

## PRIORITY AREAS OF ANALYSIS OF THE EXTERNAL ENVIRONMENT OF A COMPANY-INNOVATOR DEPENDING ON A TYPE OF INTRODUCED INNOVATIONS

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**Abstract:** When making a decision about introduction of the innovative product into the market it is necessary to take into account the situation in the sector market because the uniqueness of an innovation does not guarantee commercial success of an innovative product, because insufficient consideration of factors of the external environment can negate all efforts of its promotion into the market. An effective tool for reducing the risk of uncertainty is a preliminary analysis of the external environment which is carried out by a company-innovator when making decisions concerning commercialization of innovations and introduction of the innovative product into the market.

In the article a method has been worked out and suggested aimed at setting priorities and specific methods of the external environment analysis of a company-innovator, which is interested in the commercialization of innovations of various types. The results of this work are the developed model of innovation and the suggested technique of methods selection of the sector market analysis (taking into consideration the type of implemented innovations) which can be used in preparing data about the external environment of a company-innovator state for the purposes of making decisions aimed at introduction of innovative product into the market (innovation implementation).

**Key words:** innovation product, signs of innovation, innovation implementation, methods of the external environment analysis

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### Introduction

When introducing an innovative product into the market, many organizations come across the problem of insufficient information about the actual state of environment, thus a vast majority of innovations ends in failure even at the initial stage of their implementation. Statistics show that on average about 1/3 of innovative products ends in failure and instead of profit they incur losses. Stage of introducing an innovative product into the market causes great difficulties due to the fact that consumers accept and embrace attractive qualities slowly; however, the company-innovator has to incur great expenses of organizing a mass production and market promotion of an innovative product (Bauman, 2005).

However, as studies show (CbInsights, 2014), one of the main reasons of the commercial failure of an innovation is not sufficiently deep preliminary analysis of

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a sector market, which is carried out before making a decision concerning the introduction of the innovative product into the market. This analysis is designed to help managers and others responsible for making decisions related to the commercialization of innovation to obtain full and adequate information about the market state and the behavior of key entities in it.

First of all a low quality of the preliminary analysis of the external environment is connected with the absence of appropriate analysis techniques which would take into account the peculiarities of the innovative product, and a low quality is also caused by difficulties in choosing appropriate methods for such analysis.

Thus, the aim of this study is to determine priority directions of the external environment analysis of the company-innovator and development of a methodology for the selection of appropriate methods of the external environment analysis that are used to reduce the risk of uncertainty when making management decisions related to the commercialization of innovations and introduction of the innovative product into the market.

In this study according to the confirmed hypothesis the choice of methods of the external environment analysis of the company-innovator depends on a type of an implemented innovation.

### **Literature Review**

The literature review shows that, currently, there are two main methodological approaches to the external environment analysis: analysis of a sector markets organization (Industrial Organization) and marketing analysis (Marketing Analysis).

The first approach studies the external environment from the point of view of the offer (manufacturer/seller), the second approach studies the external environment from a demand perspective (consumer).

Methods, which are based on the first of these methodological approaches (analysis of industry markets organization), aimed at studying the principle of formation of market structure, dependencies of strategic firm behavior and the results of their work on market peculiarities. The external environment analysis in this case is carried out at the macro level and is initiated by the public management structures (line ministries and agencies, the Antimonopoly service, etc.) in order to regulate the industry market on the basis of information about market structure. The preference is given to quantitative methods of the external environment analysis (statistical methods and economic and mathematical methods).

The greatest contribution to formation and development of the theory and methodology of a sector markets analysis, studying the regularities of their development and improvement of methodical approaches of the analysis has been made by the scholars: E.H. Chamberlin (1933) (developed a model of monopolistic competition that is used for the analysis of international trade), J.S. Bain (1956) (studied barriers to entry in industrial markets), E.S. Mason (1949) (developed the assessment method of the degree of monopolization of the market), L. Hannah and

Zh. Key (1977) (studied market concentration in sector markets), J.V. Robinson (1986) (introduced the concept of a border of a sector market and suggested criteria of their establishment), F.M. Scherer and D. Ross (1997) (worked on the development of methods for determining the structure of sector markets), S.B. Avdasheva and N.M. Rozanova (1998) (studied factors that determine the structure of sector markets and worked on the problem of identification of a sector and commodity market), V.P. Tret'yak (2001) (developed analysis techniques of sector markets, assessment of efficiency and work of sector markets), J. Tabor (2007) (studied the influence of the technological potential on the product innovativeness), A. Pachura (2015) (carried out an assessment of innovative capacity of business entities in the context of globalization technologies), etc.

