the development of the Maringá region and area of influence were elaborated, as was mentioned earlier, by CODEM and by PRÓ-AMUSEP, with UEM's assistance – the university participated actively in both forums.

As mentioned above, there are some channels for communication between UEM and the outside world and it is important to note that these channels are case specific. In some cases, usually in those of a more technical nature, the EN is the most natural path, while in other cases there are personal contacts between researchers and entrepreneurs or specific services. It must be noted that these specific services have been facilitated by the university's contribution in building a regional infra-structure based on information and communications technology.

6.5 Management of human and financial resources

The State University of Londrina – UEL

Strictly speaking, a regional dimension in the university's human resources policy does not exist. The resources received by the university are managed by the central administration, especially by PROPLAN.

To capture new resources, there are two divisions, one at the PROPPG and another at the PROPLAN. Both work to develop institutional projects to acquire new resources for research, especially new channels for financing from agencies for technological advancement.

The State University of Maringá – UEM

The information collected in our research confirms that the regional dimension is not incorporated by the UEM's human resources policies. The university did not provide information about its strategies for the acquisition of additional resources.

6.6 Creating a new organizational culture

The State University of Londrina – UEL

No information about the level of interest provoked by regional questions and how they influence teaching activities was provided. In terms of R&D, it has begun to increase. However, the UEL acknowledges the existence of great obstacles of a cultural nature that interfere with the establishment of regional commitments. This seems to be related to the prevailing notion of the University as a producer of universal knowledge, and fundamentally of basic research, which is also applied to universal issues. Nonetheless, there is some recognition that undergraduate and graduate courses do not focus primarily on the education of professionals who will later seek to enter the job market, but, rather, are more academic and theoretical in focus.

Some of these issues were mentioned in the second workshop conducted at UEL. When asked whether there was an effort at the university toward increasing institutional qualification and creating a new organizational culture to promote regional presence, the following strengths and weaknesses, and potential threats and opportunities were pointed out:

- **Strengths:**
  - Diversity of areas of knowledge at the UEL
- **Weaknesses:**
  - A traditionally compartmentalized style of working
- **Opportunities:**
  - Legal changes for a greater participation of the university in the generation of innovations
- **Potential Threats:**
  - Lack of qualification of staff for the creation of a new organizational culture

The State University of Maringá – UEM

Over the last few years, the UEM has suffered significant and unavoidable transformations, a result of the very transformations which have taken place in the country, in Paraná and, especially, in the educational sector. In relation to this last aspect, discussions about obstacles and solutions for problems in the Brazilian system of higher learning have generated some changes which, in turn, have affected all the universities in the country. UEM is no exception to the rule. Despite all the transformations which have taken place, the regional dimension has continued to have a very important role at UEM.

The information obtained in our research shows that regional interest is being integrated both in teaching activities as well as in R&D at the UEM. There is a sort of collective perception at the institution that the regional dimension is important and is a part of university life. (It must be highlighted that the data collected in our research is subject to error, since the incorporation of regional dimensions is highly dependent on the researcher's field of work. In fact, in certain areas such as the agricultural and biological sciences, the regional question is much stronger and therefore more present than, for example, in the area of human sciences.)

There is an acknowledgement at UEM that existing cultural barriers render the establishment of regional commitments within the university itself a very difficult task. In fact, the major obstacle, in the opinion of the researchers, is the lack of value placed by businesses on the research carried out at the university and, concomitantly, the difficulties faced by small and medium-sized companies in the region, due to their limited budgets. These companies cannot afford a significant allocation of monies to research, which is most often considered somewhat superfluous.

CHAPTER VII CONCLUSIONS: MOVING BEYOND THE SELF-EVALUATION REPORT

As could be seen throughout this report, the universities of northern Paraná, especially the UEL and the UEM have a very close relationship with the region, whose development is to a large extent fruit of the active participation of both universities in regional agenda.

Though this participation may be visible, there is still much to be done. In fact, relations between state universities in northern Paraná and civil society must be further stimulated so as to overcome restrictions on both parts. This would be favorable for everyone, in general terms, and, particularly, for productive activities, since these demonstrate a rising need for qualified human capital – graduate students – and of research and innovations developed in the academy.

Both the UEL and the UEM are open to society: their spaces may be used by the local population; there is a considerable promotion of cultural activities; and courses and programs made available to various social segments. Nonetheless, these universities, despite the progress made in recent decades, are far from the level reached by universities in developed countries and from a level of quality that both –with few changes- could reach.

7.1 Lessons from the process of self-evaluation

Promising practices and methodologies that may strengthen the region building capacity

Despite the bond between the universities and the region and the fact that they are the most important and forceful of the state public universities, their structure of research, development and innovation may still be considered incipient. They are still situated at quite a distance from the reality of Brazil's top universities and, especially, from top international universities. More important, there is a great volume of accumulated knowledge, which is unable to reach potential users.

