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## METHODOLOGICAL BASES FOR EVALUATING THE COMPETITIVENESS OF PRODUCTS OF ENTERPRISES IN THE FLOUR INDUSTRY

*У статті досліджено підходи щодо оцінювання конкурентоспроможності продукції підприємств борошномельної галузі, узагальнено та доповнено напрацювання науковців щодо компонент конкурентоспроможності, у складі яких для продукції підприємств борошномельної галузі запропоновано враховувати: сталість, витратно-цінова, ефективність, якість продукції та її відповідність стандартам, інноваційність; соціальна відповідальність виробника; екологічність; доступність та повноту інформації про продукт; репутацію виробника; добросовісність конкуренції. Доведено, що конкурентоспроможність є багатокомпонентною характеристикою продукції, суб'єкта господарювання, регіону, галузі, країни, а також залежить від факторів часу та місця, що призводять до певних складнощів в її оцінці. Проведено огляд наукових праць з оцінки конкурентоспроможності обґрунтовано, що в економічній науці і практиці не сформувалося єдиного підходу щодо вимірювання рівня конкурентоспроможності, а також стосовно того, за допомогою якого методу, переліку показників доцільно проводити оцінювання конкурентоспроможності продукції. З метою наукової систематизації методи оцінювання конкурентоспроможності було згруповано за об'єктом оцінки (методи позиціювання, конкурентних переваг, потенціалу конкурентоспроможності), за способом представлення результатів (дискретні; табличні; матричні; ранжування; графічні), а також показники оцінки за кількістю характеристик: (одиничні,; групові; інтегральні); за методом розрахунку (середніх величин; суми; співвідношення; індекси; експертних оцінок; бальної оцінки; інтервальної оцінки; ранжування), а також за критеріями конкурентоспроможності продукції. Для здійснення комплексної оцінки конкурентоспроможності продукції борошномельних підприємств запропоновано систему показників за розробленим переліком критеріїв (компонент): сталість, витратно-ціновий, ефективність, якість та відповідність стандартам, інноваційність; соціальна відповідальність виробника; екологічність; доступність та повноти інформації про продукт; репутація виробника; добросовісність конкуренції. Визначено етапи здійснення оцінки конкурентоспроможності, що враховують різноманіття її методів та показників, та яка може бути адаптована у відповідності до завдань дослідження, доступної інформації, виду оцінки за обсягом критеріїв та (комплексна, часткова, експрес-оцінка).*

***Ключові слова:*** *конкурентоспроможність; методи оцінки; конкурентні переваги; конкурентний потенціал; конкурентоспроможність продукції; підприємства борошномельної галузі.*

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## МЕТОДИЧНІ ОСНОВИ ОЦІНКИ КОНКУРЕНТОСПРОМОЖНОСТІ ПРОДУКЦІЇ ПІДПРИЄМСТВ БОРОШНОМЕЛЬНОЇ ПРОМИСЛОВОСТІ

*The article examines approaches to assessing the competitiveness of products of enterprises in the flour milling industry, summarizes and supplements the work of scientists on the components of competitiveness, in the composition of which it is proposed to take into account for the products of enterprises of the flour industry: sustainability, cost-price, efficiency, product quality and its compliance with standards, innovation; social responsibility of the manufacturer; environmental*

*friendliness; availability and completeness of product information; reputation of the manufacturer; fair competition. It has been proven that competitiveness is a multi-component characteristic of products, business entity, region, industry, country, and also depends on factors of time and place, which lead to certain difficulties in its assessment. A review of scientific works on the assessment of competitiveness has been conducted and it is substantiated that in economic science and practice a single approach to measuring the level of competitiveness has not been formed, as well as regarding which method and list of indicators it is appropriate to evaluate the competitiveness of products. For the purpose of scientific systematization, the methods of assessing competitiveness were grouped by the object of assessment (methods of positioning, competitive advantages, competitiveness potential), by the method of presenting results (discrete; tabular; matrix; ranking; graphic), as well as assessment indicators by the number of characteristics: ( individual; group; integral); by the method of calculation (average values; sums; ratio; indices; expert evaluations; point evaluation; interval evaluation; ranking), as well as by the criteria of product competitiveness. In order to carry out a comprehensive assessment of the competitiveness of products of flour milling enterprises, a system of indicators is proposed based on a developed list of criteria (components): sustainability, cost-price, efficiency, quality and compliance with standards, innovativeness; social responsibility of the manufacturer; environmental friendliness; availability and completeness of product information; reputation of the manufacturer; fair competition. The stages of the evaluation of competitiveness are defined, which take into account the variety of its methods and indicators, and which can be adapted in accordance with the tasks of the research, available information, the type of evaluation by the scope of criteria and (comprehensive, partial, express evaluation).*

***Keywords:*** *competitiveness; assessment methods; competitive advantages; competitive potential; product competitiveness; enterprises of the flour milling industry.*

**Formulation of the problem** Competitiveness is not only a qualitative characteristic of products, a business entity, region, industry, country, but it can also be quantitatively evaluated. But multi-component, multi-level, as well as the dependence of such a category as competitiveness on factors of time and place lead to certain difficulties in its assessment.

