

Subtheme: 3.1. Regional Triple Helix models: drivers, dynamics, public policy

“Possibilities and Limitations of the Contribution of Public University Research for Regional Development: Microevidences From a Regional University in Brazil”¹

André Ferreira – Professor Assistente (Universidade Federal Fluminense) – andre.ferreira10@gmail.com

Marcelo Amaral – Professor Adjunto (Universidade Federal Fluminense) – mgamaral@gmail.com

Pítias Teodoro – Professor Assistente (Universidade Federal Fluminense) – pitiasteodoro@yahoo.com.br

Keywords: Regional Development, University-Industry-Government; Triple Helix; Innovation;

1 - INTRODUCTION

The question that arises now is to define what's the university's role in the new knowledge-based society. If in the industrial era, the university has played a secondary role, providing qualified staff and basic research (Etzkowitz and Zhou, 2008), today the university has become increasingly engaged in supporting innovation and leadership of local policies toward a more entrepreneurial approach (Cooke, 2007). At the same time, the university also needs to preserve its open orientation and long-term academic research (Oliveira, 2008).

The transitional situation experienced today, resembles the first academic revolution occurred in Germany in the XIX century, at Humboldt University, where the research mission was added to the teaching mission (Teixeira, 1988). In Brazil, the first and second academic revolution are occurring simultaneously (Ferreira et al, 2010). It means a new social contract between the university and society, where government support is maintained to the extent that research and innovation plays an important role in economic development (Brisola, 1998).

In this context, we highlight the role of local actors in development, such as universities, research institutes, local governments, funding agencies, trade and industry associations, among others. These local actors act according to the experience of the problems and their solutions, and its role to stimulate innovation, which can reduce production costs and boost its market share (Souza, 2009).

This article, that is embedded in a broader research project and presents the results of its third survey, analyzes the potential of contribution of a public research university located outside the main metropolis for innovation and development of their region of influence. The case study is the Regional University of Volta Redonda (PUVR), a regional *campi* of Fluminense Federal University (UFF). Created in 2004, currently has over 2,000 students and 200 full time professors, 60% with Ph.D., expected to reach 5,000 students in 2013. PUVR has 13 undergraduate courses in Engineering, Social Sciences and Basic Sciences and 4 graduate courses in Engineering.

The area of influence is PUVR the Mid Valley of River Paraíba (RMVP), located between the main economic centers of Brazil, Rio de Janeiro and Sao Paulo, comprising heavy industries as MAN (trucks), Peugeot Citroen (automotive), Saint-Gobain (metallurgy) and CSN (steel), among others. Besides a large park of small and medium enterprises with metal-mechanic vocation and in the recent years services. The region, comprising 13 municipalities, has 890,082 inhabitants (IBGE, 2011).

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2 - Literature Review

2.1 - University-Industry Linkages: The second academic revolution in Brazil and the emergence of an entrepreneurial university oriented to the regional development

The Universities are in a cultural transformation playing a significant role in an emergent knowledge-based society. This transition process, called second academic revolution, which is the addition of an economic and social development role in the University's mission, is occurring in many countries (Etzkowitz, 1994, 2001). In Brazil, it has an additional component: the Brazilian public research universities (BPRUs) are a tool to spread knowledge, research and economic development to the countryside (Amaral and Silva Filho, 2008).

The TH thesis argues that the University after the second academic revolution is able or must be an entrepreneurial university and the basis of a regional development.

“a research base with commercial potential, a tradition of generating start-ups, an entrepreneurial ethos on campus, policies for defining ownership of intellectual property, sharing profits and regulating conflicts of interest and participation in regional innovation strategy.

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Knowledge spillover from universities promotes regional development, through commercialization of research and provision of new firms, human resources and new ideas.” (Etzkowitz & Zhou, 2007).

The BPRUs were created between 1920s-1960s with a teaching mission. In the 1960s they started to incorporate research activities with graduate programs. Since the 1990s, the economic development model has emphasized managerial efficiency and innovation to improve the competitiveness of firms. A set of interaction activities were established, as technological services (tests, measurements, consultancies, information services), education services, joint research projects with companies, projects carried out by incubated ventures and jointed-projects with ‘junior’ companies – consulting firms organized by students with faculty staff coaching (Maculan & Mello, 2009).

As a consequence, technology based incubators, science parks and technology transfer offices (TTOs) were created in the BPRUs (Etzkowitz et al, 2005). Two types of technology transfer patterns emerged reflecting different levels of cooperation and involvement (Maculan & Mello, 2009):

- The knowledgeable participant, aware of the commercial potential of technology plays to translate the knowledge to Industry, and
- The seamless web, that articulates the integration of academic research carried.

An entrepreneurial university encompasses teaching, research and service for society, not in a linear process but in a constant retro-alimentation of trilateral cooperation. Academics plays role by adding value in companies and this learning process improves education quality and research focus. It's a continuous and fundamental process of acquiring, packing, dissemination and creating knowledge.

