

# Rozdział i.

## R&D Works in the Evaluation of Business Innovation Performance

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### **Abstract**

An ability to improve innovation performance seems to be nowadays one of the key elements determining not only potential of development in business but also its survival in the highly developed markets. The research presented in literature indicates the significance of providing complex evaluation of business innovation performance. It also suggests different approaches towards measuring changes within innovativeness.

In this paper an attempt has been made to highlight important aspects related to the problem of evaluating business innovation performance in case of: companies performing R&D works and, those being non-R&D innovators- by reviewing literature studies on this aspect. At the same time, the paper aims to start the process of seeking an answer to the question whether R&D activities and R&D expenditures can be treated as universal and reliable indicator of company's innovation performance.

### **Introduction**

An ability to improve innovation performance seems to be one of the key elements determining not only potential of development in business but nowadays also its survival in the market. The necessity to innovate has become independent of: companies profile, size and the industry. Innovating is regarded, at the same time, by most of the researchers and authors of international programmes as one of the strategic value drivers (Compare Liu. 2005).

The presented approaches can be treated as an invitation to the discussion on redefining the key-innovation drivers and their role in businesses and their long-term development. One of the elements worth attention, is the influence of R&D

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works on innovation performance. The role of the aforementioned factor seems to require much attention in light of dynamic growth of enterprises being non-R&D innovators and those implementing non-technological innovations.

In this paper an attempt has been made to start the process of seeking an answer to questions related to R&D activities and expenditures- and their role in the process of evaluating business innovation performance. Special attention has been paid to the problems of potential indicators to be employed for measuring innovation performance in enterprises which do not perform R&D works.

### **i.1. R&D works and its role in the stimulation of business innovation growth**

The significance of R&D works has been underlined in literature- as a proxy for innovation- relatively often (Compare: Hitt, Hoskisson, Kim. 1997). R&D works have been seen as enhancing firm's capacity to absorb and make use of new knowledge of all kinds, not just the technological one (Compare: Oslo Manual. 1997). The broad usage and usefulness of R&D- and R&D related indicators can be partly explained by the high share of technological process innovations and technological product innovations in business activities. It is also worth underlining that the R&D intensity based factors have been used in other-than-innovation methodologies- they have been employed for the final evaluation in knowledge assessing methodologies<sup>2</sup> (Worldbank. 2008).

On the other hand, some authors notice the limited usage of the indicators of this type. Berry, for example, expresses the opinion that, due to the aging process of technologies, competitive advantage can no longer be maintained just by increasing investment in R&D (Berry. 1998). This thesis refers, to a high extent, also to the problem of increasing innovation performance- which is closely related to gaining competitive advantage.

Implementing such an approach raises the question about the significance which should be attributed to R&D in the process of measurement and evaluation of changes in business innovation performance. In the previous studies, R&D based indicators such as: public R&D expenditures, business R&D expenditures, share of medium-high-tech and high-tech R&D, have been treated as one of the basic tools for the evaluation of innovation performance (Compare European Innovation Scoreboard. 2006). The high share of 'R&D indicators' seems to be however systematically transformed into a kind of systemic approach employing a number of additional innovation indicators of a soft type.

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<sup>2</sup> such as: 1. total expenditure for R&D as % of GDP 2. researchers in R&D 3. researchers in R&D per million population.

## i.2. R&D innovators vs. non-R&D innovators- problems of measuring innovation performance

Literature studies indicate dynamic development of other innovation types. Earlier 'dominance' of product and process innovations has been preceded by non-technological innovations. According to Sirilli, marketing innovation, organizational innovation<sup>3</sup>, management innovation, innovation related to strategies, and innovation related to aesthetic appearance can be distinguished (Sirilli. 2003).

Similarly, the studies of the trends in the EU economies show that more and more attention has to be directed towards the non-R&D innovators- the new target group whose share within innovating businesses is systematically increasing (table 1).

**Table 1. Share of non-R&D innovating companies according to EIS 2007**

Country	non-R&D innovators, %
Sweden	22
Denmark	8
Germany	40
United Kingdom	52
Luxembourg	49
Netherlands	17
France	30
Belgium	38
Estonia	57
Norway	23
Czech Rep.	45
Italy	41
Cyprus	76
Spain	61
Malta	47
Lithuania	70
Hungary	57
Greece	49
Portugal	56

<sup>3</sup> A different classification can be found in the studies by Dougherty, where organizational innovation is described as a complex process (...) involving activities such as: product design, coordination between product innovation functional departments and matching from company resources, structure and strategy (Dougherty. 1995, cited after Liu. 2005).

Slovakia	40
Poland	82
Bulgaria	91
Romania	68

Source: European Innovation Scoreboard 2007.

While analyzing the data from table 1, the relationship between the share of non-R&D innovators and the Summary Innovation Index (SII) in particular countries is worth studying (table 2).

