Technology Transfer between Research Units and Enterprises. An approach to centred model in the impact on territorial strategic targets.

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Abstract: The purpose of this paper is to present significant advances on a research project under development by the authors. The project, analyses the bases for a model that evaluates technology transfer between research units and companies; it does it, by trimming the impact on strategic targets, investigation units, companies and the region itself in which they are immersed by analyzing the impact in terms of their development and consequential benefits for the society.

It is tried to diffuse the preliminary design of a model, the research method and tools that facilitate the multidimensional approaches that are able to involve actors who are of very different nature (partnerships) and that allow generating and managing knowledge in a participative way. This would encourage an improvement in the dialogue between science and society, defining specific research activities and as a final step, taking actions without losing in mind, the goal of favouring and encouraging the ownership of this knowledge by the territorial actors and the people who eventually will contribute to the improvement of the territorial governance.

This model underlines the scientific world and territorial complementary action, the participative research-action activity could be defined as a kind of research behaviour in which researchers and territorial actors are involved in pursue of a double objective: first of all, a scientific one which would be represented by improving the knowledge on a concrete aspect of the territorial structure and/or dynamics; and a second one, that would embrace the acting and resolution of concrete problems of a definite region or territory.

1. INTRODUCTION

This paper contains an insight into the development of a model whose objective is managing technology transfer within a region. In order to do so, it trims out the impact over territorial strategic targets, like those from scientific systems (organizations and technological units), productive systems (enterprises) and the territory in which they are immersed while it analyzing its impact in terms of the development and benefit caused in society.

Fist of all, as a departure point, there are three conclusions and reflections to have in mind (Dalmau, Perez and Baixauli, 2005) that come from previous researches on regional intellectual capital:

- Competitiveness continues to be considered as a vital factor in the development model.
- In the actual competitive context scope; creating value, obtaining and maintaining competitive advantages is due to a combination of the following: significant productivity increments (lowering the costs but maintaining high quality standards), innovative production (including the creation of new processes, new products and new businesses) and flexibility (adjusting production needs to satisfy changes in the market consistent with user's demand).
- The last aim of the management of intangibles and intellectual capitals of a territorial, company or organization, ought to be a significant development represented by the growth and improvement of enterprises and an overall life quality increment reflected in its employees and society in general.

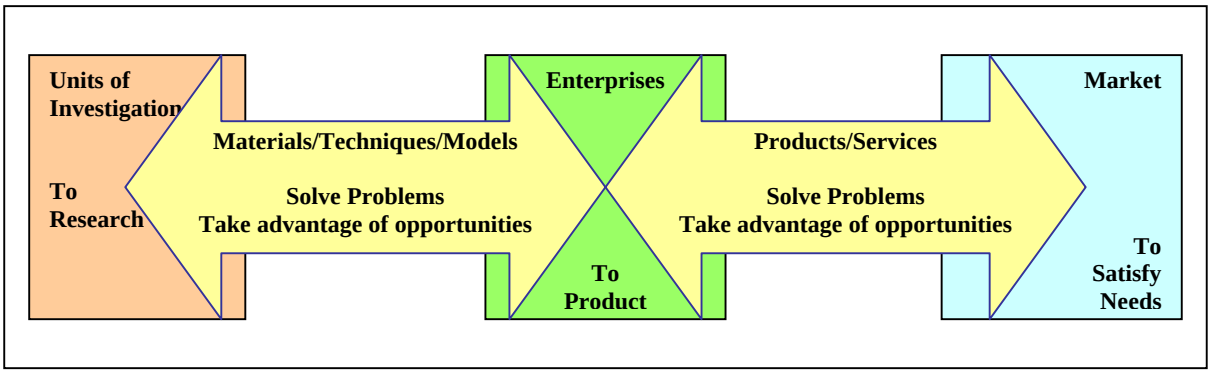
2. TECHNOLOGY TRANSFER AND RELATIONS BETWEEN RESEARCH UNITS AND ENTERPRISES

- Technology Transfer exemplifies an intentional interaction that is oriented towards specific objectives between two or more social organizations; it establishes a process in which know how, remains stable or increases as a result of technology transfer of one or more components (Autio & Laamanen, 1995).
- Technology Transfer is one of the main routes to unveil the key ingredients for innovation (Love & Roper, 2001).
- Organizations carry out all kind of innovations as an answer to changes in their external and internal surroundings or with the objective of modifying these surroundings. This is done in such way that, organizational context performs and influence in a different manner an equally diverse number of organizations (Damanpour, 1991). This happens also with Technology Transfer describing an analogous behaviour.
- Technology transfer calls for special context and condition requirements.
- Technology transfer taking place between investigation units and enterprises is little inasmuch as the relations are not happening with the necessary frequency and the

intensity and; provided they do happen, for the most part, they are developed by means of a linear interaction in their struggle for finding a better way to satisfy necessities within the market.

