



RELATÓRIO CIENTÍFICO DO PROJECTO PTDC/CS-GEO/102961/2008

2º ANO DE ACTIVIDADES

CIEO, Universidade do Algarve (coordenação)
Instituto Superior de Ciências do Trabalho e da Empresa, Lisboa
ISEGI, Universidade Nova de Lisboa

PROJECT IDENTIFICATION

Redes de Inovação em Portugal: Intensidade dos Fluxos, Spillovers do Conhecimento e Desempenho Empresarial

Innovation Networks in Portugal: Flow Intensity, Knowledge Spillovers and Firm Performances

(PTDC/CS-GEO/102961/2008)

General overview

The project development for the second year was mostly driven by the previously designed tasks and the first year advances – 2010 to 2011. Several hindrances caused a delay in the realization of some early tasks with an impact on low financial reduction but no decrease in the number of scientific outcomes. This can be interpreted as a very good scientific result in spite of the observed obstacles.

Just like during the first year execution period, the second year pre-defined specific goals have been achieved. This report synthesizes them by presenting a similar structure to the earlier report. It is composed by eight points: Limitations and justifications, theoretical advances, material and methods, advanced formation, meetings, scientific outcomes, proposed management changes and financial related alterations.

1) Limitations and justifications

The first serious limitation the team had to face was related to the unexpected start of Prof. Ana Ramalho Correia, one of the three members of the team, in the early retirement process. This fact created a lack of drive in the terminal phase of the first project task. It should be mentioned, however, that would if it not has been the then recent legislative change for public services prohibiting retired public employees to receive financial support to delivered services, the partner would have finished her activities. Notwithstanding, ISEGI, Universidade Nova de

Lisboa, supplied some parts of the theoretical framing of this project, having supervised a master thesis, that so far is about to be concluded. The second limitation is related to the delays in the approval of several requests of payment and changes in the project organization sent to FCT. Annex 1 shows a major request (dated the 7th September, 2011) to FCT, for which the team has received no reply. Finally, the last restriction justifies a lower execution than expected: new rules in the Portuguese public sector in general and in the FCT in particular made impossible some expenses expected to take place with guest speakers that could not be financed due to the fact that they had not been included in the short list of consultants of the project – we consider that guest speakers to a related conference organized within the framework of the context do not necessarily should be consultants of that same project.

2) Theoretical advances:

- Further to the first execution year, for which methods of multidisciplinary research have been used to combine a theoretical background closed to the evolutionary economics approach and management science, the theoretical framing was delimited, synthesized and developed based with new concepts and advances expressed in the introductive parts of all published papers.

The literature revision was also summarized in the context of two master theses, both discussing the interest and the form to add Systematic Literature Review (SLR) as a major tool to detect literature in the area of Innovation. Traditional Revision of Literature (TRL) demonstrated to be an indispensable resource to literature building in this area.

- Chanda Faustino, Master theses defended the 8th June, 2012

- Also in this point, there are contributions to be mentioned in the areas of the cluster theory, networking and knowledge flows. These have been obtained by the revision done within the context of two PhD theses included in this project and already defended:
 - Mauricio Maldonado, Master theses defended the 12th July, 2011
 - Pedro Monteiro, PhD theses defended the 5th June, 2012

- In order to explore the reasons behind the formation, development, and maintenance of innovation networks, a case study approach is being followed (Yin, 1984; Eisenhardt, 1989). Case study strategies are suitable when one needs to explore phenomenon within its context, or when themes under observation depend on a complex set of variables which interact amongst themselves as well as with their surrounding context (Stake, 1994). An innovation network is composed of several entities sometimes far apart, but which combine resources, wishes and people in order to pursue common goals. Therefore, in an innovation network entities can be industrial and service organizations, government institutions, universities, and so on, each with its agenda and goals, but which nevertheless accept to integrate a network with common goals of carrying out innovation activities.

In Yin's (1984) framework, this meant that an embedded case study research had to be designed. An embedded case study is a research in which the case under analysis is composed of several units of analysis. In the current research, typical units of analysis are: the industry, the entity (industrial or service organization, university, research centers, and other similar organizations), the individual involved in innovation, and the innovation process. Depending on the accessibility to the data, the research was initially designed to focus on one single (or on a maximum of 3) case study, or on multiple cases. This is an important technical aspect, since in an ideal situation, with access to all data and entities required by the researchers, a maximum of 3 cases would be sufficient to answer the research questions. However, due to the difficulties experienced in previous researches, the research team decided to maintain the

possibility to use a convenient approach to collect data, i.e., data collected whichever and whenever entities accept to participate, regardless of being in the *same* innovation network. The criterion of being in a network, however, was to be maintained at all costs.

