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ANALYSIS OF METHODS OF DETERMINATION OF PRODUCT COMPETITIVENESS OF AUTOMOTIVE ENTERPRISES

In the article the analysis of existing approaches for determination of the competitiveness of industrial products was performed. The specific structure of the concept of "competitiveness of automobile enterprises products" was characterized. A theoretical aspect of defining the essence of competitive significance was analyzed. Methods for determining the competitiveness that are most effective for the automotive industry were classified. The author determined the main principles which have to be met for method of determining the competitiveness of products of this industry and the main directions of the problems that have not been studied before, but are important for modern competition in the automotive market of Ukraine.

Keywords: competitiveness of products, automobile industry, automobile market, consumer characteristics of the goods, the strength of the brand.

Том'юк О.Я. АНАЛІЗ МЕТОДІВ ВИЗНАЧЕННЯ КОНКУРЕНТОСПРОМОЖНОСТІ ПРОДУКЦІЇ АВТОМОБІЛЕБУДІВНИХ ПІДПРИЄМСТВ

У статті проведено аналіз існуючих підходів для визначення конкурентоспроможності продукції промислових підприємств. Охарактеризовано специфіку структури самого поняття «конкурентоспроможність продукції автомобілебудівних підприємств». Проаналізовано теоретичні аспекти визначення сутності значення «конкурентоспроможність». Здійснено класифікацію методів визначення конкурентоспроможності, які є найбільш ефективними для автомобілебудівної галузі. Визначено основні принципи, яким має відповідати методика визначення конкурентоспроможності продукції даної галузі, та основні напрямки даної проблематики, які не досліджувалися раніше, але є актуальними для сучасної конкурентної боротьби на автомобільному ринку України.

Ключові слова: конкурентоспроможність продукції, автомобілебудівна галузь, автомобільний ринок, споживчі характеристики товару, сила бренду.

Томьюк О.Я. АНАЛИЗ МЕТОДОВ ОПРЕДЕЛЕНИЯ КОНКУРЕНТОСПОСОБНОСТИ ПРОДУКЦИИ АВТОМОБИЛЕСТРОИТЕЛЬНЫХ ПРЕДПРИЯТИЙ

В статье проведен анализ существующих подходов для определения конкурентоспособности продукции промышленных предприятий. Дана характеристика специфики структуры самого понятия «конкурентоспособность продукции автомобилестроительных предприятий». Проанализированы теоретические аспекты определения сущности значения «конкурентоспособность». Осуществлена классификация методов определения конкурентоспособности, которые являются наиболее эффективными для автомобилестроительной отрасли. Определены основные принципы, которым должна соответствовать методика определения конкурентоспособности продукции данной отрасли, и основные направления данной проблематики, которые не исследовались ранее, но являются актуальными для современной конкурентной борьбы на автомобильном рынке Украины.

Ключевые слова: конкурентоспособность продукции, автомобилестроительная отрасль, автомобильный рынок, потребительские характеристики товара, сила бренда.

Statement of the problem in general. The concept of competitiveness of automobile enterprises is strongly associated with quality of products and its value for the customer. Quality is a characteristic of the goods, indicating the suitability of the product to meet the needs (criteria) of the consumer, but apart from this, it is necessary to highlight the characteristics and level of completeness to meet this need from the consumption of the product. In other words, the concept of quality and customer value is related, because both of them from different aspects allow characterizing the suitability of products to meet the needs of the consumer.

On the other hand, consumers during the process of assessment of the competitiveness of the product, evaluate the product in accordance to the acceptability in terms of its costs, which in its turn characterize the economic component of competitiveness of the product. In this case, it is important to highlight the structural nature of the economic component of competitive products. For some products a qualitative component is shown only during long-term usage, resulting in additional financial expenses in addition to the cost of buying the product itself. Therefore, please note that the economic component of competitiveness, which has a significant impact on consumer conventionally consists of nominal prices and price of its operation, which together may indicate the real cost of production.

In order to determine the nature and components of competitiveness of automotive enterprise products it will require preforming analysis of the general concept of competitiveness and highlight of the main principles that form its essence. In addition, it should be a detailed analysis what influences the formation of high-quality components, and what will influence on the formation of economic competitiveness in the provision of motor vehicles on the market. It is important to analyze whether there are additional components that have a significant impact on customer value of the car, or on the price.