In this context, some practices and methodologies seem promising to the extent that they appear to stimulate a new culture, focused on regional development and based on the partnership between the university and the productive sector. Though many obstacles must still be overcome, UEL and UEM's efforts to tighten the bond with businesses and to show the surrounding areas what is done and produced within the academy is noteworthy. The technological incubators and the Business Office (EN), for example, are some of these universities initiatives to promote cooperation with the business world. The results, even if still modest, are beginning to show and, consequently, serve as a signal that the channels between the university and the productive sector may and must be enlarged.

One important aspect that may be highlighted is related to the comment above. Universities need to promote a better exchange with civil society in order to bring awareness to the latter, not only of universities' importance but also of their potential for R&D that promotes regional development. In addition to the awareness among external stakeholders about what is produced within the academic world, it is also important that universities take initiatives to participate in and to follow what happens in the productive sector. Technology parks are a good example of this and show that a closer relationship between academics and entrepreneurs is possible.

Both universities have a good track record in terms of cultural activities. In this arena, various types of courses and events are offered to all of society. Community members

and professors, students and administrative technicians all participate both in the events and in the courses, which usually enjoy impressive attendance.

Existing synergies between HEIs' and the region's intentions and objectives. Conflicts of interest

Every region hopes to reach high economic, social and cultural standards that can provide to resident population an excellent quality of life. Universities, however, are generally focused on objectives, which are strictly academic. In spite of their different objectives, universities may contribute to raising their region's living standards through what they have to offer: the quality of the professionals they train, the research developed in their campuses and the transfer of the results of their work to broader society. Furthermore, they may also offer their surrounding area an ample variety of cultural activities that end up being incorporated by the municipality's own cultural calendar.

Synergies between the intentions and objectives of the universities in northern Paraná and the region are clearly evident. Nonetheless, these synergies are not linear, that is, there is frequent dissonance between the universities, the government and the other regional actors insofar as the former are guided basically by academic criteria whereas the governments are guided by political interests and others, especially those tied to economic activities, are guided by market logic. In reality, the universities, as has been seen throughout the report, depend heavily on state and federal funding, which becomes a severe restriction to a broader and more independent performance in their own region. However, if synergies are visible in the rhetoric, the implementation into practice is quite difficult.

Incentives that may lead the HEIs to a greater commitment to the region

One of the greatest problems that hamper the HEIs' commitment in the region is the lack of incentives given to their faculty. In reality, this is not a problem that affects only state universities in Paraná. It is present in most public universities in Brazil. The institutional picture drawn by legislation and by federal institutions does not bring any incentives for regional presence. The national institutions which promote research apply criteria which allocate scholarships and financing to institutions of academic excellence using international standards. The same thing happens to most calls for research proposals. The possibility of tackling regional concerns is rarely taken into consideration.

Within the state of Paraná, legislation and institutions tend to perform in a similar manner. The research developed in the region is mostly financed by the state of Paraná, through the *Araucária* Foundation or through UGF, both subordinated to the SETI. These resources, in addition to their scarcity, are applied using political guidelines which are temporary and often far from the real interests and necessities of the region. The calls for research proposals do not always prioritize specific regional concerns. On the other hand, many public agencies and research institutions within the state tend to hire consultants and research institutions from universities outside the state. In so doing, institutions also contribute to discouraging the study of regional concerns by universities in Paraná and, consequently, hamper the construction of competencies within the state.

State resources allocated to universities are related to a series of specific factors, such as the number of pupils, faculty and researchers, the number of courses offered, etc., which have nothing to do with regional matters. In fact, there are no incentives for faculty and researchers to adapt to or adopt regional concerns in their academic activities. It becomes important to note, then, that state universities themselves, and the UEL and UEM specifically, do not stimulate their faculty to incorporate these practices.

The major challenges to be faced by different decision-makers

The major challenge to be faced by groups of different regional actors regards the building of a consensus on the problems and the future of the region. Despite the existence of development councils which are autonomous and face relatively few obstacles, the cities of Londrina and Maringá do not have adequate instruments to conceive a plan for development that can meet the region's needs or that might be consonant with the plans for development of the universities themselves. In fact, the different "world views" held by universities and by the productive sector are real obstacles which must be overcome if every player, especially the region, wants to win.

Another challenge, which is intrinsically related to the previous one, is for universities to take on the leading role in the regional development process. Although they participate in development councils, in technology institutes, in municipal associations and in their region's development programs, the university role in the regional development process is still far from what it could be. Obviously, the excessive bureaucracy and the impediments of university legislation are significant barriers, but there is also certain lethargy inherent to the academic universe which makes universities' participation in society more difficult.

