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MEASUREMENT AND EVALUATION OF BUSINESS INNOVATION

Key words

Innovation, innovation measurement, measurements and indicators of innovation, evaluation of business innovation.

Summary

This article introduces the newest trends and approaches to measuring and evaluating business innovation. Diverse sets of benchmarks and indicators of business innovation measurement which appeared in both Polish and foreign publications in the last few years are presented here. The article also indicates the most common mistakes committed by business entities in innovation measuring and in the usage of innovation indicators, as well as their significant role in future forecasting. Finally, following the analysis of available approaches, the conditions of a proper and effective practical usage of such indicators are discussed. The aim of the article is the analysis and comparison of chosen new approaches to measuring business innovation.

Introduction

Innovative activity requires a wide scope of proactiveness in multiple areas of a company's management. This proactiveness is conditional on many factors, both internal and external.

The external conditions of business innovation include diverse aspects (economic, social, political and legal, cultural, technological, natural, financial, and market), which are related to the surrounding of a business entity. The internal background of business innovation is directly connected with the resources used by an enterprise in the process of change. It is important to emphasize that business innovation is primarily conditional on the markets that companies operate in, and also on state policy that defines current trends of science and technology development [1]. These factors may vary in the importance, degree, and intensity of impact on an organization.

Due to the fact that current business environments are characterized by high changeability and dynamics, innovative activity of enterprises requires not only the openness to new undertakings, constant learning, making predictions for the future, taking risks, but also the regular evaluation of innovative activities.

1. Innovative activities of business entities

Innovation may refer to all society, local communities or organizations, their parts and finally, to individual people. The economies/organizations that are considered innovative are able to create, absorb and sell new products (services) and have the ability to adapt to changes in the environment [2].

Business innovation is an enterprise's ability to effectively allocate resources for the development of optimal configurations of competitive advantages. This includes the element of effectiveness and the time factor, thanks to which the dimension of competitive advantages changes [3]. It depends on many factors such as the form of ownership, the branch of industry, the enterprise's size, organizational culture, structure, and experience in the innovation implementation.

Innovation of an organization is defined as its eagerness to react to changes of the environment, and its ability to initiate original and imitating behaviours regarding or regardless the signals from the environment by means of the company's common and private knowledge. Innovation is a socially complex and complicated phenomenon, because it embraces elements of science, technology, production, and society. The intensity of activities of competitors and the globalization of sales markets causes the increase of interest in invention. Turbulent environs in which organizations act require constant change and adapting activities. The ability of adaptation is enough to survive; however, it does not ensure competitiveness, which may be reached only by the creation and implementation of innovations.

An innovative enterprise – according to the Oslo methodology [4] is an enterprise, which in the researched period of time (usually 3 years) introduced at least one technical innovation to the market (new or significantly improved product or new/significantly improved technological process). An enterprise conducting innovative activity is a category used in the analysis of the results

of innovative activity research made by GUS, and it applies to businesses, which were involved in innovative activity, that is, making financial investments in this area in the particular fiscal year.

Current innovative activity of business entities may be characterized [5] by the openness of innovation based on the creation and the exchange of knowledge, which is impossible without a broad, diversified collaboration, and which may transform into a creative partnership, as it usually happens in the context of a dynamic ecosystem – which a region usually is.

2. Measurement of Business Innovation

The problem of innovation measurement in the region or state appeared with Poland's accession to the European Union. Modern enterprises tend to undertake actions aimed at innovation and competitiveness development more often (they invest multiple resources and dedicate actions to achieve that goal), but they do not use calculable tools of measurement and evaluation of the results. Effective management of an innovative company requires analytical tools, which can be used for the measurement of organization's innovativeness [6].

