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INFORMATION MAINTAINING OF ENTERPRISE COMPETITIVENESS MANAGEMENT SYSTEM

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Abstract

In order to make effective managerial decisions in the conditions of a dynamic development of a market economy, an enterprise needs an appropriate information support system that reflects the current economic situation objectively. Currently, the topic is relevant, since good information support is not only the key to the success and competitiveness of the company, but it also sometimes acts as a means of survival in a competitive environment.

Keywords

Information – Evaluation – Competitiveness

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Introduction

Management information maintaining is the transfer of enterprise information systems and the management process as a whole. It can be considered not only as a whole for calculating all the management functions, but also for individual tasks of functional management, such as forecasting and planning, accounting and analysis. It allows you to obscure the key points of the functional information management, revealing its common functions.

In modern conditions, information security is an important area; it consists in the collection and processing of information necessary for making reasonable management decisions.

The transfer of information about the position and activities of the company to the highest level of management and the mutual exchange of information between all interconnected divisions of the company is based on modern computer technologies and other technical means of communication¹.

The scientific literature contains the idea of the need in a systematic and integrated approach to maintenance of various aspects of the problem of managing the competitiveness of business structures.

Proposed methodology

It should be noted that the entire process of transmitting information moves in one direction and passes through a large number of intermediaries, which means that during the transmission of information it is late and distorted. Information also has the ability to transform depending on who it is addressed to. Let us give an example, when information is transferred upward from subordinates to the head, then generalization occurs, and if the transfer is directed downward from the head to subordinates, then it is concretized.

It is important that the maximum information transfer rate would be with the minimum allowable distortion in this process. The correct decision-making depends on this process, which as a result will increase the profit of the organization².

In the management process, information is always exchanged. And by the way, the direction of information flow is vertical, that is, from the head to subordinates or vice versa, and horizontal, that is, between the heads of divisions and subordinates of the same level.

The effectiveness of management decisions is indicated by one of the indicators:

- market position;
- highly professional subordinates;

¹ I. A. Kiseleva; I. S. Lebedeva; Gasparian; M. S.; Karmanov; M. V. y Kuznetsov, V.I., "Modeling the Activities of Internet Companies by Using Innovative Processes", International Journal of Innovative Technology and Exploring Engineering Vol: 8 num 11 (2019): 2506-2514.

² S. I. Dolgov; Yu. A. Savinov; E. V. Taranovskaya; V. D. Sekerin y A. E. Gorokhova, "Developing the Exports of Russian Goods and Services through Online Stores", International Journal of Innovative Technology and Exploring Engineering Vol: 8 num 5 (2019): 981-986.

- knowledge, experience and personal qualities of a leader;
- quality, reliability and timeliness of information.

Therefore, it is necessary not only to have timely information, but also accurate, as well as to be able to understand it and draw the right conclusions and effectively implement it into managerial decisions. It follows that information is an integral base of the entire management process.

The analysis of information is not limited exclusively to financial and economic data, but extensively uses technological, scientific, technical, industrial and other information. It should be noted that an important role in the use of information is played by the methods of its registration, transmission, accumulation and processing, as well as the systematic storage and delivery of information in the required form; production of new numerical, graphic and other information³. In practice, work with information in organizations in most cases is carried out without creating information maintenance services. And often part of the functions on working with information is performed by employees of other departments.

The process of working with information containing storage, processing, collection, analysis and dissemination of information is continuous. There are such stages of the process that receive little attention, and certain types of work are duplicated. The interaction of all departments of the organization on working with information is not provided. Therefore, in the case when the enterprise does not have an information maintenance service, some of the problems of information maintenance cannot be solved.

Analysis of the enterprise competitiveness management system has certain features and objectives:

1) Assessment of competitiveness, this definition of the enterprise competitiveness index, is the starting point for organizing all industrial and economic activities in a market economy.

2) The study of competitiveness should be carried out constantly and systematically, at all stages. This approach will allow you to make the necessary decision on changes in the range of services in time. It is always necessary to search for new markets or market areas. There is need in expansion and creation of new production facilities. It is necessary to provide improvement and development of new services.

