STUDY ON THE ADOPTION OF OPEN INNOVATION PRINCIPLES BY THE ROMANIAN SMES

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Abstract
This paper highlights some of the results of the study carried out by the authors within the research project "Integrated system for innovation management in SMEs", code PN-II-PT-PCCA-2013-4-1319, under way at the Business Administration Research Centre of the Bucharest University of Economic Studies.
The objective aimed at was to show the progress made by the Romanian SMEs in adopting the open innovation principles. In order to reach this objective, we analysed the available statistical data for the period 2002 - 2012 concerning the trend of the SMEs' weight in the total innovation businesses compared to the weight of the large companies, the trend of the number of innovation projects started but unfinished or abandoned, and the trend of the ratio between the weight of the expenses on internal innovation activities and the expenses on external innovation activities for these businesses.
The performed study highlighted the fact that within the analysed period, the weight of innovative SMEs in the total SMEs doubled. Within the same period of time the number of Romanian SMEs that initiated research-development-innovation projects unfinished and/or abandoned went up significantly, which proves that the initiatives of these businesses in developing ever more complex and riskier research projects multiplied. Under these circumstances, the authors' opinion is that focus is needed on external innovation sources that are typical to open innovation, with an important role in enhancing the performance of the innovation process.

Keywords
innovation, R&D, open innovation, SMEs, Romania

JEL Classification
O30, O31, O32

Introduction

Innovation is a process that begins with a new idea and concludes with market introduction (Brad, S., 2014 and Brad S., 2012). Innovation is an everyday phenomenon that changes progressively the economy and the society (Camelo, C., 2010). Along with creativity, this

is one of the main sources of development in the knowledge society, being strongly related to entrepreneurship and economic growth (Dinu, Grosu and Saseanu, 2015). During the past years innovation became more and more a common word. Businessmen argue they are concerned ever more with innovation whereas advertisements come up with innovation in an attempt to lure customers, while for mass media innovation is one of the most employed words (Jaramillo et al., 2008). At the same time, academic environments become increasingly preoccupied with investigating innovation, while many public actors, especially those directly involved in preparing and implementing macroeconomic strategies and policies deem that innovation generates value and prosperity for a given region.

Under these circumstances, the taking up of the open innovation principles turns into one of the priorities of organisations, especially of large companies that wish to improve the efficacy and efficiency of their innovation processes considered to be directly linked to their business performance. Concomitantly, it is an obvious fact that SMEs are concerned with spurring their innovation activities. These businesses develop specific national and regional programmes in an attempt to enhance the performance of their innovation processes, including through the adoption of the open innovation principles.

Literature Review

Innovation is regarded as a key element in achieving sustainable competitive advantages for the success of firms (Maier et al., 2014). According to some authors "innovation is a complex process which ensures communication between the scientific community, market and technology" (Brad, 2006, cited in Procopie et al., 2009), representing basically "the main engine of progress" (Kao, 2007) for both a company and a nation. In a general sense, innovation means the introduction of something new. But for an appropriate use of the term, this paper's authors embrace the definition given by the Oslo Manual according to which innovation is "the implementation of a new or significantly improved product (good and/or service), or process (manufacturing and supply methods), a new marketing method (package, sales or distribution methods), or a new organisational inbusiness practice, workplace organisation or external relations" (OECD, 2005, p. 46). The innovation process is today one of the most important factors behind the growth and prosperity of the global economy (Maier et al., 2014).

In the context of the previously mentioned conceptual delimitation, the authors of the present paper have set out to analyse the extent to which Romanian organisations adopt open innovation principles and use external innovation sources to enhance their own innovation performance. The analysis will be different for the SMEs and for the large organisations. Lately, SMEs have received a special attention from the researchers. Various studies focused on the argument that SMEs are as innovative as the large companies (Rothwell şi Zegveld, 1982; Pavitt et al., 1987; Oakley et al., 1988; Acs şi Audretsch, 1990 cited in Tomlinson and Fai, 2013). It is the opinion of many authors that innovation is even more important for SMEs than for large organisations, being perceived as an important engine of competitiveness (Fritz, 1989; Sweeney, 1983 cited in Radas and Bozic, 2009). Also, SMEs may be a significant source of innovation for large companies in the sense that they may work together in developing some components necessary to the innovation process, the more so as the firms that act as suppliers ~~to~~ for large companies are primarily SMEs (Fountain, 1998, cited in Tomlinson and Fai, 2013).