The use of methods of analysis of the sector markets organization for purposes of making decisions about the introduction of the innovative product into the market in this research is not possible, because they do not pay enough attention to the study of demand conditions. Nevertheless, they provide an opportunity to get an idea about a place and a role of individual firms in the economy, and they also allow exploring the behavior of competing firms in the external environment, which is very important when making strategic decisions.

Specific methods of analysis of the sector market organization find their application on the level of functioning of individual companies in the framework of the external environment analysis, ensuring the solution of such important issues as: identification of the market borders, analysis of factors which determine its structure, the assessment of the concentration level of producers (sellers), the study of sector barriers of market entry and exit.

As a result of this analytical research a company as a market entity can adequately assess the external environment, it can identify distribution of forces in competition and it can work out main directions for the creation and development of competitive strengths.

Analysis techniques based on the second of these methodological approaches to the analysis of the external environment (market analysis) include a group of methods aimed at the needs of consumers, the state of demand and prevailing market conditions. Marketing analysis is carried out in order to prepare information about the state of a sector market to develop tactics and strategy of marketing activities, ensuring the achievement of aims of an economic entity on the basis of satisfaction of consumer needs. Those who use the results of such analysis are mostly managers who develop marketing strategy and marketing policy of a company.

The majority of modern suggested methods of the external environment analysis based on a marketing approach includes analysis tools that use mainly qualitative assessment of environmental factors (matrix and expert methods: portfolio analysis methods, SWOT-analysis, PEST-analysis, model "5 forces of M. Porter", analysis on the model "4P" etc.). Among their disadvantages there is a high degree of subjectivity in the selection of evaluation criteria, as a result of which the quality

and reliability of the results of such analysis are highly dependent on the skills and professionalism of the analyst.

Improvement of marketing analysis methods was studied by A.I. Kovaleva and V.V. Voilenko (2006). Studies of major groups of competing forces that can have an impact on the company were carried out by M. Porter (Porter et al., 2007). A great contribution to the development of theoretical and methodological aspects and recommendations in the field of marketing research has made by Zh.-Zh. Lamben, R. Chumpitas and I. Shuling (2010). A model of formation of an information base to ensure marketing activities was developed by B.E. Tokorev (2013), N. Torugsa and A. Arundel (2016) studied the development of analysis tools of various factors in the innovation sphere, etc.

Thus, it should be stated, that today there is no method of analysis, which would provide a complex study of various aspects of the external environment of the company-innovator, when making a decision about the commercialization of innovations and introduction of the innovative product into the market (innovation implementation).

### **Research Methodology**

The suggested method of the external environment analysis is designed for innovative companies that plan on the introduction of the innovative product into the market.

The selection of specific methods of analysis in these conditions needs to be carried out taking into account the type of the implemented innovation. Such selection of methods of the external environment analysis considering the type of innovation helps to reduce time and cost expenses for carrying out analytical procedures, ensuring a focus of attention of a manager on the most important key aspects of the external environment.

According to "Oslo Manual" – the international standard is presented in the measurement and interpretation of data science - technology - and innovation – applied, under an innovation one understands "*...the introduction into the use of any new or significantly improved product (goods or service) or process, new marketing method or a new organizational method in business practices, in workplace organization or in external relations*" (OECD and Eurostat, 2005). "Oslo Manual" distinguishes main "characteristics of innovations":

- 1) Product, process, marketing method or organization method must be new (or significantly improved) for a firm activity ("the minimum characteristic of innovations" (OECD and Eurostat, 2005),
- 2) Innovation has to be implemented (introduced into the market or used in the activities of a company) (the «common characteristic of innovation" (OECD and Eurostat, 2005).