3) It is necessary to assess the level of competitiveness of the enterprise, which causes the use of a number of indicators.

All these indicators show the stability of the position of the enterprise, the ability to provide services that are in demand among consumers, which ensures stable profit for the enterprise⁴.

³ B. Rogalski y P. Valentinovich, "Application of new concepts of management at the industrial enterprises of Poland", Russian management journal Vol: 3 num 3 (2005): 149-156.

⁴ A. A. Rudychev; E. A. Nikitina y A. S. Levchenko, "To the Question about Basic Directions of Enterprise Competitiveness Increase at the Branch Level", World Applied Sciences Journal Vol: 24 num 12 (2013): 1707-1710.

The purpose of the information maintenance service is to ensure the timely receipt of the maximum amount of quality information by the head and services of the enterprise they need to make reasonable decisions, develop recommendations and suggestions.

The main tasks of the information maintenance service include the following:

- 1) Improving the qualifications of employees of the organization.
- 2) The introduction of information technology.
- 3) Effective access for employees to the necessary information.
- 4) Formation of a single information space for employees using local programs⁵.

For the information maintenance service of organizations, it is necessary to determine its structure, develop documentation regulating the activities of the service such as:

- staffing table;
- job descriptions of service specialists;
- position about the service.

The effective functioning of information maintenance services will enhance the competitiveness of enterprises, especially enterprises in foreign markets. Since, due to the specifics of their activity, they need a variety of high-quality information to a greater extent than enterprises operating exclusively in the domestic market.

In our century, a personal computer has become a modern management culture. The ability to use it allows you to save huge amounts of money, which under the traditional labor system would be spent on the maintenance of various departments and perform applied functions not related to the production process⁶.

Result analysis

An enterprise that produces products that are not in demand on the market, that is, uncompetitive, cannot take a leading position and be competitive.

The development of measures to increase the competitiveness of products of an industrial enterprise should be based on the results of an analysis of the competitiveness of products. A variety of scientific approaches are used to analyze the competitiveness of products. From our point of view, a very relevant approach is a comprehensive one, involving the study of an object in the aggregate of interconnected components and taking into account all aspects of the process of increasing competitiveness.

⁵ E. D. Shchetinina; A. V. Polarus y D. U. Shchetinina, "Methodological approaches to the assessment of the communications potential of the industrial Enterprise", Bulletin of the University num 3 (2012): 133-136.

⁶ E. A. Nikitina y I. V. Shchetinina, "Assessment of the IT Business Competitiveness", International Journal of Innovative Technology and Exploring Engineering Vol: 9 num 1 (2019): 3723-3729.

Product competitiveness is one of the main elements in ensuring the overall competitiveness of an enterprise⁷.

Based on this, let's consider the proposed assessment methodology, which includes five main steps. The scheme of the proposed methodology is shown in Figure 1.

At the initial stage, the goal is formulated classically, the tasks of analysis are determined.

The second stage is based on a competitive analysis, with an assessment of market positions, the dynamics of changes in competitive positions.