Analysis of recent research and publications. The subject of definition of competitiveness following domestic and foreign scientists were involved: Alstrend B., A. Gluhov, E. Hrebnev, M. Dolinskay, O. Zahoryanska, A. Zulkarnaev, L. Ilyasova, O. Kuzmenko, O. Kuzmin, A. Larka, J. Lempel, I. Lifts, A. Mazaraki, O. Melnyk, D. Novikov, V. Orlova, D. Psheslinskyy, O. Romanko, I. Smolin, M. Sokol, N. Chukhray, O. Yurynets and others. However, in this study, special attention is paid to definition of competitiveness of automobile enterprises, which are technologically complex products, and therefore the analysis of its market position requires a detailed study of all the existing approaches and determination of optimal approach according to its structure.

Formulation of objectives. In the process of ensuring of competitiveness of automobile enterprises is necessary to analyze all possible methods of its determination, because it allows you to select the most effective way, which would allow to take into account the maximum number of factors that are most important for competitiveness of consumer vehicles.

The main material. Researchers from various scientific fields interpret the concept of "competitiveness of products" in different ways making a start from both customer value and technological point of view. Table 1 shows the basic interpretation of the term "competitive product" by foreign and domestic scientists.

Scientists M. Dolynska I. Solovyov offering to understood competitiveness of products as "characteristics of products that reflect its difference from competitors' products as the level of matching to the specific needs and cost to meet it» [10, p. 11]. It is necessary to formulate the nature and to determine components of competitiveness of automobile enterprises in the research.

1. Competitiveness of automotive products should be defined only within the closest identified criteria of competitive products. At this stage, should be identified a list of criteria that would correspond to a set of factors that are critical to a particular "user profile". Under user profile is important to understand the sum of features of the target audience of consumers that characterize a particular set of needs, lifestyle, behavior, principles of moral and ethical principles, way of life, financial capacity and outstanding features of customers.

2. Competitiveness of automobile enterprises, as any other commodity has two main components: quality and cost. Defining quality component requires analysis of the performance of the car, which can be divided into three groups: directly proportional to customer value , inversely proportional to customer value, and neutral. The importance of separation of following characteristics is that the technical evaluation of each parameter must consider its effect on the competitiveness of the car. The analysis of each parameter must be adjusted to the weight of the parameter. Thus, the mathematical

definition of these indicators can be expressed by the form.1.

$$I_{TP} = \sum_{1}^{n} \frac{P_i}{P_{i\,0}} * a_i. \tag{1}$$

Where I_{TP}- is a group indicator of technical component of competitive products, P_i – value of ith parameter of technical indicators for analysis of the object, $P_{(i0)}$ – value of ith parameter of technical indicators for a competitive product, a_i – weight of ith parameter of technical indicators for the profile of the consumer, n – number of technical indicators, which are involved in the assessment of quality (technical for cars) component of competitiveness [10, p. 17-19].

3. Economic component of the competitiveness of automobile enterprises contains many components, but has two main, the first of which is one of the most important factors influencing the decision to purchase: 1. Ultimate nominal price; 2. Consumption (running) costs.

4. Automotive market is characterized by small segments that is deepening and the appearance of new car brands and models, new classes and sub-classes of vehicles, and this in turn intensifies competition. The issue of ensuring the competitiveness of today should be studied in particular detail in the context of a specific industry, because it may be that this indicator is affected not only by the generally qualitative and economic components, but also other important components.

Scientists O. Kuzmin, Melnyk O. and O. Romanko propose to include economic (price), marketing and consumer settings in the process of determining the competitiveness of engineering products. Consumer options offered divided into "hard" (technical, operational, resource saving, regulatory, procedural and ergonomic) and "soft" parameters (aesthetic) [11, p.136-138].

The strength of the brand is formed as a result of previous attempts of the consumers or members of his entourage or experts whom he trusts, but this should be included and marketing efforts for the promotion. The marketing aspect can be divided into image tools, and urgent.