Important challenges are also present in the area of training professionals. Though universities are guided by universal values in the elaboration of curriculum and in program creation, they do not have precise information as to what the region expects of their students. They also have little knowledge about the trajectory of their graduates, such as their current fields of work, where they are residing, and so on. Programs are created and curriculums are reformulated without deeper investigation regarding demands for this knowledge. Linked to this challenge, there is also the fact that today universities need to offer continuing education courses for those who have already received professional training.

Another great challenge to universities is to make their accumulated knowledge available and to redirect their programme of research to regional needs. The toughest problem may very well be that of solving communication problems with users. The most difficult question to be answered regards how to get the knowledge accumulated in the university to the region's typical entrepreneur and thus raise his/her competitiveness.

Finally, one of the biggest challenges to be faced both by universities and by government authorities is that of the changing of internal cultures in both sectors in order to liberate and stimulate the search for salary complements for professors. A system which remunerates professors for tasks actually done while leaving them free to look for ways to complement their salaries through research, consulting and short-duration courses, instead of binding them to one fixed form of remuneration would probably bring about greater interaction with the region.

7.2 Strengths, weaknesses, opportunities and potential threats to increase the HEIs' contributions to the region.

In this section, we refer to the result of the workshops carried out at the universities. The reader will notice that there are issues shared by both universities and also issues which are university specific.

Contribution of research activities for regional innovation: The State UEL

- **Strengths:**
  - Diversity of courses
  - Center of innovations (INTUEL and others)
  - High volume of research

- Center of research and development of technologies
- Consolidated institutions, human resources and infrastructure
- Development of methodologies for regional development

- **Weaknesses:**
  - Scientific production "left on the back burner"
  - Lack of a culture of innovation
  - Deteriorating infrastructure
  - Structure is unprepared to relate to private initiative
  - Inexistence of courses to meet specific market demands (public management, chemical engineering, mechanical engineering, food processing engineering, and so on)
  - Low interaction with the productive sector
  - Heavy corporate structure
  - Lack of interaction between public and private universities
  - Little interaction between graduate programs (research) and other regional R&D institutions

- **Opportunities:**
  - A university which could change the regional reality
  - Federal innovation law
  - State innovation law being discussed
  - Creation of free software
  - The needs of a market in search of innovation
  - Promotion of the public universities' role in the community development
  - Pro-active participation in the *Arco Norte* project
  - The UEL's participation in movements for regional integration (development forum and *Terra Roxa*)
  - Broadening the UEL's relationship with the productive sector
  - Autonomy

- **Potential Threats:**
  - Other public and private institutions occupying UEL's spaces for action
  - Dependence on public resources
  - Loss of human resources to other centers
  - Duplicity of research

The State University of Maringá – UEM

- **Strengths:**
  - The UEM has strengthened itself throughout recent years. It has a well qualified faculty which has produced basic and applied research, obtaining national and international recognition in certain areas of knowledge.
  - The UEM has offered consulting services and has performed with greater intensity in its region.
  - The UEM, aware of its difficulties in the relationship with businesses, is trying to overcome existing obstacles to improve channels of communication to the outside world.
  - The UEM has been involved in local and regional concerns (within its area of influence).

- **Weaknesses:**

- Mechanisms for transferring research results are still very incipient.
- Paraná state legislation directed toward public universities greatly limits their researchers' initiatives. Researchers do not feel stimulated to establish partnerships with the private sector.
- The UEM needs to have its own model and structure to stimulate and facilitate collaboration with businesses.
- Collaboration with businesses is, in most cases, restricted to service provision .

- **Opportunities:**
  - A greater integration with the outside world could generate new opportunities for research, as well as increasingly meet regional demands.
  - C&T policy implemented by the SETI could stimulate the UEM to maintain a higher number of R&D projects, broaden its collaboration with the productive sector and, consequently, make it clear to everyone that R&D is one of the university's essential attributes.

- **Potential Threats:**
  - The lack of synchrony between the need for constantly improved scientific production and regional demands, since it is not always possible to reconcile specific demands with academic production. This type of scientific production, however, responds to demands made by the Ministry of Education (MEC), through CAPES, an agency for the promotion of scientific and academic advancement which regulates all graduate programs in the country.
  - If nothing is done to combat those, prejudices on both sides, the university against the productive sector and vice-versa, may constitute a real obstacle for the UEM's integration with the outside world.
  - The uncertainty of future financing may interrupt or delay efforts toward the improvement of scientific infrastructure and of R&D projects, most of which attend to regional demand.