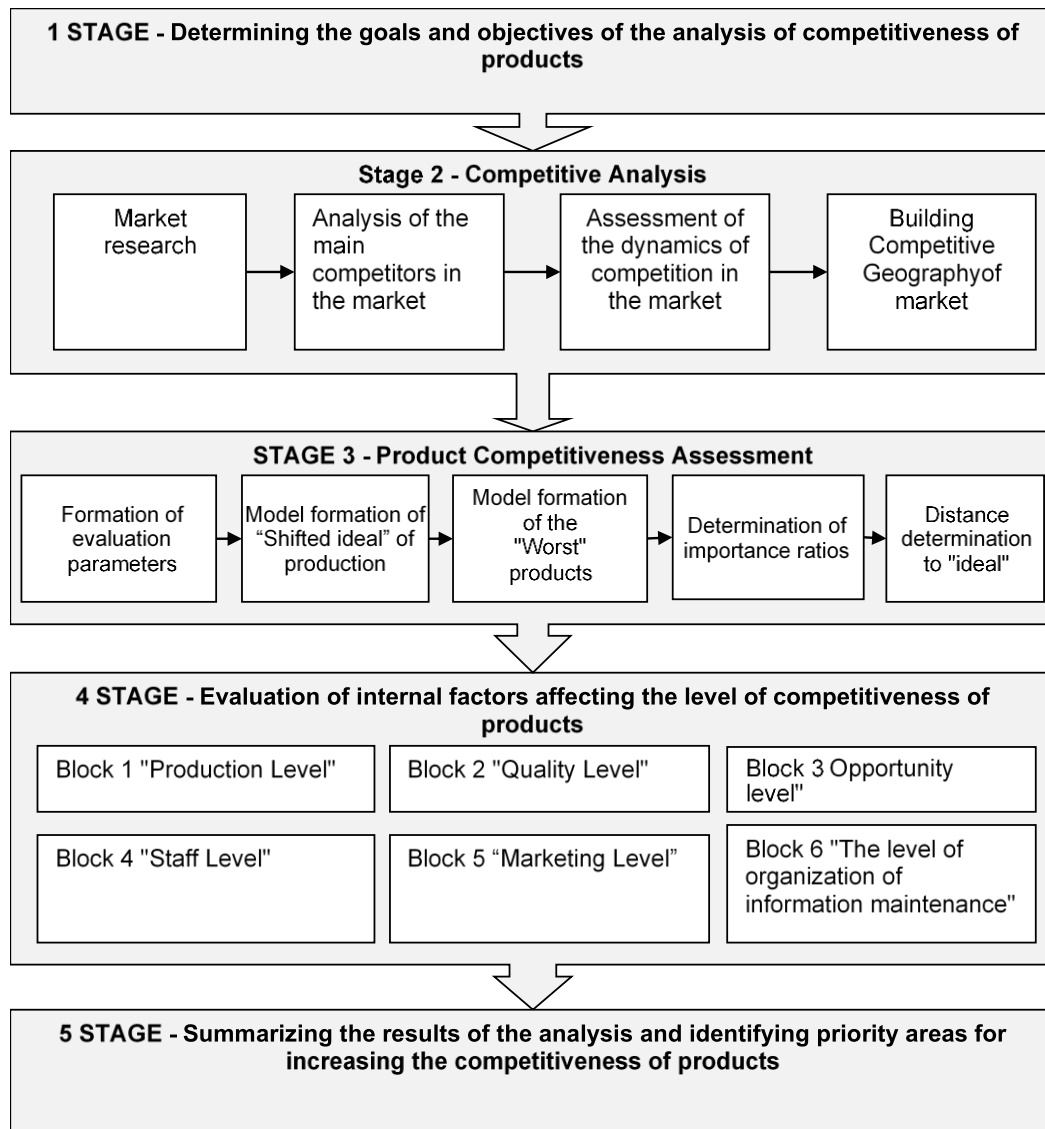


Figure 1
Scheme of a methodology for analyzing the competitiveness of enterprise products

⁷ R. S. Russell y B. W. Taylor, Operations Management: Quality and Competitiveness in a Global Environment (New York: Wiley, 2005), 832.

The second direction of competitive analysis is the analysis of the competitive structure of the industry market, which is carried out by assessing the competitive forces presented in Fig. 2.