According to the International standard classification, innovations, by their scope of application, are recommended to divide into 4 groups: product, process, marketing and organizational. In their turn, the first and the second type

of innovation, which are in the previous, the 2nd edition of this document is known as "technological innovation", are classified according to their degree of newness in "new" ("basic innovations") and in "those that are aimed at improvement". According to the "Law of increasing the degree of ideality of a system", the development of systems of any nature is aimed at the pursuit of an increase of system ideality (Altshuller, 1979). A measure of system ideality (ideality coefficient) can be presented as a ratio of aggregate functions to the set of expenses of their realization:

$$\uparrow C_{ID} = \frac{\uparrow \Sigma \text{Function}}{\downarrow \Sigma \text{Expenses}} \quad (1)$$

Increasing ideality of the system is achieved by the increment of the functions of the original system and/or by the reduction of the cost of its reproduction.

The purpose of the innovation implementation (relative to a company-innovator) in "Oslo Manual" is assumed to be: increasing efficiency of a company and obtaining market advantages (OECD and Eurostat, 2005). It follows that any innovation is aimed at increasing the ideality degree of the system:

$$\uparrow C_{ID} = \frac{\uparrow \Sigma CP + \uparrow \Sigma M}{\downarrow \Sigma E} \quad (2)$$

Where:

$\Sigma CP$  – aggregate consumer properties (functional characteristics) of the product,  
 $\Sigma M$  – aggregate characteristics of the "marketing environment" (Under the term "characteristics of marketing environment" one can understand such product features that make it appealing: image making, brand formation, service organization before and after its purchasing, formation of a public opinion and creation of customers' satisfaction from the purchase and the use of this product, etc (Bagiev et al., 2007)),

$\Sigma E$  – total expenses (resources).

Thus, an innovation occurs when an innovative change provides improved properties in the following areas:

- 1) Change in the direction of improving: consumer properties of a product (product innovations) and/or improvement of the so-called "characteristics of the marketing environment", (it is referred to marketing innovations that do not improve technical - performance characteristics of the original product, but they are able to increase its importance in the eyes of a consumer; in some innovation classifications, innovations of this type are referred to "pseudo-innovations", because they improve only the form or appearance (perception) of a product but not its contents (for example, this perception of marketing innovation occurs in the classification of G. Mensch (1979) and in the classification of F. Betz (1987));
- 2) Reduction in expenses or aggregate resources required for the production or use of a product (process and organizational innovation).

Thus, one can distinguish another important feature of an innovation that is not mentioned in "Oslo Manual": an innovation which is aimed at enhancing operational efficiency by the use of a new product (in comparison with analogues) or an improved product (compared with the original product); as a result, an innovative product acquires a competitive advantage.

This increase is manifested in the improvement of technology, in the increase of product utility, reducing expenses, saving resources and etc., and it is "a source of market advantage" of a firm.

The developed "innovation model" has provided the basis for setting priority areas for the external environment analysis and for selection of appropriate tools (methods of analysis), taking into account peculiarities of an innovative product (Table 1); and it can be useful to those who are responsible for decision-making in the field of innovation commercialization.

**Table 1. Priority areas of the external and internal environment analysis of a company-innovator, depending on a type of implemented innovations**

	Type of innovation		Investigated elements of a sector market				Priority areas of analysis		
	according to the field of application	according to the degree of newness	Product	Buyer	Compe-titors	Company-innovator			
C <sub>ID</sub> =	↑CP	Product innovation	Basic	+	+	+	-	I	
			Improving	+	+	-	-	II	
	↑M	Marketing innovation	-	+	+	+	-	III	
	↓E	Process innovation	Basic	-	+	+	+	+	IV
			Improving	-	-	-	+	+	V
	↓E	Organiza-tion innovation	-	-	-	+	+	+	V

*I - Establishment of sector market boarders; demand analysis; analysis of consumer needs; market analysis; supply analysis (competitive environment)*

*II - Demand analysis; analysis of consumer needs; competitiveness assessment of an innovative product; monitoring of the current state of a sector market (macro environment)*

*III - Demand analysis; analysis of consumer needs; market analysis; analysis of the expected impact of marketing innovations on the demand, analysis of competitors' marketing tools; comparative analysis of competitive advantages; supply analysis based on quantitative methods*