Table 1

Analysis of the interpretation of the term "competitiveness of product"

Author	Definition
H. Mintzberg	«Competitiveness – the ability of an object withstand the struggle for achieving the highest benefits, advantages» [1, p.249]
A. Mazaraki, D. Psheslinskyy, I. Smolin	«Competitiveness – this is the place of the product in its understanding of consumers against competitors» [2, p. 121]
I. Tatarenko, M. Vlasova-Zaharchenko	«Competitiveness of the product – a set of consumer qualities of the product that ensure its ability to meet any need, compared with counterparts in a particular market at a particular time» [3. p.58]
A. Azriliyan	«Competitiveness – is a feature of product, service, subject of market relations to perform on par with similar products, services or subjects of market relations that are present on the market» [4. p. 338]
S. Mocherny	«The competitiveness of the product – a consumer characteristics of goods (services) that differentiate it from competing products in terms of their compliance to specific needs, requirements of a competitive market, taking into account costs to meet them» [5. p. 813]
I. Bulyeyev	«Competitiveness of the products can be defined as a set of indicators that provide development, production, sales and after-sales service of goods with the aim of satisfying consumer demand and obtaining the target enterprise profit» [6, p. 77-78]
V. Andreychuk	«Competitiveness of Ukrainian products determines the competitiveness of enterprises and in its turn the state's economy in general » [7, p. 90-92]
A. Larka	«The competitiveness of the product – a set of technical, economic and marketing characteristics of the product that can satisfy the requirements of customers in a particular market conditions and the particular time» [8, p.7]
A. Zahoryanska	«Competitiveness of production – is its ability to stay ahead of competitors' performance on a separate segment of the market thanks to the rational quality and established by additional competitive advantages of the producers » [9, p. 5]

Analyzing the specific structure of the competitiveness of automotive products, we determined its three main components: quality (technical parameters), economic (the nominal price and the price of consumption), marketing component and the strength of the brand. According to this structure should be determined which of the existing methods for the determination and calculation competitiveness can be effective for a given product in the industry. There are three groups of methods that are effective for determining the competitiveness of automobile enterprises [13, p. 83-88; 14, p. 106-107;15, p. 145-158;16, p. 25-38; 17, p. 60; 18, p. 349-350]:

1. Classical, involving the use of mathematical approaches in terms of competitiveness indicators;

2. Graphical that provide a visual interpretation of a wide range of group criteria pillars of competitiveness;

3. Specific, involving analytical methods and qualitative research that are not concise mathematical or graphical expression.

Each of classic methods can be divided into differentiated, complex and mixed, depending on the indicators used in the analysis. Mathematical approaches of using these methods are presented in Table 2.

Table 2

Mathematical expressions for methods for determining the competitiveness classified by comparison base

	Method of comparison with targeted model	Method of comparison with competitors	Method of comparison with the nominal model
Differentiated	$q_i = \dfrac{P_i}{P_{i\,aim}}$	$q_i = \dfrac{P_i}{P_j}$	$q_i = \dfrac{P_i}{P_{i\,0}}$
On the basis of average quality indicators	$P = \sum\limits_{1}^{n} \dfrac{P_i}{P_{i\,aim}} * a_i$	$P = \sum\limits_{1}^{n} \dfrac{P_i}{P_j} * a_i$	$P = \sum\limits_{1}^{n} \dfrac{P_i}{P_{i\,0}} * a_i$

Source: [10; 14]

Where q_i − relative unit of i-th parameter of competitiveness of production, P_i − value of i-th indicator of quality of these products, $P_{i\,aim}$ − value of ith indicator quality of a target (reference) sample, P_j − value of i-th indicator of quality of competitive product, $P_{i\,0}$ − value of i-th indicator of quality of nominal sample, a_i − weighting factor of ith indicator of product quality, P − average arithmetic index of individual quality products.

Using a method based on the weighted average quality indicators is more informative, as it allows estimating the parameters according to consumer profile. Weight ratio and first rate quality products is the largest settlement, which is given in equation 3.

$$a_i = \frac{\sum_{i=1}^{N} a_i}{N} * B, \sum_{i=1}^{N} a_i = 1 .\qquad(3)$$

Where a_i- ratio of weight of i-th quality of products, N − number of experts, B − the total number of points assigned by experts to assess weight indicators [14].

Differentiated method involves comparing the total aggregate individual indicators that has rather general character and does not give specific results regarding the strengths and weaknesses of the product.