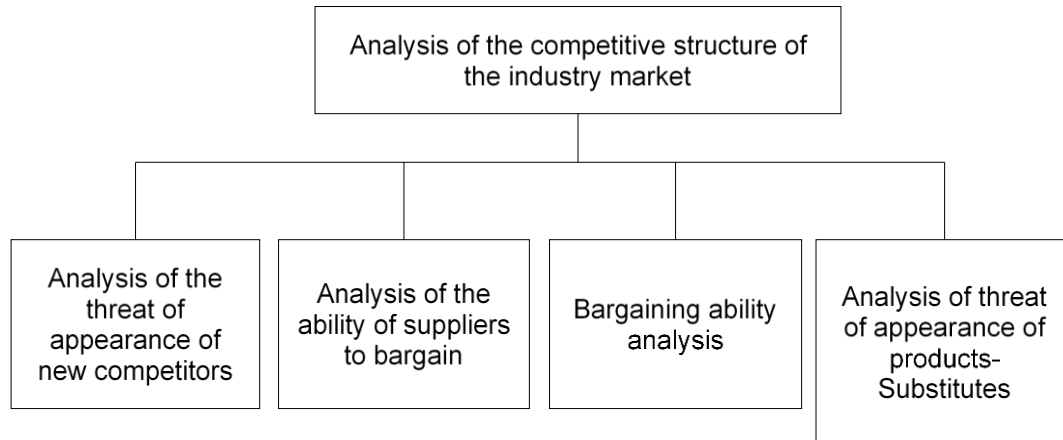


Figure 2
Directions of analysis of the competitive structure of the industry market

The indicated forces, influencing the prices set by enterprises, on the costs and volume of investments necessary for the production of products and maintaining their competitiveness at the required level, determine the profitability and attractiveness of the industry market.

Discussion

The third stage of the analysis of product competitiveness is its assessment. As a method for assessing the competitiveness of industrial enterprise products, we propose to use the “shifted ideal” method⁸.

This method belongs to the group of lexicographic methods, which are based on the assumption of the dominance of criteria and the possibility of identifying preferences.

The essence of the “shifted ideal” method is to find the distance from the object of assessment to the “ideal” object. The smaller this distance, the therefore, the object is more competitive in the market.

When solving problems by the indicated method, the criteria $\{k_1, k_2, \dots, k_m\}$ are dominated. They are ranked by importance and index 1 is assigned to the criterion that is most important. Next, the selection of objects is made according to this most important criterion. The remaining criteria $\{k_2, k_3, \dots, k_m\}$ are subject to restrictions of the following type:

$$a_2 \leq k_2 \leq b_2 ; a_m \leq k_m \leq b_m \quad (1)$$

⁸ M. E. Porter, *Competitive Advantage* (New York: The Free Press, 1998).

If any of the options in the analysis of alternatives does not meet the criteria limitations, then it is excluded from consideration. If, according to the chosen important criterion k_1 , it is not unambiguously possible to choose the optimal option $Y_{opt} = Y^* \subseteq \{Y_1, Y_2, \dots, Y_n\}$, then at the next stage, the next criterion in importance is selected, according to which the selection procedure is performed taking into account restrictions on other criteria, i.e. by k_2 etc. The procedure is repeated until the only optimal option is left in the admissible set of alternatives.

The dominance condition means that if you order the objects of assessment according to the k_1 criterion, then this order will not undergo changes when taking into account the criteria k_2, k_3, \dots, k_m , etc., i.e. criterion k_1 is so important that it outperforms other criteria.

At the first stage of the assessment, the expert group determines the list of parameters by which the competitiveness of products is assessed. This list should contain economic, regulatory, technical, marketing indicators, safety parameters, service level indicators.

At the next stage, based on the values of the parameters for evaluation, it is necessary to form a model of the "ideal" object, the values of which will be equal to the maximum values of the parameters of the evaluated product (selection criteria) according to which the profitability increases, and the minimum, the profitability of which decreases. Thus, we get an ideal object, the vector of values of which will be composed as follows:

$$Y^+ = \{k_1^+, k_2^+, \dots, k_m^+\}, \quad (2)$$

where $Y^+ \notin \{Y_1, Y_2, \dots, Y_n\}$ may not belong to the set of possible or even really existing objects.

An "ideal" object is a kind of goal, the achievement of which must be sought. An "ideal" may not be achievable and may not exist in reality, but it must be formed in order to understand the linear programming of its goals and objectives.