In technical terms, the case study is mainly based on qualitative information, collected from different sources, and again depending on the accessibility to the data and the entities. Typical data sources include: entity websites (especially in a first stage, so that preparatory information and knowledge is built prior to any direct contact); entity internal documentation and reports (especially documentation concerning the entity characterization and innovation processes); and interview to key individuals involved in the identified innovation networks.

- Contacts with the entities involved in innovation started in middle 2011 and continued in the first 6 months of 2012. The initial entities contacted were from the networks identified in previous stages of the project. Soon the project team realized that most of these entities were not keen on providing information, for several reasons: a) because in fact they were not involved in innovation; or b) because they were no longer operating; or c) because they were not interested in the study.
- After some preliminary analysis of these rejections, the project team concluded that the innovation networks identified in previous stages of the project had changed dramatically in the last 2-3 years. In fact, the whole national industries dynamics had changed, and are still changing as we write this report. This is most probably due to the unusual, hyperturbulent, and fast-changing global economic environment. Entities that were once highly involved in innovation networks, are no longer active, while some other entities that had never been involved in such networks, are now starting to create alliances in order to cope with the ongoing financial and economic critical changes.

The practical result of this was that the project team took the decision to change its data collection tactics. Instead of proceeding with the initial innovation networks, interviews were scheduled with whole new entities, not present in the first stages of the research, but

still involved in new or current innovation networks. The negative consequence of this change was a 4 month delay in the qualitative case-study research, with data collection effectively starting in April 2012.

- In June 2012, 10 interviews from several entities had been conducted in the Coimbra region. All entities are currently involved in innovation networks, and they include: service organizations, industrial organizations, research centers, the University of Coimbra, amongst others. All interviews were recorded and transcribed, and content analyzed. A stabilized coding system has been reached, which is the basis for one paper presented in the 2012 International Congress of Psychology, held in Cape Town, South Africa.

3) Materials and methods:

2010/2011

In continuity to the previous period the research observed the behavior of a sample of institutions gathered by means of:

- Internet search on key words concept;
- Content analyses;
- DB matrix comprehending a institutional characterization for different sets of institutions;
- The following set of institutions have been observed: governmental institutions, associations, technological parks and centers, R&D organizations, entrepreneurship support entities, technological schools, university interfaces, companies and other related entities;

- The final sample is composed of: 623 institutions, classified into nine groups: 18 governmental entities, 297 private institutions, 70 associations, 20 technological parks and centers, 58 R&D organizations, 48 entrepreneurship support entities, 12 technological schools, 80 university interfaces, and 14 other entities.
- Institutions have been characterized by ten variables. The selection of these variables was based on our prior theoretical framework which suggests that the considered variables will likely determine innovation patterns – or, to be more specific, the firms' capacity to dynamically innovate (Vaz and Cesário, 2008; Vaz and Nijkamp, 2009). The ten variables are: Promoting knowledge (PK); Studying processes (SP); Managing (Mg); Promoting R&D (PRD); Knowledge transfer (KT); Support to entrepreneurship (SE); New product development (NPD); Promoting partnership and cooperation (PPC); Application of external technologies (AET); and Orientation towards innovativeness (Or).
- Results for the first year period showed that:
 - These institutions are asymmetrically distributed by the whole country;
 - All the relations of such institutions have been followed, up to the 9th possible link. This data has been geo-referenced and its analyses was kept for the third execution year;
- The statistical applications have been developed in order to allow the use of innovation indicators in order to:
 - Create a ranking for innovative firms in Portugal;
 - Describe innovation agents and respective cooperative and innovative profiles, at national and regional levels. Regional performance for innovation has been traced – Multivariate statistics and non linear regressions were applied;

2011/2012

- The methods to define and build up the networking systems of cooperative forms as well as the design of linkages and relationships among institutions have been clearly defined, although yet in progress – two specific publications on this issue are in evaluation process;
- A next paper is in draft to combine the use of GIS and SNA to map the detected relationships in flow-graphs techniques, as planned.
- Furthermore, for the third and current year should provide improvements related to the dynamic prospective, supplied with the application of ABM, if possible.
- The case case-study methodology has been implemented and advanced, in particular, during this period:
 - Relevant literature review was carried out, in particular to assess previous data collecting instruments.
 - Design of a case study protocol was carried out in the last 2 months of 2011, and testing (with peer review and pilot testing) took place in the first 2 months of 2012. This allowed to introduce changes in the case study protocol, as well as to develop an interview guideline.
 - Extensive contacts with the networks identified in previous stages of the project were also carried out in this period. Some of these contacts accepted to participate in the study.
 - Interviews with key companies started in March 2012. At the moment of writing this document, people from 15 companies have been interviewed by the project researchers.
 - According to accepted qualitative-research guidelines, data analysis is being processed at the same time as data collection, which allows preliminary results to be presented in conferences in June-July 2012.