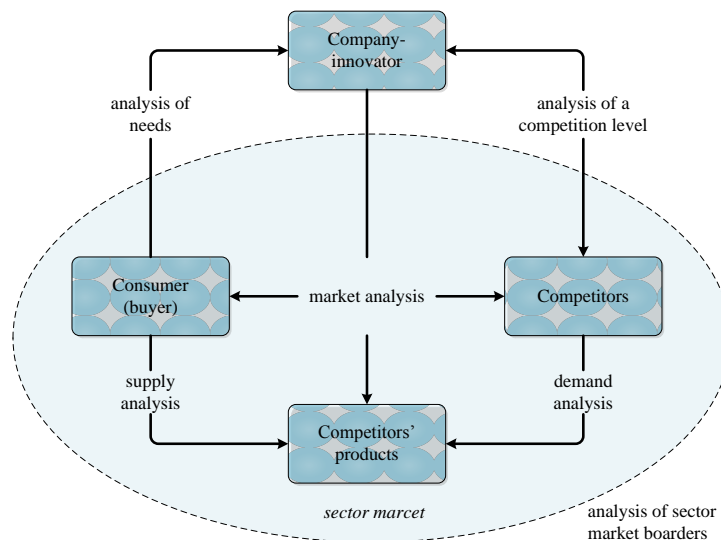
*IV - Analysis of consumer needs; price analysis and price policies of competitors; analysis of technologies used by competitors; comparative analysis of competitive advantages; analysis of the internal environment*

*V - Comparative analysis of competitive advantages; analysis of the internal environment*

The boxes that are highlighted and marked with "+" indicated those aspects that are of a particular interests of a manager of the company-innovator.

In order to implement a basic product innovation it requires holding a complex external environment analysis which in the process of the study of a current sector market situation presupposes to provide information for making management decisions. When implementing other types of innovation, methods are of selective nature, and the choice is being made taking into account challenges faced by those who are responsible for implementation of these innovations. If the company-innovator introduces a basic product innovation into the market, then the market appears to be new and unknown. The company - innovator cannot be yet considered as an entity of this market because there is no such company in this market yet. In this case, at the initial stage of analysis it is required to establish borders of a sector market in order to identify a group of consumers interested in the product, and competitors with which the company - innovator will be forced to compete.

The objects of the research are: consumers with their needs, the criteria of the demand for competitors' products, competitors and their abilities, current market conditions. Thus, the choice of analysis methods will be done based on the following priority areas of analysis: defining the borders of a sector market, demand analysis, needs analysis, supply analysis (competitive environment), market analysis (Figure 1).



**Figure 1. Priority areas of the external environment analysis when implementing basic food innovations**

When introducing a new improved product into the market, the company-innovator is a participant in a sector market. Managers of the company know main participants of this market (customers with their needs and main competitors). In this analysis the degree of customer satisfaction and the study of some



characteristics of products demand produced by a company present an opportunity to identify possible directions of improvement for a market product.

As a result of the implementation of these improvements, the company-innovator develops a "food-enhancing innovation".

When making a decision concerning the commercialization of this innovation it appears to be necessary to assess the competitiveness of the innovative product in the course of its comparison with products of competitors; to distribute a sample consignment of an innovative product in order to test and explore reactions to changes in demand from consumers (re-analysis of the needs and demand analysis). In addition, taking into account the dynamism of changes that happen in the external environment, managers of the company-innovator are highly recommended to perform regular monitoring of the current state of a sector market. One should pay attention to the fact when implementing process and organization innovations the internal environment analysis of the company-innovator becomes very important along with the external environment analysis.

Thus, the described technique to select priority areas of environmental analysis and determine the list of recommended group methods of such analysis according to the type of the implemented innovation may be recommended to managers of innovative companies when preparing data for making a decision aimed at introduction of an innovative product into the market (innovation implementation).

### **Results**

The results of this work are the developed model of innovation, the technique of methods selection of the external environment analysis for innovative companies taking into consideration the type of implemented innovations.

These tools can be used in preparing data about a sector market state for the purposes of making decisions aimed at developing an innovative product (innovation implementation).

### **Discussion**

Today suggested methods of the external environment analysis that are used as a decision-making tool aimed at introduction of innovative product into the market (innovation implementation) do not take into account types of implemented innovations. The suggested technique of setting priority directions and methods of the external environment analysis, in the contrast, is formed on the basis of implemented innovation peculiarities account.

For further development of the suggested method it is necessary to form a catalogue of methods of the external environment analysis, which is systematized according to the four selected units of analysis: establishment of borders of a sector market which is subject to study; demand analysis; supply analysis (analysis of the competitive environment); analysis of the market situation (balance between supply and demand).