Next, it is necessary to create a model of the "worst" object, the values of the criteria of which will be equal to the minimum values of the parameters of the evaluated products, the profitability of which increases, and the maximum, the profitability of which decreases. Thus, the vector of values of the "worst" object is composed as follows:

$$Y^- = \{k_1^-, k_2^-, \dots, k_m^-\}. \quad (3)$$

The "ideal" and the "worst" objects form a kind of scale on which the location of products is possible from the point of view of moving away or approaching the "ideal" or "worst" object).

The criteria by which the values of the best and worst objects coincide (or differ little) can be removed from consideration, thus reducing the dimension of the criteria space.

If the values of the evaluation criteria are presented in different units of measurement, then it is advisable to switch to normalized units using the following formula:

$$Z_{ij}^l = \frac{(k_i^+ - x_{ij})}{(k_i^+ - k_i^-)}, \quad (4)$$

where x_{ij} is the current value of the i - criterion of the compared j - object;

k_i^+ is the ideal value according to the i - criterion;

k_i^- is the worst value according to the i - criterion.

The values of the criterion in relative units of Z_{ij}^l are interpreted as the distance from the object Y_j according to the criterion k_i to the ideal object.

According to the criterion under study, the “ideal” product has a distance equal to $Z_{ij}^l = 0$, and the “worst” one has $Z_{ij}^l = 1$.

At the next stage, it is necessary to determine the value of the importance ratios. To do this, the method of paired comparisons of criteria is used. If the k_i criterion is less preferable than criterion k_j , then it is assigned 0, otherwise - 1.

At the final stage, we find the distance at which each of the evaluated objects is from the “worst” one. To do this, we will use the following generalized metric:

$$L_p = \sqrt[p]{\sum_{i=1}^n \beta_i (1 - Z_{ij}^l)^p} \quad (5)$$

where β_i is the relative importance of the criteria in the form of a vector of weights, ($\sum \beta_i = 1$);

p - a certain coefficient characterizing the degree of concentration, allowing you to go to different types of metric to calculate the distance. The larger the value of the metric L , the farther the output is separated from the “worst” and, accordingly, closer to the “ideal”, i.e. the higher its competitiveness is.

The algorithm for assessing the competitiveness of products using the “shifted ideal” method is presented in Fig. 3.

At the fourth stage of the analysis, it is necessary to assess the internal factors that influence the level of competitiveness of the studied products.

The competitiveness of products is influenced by numerous internal factors, the consideration of the impact of which is possible only if there are relevant indicators that can reflect this impact. We propose structuring internal factors into 6 main blocks. For each of the selected blocks, an appropriate system of indicators characterizing them is proposed⁹.

⁹ C. Roberts, Dynamic programming processes in chemical technology and management methods (Moscow: Mir, 1965).

