

THESES OF DOCTORAL (PhD) DISSERTATION

**INNOVATION CAPACITIES AND KNOWLEDGE TRANSFER CAPABILITY
BUILDING IN EUROPEAN REGIONS**

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1. INTRODUCTION

Innovation and scientific development are clearly on the top of the agenda of current European policy makers, it is equally extensively discussed in academic circles. The recent developments in the world economy seemed to have strengthened this tendency as a way of finding solutions for fundamental challenges. The idea of the European Research Area (ERA) was elaborated to organize research and innovation actions across the continent in a coordinated, complementary and inclusive way, making sure that all EU member states, as well as sub national territories, would have a certain rationale to follow in this complex system. Moreover, the recently introduced concept of smart specialization adds to this framework that in order to maximize Europe's economic potential in the global competition as well as to effectively respond to societal and economic challenges triggered by the crisis, European territorial entities have to be more strategic and efficient in exploiting the opportunities of the ERA.

Regions (understood as sub-national entities) are clearly targeted by European research and innovation policies, because their research and innovation efforts are rather fragmented. Therefore their ability to interpret these policies into concrete actions will considerably shape the competitive landscape of Europe.

The dissertation will review the main academic literature contributing to my research questions, and setting the conceptual stage to the main research subjects of this work. The theoretical chapter reflects some of the main developments of the S&T policy over the last decades, as the focus will be on Europeanization, multi-level governance, and the regional innovation systems.

The current thesis follows the structure of the dissertation; the introduction outlines the importance of the topic as well as the objectives of the work. The methodological section summarises the main methodological tools used in our research. The hypotheses develop the main research questions, and link them together. Conclusions and the most important results are presented, as well as the most relevant publications by the author.

OBJECTIVES

Objective 1 is to provide an overview on the development of EU science, technology and innovation policies during the last 60 years, highlighting the main milestones and dynamics of the Europeanization of this complex policy domain. The goal is to describe the main logic behind the evolution of European research, science and innovation policies, with particular focus on the framework programme (FP), the EU's main instrument to support research and innovation. It is very important to understand the evolution of the FP, to put it into a broader policy context, as we use this instrument as a reference tool for the regional mapping exercise, as well as for the knowledge transfer analysis.

Objective 2 is to map NUTS 2 level European regions in terms of their innovative capacities and economic potential. Innovation capacities will be measured by standard parameters collected from Eurostat, as well as from a database on their participation in the European Framework programmes. Different groupings (clusters) of regions will be created based upon these comparisons (7+1) from very innovative and dynamic regions to regions with less innovative capacities. The most efficient regions in terms of innovation and research capacity (Supergroup) will be discussed in details, and I will attempt to draw common characteristics and features upon these.

Objective 3 touches upon less favorable European areas (regions) following the mapping exercise. It offers a case study for demonstrating that targeted intervention is needed to help less developed regions actively participate and to find their rationale in the European Research Area. Research and innovation strategies are difficult to develop and implement therefore some sort of European level assistance (instrument) is welcome for these regions. With the analysis of a selected supranational programme supported by the European Commission's framework programme for research (Capacities specific Programme – Research Potential's Evaluation facility for research entities) I will show the importance of knowledge transfer as strategic learning for less developed European regions in order to unlock their innovation potential, to prepare for more complex collaborative actions, as well as to find their clear roles in the setting of a very complex European innovation and research system.

HYPOTHESIS (1-6)

1.

The evolution of European research and innovation policies reflect the main historical trends of European integration during the last 60 years. The Member States agreed to deepen their collaboration over the course of this period (both in terms in geographical and technical scope) and allocate more and more competences to supranational level, providing the European Commission with a considerable budget to implement on community policies. Of the community internal policies, research and innovation have become of major focus these last decades, given its derivative effects on economic and social development.

H1: The progress of European level S&T policies is related to economic and historical challenges: it has been a reactive policy development rather than a proactive evolution.

Method of assessment: desk research, overview of literature.

2.