There's a wide literature about innovation and local/regional development, such as Piore & Sabel (1984), Saxenian (1996; 2007), Storper (1997) and Cooke (2006; 2007), which analyze the types of interaction, incentives, barriers and recent performance. This idea is also the core of TH approach, originally designed in the high-tech technology transfer process (Etzkowitz, 2008). The TH of University-Industry-Government linkages can be also a metaphor to analyze the economic

development of regions (Etzkowitz & Leydersdorf, 1996). From the literature three relevant points were identified:

- The knowledge based economy cannot be limited to the high-tech sectors (such as microelectronic, communication, pharmaceutical and software), in the medium and low-tech sectors (food, raw materials or textile) the learning and innovation are also significant and the sources of knowledge are many times along the value chain (Cooke, 2007);
- The concept that Universities play a central role in the economic development is useful in the modernization of low-tech companies (Etzkowitz & Leydesdorf, 2000);
- The local context is important as a space where the collective identity is produced and reproduced, the mutual trust is reinforced and effective and flexible networks of economic and cognitive relationships support the creation and diffusion of knowledge (Cooke, 2007; Saxenian, 2007).

In the Brazilian case, most part of the regional economic development activities is organization, decoding and diffusion of knowledge to modernize the productive process of small and medium companies. The Brazilian experience in the last ten years joined the concept of entrepreneurial university with the policy of regional economic development (Etzkowitz et al, 2005; Amaral et al, 2009).

In the low-tech sectors, the UI linkages are less frequent and, in general, oriented to solve current problems and develop new products (Cooke, 2007). Brazilian companies at low-tech sectors do not have a demand for the state of the art technologies. In many cases the access to information/knowledge to improve production standards is more important to sustain competitiveness (Tigre, 2007; Yusuf, 2007). The Ministry of Science and Technology recognizes that Brazil cannot underestimate the effects of national competitiveness from incremental innovations (MCT, 2002). Many times, in developing countries, science and technology capacities are used to identify and select opportunities generated abroad. The role of a national innovation system in the periphery is to follow the international technological flows (Albuquerque, 2009).

An increase in complexity of levels of organizational infrastructure is concomitant with the devolution of power from the national level and creation of new regional entities. This transformation includes efforts to encourage UIG players to undertake joint innovation projects and to enhance clusters by encouraging a broader set of Local Productive Arrangements.

“Encouraging a meta-innovation process, activating areas of society that had been distant from innovation, allows the triple helix model to be realized in developing countries where it had been a normative rather than an analytic concept. The process is more complex than simple organization and technology transfer. The same organizational mechanism can play a completely different role in innovation, depending upon the actor(s) that promote its introduction and the context into which it is introduced. The incubator was adapted to Brazilian circumstances as new actors entered onto the incubator scene and adapted the mechanism to realize their objectives.” (Etzkowitz et al, 2005).

2.2 - UFF as a entrepreneurial university – defining a institutional vision

The Fluminense Federal University (<http://www.uff.br>) is a public university created in 1960 and its main campus is in Niterói, a city close to the Rio de Janeiro city. The university has 66 undergraduate courses, 78 graduate programs (48 masters and 30 doctoral programs in many cities). In 2011, it has almost 3,581 students in undergraduate courses and 4,030 in graduate programs.

In the 1990s many initiatives were developed to turn UFF a more participative actor in the regional economic development. Some of these actions were the creation of undergraduate courses in many countryside cities and program of entrepreneurship and innovation (Amaral & Silva, 2008). Also several UI mechanisms were developed. Meta Consulting, the first junior companies, was created in 1995 by engineering undergraduate students. In 1997, some professors began the creation of a technology firm's incubator. In 1999 the physical installation was inaugurated. In 2001, a technology transfer office was created to manage industrial property rights and software. In 2004, the Coordination of Scientific and Technological Projects (CPCT) was created in the Vice-President of Research and Graduated Programs to articulate the internal innovation system (Amaral & Silva, 2008).

In the end of 2004, after four years of discussion, the Federal Government sanctioned the Innovation Law to incentive science, technology and innovation in the industry, looking for the improvement of technological competencies and industrial development in Brazil (Barbosa, 2006). This law covers important aspects as cooperation between S&T institutions and firms, sharing of laboratories, incubation of small firms in public research institutes, provision of R&D services for firms, creation of TTOs and the participation of the researchers in the economic rewards of their inventions (Maculan & Mello, 2009). Several Innovation Laws from the States of Brazilian Federation are being created after that to promote innovation in the regional systems. The State of Rio de Janeiro approved its regulation in December, 2008, after one year of discussion.

In the end of 2006, UFF created a President's Adviser for Innovation Policy. A group of researchers started to work in September 2007 to define an innovation strategy and structure. The purpose is to implement the Innovation Law's requirements inside UFF with the creation of an organ to manage institutional policy. Many Brazilian universities created Agencies of Innovation joining internal structures related to U-I linkages (Amaral&Silva, 2008).