For instance, Figure 1 show us the schematic relations that highlight research as the essence of knowledge among all investigation and production related units; afterwards as the essence of doing in the enterprises; these, in their intention for featuring their products and services over the more competitive markets, often interact with investigation units to obtain materials and/or techniques; therefore, solving problems and improving productivity, and lastly, to obtain materials and/or novel techniques in order to take advantage of opportunities.

Figure 1: Investigation's Units and Enterprises relations.



Source: Authors.

3. THE GUIES SYSTEM: GOVERNMENT - UNITS OF INVESTIGATION - ENTERPRISES - SOCIETY

Government's I+D investment is compared to the increase in productivity. No only Spanish's economy productivity, but the average of the European Union has being descending throughout the last three decades. The Forum "The problem of the low productivity of Spain's economy, its Causes and remedies", gathered experts in Barcelona to analyze the stagnation of productivity and pointed out as a result; the lack of effectiveness compared to the high cost of investigation and development (I+D), and the aid system as one of the explanations to the problem (www.elperiodico.com, December 12 of 2006).

Those results were ratified by Rostrup-Nielsen (2005) in the European Commission Report by stating that, although well consolidated industrial sectors may show a healthy correlation between the investment in I+D and the growth (Bassanini et al., 2000; DTI, 2002) it is difficult however to demonstrate a similar correlation at a regional or national scale (COM, 2002). There is and arguable scenario to discussed if the growth is the dependent variable (Solow, 2000). It is possible that this idea, is too much subsidiary of a linear model of innovation in which, knowledge is created and spread independently of its application to commercial products (Rostrup-Nielsen, 2005).

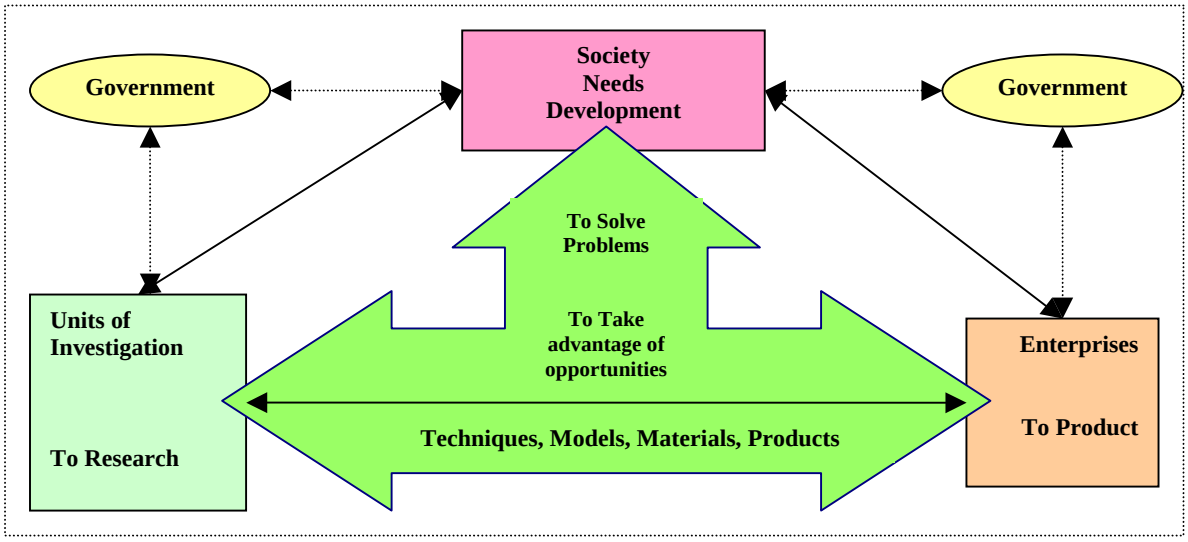
3.1. Elements that make up the GUIES System

To guarantee an improvement in the efficiency and effectiveness of I+D investments, frequency and intensity of relationships among units of investigation and enterprises would need to be permanent, dynamic and systematic. This behaviour can be achieved by conforming a system that besides satisfying marketing needs; contributes as well to the wellbeing and development of society.

Figure 2 shows a scheme of this system that underlines that, although is well known that the research taking place at the various units of investigation and the production in the enterprises is responsible for satisfying the marketing needs, however, by all means, they must above all consider their impact in the development of society; as consequence, society is responsible for bringing up to these investigation units and enterprises its concrete needs for a healthier development.

