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METHODOLOGICAL APPROACH FOR INTERNAL ASSESSMENT OF INFLUENTIAL FACTORS ON THE INNOVATION ACTIVITY OF AN INDUSTRIAL ENTERPRISE

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Abstract: This report aims to present a methodological approach to study the impact of influencing factors on the innovation activity of an industrial enterprise by building a system of consecutive activities for internal impact assessment, conducted by analytical and managerial specialists of middle and top management level in the organization. The approach includes: systematizing a set of factors in two directions - internal-external and beneficial-deterrent; preparation of evaluation tools (questionnaire); selecting appropriate respondents; contacting respondents, interviewing and completing the forms; processing (averages, graphs), data analysis and recommendations. Based on the results obtained, we proceed to formulate recommendations for better reporting of factor influence. The applicability of the approach is to broaden the scope of the business unit for adequate measures to improve its innovation activity. The benefits of the practical adaptation of the methodological approach focus on enhancing the adequacy of management policies in the enterprise with regard to the definition and implementation of measures to reduce the impact of deterrent factors, on the one hand, as well as to improve the condition and the influence of the beneficial factors, on the other.

Keywords: Innovation activity, enterprise management, organization of production
JEL Codes: *L230, O310, M100*

INTRODUCTION

The different types of innovation help to develop businesses by giving them competitive advantages, but in their pursuit of innovation some of them encounter barriers of a different nature. Implementation of innovation is a major investment and managers should therefore be well aware of factors that have a strong impact and would hamper or support innovation. This implies the opinion that the possession of knowledge in the field of innovation provides the opportunity for precise handling of concepts and the formation of a good innovation environment.

An important condition for the successful management of innovation processes in enterprises is the overall innovation context and how it influences innovation approaches (Luqmani, 2017). In a broader sense, the innovation context of a business unit represents the cumulative impact of various influencing factors, both at the enterprise level (internal environment) and outside it (external environment with direct and indirect impact). Often, the most important factors in the context are related to the overall philosophy of the company and its innovative behaviour, the regulatory framework at local and national level as well as the receptivity of consumers to introducing new

products to the market. In general, if a company is to be proven as innovative one it should not only have plans to introduce new or improved products, should not only implemented an innovation process or projects, but have also come to results of those efforts. Such outcomes are usually successfully developed new products, implemented new organisational and technological changes or significant changes in their business model (Applied Research and Communications Fund, 2017). All the results, achieved after successfully implemented innovation processes and projects are describing the innovation activeness of an enterprise (Kunev, Antonova, 2014).

EXPOSITION

The **methodological approach** includes the following elements with their characteristics:

Goal. The main goal is to investigate the influence of impact factors on the innovation activity of a selected industrial enterprise and to formulate recommendations based on the results analysis in order to better take into account this impact and to develop adequate measures by the business unit in order to improve its innovation activity.

Sometimes, such measures might also be connected with changes in the core business model of the company in order to make it more sustainable (Geissdoerfer, et al., 2017). Another changes might occur not in the general business model, but in the strategic controlling system of the company which helps to better evaluate the performance of some innovative decesions, particularly in product innovations at the the first phase of the product life cycle (Mihaylova, 2014). Other approaches focus on improving the management functions in the company, as part of the key characteristics of the organisation, that influence the development of new products and introducing new technologies in the company (Stoycheva, Antonova, 2016).

Tasks. The following tasks are formulated: (1) Preparation of a questionnaire including factors from the external and internal environment of the company with a favorable or dissuasive effect. The selection of factors could be done on the basis of the literary review of relevant publications and/or similar surveys; (2) Selection of appropriate respondents; (3) Contacting respondents and schedule of meetings; (4) Interviewing and completing the forms; (5) Entering the data in a spreadsheet (MS Excel); Processing (averages, graphs); (6) Analysing the data and elaboration of recommendations.