Until 2006 UFF's incubator was oriented by a conventional technology transfer model. It was part of a mechanism in construction to transform academic knowledge in technology embodied in products, process and services. The results obtained weren't satisfactory. Only two ventures were graduated and incubator suffered financial and managerial setbacks which culminated in its non-recognition by UFF as a mechanism of interaction with Industry. In 2004, the incubator lost its physical space and the funds raised in projects weren't sufficient to mount an effective structure. It's not possible to conclude whether the inefficiency is resulted or caused by the lack of support, maybe both. In January 2007, it has only one firm physically installed in a rented house. A new academic coordination assumes the operation and diagnosed the failure of management model. The administrative staff was fired, an external manager was hired and a new staff organized. The incubator, now called InitiäLab, joined specialists in technology management innovation to reshape the strategy and operational processes. Under the influence of Triple Helix and Open Innovation the processes were set in a new configuration. As a result, after 18 months, a new concept of incubator was built based in a broad critique of conventional incubation model (Amaral & Silva, 2008)

In 2009, after two years of discussion, the researches involved with innovation activities proposed the creation of an Agency of Innovation to coordinate the policy and structures related with innovation. This proposal was approved by the Vice-President of Research and Graduated Programs. Since February, 2009 the former CPCT is being transformed in the Agency assuming the rule of the Nucleous of Technology Innovation recommended by Innovation Law.

In sum, the evolution in the last 15 years shows a clear route in the direction of an entrepreneurial university involved with the dissemination of innovation applied to the economic and social

development. The second academic revolution is being spread in UFF from the most dynamic departments and research groups. The institutionalization process of innovation management is a strong signal of this direction. However, many schools and departments are yet reactive to this process. In the next topic the countryside campus will be analyzed (Amaral & Mecena, 2008).

2.2 - PUVR's development

The Regional University of Volta Redonda (PUVR), created in May 2004, is a UFF campi situated at 140 km from Niterói. It has over 2,000 students enrolled and offers undergraduate courses in Metallurgical Engineering, Mechanical Engineering, Production Engineering, Agribusiness Engineering, Business Administration, Direito, Ciências Contábeis, Psicologia, Matemática, Física e Química in addition to MBAs, M.Sc. and Ph.D. courses in Metallurgical Engineering, Engenharia Mecânica, and Modelagem Computacional. In 2011, it counted with a faculty staff of 180, over 60% of which with a PhD degree. With the project of university expansion, it is forecast that this number will increase to 5,000 students and 260 professors by the year 2012.

EEIMVR was an independent college created 1960, under the name University of Work, to offer high level education and laboratories services to CSN. This college was integrated in UFF in 1966 and during almost 40 years was an important school to train workforce to the local industry but disconnected from UFF's strategy.

In 2003, the Ministry of Education (MEC) created a program to expand the public research universities from the big and developed cities of Brazil to the cities leader in the economic regions. The EEIMVR took this opportunity and proposed a US\$ 2 million project to create new courses (business administration, public management, law and accountability), develop research and act as a important player in the regional development. With the privatization of CSN in 1994, EEIMVR lost an important funding partner (CSN invested US\$ 1 million in the 1990s to implement new laboratories) and a new source of investment in infra-structure would be important.

In 2004, after MEC approval, the first movement was the creation a new department (Management and Agribusiness) inside the EEIMVR to develop new courses. The course of Business Administration started in 2005 in a partnership with Federal Rural University of Rio de Janeiro (UFRRJ), localized in Seropédica, 60 km from Volta Redonda.

In the end of 2006, ECHS and PUVR were formally created. Under this period the building of new spaces was started and also a linkage process with local political power, as City Hall and representatives in the National Congress.

In the last three years many research and infra-structure projects were elaborated and approved by funding agencies bringing additional amount of resources and responsibilities. Two research groups were created in ECHS. The first one, the Research Group in Management and Economic and Social Development (GPADES), promotes infra-structure projects, like thematic laboratories, and incentive researches to develop projects oriented to the regional development. A project of a diagnosis of regional economy and the idea to create and observatory to monitor economic, social and technological development emerged from these discussions. The second research group is the Triple Helix Research Group – THERG-Brazil, a branch of the international movement of Triple Helix. In term of University-Industry linkages, the first long term partnership was signed with Peugeot-Citroen in 2008. The activities involved are initially training and, in a second stage, harmonization of methodologies.

In 2007, MEC created a national program to restructure public universities and expand its action. REUNI program hired more than 2000 PhDs in three years. PUVR received more resources with the compromise to create other new set of courses (Psychology, Chemistry, Mathematics, Law).

In this context, the case study analyzes the implementation of PUVR. It focuses on the process of building its strategic direction and the perception of its academic staff over the possibilities of U-I interaction and its main barriers. In Brazil the production of knowledge, considering the number of publications of Brazilian researchers in well-regarded international journals, is similar, for example, to those from countries such as South Korea and Israel. However, when transforming the knowledge created into innovations, the results are not expressive. Therefore, this can be considered an opportunity window for researching into strategic directions as well as possible barriers in regard to the University-Industry linkage, once in a new University Center, such as PUVR. The organizational culture is not sediment yet, making it possible to map the player's expectations and to find ways to contribute to improve the relationship between University and the local society, allowing ideas and partnerships to leverage the regional development.