A systemic type interaction should exist between society, enterprises and units of investigation, and consequently, in conjunction with development, production and investigation.

Figure 2: GUIES System: elements and relations.



Source: Authors.

Therefore, investigation (knowledge) must be oriented towards supporting goods production (by the making of) products and services that strike society's development in a positive manner. In this system, several functions would emerge as incumbent to the government, among them: cause (make happen), foment, and finance effective relationships involving society, enterprises and investigation's units.

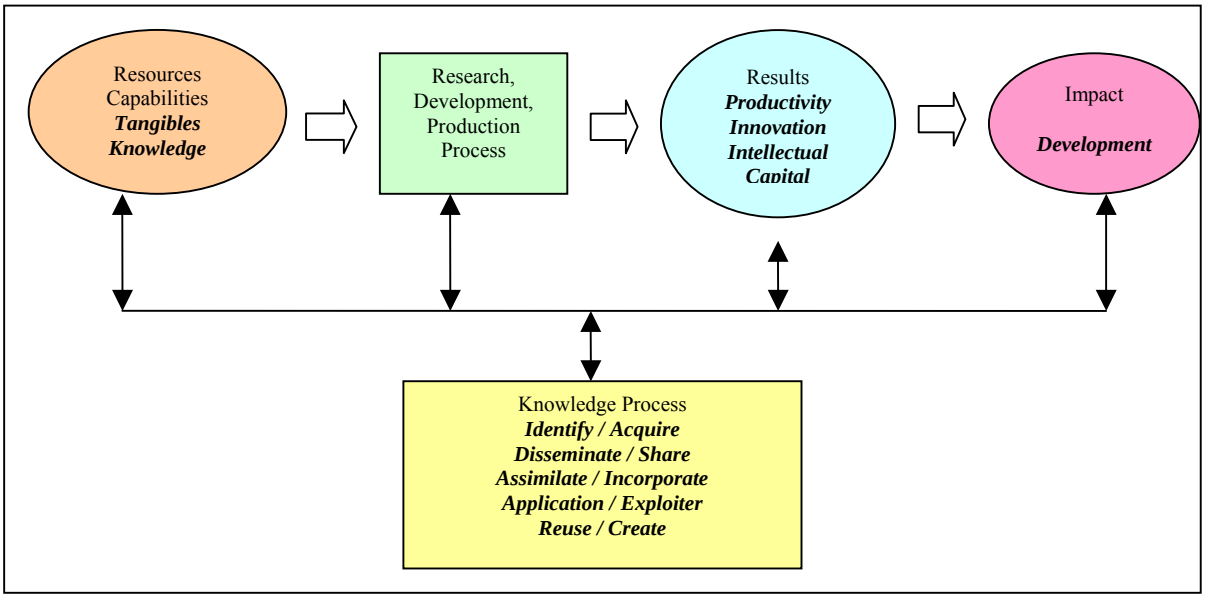
Finally, interaction flanked by units and enterprises must look for a way to solve problems that consequently may lead to an increase of existing processes and products productivity. What's more, they should incorporate new and different processes and products as a result of the planning and cooperative execution of projects, contributing to the design and

development of techniques, models, materials and products that may provide up to date answers to necessities in the market or that otherwise, will allow for potential opportunities delivering a crystal-clear growth in society.

3.2. The GUIES System Operation

In Figure 3, GUIES System is explained in the form of a traditional production system scheme that embodies access entrances, processes, exits and their respective feedback. In this particular case, a significant fraction of the entries corresponds to the system competence displayed at any given moment. For this, knowledge, skills, personal (singular) faculties (from people involved in research units); enterprises, government and society related abilities in general are taken into account. At this point, any predictions and anticipated knowledge that ones may have regarding the results and impact of the GUIES system occupy a crucial role. Based on prior mentioned faculties, resources are processed with integrity through different investigation, development and production stages in an effort to achieve pre estimated results; with the ultimate purpose of adding value represented in productivity profits, innovation and intellectual capital; results whose last goal is to convey a positive influence on institutions, regions and an the overall development of society. System's feedback is essentially conformed by pointing knowledge management in line with the purpose of increasing system's value all the way through; furthermore, processes related with the identification and acquisition of specific knowledge, spreading and sharing knowledge are carried out; all this addressed to apply all strategies properly, and lastly, the most important, taking a step headed for the creation of new knowledge. Summarizing, we are talking about a system (System I) which embraces the following components: I (Investigation) + D (Development) + i (Innovation) + I (Impact), having as the ultimate objective the representation of the impact caused by innovation.

