Chapter 10

Innovation Efficiency and Open Innovation: An Application to Activity Branches in Spain

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ABSTRACT

This chapter aims to analyze the innovation efficiency in Spain by activity branches and to relate the obtained results with the way in which the branches innovate. The conclusions show how the branches with high levels of open innovation activities perform better in terms of innovation efficiency even with low rates of closed innovation (internal R&D activities). This result led us to think of open innovation as a fundamental factor for innovation efficiency.

To analyze the efficiency, the authors choose a DEA (Data Envelopment Analysis) approach applied to the principal components of the set of inputs and outputs separately and they introduce a new stage at the end of the process to study the robustness of the efficient branches. This study of the robustness adds the fact of not applying DEA to the original inputs and outputs, but to the principal components of these two sets separately.

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INTRODUCTION AND BACKGROUND

Main objective of the Strategy of Lisbon (Presidency conclusions, 23 and 24 March of 2000) for the current decade is that the European Union, should become the most competitive and dynamic economy of the world based on knowledge, able to generate a sustainable economic growth with more and better works and wider social cohesion. To reach these objectives, a global strategy it is required in order to prepare the transition toward an economy and a society based on the knowledge, through better politics on R&D, and also by means of the impulse of the process of structural reform, which increases the competitiveness and the innovation. (Strategy of Lisbon Presidency conclusions, 2000: 1).

Spain, as State Member of the European Union (Bulletin of the European Communities, 1985:3), should contribute to make European Union the most competitive, dynamic and efficient economy based on knowledge of the world, not only in education, but also in innovation, research and development. From now on, R&D, refers to “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications” (OECD, 2009: 164).

At this point the following questions arise:

- Which is the paper of innovation in the transformation of the economic structure of Spain?
- Which is the innovation efficiency of the different sectors of the Spanish economy?
- In what sectors are the investments more efficient in innovation?
- Does difference exist in innovative efficiency among sectors that make open innovation and those that don’t make it?

These questions are analyzed in this work with the purpose of evaluating the innovative efficiency of the sectors of activity of the Spanish economy and with the objective of offering information to the policy makers.

R&D and innovation are basic to improve the structural change that allows Spanish economy transformation into a knowledge based economy. The structural change that must take place should be designed taking into consideration a balanced and sustainable economic growth based on the innovation. So it becomes necessary to analyze the changes that have been happening for the last years concerning innovation within companies.

The companies that seek to be innovative should adopt a new work focus, not only by using the knowledge generated internally in the company, but also acquiring and using external knowledge.

During most of the 20th century companies followed the way of “closed innovation” (Berkeley, 2003: 28) to introduce innovations in the market. Best companies made large investments in R&D, and they wanted to hire the best researchers and more brilliant technicians to be permanent members of their staff, with the intention of arriving at the market in first position due to the best discoveries obtained. The results of research were protected rigorously by the control of the intellectual property, avoiding the competitors to use and profit these innovations. In this way, the companies that introduced innovations could generate more benefits than the rest of enterprises. Then, benefits were reinvested once again in R&D, with more innovations self-generated, creating a cycle of perfect functional innovation.

At the end of the last century, for diverse reasons, as the need to increase the mobility of the technicians and researchers together with the growing availability of capital risk, urged the companies to evolve towards the open innovation.
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