Business innovation may be measured by a number of methods. J. Kozłowski [7] focuses on the two main methods of innovation measurement: the objective (measurement of the number and type of existing innovations) and the subjective one (researching of enterprises that implemented innovations). The subjective method is based on surveying of companies. The questions of a survey relate to diverse aspects of innovation in the industry and services and to the amount of resources invested in the innovative activity, as well as to factors facilitating or hampering innovation, the effects and sources of innovation, the business activity of the enterprise, and the diffusion of innovations [7]. This method is described and recommended by the Oslo Manual [4].

The usage of innovation indicators is more common in foreign companies, than in Polish ones. Their role is essential, not only because they measure the efficiency of innovative actions undertaken, but also because their regular observation may become a forecasting tool. Innovation indicators may be used to provide comparison and evaluation of companies in a particular industry, and their position in relation of competitors or other business units of the company, and also they can provide information about the increase of innovation capacity of a company or a business unit in a given period of time [8]. As a result, it is safe to state that innovation measurement should be an element of strategy and policy of every modern business entity.

The traps of innovation measurements are the following according to [9]: insufficient standards and the promotion of conservative innovation, as well as the focus on input instead of results, among all the others. Other mistakes include overly extensive lists of indicators, incorrect matching of indicators to

the organization type. While matching the indicators to an organization, it is important to take into consideration the type of organization we are dealing with – whether the company mainly creates innovations, or rather adapts innovations. Innovation indicators should also refer to the overall assessment of the company, not to its particular projects.

A selection of approaches to innovation measurement offered by both Polish and foreign publications is presented below.

Measurements of innovative activity described in foreign literature of recent years include the following:

- Intellectual property measurements,
- The number of innovations implemented in a given period of time,
- The number of adapted technological innovations in a given period of time,
- Sales volume of new or substantially improved products/services, and
- The rate of return on investments in innovative activities R&D [10].

A different research conducted by the Human Resource Institute by order of the American Management Association comprises five sets of measurements, including the importance of each measurements (Table 1) [11]. This approach does not assume that the measurements should refer only to the innovative activity of an enterprise.

Table 1. Measurements of Business Innovation based on AMA/HRI research results [11]

Sg.	Specification	Importance
1	Customer satisfaction	1
2	Market share	2
3	Number of new commercialized products/processes/services	3
4	Per cent of revenue/profit generated by the innovative activity	4
5	Intellectual property measurements	5

Despite the fact that the indicators proposed by [10] and [11] are popular in literature, they are insufficient. They do not take into consideration, for example, the estimation of enterprises' innovative climate and pay too much attention to measures of intellectual property. However, enterprises not always make use of legal protection of intellectual property. It can also happen that not every patented innovation has market potential and may serve as an example of a company's innovation.

InnoScore Model [12, 13], created for the innovation measurements, distinguishes nine different areas of action which are essential in the innovation of an enterprise: the culture of innovation, strategy, skills and knowledge, technology, products and services, processes, structure and relatedness, market, and project management. InnoScore allows for the definition of innovation capacity of an enterprise for each of the aforementioned areas, which influence company's innovation. In other words, it specifies the position each area

occupies in comparison with that of the most innovative companies. Innovation measurement, according to [12] and [13], was prepared and conducted on small and medium German companies, and it enabled the measurement of innovation indicators in a research group.

Kleinrok [14] offers a different approach to business innovation measurements and divides indicators into three groups – measurements conducted in reference with the effects, competences, and strategy. The problem of too many indicators in each of the areas suggested may be solved by means of the strategic chart of results. A balanced scorecard is a popular tool for the evaluation and auditing of significant companies in relation to innovation.

The most common criteria of innovation measurements include the following [9]: innovation potential, innovation process, and the results of innovation processes.