The main instrument at the European level to support research and innovation activities is the Framework programme managed by the European Commission and its executive agencies. This current program (FP7) supports transnational actions organised around two axes (thematical, activity oriented) in research and innovation around Europe. The main idea is to provide European added value for these initiatives, bringing together actors from around the EU, working on issues that otherwise would be difficult to tackle. The beneficiaries of this programme are private or public research entities, public authorities, small and medium sized enterprises and other business.

H2: In the European Union researchers, research expenditure and funding from the EU Framework programmes are regionally concentrated and different regional groupings can be constituted using the mentioned parameters.

Method of assessment: statistical analysis

3.

An important question arises when allocating funds attributed mainly from the Member States GNI (around 75% of the Community budget comes from this component). These funds are coming from European tax payers' money, therefore it is highly political what the main

objectives of such a programme is, and how these objectives are reflected in the allocation of available funds.

H3: The allocation of funding from the Framework programmes also reflect the divide between “old” and “new “ European member states, but the state of economic development does not necessarily mean strong absorption rate of EU research funds.

Method of assessment: statistical analysis

4.

Dealing with European research funds requires beneficiaries' special skills, knowledge and experience. These skills are obtained over time, therefore there is a clear advantage for "old" member states when preparing, implementing (absorbing) European funds. Equally, institutional settings, informal networks, well developed infrastructure (both physical and human) are widening the gap between the "old" and "new" member states.

H4: There are other variables such as organizational methods, existing infrastructure, policies, norms and know-how (sticky knowledge) which play an important role in absorbing European funds.

Method of assessment: desk research, questionnaire, personal interviews

5.

In the thesis Europe's less developed territories are understood as used by the methodology applied in regional policy: convergence regions, defined in 2006, are regions having a per capita gross domestic product (GDP) of less than 75 % of the average GDP of the EU-25. These European regions are mainly constituted by regions from the "new" member states. Hence, these regions are lacking both in economic terms as well as in terms of "institutional" variables.

H5: For research organizations established in less developed European regions, targeted instruments, such as the “Evaluation facility of research entities” can assist the catching up process by enabling strategic learning from supranational level (EU) to institute level.

Method of assessment: desk research, questionnaire, personal interviews

6.

Acquiring the "institutional" variables is sine qua non for successful engagement into European level research and innovation activities, financed by the framework programme. Besides creating the necessary research infrastructure (physical and human) research actors from less developed regions should be able to absorb these funds and turn them into new opportunities (research and innovation actions).

H6: Knowledge transfer is an important way of building research and innovation capabilities in the less developed European regions as a first step for engaging in more complex collaborative research and innovation activities.

Method of assessment: desk research, questionnaire, personal interviews

2. RESEARCH METHODES USED

Analysis of relevant literature

During the analysis of relevant literature I had the opportunity to use the facilities of the library of the Directorate General for Research and Innovation (European Commission), the European Parliament, as well as the central library of the Brussels Free University (University Libre de Bruxelles – ULB).

Statistical data analysis

As regards the statistical analysis, the main sources of information were

- (a) publicly accessible data from Eurostat on economic indicators of NUTS 2 statistical regions in the EU27;
- (b) a database compiled from the CORDA (Common Research Data Warehouse) internal information system, administered by DG Research and Innovation, European Commission. I have requested and received the authorization from DG RTD to assemble a database for scientific purposes. The database contains aggregated data on all EU27 NUTS 2 regions as for their participation in the research framework programmes: FP5, FP6, and FP7 (until the middle of 2010).

After completing the database with the FP data, we combined and merged it with the Eurostate tables containing NUTS 2 level information on relevant economic, and innovation capacity indicators. As a concrete statistical tool we used the K-mean clustering. We have executed the calculations with the computer software SPSS (Statistical Package for Social Sciences).

An additional tool for processing our data was the Lorenz curve. It is a graph for showing the concentration of ownership of economic quantities such as wealth and income (in our case participation in FP and relevant economic and innovation capacity indicators); it is formed by plotting the cumulative distribution of the amount of the variable concerned against the cumulative frequency distribution of the individuals possessing the amount.