The transition from a closed to an open innovation system is thus ensured and triggered by the development of a company, especially in terms of size and results (Chesbrough, 2006). Closed innovation implies the holding of an absolute control over innovation, since companies themselves generate innovation ideas that they subsequently develop. Quite opposite, open innovation is based on internal and external knowledge that may be developed and capitalized in order to create value for the organisation (Chesbrough, 2003). Open innovation, especially considering the dislocation and knowledge-using processes, is at the same time a challenge for companies as it implies significant investments on their part (Rogbeer, Almahendra and Ambos, 2014).

Nevertheless, open innovation may be an important factor which triggers success for companies and does not involve the taking of significant risks or the carrying out of major investments (Pamfilie et al., 2013). For Chesbrough (2003) open innovation implies the taking into consideration of the following aspects: organisational culture, the structure of the innovation process, and the business pattern adopted. The culture oriented towards open innovation is based on different principles, amongst which: intelligent persons from outside the company may generate and develop ideas, external research and development activities may create value, etc. The innovation-oriented structure refers to different mechanisms of capitalization of the internal and external knowledge into ideas, projects, methods, and systems that facilitate the internal and external flows of the innovative process. Business models must be flexible and easily adaptable to various opportunities that may arise, in order to benefit from them and generate value for the company (Chesbrough, 2003; 2006).

Thus, by resorting to open innovation, companies may increase their chances to obtain a better efficiency in creating value and growth, becoming much competitive in the dynamic environment in which they operate (Kolk and Puumann, 2008; Chesbrough, 2011).

In order to show to what extent Romanian companies adopt open innovation principles, the present paper uses the results of a library research consisting in collecting, processing, analysing, and interpreting a series of statistical data representative for the studied phenomenon. Structured in two parts, the paper highlights in its first part a series of methodological aspects which were the basis for the research performed, while in the second part, the main results obtained.

Research Methodology

This paper is based on a desk research initiated from the following questions:

- How many Romanian firms had unfinished and/or abandoned innovation projects?
- What is the weight of innovative firms in the category of SMEs, compared to that of large Romanian companies?
- What is the weight of expenses on internal innovation activities compared to those on external innovation activities for Romanian companies?

In order to give an appropriate answer to the above questions, a statistical analysis of a series of data provided by the Romanian National Statistical Institute of Statistics (INSSE, 2015) was performed. This analysis follows various indicators linked to the trend of innovation activities in Romanian companies.

The research method on which this paper was based consisted in the statistical analysis of secondary data provided by the aforementioned institution for the period 2002-2012, i.e. the most recent data available in Romania, with regard to the investigated phenomenon. MS

Office 2013 instruments were used to process and analyse statistically the identified data. This led to a simplification of the way in which the followed categories of data are grouped and represented in charts.

Results

The carried out research showed that in the period 2002-2012 there was a significant growth of the number of Romanian firms that initiated research – development – innovation projects, which eventually remained unfinished and/or were abandoned. Their number increased fivefold throughout the ten years analysed, which proves that the complexity of the innovation activities that Romanian firms undertake also went up.

It is ever more important to note that SMEs have increased the number of unfinished and/or abandoned projects, with seven times more such projects in 2012 than in 2002, while in the case of large companies the number of such projects halved in the same period. Among other aspects, this situation may also be due to an increase in the number of innovative companies, i.e. from 3983 in 2002 to 9986 in 2008, and after the economic crisis there were only 5986 innovative companies left in 2012, as shown by the data provided by the INSSE (2015).

It is worth noting the spectacular twofold increase in the number of innovative SMEs throughout the analysed period, while the number of large innovative companies went down from 663 in 2002 to 479 in 2012. This trend is justified by a decrease in the total number of large companies as well, i.e. from 1622 in 2002 to 1196 in 2012 (INSSE, 2015).

The respective situation can be linked to a multiplied number of initiatives put forward by Romanian companies aimed at developing more complex innovation projects which imply taking higher risks in response to the emergence of radical technologies. Also, the growth rate of research-development-innovation projects throughout the same period exceeded the growth rate of innovative firms.