3 - METHODOLOGY

The method of research is the case study , indicate when the object being investigated can be regarded as a contemporary phenomenon, in which the researcher has little control over the events there is a need to use multiple research sources, seeking converging lines of investigation (Yin, 2005). This method also allows comprehension of the social reality through a deep dive on a bounded object (Goldenberg, 2001). The research investigate the perceptions of political and business leaders of RMVP and various organizational levels from UFF about PUVR's role on innovation and regional development. From October/2010 to February/2011, 24 people were interviewed, as shown in Figure 1, totaling more than 40 hours of recording.

The interviews were conducted in person and recorded for later transcription, following an interview guide. In the university context, the choice of interviewees followed a criterion of representativeness of the university structure. Therefore the Vice-Chancellor, the Dean of Research and Innovation, Director of the Office of Innovation and Technology Transfer Manager and Business Incubator were interviewed. These respondents are located in the central structure of the university, located in the city of Niteroi. From the Volta Redonda Campus four Unit Officers, two Postgraduate Sensu stricto Coordinators, seven assistant professors with relevant research and / or extension work and two heads of the Laboratory.

In the society context, the objective was to interview the leaders of institutions which have an active participation in the regional development process. Participated in the research: (i) City Secretaries of Economic Development from Volta Redonda, Barra Mansa, Itatiaia and Resende. The population of these cities represent 66% of the total RMVP population; (ii) the President of the Regional Development Agency (ADEMP) and also the President of the Commercial Association of Industrial and Agropastoril of Volta Redonda (ACIAP), (iii) the Regional Director of FIRJAN (iv) the President of the Metal-mechanic enterprise Union of the South Fluminense Region. Figure 1 shows a schematic of the interview's participants.

It is important to highlight that all leaders, managers and professors who were contacted for the interview agreed to participate