Figure 3: GUIES System Operation.

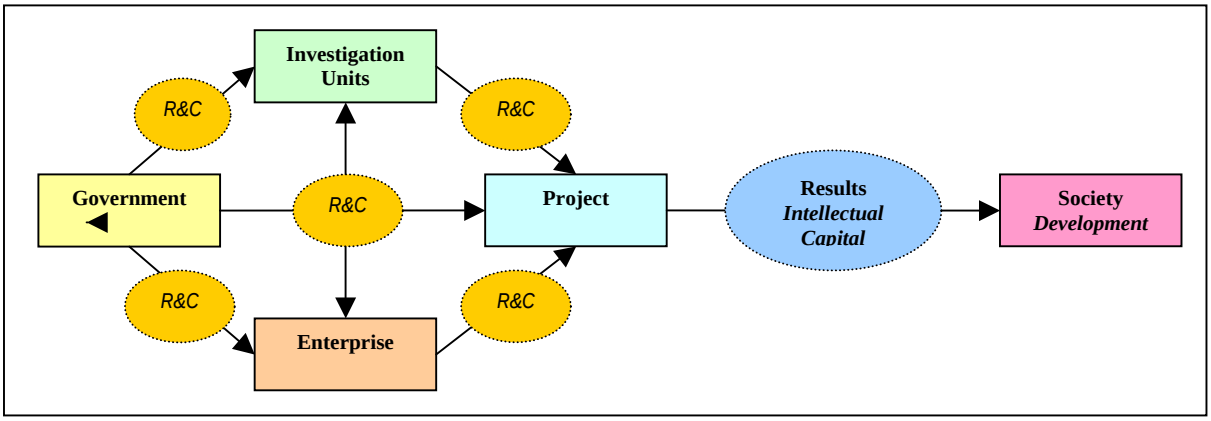


Source: Adapted from (Perez, 2001; Bueno, 2003; Dalmau, Perez and Baixauli, 2005).

3.3. GUIES System Intellectual Capital

In Figure 4, we are looking at the intellectual capital balanced as represented by the GUIES System. Thru the system; government, technological scientific systems, and the productive system contribute to each one of the projects with resources and capacities (R&C); as a result, obtaining significant increments over the intellectual capital of each one of the contributors and the region itself, causing a development in society, in addition to a parallel development for each one of the subsystems that integrate the GUIES System.

Figure 4: GUIES System Intellectual Capital.



Source: Authors.

3.4. GUIES System Management

In Table 1, all elements necessary in order to make up the integral control panel that makes possible the planning and management of the GUIES System are related. The vision and strategic targets related with a particular region along with each one of its subsystems constitute the actual departure point. Generally speaking, this foundation stone is represented by means of productivity measurements, innovation in addition to the creation of new organizations. Based on this, expected results should be identified, moreover in conformity with all source of related components to the intellectual capital, like: (human, organizational, relational and technological) aspects; and at last, all key activities that should be developed in conjunction with the identification of the required resources and faculties that would make a project possible and, after all, the actual assembly of projects, planning and programs to be done.

Table 1: Integral control panel for the Planning and Management GUIES System.

VISION STRATEGIC AIMS	INTELLECTUAL CAPITAL	TARGET RESULTS	ACTIVITIES TO DEVELOP	NEED (R&D) RESOURCES CAPABILITIES	PLANS PROGRAMS PROJECTS
Productivity Innovation New Enterprises	*Human Capital*				
Productivity Innovation New Enterprises	*Organizational Capital*				
Productivity Innovation New Enterprises	*Relational Capital*				
Productivity Innovation New Enterprises	*Technological Capital*				

CONCLUSIONS

In conclusion, we have attempt to show in brief, the principles for a model based on the conformation of the GUIES System Government - Units of Investigation - Enterprises - Society, together with certain management tools that smooth the process of analysis, policies formulation and its consequential implementation by private and public actors with the final purpose of facilitating a social transformation. As a result, the GUIES System makes possible the management of R+D+i+I (Specific Research and Development with the goal of seeking innovation that as a result, causes an Impact in the society as well as in its social and economic development). This paper constitutes a brief theory that looks forward to be discussed and enriched through academic and expert pairs insight, priceless feedback that will allow us to develop better and more appropriate models for Iberoamerica. The corresponding results of this investigation will serve to put together other projects with a better fit, whose results will contribute designing a strategy for the acquisition and improvement of enterprise's competitive capacities, scientific and technological capacities, and the social and economic development of a region. Projects will be held specifically in the Comunidad Valenciana, Spain and in the Pacific Region of Colombia.

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