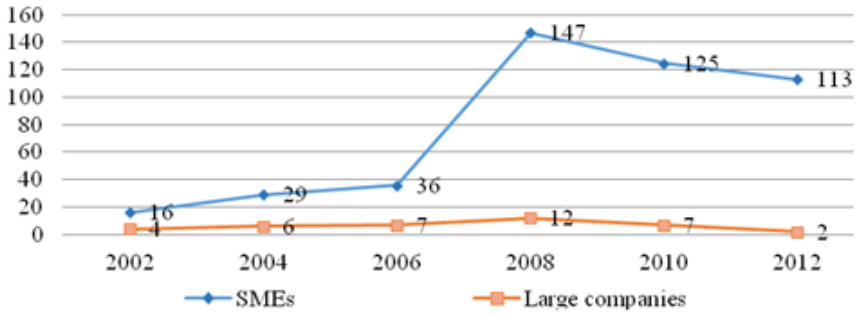

Figure 1. Evolution of the number of enterprises in Romania that registered unfinished and/or abandoned innovation activities

Source: own representation based on from the National Institute of Statistics, 2015

The identification of new optimum ways of encouraging the Romanian companies to adopt open innovation principles can thus be justified by the need to enhance the performance of innovation processes by working together with other partners or by using some external sources of innovation.

The dispersal of innovation, that is the increase in the level of diffusion of the results of innovation amongst a higher number of large companies, but especially amongst SMEs, is a second element that proves how important is to adopt open innovation principles. Especially taking into consideration the fact that the results of innovation no longer concern just a few large companies, but they are much more diversified.

This aspect, as also shown in Figure no. 2, is evidenced by the fact that the weight of innovating SMEs in the total SMEs increased twofold, going up from 15% 2002 to 32% in 2008, then a decrease down to 20% in 2012 followed. It is expected for such weight to increase in the coming period. In 2012 the number of large innovative companies (their number weighting 40%) was two times higher than the number of innovating SMEs (weighting 20%). This may also be due to resources available to large companies, especially financial resources, which allow them to invest appropriate amounts of money into innovation processes. However, SMEs had a higher rate of growth with regard to these processes within the analysed period.

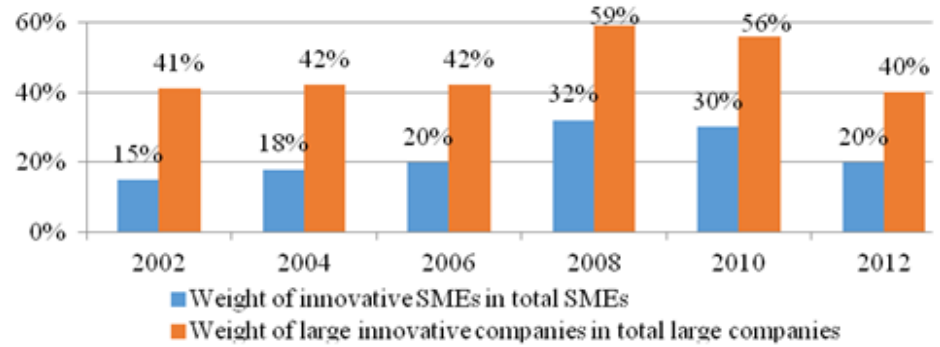

Figure 2. Evolution of the weight of innovative enterprises in the total number of Romanian enterprises, by dimension type

Source: own representation based on data from the National Institute of Statistics, 2015

In order to establish to what extent Romanian companies adopted open innovation principles, an analysis of the expenses of the companies that develop product and/or process innovation was carried out, depending on their specific activities.

And as shown in Figure no. 3, the companies use the largest part of the resources to purchase machinery, state-of-the art equipment, software, and buildings in order to develop some new or substantially improved products and services. So specific activities of capitalizing the external sources of innovation, which are a particular feature of the open innovation and which can contribute to increased performances of the innovation process should be more focused on.