Table 2. The division of innovating measures [9]

Sg.	Category	Measures
1	measures of expenditures	Financial resources assigned to innovation
		Human resources engaged in innovation
		Separate, protected resources assigned to innovations, not connected with the basic activity
		Time devoted by the management to innovation, leading to new growth
		The amount of patent applications
2	measures of processes	The rapidness of an innovating process
		The scope of a process of ideas creation
		Balance of an innovating portfolio
		Current gap of the growth
		Separate processes, tools, measures for different kinds of economic opportunities
3	measures of results	The amount of new products or services introduced to the market
		Percentage share of new products in incomes received from main categories
		Percentage share of new customers in general incomes
		Share of new range of products in incomes
		Profitability of investments in innovation

The Boston Consulting Group suggests the usage of certain balanced set of measures in three categories – investment, processes, and results (Table 2) – in order to evaluate the innovative activity of an enterprise. Indicators BCG and similar to them [9] omit the aspect of the intensiveness of innovation activities and the measurement of innovation climate, hence they are not recommended.

A very similar approach to this matter is offered by L. Bialon [15], who divides the measurements of innovative activity – as he refers to them – into the three very same areas: innovation potential, innovation processes, and the results

of innovation processes, where he distinguishes sets of indicators of quality and quantity.

P. Kotler and F. Trias de Bes suggest four groups of innovation indicators:

- Indicators that aim at measuring the innovation in terms of economy;
- Indicators that aim at measuring innovative activity within a single organization unit;
- Indicators that aim at measuring the efficiency of innovative activity and investments in it; and,
- Indicators that aim at measuring the degree of the presence of the creative culture in the organization.

The twenty-two indicators organized in accordance with the four aforementioned categories are presented in the Table 3.

Table 3. Innovation indicators based on [8]

Sg.	Area	Indicators
1	Economy	sales results generated by new products
2		profit on launching of new products to the market
3		sales related to innovations other than new products
4		profits on innovations other than new products
5		innovations-related savings
6		total return on investment (ROI) in innovations
7	Intensity	number of patents
8		number of innovations in terms of products, services, processes and business models
9		number of brands
10		number of ideas generated yearly
11		number of innovation products in preparation
12		number of planned innovation models
13		Investments in R&D
14	effectiveness	success indicator for new products
15		time left to product launching
16		average investment per project
17		efficiency of investments in innovation
18		average expenses on rejected projects and ideas
19		time of holding the position of the industry leader in years
20	Culture	per cent to employees who generate new ideas
21		per cent of employees who assess the ideas
22		average number of ideas per employee yearly
23		work time devoted to innovation
24		number of divisions which conduct a continuous innovative activity
25		proneness to risks

The set of indicators described above deserves special attention due to its broader grasp of important areas of a company functioning, e.g. the intensiveness of innovative actions, and changing innovation culture in the organization. It is recommended to choose a number of indicators from each of the four groups, and not to use all of them, because some of them complement each other. In the first group, for instance, the sales results generated by new products are directly related to the profits on the launching of new products to the market.

The strategy and goals of an enterprise, as well as the capturing of the indicators that reflect specific properties of the industry the organization is operating in are important aspects while choosing indicators used to evaluate innovation.

The following conditions should also be taken into consideration when matching indicators [8]: indicators should be understandable, not overly complicated, and should include as many other indicators regularly used by the company as possible; and, they should also relate to the customer.

Summary

The complexity of phenomena influencing organizational innovation compels the investigation of optimal methods of analysis and enterprise estimation.

Based on the various concepts of enterprise innovation measurement presented, it is recommended to choose the range of indicators most suitable for organization type (corporation, MŚP), branch and attitude to innovation activities (for example activity, character of activity, etc.), among the ones presented in the article. According to the author, the particularly complex approach presents the range [8], showing indicators in four major areas of organization functioning. The selection of indicators, determined by their importance, their measurement, long-term observation or in comparison with other enterprises should constitute the main steps in the estimation of each enterprises' innovation.

Undertaking innovative activity and implementing innovations by business entities depends on many internal and external factors. The importance, degree, and intensity of their impact vary significantly. An enterprise operating in such conditions requires the use of tools of measurement and the evaluation of the efficiency of innovative activity in all areas. The most challenging aspect of business innovation evaluation may not be the actual achievement of high indicators by the enterprise in the long-term perspective, but the retaining and increasing the results in the long-term perspective. Regular evaluation of innovation efforts may facilitate the more effective company management, as a result, company development.