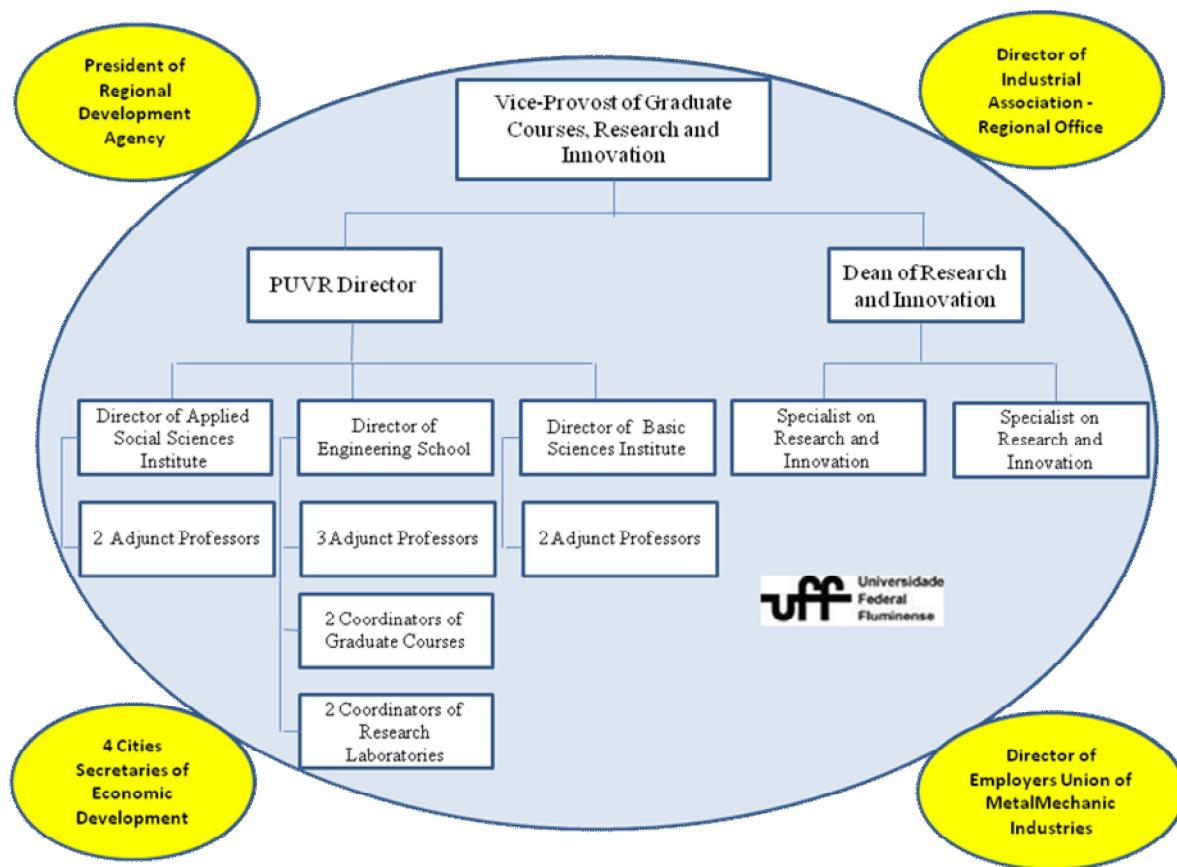


Figure 1: People Interviewed

The interview was designed with the respondent's profile in mind, seeking to address the following topics: the socio-economic profile of RMVP, support for innovative activities, barriers to innovation in academic and business environment, local / regional developed strategies and the university's contribution to innovation and regional development. All forms used were reviewed by at least two specialists before application

4 - EMPIRICAL FINDINGS

4.1 – The perception of RMVP political leaders and business on innovation, regional development and interaction with the university

From the interviews with the Secretaries of Development (SDE) from Barra Mansa, Itatiaia, Resende and Volta Redonda, some relevant conclusions can be highlighted. Firstly, the cities of Barra Mansa and Itatiaia do not have public policies established as part of its Department of Economic Development, in order to stimulate the process of innovation in existing businesses and to attract technology-based companies for their respective municipalities. The actions of these departments are focused primarily on attracting traditional companies to the region, having the logistics area as the main target of the actions due to the privileged location of RMVP which facilitates the attraction of this kind of enterprise.

The city of Resende has a slightly different strategy, with timid actions, to stimulate the creation and attraction of technology-based companies. One of these actions is to support UERJ's technology-based incubator, located in the city. In addition to giving public officials for the incubator, the city provides annual financial support for its operation. Another action was the change in municipal law to reduce the tax services for businesses in the area of Information Technology, aiming to create a teleinformatic pole. According to the Resende SDE "In the strategy for the city's development, the teleinformatic pole is a priority, alongside the development of the logistics pole". The goal is to bring more companies in this sector to create a pole of Information Technology. These incentives contributed so that a French company installed a distribution unit in the city, with the prospect of deploying a production line of telecommunication products.

In the Department of Economic Development of Volta Redonda, which is the largest city in the RMVP, some actions have begun to be undertaken with the objective of bringing the issue of innovation to the center of the debate, highlighting the creation of the Inova VR prize, established in the year of 2010 with the goal of encouraging high school, undergraduate and postgraduate students of the city to present projects that examine the problems of the city and provide creative and innovative solutions. In the first edition of the event, 27 papers were presented, having eight winners, some of which had immediate application, as was the case of the proposal for participatory budgeting over the Internet, proposed by PUVR students, which is being implemented by the Municipal Planning Committee. In Volta Redonda, the Municipal Committee on Technological Innovation was also created, composed of representatives from various sectors of society such as the State Government, Private Companies, Educational Institutions, Trade Unions and Members of the municipal government. The Committee's goal is to foster the development of scientific and technological research in Volta Redonda.

With reference to development strategies, the city of Volta Redonda focuses on the area of services (health, education, commerce, and information technology) and searches for metal-mechanic sector companies that can transform the steel supplied by CSN in products with higher added value. The difficulty of the city is its small geographical area coupled with a steep topography makes it difficult to find available and feasible areas for large enterprises, unlike the neighboring cities of Resende, Itatiaia and Porto Real which not only have large areas available but also have a large area along the President Dutra Highway, the country's major highway. As far as advantages the city of Volta Redonda has the quality of services offered and expanding universities, currently in the city there are three private universities (UNIFOA, UGB and UBM) an isolated university (FASF), a State Higher Education at a Distance Pole (CEDERJ) and two Federal University poles (UFF and IFET)

Another conclusion that was unanimous among the four cities surveyed, are the actions aimed at improving the skills of the workforce, with emphasis on operational and middle levels. This occurs because the majority of companies with investment intentions have as a condition the existence and / or training of qualified workers to fill vacancies. In these cases, the common partners are Senai units, Private Colleges and Employers' Unions. Volta Redonda's SDE is negotiating with two public universities the opportunity to bring a Computer Science course to the city. The goal is to develop a skilled workforce to attract companies in the IT field.

Another recurring theme on these Departments is the attraction of public investments; the most current is the dispute between the cities to house a station of the High Speed Train project from the federal government, which will link the two largest Brazilian cities, Rio de Janeiro and Sao Paulo. In preliminary studies, there is a provision of a station on the RMVP, which would be located in one of the following cities: Volta Redonda, Barra Mansa or Resende. The launch of the

bidding documents has already been postponed twice, and so far, there are no firm guarantees that the construction will take place.