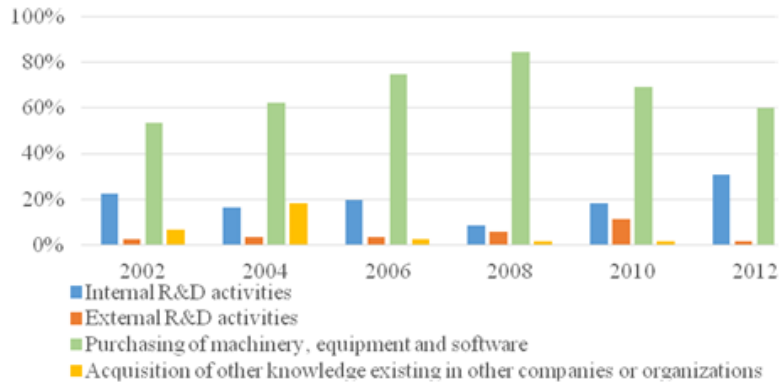

Figure 3. Evolution of the innovation expenses' structure in Romanian companies, by activities developed

Source: own representation based on data from the National Institute of Statistics, 2015

The analysis of the expenses on acquiring external R&D services and/or external knowledge - as activities dealing with the capitalization of external innovation sources - highlight a significant increase in such expenses, from 2% in 2002 to 11% in 2010, followed by a decrease to 1.6% in 2012 due to the significant increase in the internal R&D activities after the economic upturn (Figure no. 4).

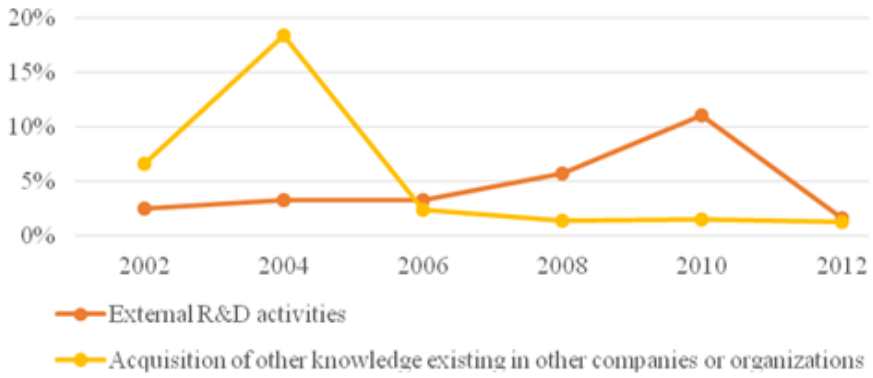

Figure 4. Evolution of the acquisition costs of external R&D services and other external knowledge, in Romanian companies

Source: own representation based on data from the National Institute of Statistics, 2015

Throughout the analysed period the weight of the expenses on external R&D activities was higher in the case of large companies and reached a maximum of 12.9% in 2010 in the total innovation activities, while for SMEs the same weight peaked at 6% in 2010. As regards the acquisition of knowledge from other organisations it was noted that, along with a significant increase in 2004 largely due to the large companies, in the period 2006-2012 the small companies reached a maximum weight of their expenses on the acquisition of knowledge from other organisations, compared to the middle and large-sized companies in the case of which this activity weighted in terms of expenses less than 1%.

The external research and development activities involve the acquiring of knowledge from other organisations in order to come out with new or significantly improved products and/or services. However it can be noted that there is necessary to increase the weight of certain kinds of new external knowledge to be acquired, such as know-how, copyrights, patents and other type of knowledge. This can be obtained through a better capitalization of the results of university research (Pamfilie et al, 2014; Cretan and Gherghina 2015).

Conclusions

The results of our study show that the Romanian companies were capable to innovate throughout the analysed period of ten years, a phenomenon which happened along with the opening towards collaboration and the taking up of more ambitious research projects.

Particularly it was found that significantly more SMEs innovated, and actually their number doubled throughout the analysed period. In the same period the number of Romanian SMEs that initiated unfinished and/or abandoned research – development – innovation projects also went up. Such phenomenon highlights that the initiatives undertaken by these companies to developed ever more complex research projects multiplied, a fact which involves a higher risk imposed by the emergence of an increasing number of radical technologies.