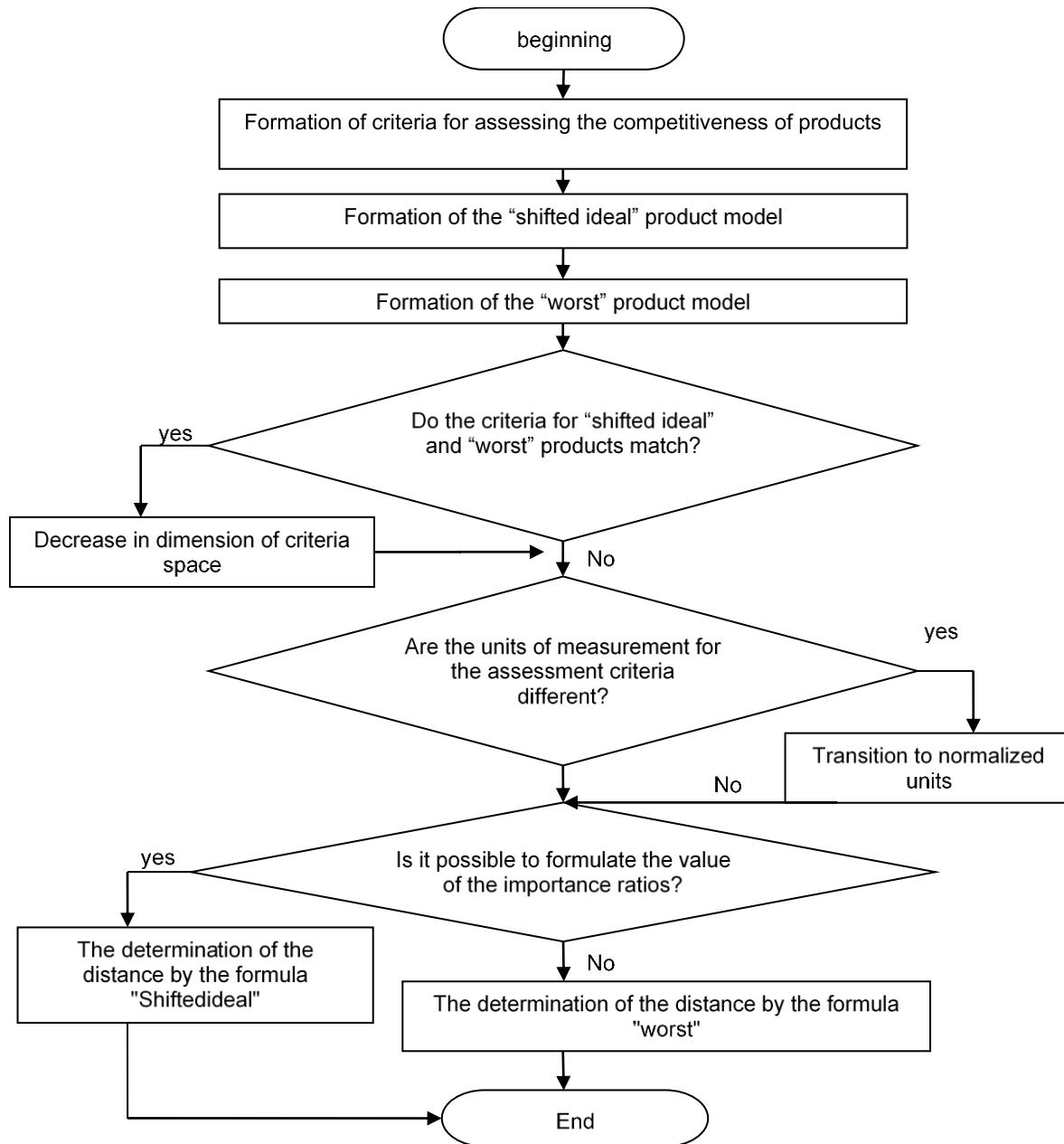


Figure 3

Algorithm for assessing the competitiveness of products using the ideal method

In the framework of this work, it is most preferable to consider a system of indicators for assessing the factor “Level of organization of information maintenance at an enterprise” which is presented in Fig. 4.

A comprehensive indicator of the level of organization of information maintenance at the enterprise (k) is defined as follows:

$$K_{uo} = Y_a q_a + Y_{omu} q_{omu} + Y_{u6} q_{u6} + Y_{nnk} q_{nnk} ,$$

where q is the coefficient of weighting indicators

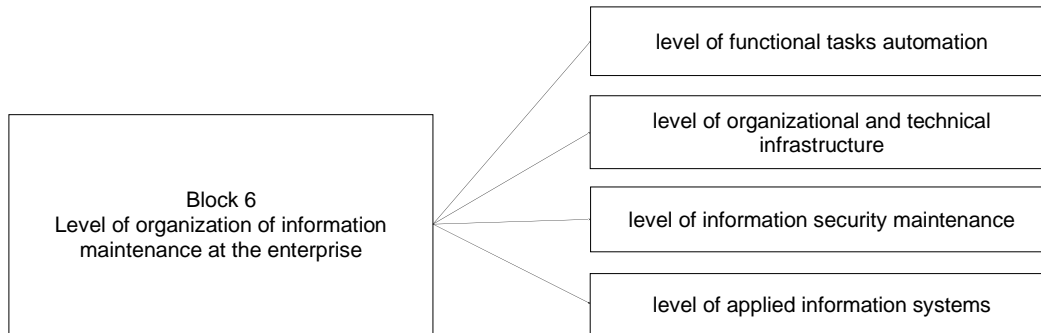


Figure 4

A system of indicators for assessing the factor “Level of organization of information maintenance at the Enterprise”

Conclusion

The methodology for calculating partial coefficients on complex indicators is presented in the information guide E.K. Smirnitsky "Economic indicators of industry."

