

***PICO project***  
***Publishable executive summary***

Project objectives

In the last 10 years, the transfer of research results to industry has received growing interest from European policy makers and from the managers of university campuses or other public research organizations (PROs). Traditionally emphasis has been put on the licensing of innovations but greater attention is now being paid internationally to the creation of new ventures that involve the spinning-off of technology and knowledge generated by PROs.. The PICO project focuses on these new ventures that we call Research-Based Spin-Offs (RBSOs). The RBSOs play a key role in transforming scientific knowledge into new knowledge that is embodied in new technologies, products, services and processes and hence is suitable to commercial exploitation. As such, they are a potentially very important engine of innovation and economic growth for Europe. In this project we seek to understand the conditions under which RBSOs effectively contribute to the generation of new knowledge and its dissemination in the local/national environment in which they are embedded.

In a small number of cases RBSOs exhibit very high level of growth; these firms are generally referred to as the “gazelles”. If in many other cases RBSOs do not achieve high growth, the knowledge they create, however, may significantly contribute to the innovativeness of their customers or may be transferred to and successfully exploited by outside companies through partnerships or mergers and acquisitions (M&As). Consequently, although the majority of RBSOs do not fall into the gazelles category they may still play a very important role for the dynamic efficiency of the economic environment in which they are embedded.

The project has three specific research objectives:

- a) analyze the determinants of the knowledge creation and transformation function of RBSOs as it is mirrored in their innovative activity, including the structure and resources of RBSOs, the institutional characteristics of the PROs and the local or national environment, as well as the nature of knowledge in different domains;
- b) analyze the impact of the innovative activity of RBSOs on their growth, and the factors that moderate this relationship;

c) analyze the impact of the knowledge creation and transformation activities of RBSOs on the innovation of their customers and their partners (in alliances or M&As).

In order to achieve these objectives, we address the following research questions (RQs):

RQ1: What are the determinants of the innovative activity of RBSOs?

RQ2: What is the relationship between the innovative activity of RBSOs and their growth performance?

RQ3: How do RBSOs affect the innovative activity of their customers and partners?

RQ4: How do RBSOs affect the innovative activity of the firms which merge with or acquire them?

### Contractors involved

The following contractors are involved in the PICO project:

- Armines-CSI (Ecole Nationale Supérieure des Mines de Paris): this team, led by Prof. Philippe Mustar, coordinates the PICO project and is in charge of RQ3.
- Politecnico di Milano (Department of Management, Economics and Industrial Engineering): this team, led by Prof. Massimo Colombo, is in charge of RQ4.
- University of Ghent: this team, led by Prof. Bart Clarysse, is in charge of RQ2.
- Dinamia (ISCTE): this team, led by Dr. Margarida Fontes, is in charge of RQ1.
- University of Nottingham Business School: this team is led by Prof. Mike Wright.

### Work performed and results achieved so far

The first year of the project was devoted to the review of relevant literature and the development of the theoretical framework and the methodology.

Previous research conducted by the members of the team and recent research on the strategic decision making process of new technology intensive companies commercialising novel technologies led us to identify the commercialization strategy (markets for technology / markets for products) as a key determinant of RBSOs' behaviour, influencing the innovative output and the growth path of these firms. We developed conceptual models for RQ1 and RQ2 which put into relation the commercialization strategy of RBSOs, their innovation and their growth. In order to empirically test this framework, we also developed a questionnaire which will be the basis for 80 in-depth interviews with RBSOs led by all the teams in five

different countries (UK, France, Belgium, Italy, Portugal).

The commercialization strategies adopted by RBSOs are also likely to impact the types of partnerships (customer-supplier relationships, alliances and M&As) in which they engage. We are particularly interested in the effects of RBSOs on their partners' innovative activity. We developed two conceptual models for RQ3 and RQ4 that allow us to address this issue. In order to empirically test these frameworks, we also developed different questionnaires. First, we developed the one part of the questionnaire for RBSOs which will allow us to identify RBSOs' partners, as well as the nature of these partnerships, during the interviews with RBSOs. Second, we developed a tentative version of the questionnaire for in-depth interviews with RBSOs' partners, which will be adapted, if necessary, after several case studies of partnerships involving RBSOs. Third, we built two questionnaires for the cases of M&A, with one version for the acquirer and one version for the target.

We also worked on the identification of the population of RBSOs, as well as on the definition of sampling criteria. Since some teams did not have an available and complete database of the RBSOs in their country, they had to engage in further research in order to find the missing RBSOs. This identification stage has now been completed. We also needed to set the sampling criteria. For instance, we limit our sample to RBSOs founded between 1995 and 2002. We are confident that on the one hand a period of 12 to 5 years since foundation has been enough for the company to develop a clear innovation and growth strategy, and on the other hand it is short enough to limit the retrospective bias in the collection of information on foundation. We aim at ensuring sector variety at the overall European level.

#### Expected end results, intentions for use and impact

During the second year of the project, we will carry out field work (in-depth interviews with RBSOs and their partners in alliances and M&As) and data collection (data on the institutional environment of RBSOs and phone enquiries of the remaining alliance partners). During the third and last year of the project, we will process these data. First, we will test in a quantitative manner the framework linking the commercialization strategy, the innovation and the growth of RBSOs, which was developed for RQ1 and RQ2. Moreover, we will gain a better understanding of the effects of RBSOs on their (alliance and M&A) partners' innovation. On the one hand, in-depth interviews with RBSOs' customers and partners will provide us with insights on these potential effects, and the main conclusions of this first stage will be tested on a large sample of RBSOs' partners. On the other hand, studies

of the cases of M&A, which consist in interviews with the acquired and the acquiring firms as well, will allow us to shed light on the effects of M&As with / of RBSOs, with an emphasis on the changes in the R&D process of both firms. Finally, the data collected all through the project will be stored in national databases which we intend to update and use on a regular basis.

While providing a better understanding of the knowledge creation and transformation function of RBSOs and its (direct and indirect) effects on innovation and growth, this project will draw important lessons for academic entrepreneurs, PRO officials, and policy makers. In addition, the results of our proposed analyses will allow us to reassess the rationale for public support to the creation and development of RBSOs, and to contribute to the contextualization of the design of public policy for RBSOs. In order to achieve these wider results, we put emphasis on dissemination activities. Throughout the project, the contractors will disseminate their results by means of scientific publications, presentations in international conferences and the writing of teaching cases. Furthermore the Consortium will organize a symposium and a final conference, will circulate a short document presenting the key results of the project among the 80 RBSOs analysed in the cases and will publish a book including all the publications of the research teams involved in the project.

For further information:

Web site of the project: <http://www.csi.ensmp.fr/WebCSI/PICO/>



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