Taking into consideration the results of our research, we can draw the conclusion that by adopting the open innovation principles and focusing on activities dealing with the capitalization of external innovation resources, Romanian SMEs may increase the performance of their innovation processes. The results of this study can be an opportunity to launch future research aimed at identifying the most appropriate ways to enhance the innovation capacities of the Romanian SMEs.

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References

Brad, S., Mocan, B., Brad, E., Fulea, M. (2014), *Leading Innovation to Improve Complex Process Performances by Systematic Problem Analysis with TRIZ*, TFC2014, Global Innovation Convention, EPFL, Lausanne, Procedia CIRP, Elsevier.

Brad, S., Fulea M., Mocan, B., Brad, E. (2012), Systematic Innovation for Improving Competitiveness of a Master Study Program, *Proceedings of International Conference on Engineering & Business Education, Innovation and Entrepreneurship*, 365-368.

Camelo, C. (2010), Strategic consensus top management teams and innovation performance, *International Journal of Manpower*, 31 (6): 678-695.

Chesbrough, H. (2003), *Open Innovation: The new imperative for creating and profiting from technology*, Boston, Harvard Business School Press.

Chesbrough, H. (2006), *Open Business Model: How to thrive in the new innovation landscape*, Boston, Harvard Business School Press.

Chesbrough, H. (2011), The Era of Open Innovation, *MIT Sloan Management Review*, 29: 35-41.

Cretan, G.C., Gherghina, R. (2015), Funding Higher Education in a few EU Countries: Implications for Competition and Competitiveness in Higher Education, *Journal of Knowledge Management, Economics and Information Technology*, V(1): 1-22.

Dinu, V., Grosu, R.M. and Saseanu, A.S. (2015), Romanian Immigrant Entrepreneurship: Utopia or Reality? An Overview of Entrepreneurial Manifestations of Romanian Immigrants in Andalusia, Spain, *Transformations in Business & Economics*, 14(1(34)): 48-64.

INSSE. (2015), Tempo Online, https://statistici.insse.ro/ shop/?lang=ro, Accesed 10 February 2015.

Jaramillo, B., Jenkins, C., Kermes, F., Wilson, L., Mazzocco, J. and Longo, T. (2008), Positive Deviance: Innovation from the Inside Aut, *Nurse Leader*, 6(2): 30-34.

Kao, J. (2007) *Innovation Nation: How America is losing its innovation edge, why it matters, and what we can so to get it back*, New York, Free Press.

Kolk, A. and Puumann, K. (2008), Co-Development of Open Innovation Strategy and Dynamic Capabilities as a Source of Corporate Growth. Working Paper in *Economics Tallin University of Technology*, School of Economics & Business Administration, 173: 73-83.

Maier, A., Keppler, T., Maier, D. (2014), Innovation the new trend in today's challenging economy, in Proceedings of the *13th International Conference on Informatics in Economy, Education, Research & Business Technologies*, 15 - 18 May 2014, Bucharest, Romania.

OECD, (2005), OSLO manual, Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition, http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/OSLO/EN/OSLO-EN.PDF, Accesed 19 November 2014.

Pamfilie, R., Onete, B., Bumbac, R. and Orîndaru, A., (2013), Open Minded Companies for Better Innovation Performance, *Towaroznawcze Problemy Jakości*, 4: 22-30.

Pamfilie, R., Giuscă, S. and Bumbac, R. (2014), Academic research–a catalyst for the innovation process within companies in Romania, *Amfiteatru Economic*, XVI (37): 759-769.

Procopie, R., Pamfilie, R., Bobe, M. and Carceag, M. (2009), Innovation - global vision on the product in the socio-economic environment, *Textile Industry Journal*, 60 (2): 90-96.

Radas, S. şi Bozic, L. (2009), The antecedents of SME innovativeness in an emerging transition economy, *Technovation*, 29 (6-7): 438-450.

Rogbeer, S., Almahendra, R. şi Ambos, B. (2014) Open-Innovation Effectiveness: When does the Macro Design of Alliance Portfolios Matter?, *Journal of International Management*, 20 (4): 464-477 .

Tomlinson, P.R. şi Fai, F.M. (2013). The nature of SME co-operation and innovation: A multi-scalar and multi-dimensional analysis, *International Journal of Production Economics*, 141(1): 316-326.