2012/2013

For the next execution period, we expect to improve the theory on smart specialization in Portugal – identifying the sectors for which innovation has greatly contributed. This will take place, as planned by:

- Highlighting the selection of certain, advantageous networks, eventually certain networking systems for which the game of power plays a more or less dominant role. Governance systems should provide scientific relevance to be studied, and respective creative environments and promoting factors detected.
- Characterizing and evaluating the systems (eventually structures) and their architecture. The end result of this outcome will supply better tools for tailor made policies. This will include, for the first time in the literature, a scientific instrument for such specific evaluation processes.
- Describing the individual, social, and organizational dimensions that provide the basis for innovation networks. Previous research has taken a descriptive approach in the sense that it has identified innovation networks and described their specific features and attributes. However, it has not looked at the *why* and *how* such networks initiate and develop. For this end, this research will look at the human and social dimensions of innovation networks. In practical terms, and as it will be described in greater detail below, this implies collection of primary data, through case study analysis, with qualitative data gathered directly from people and entities involved in innovation networks.

4) Advanced formation

Related to this project, the following theses have been defended (titles and institutions, dates have been previously provided):

Master level:

1. Chanda Faustino, Faculdade de Economia, Universidade do Algarve.

Title: “Dos fluxos de conhecimento aos fluxos de inovação: um contributo teórico”

2. Mauricio Maldonado Rojo, Universidade do Algarve.

Title: “Sources of Local Knowledge Spillover within the Algarve Tourism Region. Evidence to identify a Regional Innovation System”

3. Valdemar Rosa, Instituto Superior de Estatística e Gestão da Informação - Universidade Nova de Lisboa.

Title of the thesis: “Open Innovation vs Innovation Networks: A Bibliometric Analysis and Systematic Literature Review

PhD level:

1. João Pedro Valadas Monteiro, Universidade de Évora

Title: “Estruturas de cooperação na inovação e criatividade em Portugal”

5) Meetings

During the second execution year of the project, the meetings took place informally and as needed, by videoconference in order to decrease the project expenses.

6) Scientific outcomes

All the scientific outcomes follow in Annex 4.

7) Limitations and proposed management changes

The project has developed according to the expectations and the task calendar defined.

Nonetheless, fragilities have been detected related to the initial design, requiring possible revision of the team, calendar and financial distribution.

Although taking more time than expected, the literature revision is finished. This revision was improved by a bibliometric approach that permitted to get very interesting conclusions such as that Systematic Revision of Literature is not a sufficient instrument to literature revision in the area of Innovation Management and Economics.

As Prof. Ana Maria Ramalho Correia, coordinator of Task 1, retired unexpectedly, by the recent law application, her participation in the project could not be reimbursed as initially planned. This major constrain could only be surpassed by the inclusion of new team members who should replace her. Lastly, there has been a permanent difficulty in getting fulltime Master students located in the Algarve with the necessary skills to scientifically support this project. This problem was surpassed by motivating students to readdress their project towards the goals of this project, in a very positive synergetic compromise.

A different problem is resulting from both, the financial difficulties and the inoperability of the informatics support system of the Universidade do Algarve that are at present are restricting most of the activities of the institution, by taking excessive time to pay the suppliers. Also the introduction of unexpected payment rules and legislation delay the financial execution of this and others projects for which it is responsible.

In brief, the above described conditions demand for a few changes and among them new project deadlines and team composition, identified as follow:

1. Project one year extension: Although most of the scientific indicators may be achieved in due time, the use of the available financial support for more 12 months will permit a full financial execution and a further progress in the scientific results.
2. Change in the institutional partnership: The exclusion of ISEGI, with the transfer of the full remaining budget in 75% to the Universidade do Algarve and 25% to CIS/ISCTE, is necessary to reflect the real present working conditions and facilitate the use of the provided support.
3. Team composition change: There is a need to include new members as consultants to this project to easy the cooperation and facilitate the production of more scientific material. Therefore we propose the names of Prof. Doctor Eric Vaz and Mestre Hugo Pinto to be included in the list of project consultants.
4. The BIC attached to this project should be expanded in agreement with this project extension.

It should be reinforced that such proposed changes will neither have any implications in terms of the project final outcomes nor in terms of the overall budget.

Maria Teresa de Noronha

Universidade do Algarve