In the works and scientific developments mentioned that product competitiveness is calculated on the basis, ie the ratio of quality and cost competitiveness component [19, p.282; 20, p. 136].

Both of these methods include determining the quality component in the calculation of the integral index of competitiveness of products which is given in the following formula 4.

$$K_{int} = I_q * \frac{S_0}{S_j} .\qquad(4)$$

Where K_{int} − integral indicator of the competitiveness of products, I_q − relative indicator of product quality, S_0 − price of the basic product samples, S_j − cost of evaluated product samples.

Some scientists in the process of calculation of the integral index of competitiveness propose to use weighted arithmetic mean or geometric indicator of individual settings, adjust the competitiveness index for relative index of share of the product in total sales, to determine the relative index of product weight factors of specific parameter and comparative factor the presence of this parameter to the economic component competitiveness, etc. [17, p. 56-59; 21, p. 33-39; 22, p. 17-27; 23, p. 83-84].

An effective approach in evaluating the competitiveness of products offered in their research scientists S. Panin And V. Statiyev (equation 5).

$$K = \frac{q_0 * p_0 + E_v}{p_s + Exp_p + Exp_{0p} - U} .\qquad(5)$$

Where q_0 − output of products from unit of raw material, p_0 − the price of the main product, E_v − economic impact of recycling, p_s − unit price of raw materials, Exp_p − production costs, Exp_{0p} − costs of not production character, − relative economic effects of waste disposal per unit of raw material [24].

This method is used to evaluate raw materials, as well as, automotive products are technologically complex goods production of which consists mainly in the preparation then this method can calculate the same components of the car at stage of elaboration and manufacture of automotive products.

The second group of methods for determining the competitiveness of products includes graphics that allow you to visually display the results of mathematical computations and calculations. For automotive products effective and easiest to use is the method of constructing the polygon method.

To the Ghraphical techniques commonly used for analysis of automobile industry refers polygon method that is development of modern domestic scientists, and received a number of interpretations and improvements.

The method of constructing the polygon is convenient to analyze the competitiveness of automotive products through a quick definition to the technical characteristics which are the driver in ensuring quality indicator component of competitiveness, which formed in such way that analysts can easily determine what action should be taken to improve this indicator.

The third group of methods for determining the of competitiveness differs from the previous two in that the mathematical or graphical interpretation of the results is based on primary data collection or expert estimates, their generalization, grouping, evaluating, analyzing and final calculation.

Some researchers suggest using the method of "ideal point", which involves an analysis of performance of those products, which according to experts or consumers have a low level of competitiveness compared to the market leader, which is perceived by the "perfect sample" (equation 6).

$$A_0 = \sum_{i=1}^{n} R_i * (I_{max} - I_i).\qquad(6)$$

Where A_0 – mathematical value of attitude of experts to the product, R_i – share of the presence of analyzed indicator in this product, I_{max} – assessment of i-th indicator for the "ideal" model, I_i – assessment of i-th indicator for analyzed product.

However, for automobiles it is appropriate to use the classic mathematical methods based on the weighted average. The method should be chosen from methods, which are grouped depending on the baseline for comparison, and it would be comparison with competitive products method, by type of performance, it should be evaluation related to mixed-mode, which is a combination of integrated and individual performance. In terms of changes in competitiveness indicators proposed to use the dynamic method, the method of determining the level of quality is a complex, depending on the stage of readiness of the product – in progress.

Conclusions. It is important to bear in mind that automotive products are technologically complex and its competitiveness largely depends on the structure and condition of the market, the dynamics of market structure and competitive group. Determining the competitiveness of products depends on the accuracy of selection of base of comparison, which is determination of belonging to the class, price range, a set of configuration and other technical features. Therefore, the approach in determining the competitiveness of automobile enterprises must include a set of some of the above methods, as well as being supplemented by the principles of selection of database of comparison and prioritization of criteria that will objectively determine the weight of each.

The further researches will allow the development of process of analysis of product competitiveness that includes development of approach to create a database to determine the competitiveness, methods of definition and identifying ways to improve it in order to strengthen market positions. Conducted analysis of existing approaches to determination of competitiveness allows us to offer approach, which will take into account the technological features of the product, consumer behavior and the competitive environment.

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