With reference to efforts to form intermunicipal trusts, they are also incipient, with isolated actions in specific areas such as health, where 12 cities in the region have united to seek funds for the construction of a Regional Hospital, which is being built in Volta Redonda. Resende's Department of Economic Development is also articulating a trust, named vicinity, involving 15 cities which borders the city, aiming to be an umbrella consortium, comprising of actions from training and qualification of workforce and environment up to actions in the health area. As a relevant fact, the members of this trust belong to three Brazilian states: Rio de Janeiro, Minas Gerais and São Paulo.

Within the Departments of Economic Development, the interaction among educational institutions and the government is low. With reference to private universities, actions are being undertaken primarily to specific issues of qualification of the workforce. Volta Redonda, due to its wider network of education, is in an advanced stage, with projects being developed in partnership primarily with UFF, most notably: the creation of the Museum of Science & Technology, which had its architectural design chosen through a competition sponsored by UFF's School of Architecture, the creation of the Agribusiness Coordinator at City Hall, which an assistant professor at the School of Agribusiness Engineering at PUVR is responsible; coordination of activities for promoting the social economy through creation of cooperatives, to create prospects for generating income for poor families.

With reference to corporate institutions, some highlighted features are that they are quite widespread in the region and are an effective channel of communication and representation of their interests with the government and society. Among these institutions include the Regional Representation of the Federation of Industries of Rio de Janeiro, the Union of Enterprises of RMVP Metalworkers (Metalsul), Commercial and Industrial Associations in each city and more recently the Regional Development Agency in the Middle Paraíba (ADEMP), which despite having little representation, has a great potential to support and promote the regional productive sector.

Among these institutions, Metalsul has stood out in an attempt to stimulate along with its 126 member companies a search for actions that leverage their innovative activities. The main action, which was held in partnership with FIRJAN, was an event that sought to qualify the member companies to participate in biddings for innovation within the public funding. Apart from training on the subject a vast number of accessories were made available so companies could develop their innovation projects. Despite all mobilization, only six companies submitted a proposal to the agencies. In an assessment from Metalsul's president, "the question should not be linked to a lack of ability or innovative business ideas but a lack of awareness of the local entrepreneurs to the importance of innovation for sustainability of business." Another action was the organization of the South Fluminense Metal-Mechanic APL, which has an active participation of various regional institutions.

FIRJAN operates more effectively in raising awareness about the importance of entrepreneurship and innovation. It organizes the "Mobile Technology" which explains to the various Regional Offices how the bodies for stimulating innovation work as well as strategies to participate of their biddings or credit lines. ACIAPs are municipal entities, with strong representation from the commerce, and their actions are aimed primarily at protecting the interests of local businessmen and are always a strong partner with the municipal government. As a common characteristic, the ACIAPs are usually the oldest entrepreneurial institutions in their respective cities. Their main demands are related to fiscal issues, infrastructure for the operation of local enterprises and

integration among its members, actions to stimulate innovation among its members are virtually non-existing.

With reference to ADEMP, its main project is to mobilize the public to build a highway linking the RMVP region to Itaguaí, where there are major steel enterprises, such as Cia Siderurgica do Atlantico (CSA) and Gerdau Steel, besides the Itaguaí Port. The goal is to integrate these two important centers of the country's steel industry and thus develop the local economy.

Regarding the interaction of these business institutions with local universities, they are almost nonexistent, and similarly to some departments of economic development, specific actions are summarized into qualification and recreational activities. In interviews, the main activity reported was the interaction between Metalsul, Firjan and PUVR for a submission to a FINEP Notice. The goal is to foster the creation of a Center for Innovation in Support in the RMVP.

4.2 - Innovation and regional development: the perception of managers and researchers from UFF

UFF does not have a formalized policy of innovation, there are practices that have been consolidated, and many of them have been institutionalized over time. To the Dean of the Pro-Dean's Office of Research, Graduate Studies and Innovation (PROPPi) "the process of innovation is an absolutely new fact, and some attitudes are milestones in this process, the first being PROPPi's name change, which was Research and Graduate Studies and became a Research, Innovation and Graduate Studies. At first, the initial effect is merely cosmetic in nomenclature, but it has built a symbolism and an important signal from the institutionalization of innovation activities. The second action was the creation of AGIR which is the Innovation Agency from UFF. "

It is precisely AGIR, which according to its Director was "born of an old project of committed people who were interested in the theme of innovation and entrepreneurship and went there and put it to work because they believed in the idea", that now has the task of creating UFF's innovation policy, based on a work of identifying the university's own vocations. In addition to building the innovation policy, AGIR also has a mission to stimulate innovation activities in an institutional manner, promoting a paradigm shift, taking the role of the university beyond the training of human resources and basic research. AGIR tries to bridge the gap with an applied research, which is absorbed by the external community, being the productive sector, the public sector, social sector or communities. In order to carry out its activities, AGIR has a lean structure and, according to the Direction, "Due to the mission which it is responsible, AGIR will need to be expanded." Currently, its structure is made up of a management, a Special Assistant, three Administrative Assistants and three interns, who are students at UFF. Hierarchically the business incubator (Initia) and the office of technology transfer (ETCO) respond to AGIR. Finally, the Forum of Agents of Innovation is the forum within AGIR where the policies and strategies are defined. This forum is composed of people from the university who are interested in the theme of innovation and researchers on the subject or players in this area.