Analysis of the selected proposals and questionnaire completed by the project proponents

In developing the methodology two conceptual frameworks were used to analyze the available data: policy transfer proposed by D. Dolowitz & D. Marsh (2000), and organizational learning categorization by Schon & Argyris (1978). This analogy has been applied for the analysis of knowledge transfer as strategic learning from the supranational to the institute level.

As this research deals with a sub-part of the elements included in Dolowitz & Marsh's definition only, i.e. the knowledge transfer of ideas and attitudes, we had to adapt the seven questions that are at the heart of this conceptual framework to their purpose. Based upon these questions we studied the selected proposals, and put together the questionnaires for the project coordinators.

The second framework for analysis is the categorisation suggested by Schon & Argyris (Argyris, 2000) that distinguishes three types of organisational learning: *Single-loop learning*, *Double-loop learning*, *Deutero-learning*. Each of the 14 REGPOT-2 projects were studied accordingly and a score on a scale of 1-5 given. We have extended the initial scale by two intermediary categories. Equally, we have adapted the original interpretation of the three types of organisational learning to the study of knowledge transfer of ideas and attitudes related to the definition of strategic research agendas from supranational/trans-national level to institute level

Before putting together the questionnaires, we have also analysed the following sources of information:

- the call for proposals related to the evaluation facility program,
- the project proposals,
- the ex-ante evaluation reports (Evaluation Summary Reports)

The purpose first was to understand, categorize and assess the declared intentions of project proponents. Subsequently, we studied the mid-term and ex-post evaluation reports, as well as the questionnaire sent to all project coordinators.

Findings from the available data and replies to the above mentioned questionnaire have been aggregated to preserve the confidentiality of project results and the anonymity of respondents.

Study trips, personal interviews

Over the course of the preparation of my thesis I was fortunate enough to speak and discuss with key European stakeholders in research and innovation policy. During my time in the Commission and the Stuttgart Region Economic Development Corporation I had the privilege to deal directly with the regional dimension of European innovation policy. Conferences like Research Connection 2009, WIRE I, WIRE II, gave me the opportunity to conduct informal interviews with key actors from academia, industry and the public (governance) authorities.

3. IMPORTANT FINDINGS OF THE WORK – THE ASSESSMENT OF THE HYPOTHESES

H1: The progress of European level S&T policies is related to economic and historical challenges: it has been a reactive policy development rather than a proactive evolution.

As underlined in the chapter on the historical trends, European level research and innovation policies have been triggered by outside events and actions, European decision-makers delegated competences to the supranational level in these policy fields following impulses coming from third countries. These impulses were initially originating from industrialized regions like the US, Japan, but recent times have seen the emergence of challengers from less developed countries (India, South America), and obviously from China. In fact during the last years research and innovation have grown to become one of the key issues for the EU when

defining medium term strategies, as well as one of the key means for achieving the objectives of these strategies, which is also reflected in the allocation of budget for implementing these policies (Lisbon strategy; EU2020 strategy).

H2: In the European Union researchers, research expenditure and funding from the EU Framework programmes are regionally concentrated and different regional groupings can be constituted using the mentioned parameters.

Following the clustering exercise conducted on the available data, there indeed is a geographical concentration in the territory of the European Union of researchers, R&D expenditure and EU framework programme support. Not more than 20 of the examined regions used half of the funding from FP6 and not more than 24 regions spend half of Europe's R&D, and not more than 34 regions account for half of Europe's researchers. 16 regions are present on all three groups of regions. These are: Wien, Karlsruhe , Oberbayern, Berlin, Köln, Denmark , Comunidad de Madrid , Cataluna, Finland , Ile de France , Lombardia , Lazio , Stockholm , East Anglia , Inner London, Berkshire, Buckinghamshire and Oxfordshire). This „supergroup” of European regions accounts for:

- 15% of Europe's population,
- 24% of Europe's GDP,
- 30% of Europe's researchers,
- 35% of Europe's GERD, and
- 43% of the FP6 funding.

H3: The allocation of funding from the Framework programmes also reflect the divide between “old” and “new “ European member states, but the state of economic development does not necessarily mean strong absorption rate of EU research funds.