Object of research. The study focuses on the innovation activity of a chosen enterprise, which is determined by its implemented innovations in different directions - technological, production, management and organizational changes. Specific attention is put on product innovations and factors that influence them, since they are more often implemented (Albers, et al., 2016; Antonova, Stoycheva, 2018)

Subject. Influencing factors of the innovation activity (IA) of a selected industrial enterprise are studied, divided into two directions - by type (internal and external) and by impact (Beneficial and Deterrents). Logically, their classification might be displayed in the following matrix:

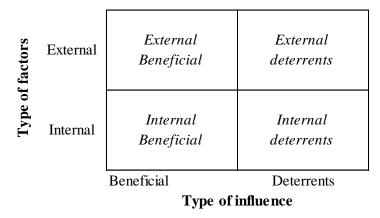| Type of factors	Beneficial	Deterrents
External	*External Beneficial*	*External deterrents*
Internal	*Internal Beneficial*	*Internal deterrents*

Type of influence

Fig. 1. Logical matrix of factors for innovational activity

Sample. In order to achieve the aim and objectives of the survey, the survey is targeted only at respondents who have the relevant knowledge and competencies on the topic according to the position they occupy in the organization. For this reason, the following staff groups from the selected company were chosen: Managing Partner, Managing Director, Operations Manager or Analyst. Altogether 8 (eight) people were interviewed, distributed as follows:

Table. 1. Distribution of respondents in categories and positions

Category	No. of people in category	Specific position	No. of persons
Managing Partner	1	Executive Director	1
Managing Director	3	Manager ERP	1
		Production manager	1
		Quality manager	1
Operations Manager	1	Head of Workshop	1
Analytical specialist	3	Logistics specialist	2
		Quality specialist	1

Survey tool. A questionnaire consisting of 3 parts was used to collect the information (see table 2). In the first part (part A), respondents assess the impact of internal factors, which are divided into two groups - Beneficial and Deterrents. In the second part (part B) the respondents assess the influence of the external factors again grouped in two directions - Beneficial and Deterrents. In the third (final) part of the questionnaire respondents put free text comments, if any, and also information on the person's position in the organization is collected - whether he/she is a managing partner, a managing director, an operational manager or an analytical specialist. In a separate question, respondents can enter the number of innovative activities they have so far participated in the enterprise. The structure of the questionnaire is as follows:

Table. 2. Structural parts and answering options in the questionnaire

Unit	No. of answers (factors, options)
Part A. Internal factors	
A.1. Internal Beneficial	19
A.2. Internal deterrents	6
Part B. External factors	
B.1. External Beneficial	10
B.2. External deterrents	10
Other comments, opinions	Free text
B.1. Position of the respondent	4
B.2. Participation in innovation activities	Free text

For assessing the impact of the factors in Part A and Part B, a 5-step Likert scale is used, allowing the respondents to quickly and easily identify their preferred response by marking in the appropriate box a symbol (x, • other) . An example of how to respond is shown in the following figure:

A1.	Do you think the following internal factors and conditions are **beneficial** to creating and implementing innovations?	1 No influence	2 Poor influence	3 Partial influence	4 Strong influence	5 Very strong influence
A1.1	Vast management experience					

Fig. 2. Type of answering for degree of influence of the factors

Processing. Data processing is done using non-specialized spreadsheet software - Microsoft Excel, where the responses received by the respondents are entered. Table 3 bellow displays an example of database with responses. Based on these data, average values are calculated, results are compared and graphical representation is performed.

Table 3. An example of database with responses

Questionaire name or ID no.	A1.1	A1.2	A1.3	A1.4	A1.5	A1.6	A1.7	A1.8	A1.9	A1.10	A1.11	A1.12	A1.13	A1.14	A1.15	A1.16	A1.17	A1.18	A1.19	A2.1	A2.2	A2.3	A2.4	A2.5	A2.6
Anketa-Owner	3	4	4	2	3	5	4	3	3	3	3	4	4	3	2	3	3	2	2	4	3	3	2	3	3
Anketa-NachCeh	5	5	4	4	4	5	5	4	3	4	4	5	5	3	3	3	4	5	5	5	5	5	4	3	
img09100-ManagerERP	4	4	4	3	5	5	3	5	4	3	4	5	5	5	4	3	4	5	5	5	5	4	5	5	5
img09101-ProductionManager	4	4	5	3	4	4	4	4	4	3	3	4	4	3	3	3	4	4	4	4	4	5	5	4	5
img09102-specialistLogitika	4	4	5	2	5	5	5	5	4	4	3	4	5	3	4	5	3	4	5	3	5	4	5	5	4
img09103-ManagerQuality	5	5	5	3	4	5	5	5	4	4	4	5	5	5	3	4	3	2	4	4	4	5	5	5	3
img09104-SpecialistQuality	3	5	3	3	5	5	2	3	3	1	4	5	5	4	5	1	1	4	5	4	5	4	2	5	2
img09105-Ioana-1	5	5	5	3	5	5	4	5	3	3	4	4	4	5	2	4	3	1	5	4	5	5	5	5	4
Average for the question	4.13	4.50	4.38	2.88	4.38	4.88	4.00	4.25	3.50	3.13	3.63	4.50	4.63	4.13	3.25	3.75	3.00	2.75	4.25	4.13	4.50	4.38	4.25	4.50	3.63
Average for the group	3.888																			4.229					
Average for the part	4.101																								