In AGIR's structure, the business incubator Initia has as a philosophy, according to its director, "bring to society the knowledge developed within UFF's research laboratories, transforming the service structure that exists now into a structure that becomes ventures so that the universities knowledge would become the products which would be internal to the university in terms of ownership." To develop the incubators, Initia utilizes a specific methodology, called Pipeline. This consists of going to the labs and doing an initial survey of the teams, the research lines and

projects that are being developed and which ones can generate new business, in other words, identify research projects that are most likely to be transformed into enterprises. This is the protective model of management. The goal is to align the nature of each incubated business, helping to build their business plans, in developing their market strategies and competitiveness. To reach this objective the incubator seeks new business, is proactive, and offers complete services, from corporate training to infrastructure and establishing the communication channel between the company and market.

ETCO, which is also connected to AGIR's structure, responds for the researcher's patents. Until its establishment in 2009, there were 12 patents registered, after one year of existence eight patents were registered. To the Dean of Research, Graduate Studies and Innovation "It is very likely that most of these patents have emerged because the researchers feel supported by the institution in order to use the institutional system. This is a highly specific and objective indicator of the institutionalization of innovation activity at the university. "

4.4 – PUVR's research structure and the university role in innovation and regional development in the perception of strategic players from PUVR

The Directors of the three PUVR units converge on the fact that UFF has a recent tradition of innovation. Even with the creation of the Foundation Euclides da Cunha (FEC), the business incubator, the technology transfer office, and the addition of the term innovation to the Dean's office of Research and Graduate Studies, these actions are still very shy . AGIR has acted very positively, but the issue of innovation has not yet been permeated into the university. The Innovation Agency itself is something quite new. According to the Director of the School of Engineering (EEIMVR) "I still do not see the issue of innovation going down to the base. But I believe that is normal, it is the beginning, and now the university has signaled its concern about innovation, I think it's a matter of time. It is too early for us to do any kind of assessment". In the conception of the Director of the School of Humanities and Social Sciences (ECHS) "AGIR could earn a higher status, leaving the Pro-Dean's office and being connected directly to the Dean's office." The direction of the Institute of Mathematical Sciences (ICEX) has as a positive fact that "since 1993 there has been a post-graduation in Metallurgical Engineering, Master and Doctorate, and in the years 2010 and 2011 Masters in Modeling Computational Mechanics and Engineering were implemented, plus others that are being evaluated by the MEC. These courses open positive perspectives for research and innovation in PUVR.

The laboratory setting is an important element so that PUVR could have high-level scientific research. In Brazil, according to Director of ICEX, "very few universities fund research with their own resources. What is happening in PUVR is the Brazilian standard model, in which researchers submit research projects for donors, such as FINEP, FAPERJ, CNPq, among others, and in PUVR results have been quite positive." Still on the perception of ICEX's Director "This is promoting a giant leap in quality of scientific and technological research in Volta Redonda, for example, in the EEIMVR there is a Scanning Electron Microscope, which is equipment that UFF does not possess. ICEX is in the process of acquiring two large equipment, again not possessed by UFF, which are the Elipsometer used for the optical characterization of materials and ICPOS, which is also used to characterize materials, but specifically metals. In ECHS a laboratory with multi-application management in support of the support of FAPERJ was created, which has 35 computers and various software for the management area. "

A forecast given by the Coordinator of Graduate Studies in Metallurgical Engineering is that "by the end of 2011 we should have over 3000 square meters of laboratories, only in EEIMVR. Adding the laboratories of ICEX and ECHS, this area is nearly 4000 square meters. This is a structure, if not ideal, is at least satisfactory for the conduction of top level research in PUVR".

In terms of application of basic research, transforming them into products, services and processes, there is a relative consensus among the interviewed researchers that it is not only important, but also is a trend of performance of PUVR. This interaction with business and society will also have the role to help raise funds for the development of researches.

There are some practical examples of the transformation of science into innovation. One is a research that is being conducted at ICEX, it involves material analysis and has ample opportunity to become a device for process control. The research consists of a plate analysis unit, in real time, to control the quality and the roughness of plates with laser techniques and image processing. This device, besides eliminating destructive testing, allows the correction of the process at the exact moment that process failures begin to occur. In the Department of Agribusiness a survey is being developed, in partnership with the City of Volta Redonda, regarding the treatment of sewage sludge fertilizer for production of trees for reforestation. The material that today would be a pollutant is currently in a work in order to make it a fertilizer for production of native species for reforestation and be used in recovering forests. At ECHS, an example of social innovation is the structuring of a Solidarity Economy Cooperative in the feeding area. Members are people who receive support from the federal government's social programs (Bolsa Familia). One possibility being examined is that the Cooperative may take care of the cafeteria of the new PUVR university campus.