References

1. Motyka S. (2014): Model kreowania systemu innowacji w przedsiębiorstwie. *Innowacje w zarządzaniu i inżynierii produkcji*. Knosala, R. ed. Opole: Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją. Volume 1, 153–164.
2. Janasz W., Leśkiewicz I. (1995): Identyfikacja i realizacja procesów innowacyjnych w przedsiębiorstwie. Wydawnictwo Uniwersytetu Szczecińskiego.
3. Bielski I. (2000): Przebieg i uwarunkowania procesów innowacyjnych. Bydgoszcz: Oficyna Wydawnicza Ośrodka Postępu Organizacyjnego Sp. z o. o.
4. Oslo Manual (2008): Zasady gromadzenia i interpretacji danych dotyczących innowacji.
5. Jasiński A.H. (2014): Innowacyjność w gospodarce Polski. Modele, bariery, instrumenty wsparcia. Warsaw: Wydawnictwo Naukowe Wydziału Zarządzania Uniwersytetu Warszawskiego.
6. Motyka S. (2014): Pomiar innowacyjności przedsiębiorstwa. *Innowacje w zarządzaniu i inżynierii produkcji*. Knosala, R. ed. Opole: Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją.
7. Zadura-Lichota P. (2013): Świt innowacyjnego społeczeństwa. Trendy na najbliższe lata. Warsaw: PARP.
8. Kotler P., Trias de Bes. (2013): Innowacyjność – przepis na sukces. Poznan: Dom Wydawniczy Rebis.
9. Anthony S.D., Johnson M.W., Sinfield J.V., Altman E.J. (2010): Przez innowację do wzrostu: jak wprowadzić innowację przełomową. Warsaw: Wolters Kluwer.
10. Pichlak M. (2012): Uwarunkowania innowacyjności organizacji. Studium teoretyczne i wyniki badań empirycznych. Warsaw: Difin.
11. Jamrog J., Wickers M., Bear D. (2006): Building and Sustaining a Culture that Supports Innovation. *Human Resource Planning*. Vol. 29 (3).
12. Kirner E., Maloca S., Rogowski T., Slama A., Som O., Spitzley A., Wagner K. (2007): Kritische Erfolgsfaktoren zur Steigerung der Innovationsfähigkeit. Institut System und Innovationsforschung.
13. Mikołajczyk B. (2013): Pomiar i ocena innowacyjności MSP. *Journal of Management and Finance*. Uniwersytet Gdański 2/2.
14. Kleinrok M. (2012): Controlling innowacji w przedsiębiorstwie, [in] Poznańska K., Sobiecki R., *Innowacje w przedsiębiorstwie wybrane aspekty*. Warsaw: Oficyna Wydawnicza SGH.
15. Białoń L. ed. (2010): Zarządzanie działalnością innowacyjną. Warsaw.

Pomiar i ocena innowacyjności przedsiębiorstw

Słowa kluczowe

Innowacje, pomiar innowacyjności, miary i wskaźniki innowacyjności, ocena innowacyjności przedsiębiorstwa.

Streszczenie

W artykule przedstawiono najnowsze nurty i podejścia do zagadnienia pomiaru i oceny innowacyjności przedsiębiorstw. Zaprezentowano różnorodne zestawy grup mierników i wskaźników do pomiaru innowacyjności przedsiębiorstw przedstawione w polskich i zagranicznych źródłach literaturowych w ciągu ostatnich kilku lat. Ukazano także główne błędy popełniane przez przedsiębiorstwa w pomiarze ich innowacyjności i stosowaniu wskaźników innowacyjności oraz szczególną rolę prognostyczną. W wyniku analizy stosowanych podejść przedstawiono warunki ich i efektywnego stosowania w praktyce przedsiębiorstw. Celem artykułu jest analiza i porównanie wybranych nowych podejść do pomiaru innowacyjności przedsiębiorstw.