Calendar schedule

The survey experts or team could carry out the activities of this study in the following consistency (Table 4):

Table 4. Gantt chart of the empirical study (an example)

Activity	Month 1				Month 2				Month 3			
	w1	w2	w3	w4	w1	w2	w3	w4	w1	w2	w3	w4
Preparation of the questionnaire	■	■										
Selection of respondents		■										
Contacting respondents and schedule of meetings			■	■								
Interviewing and completing the forms				■	■							
Entering the data in a spreadsheet (MS Excel)						■						
Processing (averages, graphs)							■					
Analysing the data and elaboration of recommendations								■	■	■		

CONCLUSION

The applicability of the approach is to broaden the scope of the business unit for adequate measures to improve its innovation activity. The benefits of the practical adaptation of the methodological approach focus on enhancing the adequacy of management policies in the enterprise with regard to the definition and implementation of measures to reduce the impact of deterrent factors, on the one hand, as well as to improve the condition and the influence of the beneficial factors, on the other.

In general, it can be concluded that if the company knows the specificity of the influencing factors, this would reduce their negative impact on the innovation process. Forming a better innovation culture would help reduce the economic risk of introducing innovation in the enterprise.

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REFERENCES

Albers, A., Gladysz, B., Heitger, N., & Wilmsen, M. (2016). Categories of product innovations - a prospective categorization framework for innovation projects in early development phases based on empirical data. *Procedia CIRP*, 50, 135-140

Antonova, D., B. Stoycheva. (2018). Approved model of factors, influencing the management process in developing new products. IN: *The 6th International Conference Innovation Management, Entrepreneurship and Sustainability (IMES 2018)*, Czech Republic, Vysoká škola ekonomická v Praze, Nakladatelství Oeconomica – Praha 2018 Nakladatelství Oeconomica, N, 2018, pp. 38-54, ISBN 978-80-245-2274-6.

Applied Research and Communications Fund. (2017). *Innovation.bg. Bulgaria in the Global Value Chains 2017*. Published by the Representation of the European Commission in Bulgaria and the Office for Publications of the European Union. ISBN: 978-92-79-76593-3. http://www.arcfund.net/arcartShow.php?id=18100, accessed on 30.03.2018.

Geissdoerfer, M., Savaget, P., & Evans, S. (2017). The Cambridge business model innovation process. *Procedia Manufacturing,* 8, 262-269.

Kunev S., D. Antonova. (2014). Approbation of methodological approach for innovation activeness of small and medium-sized enterprises in a dynamic environment (following the example of machine-building sector in Ruse region,Bulgaria.// *Annals of „Eftimie Murgu" University Reşiţa, Fascicle II. Economic Studies*, 2014, No XXI, pp. 102-118, ISSN 2344 – 6315. (SJR rank: 1.65 /2014, Copernicus)

Luqmani A., Leach, M. & Jesson, D. (2017). Factors behind sustainable business innovation: The case of a global carpet manufacturing company. *Environmental Innovation and Societal Transitions*.24, 94 –105.

Mihaylova, L., Papazov, E., Kirova, M. (2014). *Specificities of strategic controlling in innovative enterprises (after the example of the Bulgarian knitwear industry)*. IN: 21 st ISC "Smart and Efficient Economy: Preparation for the Future Innovative Economy" (Selected papers), Brno, Czech Republic (Web of Science), 2016, pp. 573-578, ISBN 9788021454132.

Stoycheva, B., D. Antonova. (2016). Improving Management Functions in Developing New Products in Medium-sized and Large Enterprises (a Comparative Study of Bulgarian and American Processing Industry).Springer International Publishing Sw.// *Dynamics in Logistics*. Editors: Kotzab Herbert, Pannek Jürgen, Thoben Klaus-Dieter, Berlin-Heidelberg, Germany, 2016, No LDIC 2014, pp. 667-674, ISSN 978-3-319-23512-7.