Another project that aims to stimulate innovative enterprises in RMVP, which is supported by three units, is the creation of a technological incubator. The conception of ICEX's Director is that "The incubator is a matter of time, and hopefully a short time." The Director of ECHS believes that "PUVR has a set of people who have the expertise, two teachers have worked in other federal university incubators, and at least six other teachers have contact with the subject and could easily get involved with the creation and management of an incubator. Since the cost is high, it might be interesting to have an incubator, or perhaps a technology park, of the region that would be a regional consortium involving several players involved in the issue. "

Regarding the main barriers to the interaction of the university in its region of influence, the bureaucratic structure of public universities stands out and in particular UFF's structure, which was considered by the Director of ECHS "as an impediment to more effective participation in PUVR innovation activities in RMVP. Another point that was mentioned by several interviewees was the emphasis given to basic science in UFF and PUVR . According to the Director of ICEX, "even in Engineering, which is usually closer to the productive sector, institutionally it is not that close, basic science is still prioritized. The Vice-Chancellor considers that "universities in Brazil are closely tied to basic research and few universities are able to adapt the model to develop applied knowledge in the university."

Finally, respondents' views about PUVR's participation in the Regional development, which for the Director of ECHS "should be the focus of PUVR's actions because it is in our DNA, we were created as an expansion project and internalization of MEC's public university. If we do not discuss the region and do not interact, do not return, it makes no sense for us to be here. Today, our research is still at an early stage, what we have done is to advance this research and dialogue with regional players. "

A consensus among interviewees is that PUVR is very passive, where there is a need to establish a communication plan and break the inertia, getting closer to businesses, public sector and communities. In the conception of the Director of EEIMVR "We get focused on everyday issues and forget to go to Peugeot Citroen, MAN Trucks and Buses, Votorantim and even CSN itself. There are a number of projects within PUVR that if presented to some big companies in the region there are great possibilities that they would be supported. "

5 – ANALYSIS

During the interviews carried out with business leaders and the municipal secretaries of economic development it is observed that the degree of knowledge regarding the potential contribution of innovative activities for regional development is still incipient. In general the focus of these businesses and political leaders is to attract new businesses that generate income and employment for the region and the achievement of infrastructure projects.

Among the exceptions is Metalsul's leadership bringing together 126 companies that have undertaken various actions aimed at mobilizing companies to undertake innovative activities.

Relevant actions have also been implemented by the Secretary of Development of Volta Redonda, which in 2010 created the Coordination of Innovation and Technology, the City Council on Innovation, Inova VR Prize, and the Museum of Science and Technology Project scheduled to open in 2011. These actions from the City Hall had the active participation of teachers / researchers from PUVR-UFF, which demonstrates an integration of these with the local government.

The results of interviews with teachers and managers from UFF and PUVR indicate that institutionally there is a consensus on the importance of giving to society the competences which exist in the university. Although such an innovation policy does not exist in UFF, there are established practices, even if tentative, it aims to stimulate innovation in UFF, especially the creation of the UFF Innovation Agency (AGIR) in 2009, whose main mission is to spread the culture of innovation. In its structure there is a business incubator and a technology transfer office. Under PUVR, there are no established mechanisms for technology management. There is a desire to establish in a short amount of time, a business incubator.

There is a consensus among managers that the main obstacle for a more active participation from UFF and PUVR in business and social activities is its administrative structure, especially in matters relating to subscription agreements (the process is slow), the system of rewards (the system of rewards of public service makes little distinction between the most productive researchers and those who perform only the minimum of their functions) and financial transactions (for bureaucratic obstacles do not allow UFF and its foundation to, for example, have a share in the incubated companies, nor receive profit from companies installed there, and even execution of research projects is difficult). It was also reported that a bias barrier is still prevalent in basic research between researchers UFF. In this case, the experience of the Business Incubator Initia is relevant because its methodology values basic research as an important tool for the generation of products, processes and services, while the University's role is to develop tools and methodologies that can transform them into technology and innovation.

6 – FINAL CONSIDERATIONS

In a region where there is a predominance of traditional activities in the economy, a relationship between the university and local government is fundamental so they can effectively disseminate innovative activities in enterprises in the region. In this context the university should contribute its technological expertise and management, while the public power acts as a catalyst of regional demands and, simultaneously, a leader in order to take actions to stimulate the pursuit of such innovative activities, also contributing for regional development.

The members of PUVR in general understand that, despite not having a great influence on the economic and social dynamics of RMVP, it is reasonable to assume that PUVR, in a medium and long term, will have a place of relevance in the regional context. In the minds of the interviewees, an industrialized region and a university center have many points of synergy, which will inevitably bring them together over time. What may vary is the intensity and the time it takes to occur. The insertion process may be faster and have more influence if PUVR accelerates its bureaucratic flows, taking proactive actions to publicize their activities and invest more heavily on basic and applied research. Externally the maintenance of a favorable economic and social environment in the Brazilian economy, especially public policies to encourage research, is also a highly relevant factor.

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