The indicators for calculating the level of organization of information maintenance at the enterprise are given in the article "Assessing of the quality of an information system based on Q factors" of the International Journal "Software Products and Systems".

At the final stage of the analysis, a generalization of the analysis results and determination of priority areas for increasing the competitiveness of products are carried out¹⁰. When assessing the competitiveness of products, which is the basis for the growth of enterprise competitiveness, this method allows you to cover a number of criteria that were not previously taken into account (see table. 1).

Classic	Proposed
Technical characteristics (strength, weight, density, brand, etc.)	Production level
Cost characteristics (price, operating costs, service costs)	Quality level
	Opportunity level
	Staff level
	Marketing level
	The level of organization of information support at the enterprise

Table 1

Comparative characteristics of the criteria used

¹⁰ G. E. Adygezalova; R. M. Allalyev; A. V. Kiseleva y N. A. Grigorieva, “Copyright Violation and Distribution of Prohibited Content on the Internet: Analysis of Legal Arrangements in the Legislation of the Russian Federation”, Journal of Advanced Research in Law and Economics Vol: 9 num 1 (2018): 6-14.

The groups of indicators discussed above make it possible to take into account a larger number of criteria for assessing the competitiveness of an enterprise in order to increase the degree of validity of decisions made.

The number of criteria varies from 10 to 18 instead of the classically accepted - 7. Previously, emphasis was placed on the possibility of correlation of identical goods, now substitute goods can be considered as a competitor.

For the purpose of consistency of the available data and the reliability of the information, it is not recommended to increase the amount of processed information unreasonably. Since the choice of strategic decisions in the field of increasing the competitiveness of an enterprise must be made on the basis of data available in the public domain.

When assessing the competitiveness of the enterprise in the classical way, it was 1.02. The closest competitor has 0.96.

Assessing the competitiveness of the enterprise according to the proposed algorithm, we came to the conclusion that its value of 0.99 is at an average level. A value of 0.76 corresponds to the “worst” object, and the value of the “ideal” object is 1.25. The most “weak” are the level of marketing, the level of personnel and the level of organization of information maintenance at the enterprise. Based on this, it is necessary to justify the choice of a competitive strategy, propose key performance indicators for personnel and justify the need for the introduction of a multifunctional software package.

The degree of reliability increased by 3%, while the number of criteria increased by 45%.

Currently, information is becoming increasingly important. Now, without information, it is impossible to conduct business, because it is one of the factors of production, along with land, labor, capital and entrepreneurial abilities.

The effectiveness of the enterprise, the achievement of its goals depends on many components. One such component is information. Therefore, one of the main tasks of any organization is the creation and support of an information system that will ensure the rapid receipt and processing of reliable data.

To ensure competitiveness, marketing departments at enterprises conduct market research, collect process and analyze information, including demand information, characteristics and descriptions of competitors activity and their products, market infrastructure, level of development and others. Also, information on projected changes and new market trends is of great importance. Possession of such information will allow the company to choose the right strategy for market behavior. Competitiveness management is one of the main tasks of the marketing department at the enterprise. Information maintenance of competitiveness must comply with the requirements and standards that apply to the information maintenance of marketing research and the general principles of creating an enterprise information system.

The decisions made in marketing are based on management processes, which are information processes. That is why the adoption of correct and valuable management decisions to a large extent depends on the information maintenance of the organization.

Consequently, as an element of a market economy, innovation is one of the most effective methods of competition, as it contributes to the emergence of new needs and their satisfaction, as well as reducing the cost of goods and services, attracting investment capital, increasing the business potential of the manufacturer of new products, entering new markets and strengthening their positions on them.

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