



Universidade do Minho
Escola de Engenharia

Semana da Escola de Engenharia October 24 - 27, 2011

NEW FORMS OF INNOVATION AND ITS IMPACTS

Cristina Pereira and Fernando Romero
Department of Production and Systems Engineering, University of Minho
Campus de Azurem, 4800-058 Guimarães
E-mail: ssaraiva.dpsuminho@gmail.com

KEYWORDS

Non technological innovation, Organizational innovation, New forms of innovation.

ABSTRACT

It is widely recognized that innovation matters for rising standards of living and for sustainable growth. In fact the current economic crisis placed again innovation as vital to the recovery process. There have been increasing efforts to investigate innovation impacts at the firm level. This work aims to contribute to this endeavour focusing on the so-called New Forms of Innovation (NFI), where the non-technological side of innovation is considered as an important, if not crucial, determinant.

INTRODUCTION AND STATE OF THE ART

The concept of innovation is usually linked to the scientific and technological dimensions, but there is now a large consensus that innovation is a complex process that cannot be reduced to the technological side. New ideas have proposed new ways to interpret this process. The so-called open innovation model emphasizes and links the structure of firms' network with innovative performance. The Organization for Economic Co-operation and Development has broadened the innovation concept to cover also non-technological innovation. Recent literature and studies on the non-technological dimension of innovation (OECD 2009) highlights the complex character of innovation processes where non-technological activities play a crucial role (Schmidt and Rammer 2007; Tidd et al. 2009). Comparing the determinants and impacts of non-technological innovations with those of technological innovations, the results show that the share of firms introducing only technological innovations (13%) is lower than the share of firms introducing only non-technological innovations (24%) (Schmidt and Rammer 2007). Consequently, better understanding is needed in

order to capture innovative efforts, capabilities and outcomes in the context of New Forms of Innovation (NFI) (OECD 2009), where NFI means the non-technological dimensions of the innovative process. In a sub-sample of innovative firms, it was found that those firms investing directly in non-technological innovation activities are 30% more likely to experience positive growth. Among innovative firms, process innovation and organisational changes are the most significant innovating strategies (O'Sullivan and Dooley 2009). Using data from the Innobarometer innovation survey, Arundel et al. (2008) state that 52.5% of firms innovate without performing R&D, 40% carry out in house R&D and 7.5% outsource R&D to other agents of the innovation system. Thus, firms innovate beyond R&D and it is therefore important to analyze how non-R&D innovators innovate (Arundel et al. 2008). According to other studies, internal organisational sources are the most important influence on firms' innovative performance. Investments in information and communication technology, combined with organisational changes such as the restructuring of production processes, human resource management practices, product/service, quality-related practices and worker skills, are found to contribute to better firm performance (O'Sullivan and Dooley 2009). Although the measurement of the scientific and technological dimensions of innovation is now an established practice, so far there has been insufficient research on possible approaches to measure and monitor organizational or other non-technological forms of innovation (Armbruster et al. 2008).

The effects of non-technological innovation on technological innovation vary according to the type of industry. Organisational and marketing innovations significantly increase the likelihood of technological innovation. However, few studies have taken into account the role of innovative strategies such as organisational and marketing innovations (Jensen et al.



Universidade do Minho

Escola de Engenharia

Semana da Escola de Engenharia October 24 - 27, 2011

2007; Schmidt and Rammer 2007). Thus, it seems that future research should address specificities of firms regarding the way non-technological innovation may support technological innovation (Schmidt and Rammer 2007; Evangelista and Vezzani 2010). Sector specific or technology specific characteristics of firms may result in significant variance concerning the NFI. Research should also investigate the impact of firm size on non-technological activity strategies to enhance performance as far as technological innovation is concerned (OECD 2009). Because there have been increasing efforts to investigate innovation impacts, especially at the firm level, this study aims to contribute to this endeavour using an approach based on the NFI, where the non-technological side of innovation is considered as an important, if not crucial, determinant. Analysis and assessment of internal organizational changes and their internal and external impacts, related to innovation performance, job creation and wealth generation, will be highlighted. The aim is to develop a framework to measure the impacts of non-technological innovation in firms, recognizing and integrating the economical, social and environmental aspects, adopting a holistic view of innovation.

There are several research challenges that this work intends to tackle. Among the most difficult are the definition and measurement of the organisational innovation, once research in this area still lags behind. Exploring and understanding the interconnections between non-technological and technological innovation is another related challenge.

Definitions of innovation have been altered a number of times. Indicators measuring marketing and organizational innovation were added to indicators of product and process innovation. Indicators of marketing and organizational innovation reflect the non-technological dimension of innovation, although the distinction between the two types may be oversimplified because evidence suggests that they are related, and both technological and non-technological activity and knowledge may be part of any kind of innovation process. Moreover, the way in which innovation is regarded may vary between size classes and sectors of economy. In order to effectively survey firms' innovativeness, as it regards to the adoption of organizational concepts, there are four points that will be taken into consideration when measuring

organizational innovation: life-cycle of organizational innovation; complexity of organizational innovation; quality of organizational innovation; extent of use of organizational innovations. Organizational innovations can be understood both as enablers for other types of innovations and as a distinct form of innovation (direct source of competitive advantage).

CONCLUSIONS

The measurement of organizational innovation and its effects is methodologically challenging due to the complexity of organizational innovations. The relationships between non-technological innovation and technological innovation are in need of further exploration. Research approaches understand organizational innovation either as a necessary adaptation to the introduction of new technologies, or as a precondition for successful product or technical process innovations. In fact, it will be important to understand how and under which circumstances organizations change.

REFERENCES

- Armbruster, H.; A. Bikfalvib; S. Kinkela; and G. Lay. 2008. "Organisational Innovation: The Challenge of Masuring Non-technical Innovation in Large-scale Surveys". *Technovation* 28, 644-657.
- Arundel, A.; C. Bordoy; and M. Kanerva. 2008. "Neglected Innovators: How Do Innovative Firms that Do Not Perform R&D Innovate? Results of an Analysis of the Innobarometer 2007 Survey No. 215", *INNO-Metrics Thematic Paper*, 1-38, MERIT.
- Evangelista, R. and A. Vezzani. 2010. *The Employment Impact of Technological and Organizational Innovations in European Firms*. University Tre, Faculty of Economics, Rome, Italy.
- Jensen, M.B.; B. Johnson; E. Lorenz; and B.A. Lundvall. 2007. "Forms of knowledge and modes of innovation". *Research Policy* 36, No.9, 680-693.
- Organisation for Economic Co-operation and Development (OECD). 2009. *New Forms of Innovation: Challenges for Policy Making*. OECD, Paris, France.
- O'Sullivan, D.; and L. Dooley. 2009. *Applying Innovation*. Sage, Los Angeles. United States of America.. Schmidt, T. and C. Rammer. 2007. "Non-technological and Technological Innovation: Strange Bedfellows?" *ZEW Discussion Paper*, No. 07-052, 1-50.
- Tidd, J.; J. Bessant; and K. Pavitt. 2009. *Managing Innovation: Integrating Technological, Marketing Organisational Change*. Chichester, J. Wiley and Sons. United Kingdom.