Contribution of education and learning to the job market and to the region's competencies

The State University of Londrina – UEL

- **Strengths:**
  - Potential of regional competencies
  - Promotion of sustainable development
  - Formation of specialized labor – programs
  - Source of reference for the attraction of innovative businesses
  - INTUEL support for regional competencies

- **Weaknesses:**
  - Lack of project evaluation– lack of guidelines or directions
  - Lack of an institutional policy that may promote regional potential

- **Opportunities:**
  - A pro-active UEL, generating social and scientific development
  - Existence of INTUEL

- Resources from businesses for the development of scientific research
- Public state and federal policy; resources for the development of projects

- **Potential Threats**
  - Internal municipal resistance to innovation
  - Political discontinuity of local powers

The State University of Maringá – UEM

- **Strengths:**
  - Faculty qualification
  - The UEM's integration with the outside

- **Weaknesses:**
  - Difficulties in making curriculum more flexible
  - Co-responsibility for regional development

- **Opportunities:**
  - Review of methods and systems
  - Involvement of political class and of society

- **Potential Threats:**
  - Governmental policy
  - University's lack of autonomy
  - Internal and external bureaucracy
  - Human and physical resources
  - Social and cultural development of the regional environment

The State University of Londrina – UEL

- **Strengths**
  - Space and support for cultural activities
  - Plurality and diversity of ideas
  - The university as a catalyst for the region's cultural environment

- **Weaknesses:**
  - Difficulty in making proposals operational

- **Opportunities:**
  - Proximity to other partners and the third sector
  - Advantage of legislation which stimulates culture:
    - Federal level –Rouanet Law
    - Municipal level – Promic
  - Value of the local culture

- **Potential Threats:**
  - Risk of loss of focus and academic excellence

The State University of Maringá – UEM

- **Strengths:**

- The interest that both the UEM and the municipal government of Maringá have in maintaining partnerships in the cultural arena. This has been systematically explored.
- The existing partnership between the UEM and local governments.

- **Weaknesses:**
  - Difficulty in attracting businesses to foment cultural activities. This discourages the sectors which attend to culture and makes artistic-cultural production a much more strenuous task. The practical outcome of all this is that the dissemination of culture becomes inviable and the population is excluded from access to artistic and cultural goods.
  - Little collaboration between the UEM and other universities in the region.

- **Opportunities:**
  - People are now more aware not only of the activities offered by the UEM but also of its role in promoting these activities.
  - New environmental technologies may improve environmental sustainability at UEM and, at the same time, serve as a stimulus for the development of new local technical solutions.

- **Potential Threats:**
  - Lack of synergy between university and society
  - Lack of political will
  - Influence of partisan politics in the distribution of resources
  - Lack of resources for financing all areas of knowledge
  - Existing resources are directed by specific demands and research areas which prioritize commercial interests which in and of themselves do not promote economic and social development. Such attitudes are a result of the lack of coordination of policies in favor of science and of public policies for socioeconomic development.
  - Lack of investment in structures that allow greater integration between university and society

7.3 The road ahead: the elaboration of a political strategy for the future of the region

The policies now being elaborated and implemented for the region are based on the notion that research, development and innovation are key elements in regional development. Technology parks are seen as potential springboards for the regional economy and these initiatives have been the supported by actors, primarily the universities. It must be emphasized that the councils (CODEL and CODEM) and the development agency (ADETEC) have been the forums for discussion of the policies and that the universities, as noted earlier, have had a collaborative role, not one of leadership. It is quite true that the state government, through SETI and TECPAR, has supported these initiatives, although they were not conceived by the state government and, therefore, are not part of a deliberate development strategy for the region. The local actors and authorities have been the leading agents in this process. In fact, the technology parks may not only contribute to regional development but also serve to tighten the link between universities and the productive sector and to help overcome prejudices from both sides which now discourage them from working together.

Another dimension, not always noted as a priority by policy makers, is the formation of regional human capital. According to Lundvall, the greatest contribution made by universities is the quality of the professionals they offer the community. Thus, a deeper

perception of the knowledge and abilities required by the region will be fundamental for improving the training provided by the universities. Here too, all regional actors must work to make these needs explicit.[20]

It will be very difficult, in light of the current scenario, for universities to take on a leading role in building a development project for the region. This, as has been noted, is in hands of local leaders. The universities have certainly participated in the process. The strategies that are being elaborated, however, must make clear what is concretely being expected of the universities as generators of the region's human capital and as producer and disseminator of the knowledge, which will favor an increase in productivity, and, consequently, the competitiveness of the region's productive apparatus. It is always important to remember that the main regional actors – the universities, political leaders, producers, and other actors – are all guided by different logics. The difficult art of region building "***El dificil arte de hacer region"*** [21] involves synchronizing these logics in a concrete project of development for the region.

[20] Lundvall (2002)
[21] Conforme Boisier (1992)

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