## Conclusion

The authors suggested the technique of setting priority directions of the external environment analysis and of establishment of specific methods of analysis depending on the type of innovation can be useful for entrepreneurs who plan introduction of innovative product into the market, for managers of innovative companies and people who are responsible for making decisions related to the commercialization of innovation.

## Summary

In order to reduce the risk of uncertainty accompanying the process of implementation the prior external environment analysis of the company-innovator is required. The literature review shows that the international community has developed two main methodological approaches to the external environment analysis: analysis of a sector markets organization (Industrial Organization) and marketing analysis (Marketing Analysis). The first approach studies the external environment from the point of view of the offer (manufacturer/seller), the second approach studies the external environment from a demand perspective (consumer). Thus, these techniques do not provide a comprehensive study of various aspects of the external environment of the company-innovator when deciding on the innovation commercialization and the introduction of the innovative product into the market (innovation implementation).

Besides, the selection of priority areas and specific methods of analysis should be carried out taking into consideration the type of innovation which allows reducing time and expenses costs for carrying out analytical procedures providing high quality analysis due to the concentration of managers on the most important key aspects of the external environment. The information which is collected in the result of this analysis and which contains only necessary data facilitates the process of formulating rational management decisions, increasing the success of innovation implement. The suggested method of selection of priority areas of the external environment analysis of the company-innovator taking into account the type of the introduced innovations provides a comprehensive solution to these problems.

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### PRIORYTETOWE OBSZARY ANALIZY ZEWNĘTRZNEGO ŚRODOWISKA FIRMY-INNOWATORA W ZALEŻNOŚCI OD RODZAJU WPROWADZONYCH INNOWACJI

**Streszczenie:** Przy podejmowaniu decyzji o wprowadzeniu innowacyjnego produktu na rynek, konieczne jest wzięcie pod uwagę sytuacji na rynku, ponieważ wyjątkowość innowacji nie gwarantuje sukcesu komercyjnego produktu innowacyjnego, niewystarczające uwzględnienie czynników środowiska zewnętrznego może podważyć wszystkie wysiłki dotyczące jego promowania na rynku. Skutecznym narzędziem służącym do zmniejszania ryzyka niepewności jest wstępna analiza otoczenia zewnętrznego, która jest przeprowadzana przez spółkę-innowatora przy podejmowaniu decyzji dotyczących komercjalizacji innowacji oraz wprowadzenia innowacyjnego produktu na rynek. W artykule opracowana i zaproponowana została metoda mająca na celu ustalenie priorytetów i specyficznych metod analizy otoczenia zewnętrznego firmy-innowatora, która

jest zainteresowana komercjalizacją innowacji różnego typu. Wyniki pracy są rozwiniętym modelem innowacji, zaproponowano technikę doboru metod analizy sektora rynku (biorąc pod uwagę rodzaj wdrożonych innowacji), które mogą być wykorzystane przy przygotowaniu danych o otoczeniu zewnętrznym firmy-innowatora dla celów podejmowania decyzji mających na celu wprowadzenie innowacyjnego produktu na rynek (implementacja innowacji).

**Słowa kluczowe:** produkt innowacji, oznaki innowacji, wdrażanie innowacji, metody analizy otoczenia zewnętrznego

### 外部環境，創新者分析優先領域根據類型引種創新

**摘要：**在做決定時對引進創新的產品進入市場，必須要考慮到的情況在該領域的市場，因為在創新的獨特性並不能保證創新產品的商業成功，因為給予充分考慮的因素外部環境可以否定進入市場的推廣所作的一切努力。減少不確定性風險的有效工具，是由一個公司的創新使得關於創新的商業化，並推出創新的產品進入市場的決定時所進行的外部環境進行了初步分析。

在文章的方法已編制完成，並建議旨在確定優先事項和一個公司的創新，這是有興趣的各類創新商業化的外部環境分析的具體方法。這種工作的結果是創新的發達模型和扇區市場分析的方法的選擇的（考慮到實現創新的類型）所建議的技術，其可以在製備約公司創新狀態的外部環境中的數據被用於製作旨在推出創新產品進入市場（創新實現）決定的目的。

**關鍵詞：**創新的產品，創新的跡象，創新實施，外部環境分析方法