Looking at the results of our calculations the following conclusions can be made: one can see a clear indication about the geographical allocation of European level framework programme RTD resources over the course of the past few years. These not so surprising results obviously table some important questions about the rationale and whereabouts of EU RTDI policy and whether this tendency in the allocation of funds really corresponds to the policy objectives and rhetoric of the European Union. At the same time, there are rather economically strong

regions where the role of EU level research funding is not considerable, mainly due to the fact that these regions have other sources of funding and hence they were not required to engage and participate in the learning process of “informal knowledge” that involves the participation to EU level research and innovation programmes.

H4: There are other variables such as organizational methods, existing infrastructure (physical and human), policies, norms and know-how (sticky knowledge) which play an important role in absorbing European funds.

When completing the clustering exercise, we have seen the emergence of one exclusive cluster of regions (supergroup) that based on the calculations conducted for H2 proved to be very important actors in European research and innovation. Besides these objective and clearly measurable variables, we have observed some common characteristics within these regions that also contribute to their successful participation in the framework programmes. These are well developed formal and informal networks, norms, know-how, and ways of doing things.

H5: For research organizations established in less developed European regions, targeted instruments, such as the “Evaluation facility of research entities” can assist the catching up process by enabling strategic learning from supranational level (EU) to institute level.

Based on the analysis on the two-year programme under FP7 (2007-2008), after studying the proposal level documentation (submitted proposals, Evaluation summary reports), as well as the responses to our questionnaire conducted with the coordinators of completed projects, there is a clear indication that research entities based in economically less developed European regions have very much appreciated a targeted instrument for their catching-up in terms of research and innovation capacities to Western European counterparts. Besides the actual physical infrastructure, such programmes could help research organizations acquire the “informal/ sticky” knowledge required for a successful participation in FP, as well as to make the necessary personal contacts and join the relevant networks.

H6: Knowledge transfer is an important way of building research and innovation capabilities in the less developed European regions as a first step for engaging in more complex collaborative research and innovation activities.

According to our two analysis, it is clearly demonstrated that less developed European regions (concentrated mainly in the new member states) receive considerably less support from the EU framework programme for research than economically leading regions. They not only miss out on financial support, but also on equally important derivative advantages. For them to become equal partners of western regions in the collaborative strands of the FP (those with the most substantial budget), targeted tools/instruments are needed.

4. NEW SCIENTIFIC RESULTS

1. Through the clustering of European (NUTS 2) regions, I have created groups of European regions in terms of research and innovation capacity, extending the traditionally used indicators/parameters with a new variable, data managed by the European Commission's Directorate General for Research and Innovation on participation to the European Framework Programmes for RTD. To my best knowledge no such study has been conducted before.

2. The emergence of the "supergroup", as well as the other resulting clusters confirms that economic development and research/innovation capabilities go hand in hand. As regards the participation to the Framework Programme, soft variables have been also identified as important conditions for successful participation to EU level funding programmes. Well developed European regions (EU15) are more successful and active than less developed European areas (EU12) in EU level funding for RTDI, however advanced economic development does not always entail strong participation to the FP programme.

3. I have conducted a study on the transfer of knowledge, understood as strategic learning, on research organizations established in less developed European regions. The subject of my analysis was a targeted action sponsored by FP7 (Evaluation facility of the Research Potential programme). The objective was to understand how these less developed European regions could enhance their participation to EU level funding programmes, thus strengthening their involvement in the European research and innovation area. The outcome of the analysis was an important learning process/knowledge transfer that took place during the implementation of the Evaluation facility. The programme itself can be considered as a blueprint for enhancing and upgrading research and innovation capabilities in economically less developed regions.

4. From the questionnaire conducted, it can be concluded that less developed European regions need intermediary instruments for catching up to their more developed counterparts in terms of research and innovation capacities, and the ability to fully exploit the opportunities of EU level funding. I suggest that these intermediary instruments come from the EU level, whereas the national and local levels could provide complementary facilities.

5. LIST OF PUBLICATIONS IN THE THESIS

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