**Table 2. General Innovation Performance based on SII**

Country <sup>4</sup>	Change in SII <sup>5</sup> , %		Country classified into the group of:	
	2004-2006	2006-2008		
Bulgaria	3,49	24,16	Catching-up Countries	Growth Leaders
Poland	6,82	8,16	Catching-up Countries	Moderate Growers
Cyprus	2,97	23,62	Moderate Innovators	Growth Leaders
Lithuania	8,71	2,44	Catching-up Countries	Slow Growers
Romania	6,70	24,22	Catching-up Countries	Growth leaders
Spain	6,99	3,98	Moderate Innovators	Moderate Growers
Estonia	1,94	7,84	Moderate Innovators	Moderate Growers
Hungary	7,89	10,10	Catching-up Countries	Moderate Growers
Portugal	16,21	8,01	Moderate Innovators	Growth Leaders
UK	5,36	-0,55	Innovation Leaders	Slow Growers
Greece	8,86	22,37	Moderate Innovators	Moderate Growers
Luxemb.	5,56	2,14	Innovation Followers	Slow Growers
Malta	6,57	12,67	Catching-up Countries	Moderate Growers
Czech R.	6,98	9,78	Moderate Innovators	Moderate Growers
Italy	9,24	3,21	Moderate Innovators	Slow Growers
Germany	1,86	6,02	Innovation Leaders	Moderate Growers
Slovakia	15,95	5,37	Catching-up Countries	Moderate Growers
Belgium	4,07	4,32	Innovation Followers	Moderate Growers
France	1,09	6,88	Innovation Followers	Slow Growers
Norway	3,63	2,43	Moderate Innovators	Slow Growers
Sweden	4,94	0,00	Innovation Leaders	Slow Growers
Netherl.	1,78	5,68	Innovation Followers	Slow Growers
Denmark	6,89	-5,79	Innovation Leaders	Slow Growers

Source: own calculations based on European Innovation Scoreboard 2008.

<sup>4</sup> Countries were classified in the following way: from the highest share to the lowest share of non-R&D innovators.

<sup>5</sup> Basis for comparison: SII acc. to EIS 2004

The data from table 2 clearly indicate the reverse relationship between the share of businesses innovating without running R&D works and the value of the Summary Innovation Index. A growing number of enterprises continues innovating without carrying out in-house or intramural R&D works- with the majority in countries with lower economic development- resulting among others in relatively weaker innovation performance. According to the EIS studies, almost half of the European innovation-active enterprises innovate without performing any R&D works. In case of these businesses, innovations of a major role are marketing and organizational innovations.

### **i.3. Concluding discussion- proposals**

The literature studies emphasize, that although non-R&D innovators have been widely recognized in theory, the concentration of further academic research was not on them- as these studies focused on businesses active in R&D works (Arundel, Bordoy, Kanerva. 2008). At the same time, the studies by European Union clearly indicate the increasing number of businesses which implement innovation without performing R&D works (or buying its results).

For example, the authors of the report, *Neglected Innovators: How do innovative firms that do not perform R&D innovate?*, widely recognize non-R&D innovators in particular European economies as well as the ways those enterprises innovate, with: 1. technology adoption, 2. modifications to products and processes, 3. imitation and 4. combining existing knowledge in new ways (cited after Arundel A., Bordoy C., Kanerva M. 2008). Results of the cited report indicate also that a significant number of non-R&D innovators, innovate by customizing or modifying products, processes or organizational methods developed by other firms or organizations (Ibidem).

The aforementioned can be treated as a signal- emphasizing the necessity of performing further studies into the mentioned direction- being of significance to the three basic groups of companies.

1. Businesses not willing to implement innovations requiring high capital investments.
2. Small and medium enterprises encountering either financial constraints or not able to invest financial resources into cost-intensive innovations.
3. Those innovators interested only in non-technological innovations such as: marketing or organizational innovations.

The measurement of non-technological innovations requires a broad spectrum of tools to be employed. An attempt to make the first step into their classification has been made in table 3.

**Table 3. Main dimensions for measuring non-technological innovations**

Innovation type	Proposed indicators
Non- technological innovation (NTI)	<ol style="list-style-type: none"> <li>1. rate of adoption of NTI (number of innovations implemented)</li> <li>2. new/ radically modified: organizational structures, administrative systems, organization of a workplace, and other methods used by a company</li> <li>3. staff creativity programs + eventual results of these initiatives</li> <li>4. employment of innovation encouragement programs (staff training programs)</li> <li>5. share of personnel training expenses on total costs of innovation</li> <li>6. employment of innovation management techniques</li> <li>7. share (%) of expenditures on NTI on total costs of innovation</li> <li>8. changes in the level of expenditures on NTI</li> <li>9. personnel (low to high) pervasiveness- affected by the NTI</li> <li>10. implementation of: market-oriented strategic planning, marketing information systems, interactive marketing</li> <li>11. marketing/organizational expenditures per 1 employee</li> </ol>

Source: Author's study based on: (Liu, 2005), (OECD 2005), (Wolfe, 1994), (Tsai, Chuang, Hsieh).

The potential difficulty in measuring non-technological innovations results mostly from the high share (in comparison to 'typical' TPP innovations) of qualitative factors raising dilemmas in quantifying, and, at the same time, creating common comparison platforms. In further studies, there seems to be a necessity to continue efforts aiming for creating an objective and relatively homogenous model for the evaluation of non-technological innovations<sup>6</sup>- which would bring objective and comparable results- independently of the size of enterprises, as well as their organization and the sector they operate in.

<sup>6</sup> Combining among others: resources, market coverage, core competences of a company e.g organizational competence.

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