**Analysis of recent research integration processes** Methods and indicators of competitiveness assessment were studied in the works of V. Karpov, V. Komarnytska [12], S. Kvashi, O. Zhemoyda, I. Luka, N. Lenska, O. Radchenko, N. Patyka, D. Romanov and many other scientists.

An important aspect of the competitiveness research methodology is the definition of the accompanying objects of analysis. In this regard, scientists propose to analyze not only the state of the subject of competition, but also the environment of competition. In particular, in the studies of V.L. Pilyushenko, V.I. Dubnytskyi, and I.P. Ganzhela, a system of basic indicators of the market situation was determined in the composition of five groups: 1) dynamics of market development (fluctuations in the economic situation, growth rates); 2) market offer (volume, structure, elasticity); 3) market demand (volume, structure (segments), market capacity); 4) equilibrium (equilibrium price and equilibrium volume, market structure); 5) business activity (indices of business activity, production capabilities, risk level) [13].

In foreign economic literature, there are various approaches to assessing competitiveness, in particular, taking into account indicators of opportunity costs, comparative advantages, exports and/or imports. productivity and efficiency, innovativeness.

**Unsolved parts of the problem.** Despite the significant achievements of both domestic and foreign economic science in the development of methodological foundations of competitiveness assessment, the variety of proposed indicators and assessment methods necessitates their

systematization, adaptation and development in accordance with the specific tasks of competitiveness research.

**The purpose of the article there** is research and substantiation of approaches to evaluating the competitiveness of products of enterprises in the flour milling industry.

**Presentation of the main material.** To systematize the methodological principles of competitiveness assessment, firstly, we will note their development in economic science for different levels: products, enterprises, industry, region, export, country.

Secondly, we should note the use of various types of indicators in the assessment of competitiveness by covering its components, which characterize a certain separate property of the competitiveness of products, exports or the subject's ability to compete, that is, single (individual, private) indicators. For example, indicators of competitiveness by costs, by price, by product quality, by service level. Also, the assessment is carried out according to group indicators, which reflect the quantitative measurement of the state of competitiveness according to a certain criterion. Another type of indicators based on the level of consideration of competitiveness components is integral indicators. Quantitative assessments of the main components and/or criteria are combined in these indicators.

For example, scientists note that the assessment of the competitiveness of enterprises should be based on a certain set of indicators, the justification of the composition of which is built based on the goals of the assessment and the needs of management subjects. Since it is difficult to give priority to a single criterion, it seems appropriate to carry out a comprehensive assessment of competitiveness. At the same time, it is possible to use methods that do not involve the calculation of a single integral indicator, and which involve the formation and quantitative assessment of a single integral criterion [7].

V. Vasylkov, I. Burachek note the following methods of evaluating the competitiveness of products: matrix; structural and functional; preference method; scoring method; integral evaluation method (based on customer satisfaction criteria and production efficiency criteria); method of profiles; graphic method (degree of consumer satisfaction according to various criteria (polygon with maximum area). But in this list there is a mixture of methods of calculating indicators and presenting evaluation results.

A.V. Cherep identifies three types of competitiveness assessment indicators (single, group, integral), and also indicates three methods of conducting such an assessment (differential, complex, mixed).

We have to distinguish different types of competitiveness indicators by calculation methods. In particular, such methods are used to determine competitiveness indicators as: parametric, average values; index; sadness; ratios, including the deviation of the actual value of the indicator from the reference value; expert evaluations; point assessment; ranking; ratings.

The method of average values involves the use of arithmetic averages, weighted averages to obtain a single indicator that characterizes a property or condition for a period, by product range.

The index method is common when evaluating the comparison of the characteristics of products or competitors, as well as dynamic changes in properties or the ability of competitors to compete. In particular, by means of the index method of calculating the indicator (differential method of assessing competitiveness), single parametric indices of competitiveness are determined by comparing individual partial indicators of the components of the analyzed type of product and the sample product

$$g_i = \frac{x_i}{x_{i0}} \qquad (1)$$

where $g_i$ – single parametric indicator of competitiveness according to the i-th parameter (characteristic);

$x_i$ – the value of the i-th indicator for the type of product being analyzed;

$x_{i0}$ – the value of the i-th indicator for the reference product type.

The method of sums involves summing up the values of the investigated indicators. But when it is applied, there is a possibility of a high assessment according to the integral indicator with a significant lag behind a certain private indicator, which is covered by high achievements according to other private indicators.

Most of the integral indicators of the comprehensive assessment are calculated by the method of sums separately for each type of product or business entity or meso- and macro-levels of the national economy by summing up the values of individual indicators and taking into account their weighting factors.

For example, the integrated indicator of a comprehensive assessment, determined by the method of sums, involves the summation of the actual values of individual indicators of competitiveness multiplied by a weighting factor and is calculated for each type of product or subject of competition according to the following formula [5]:

$$K = \sum_{i=0}^{n} a_i x_i \tag{2}$$

where K – integral indicator of product competitiveness;

n – the number of indicators (selected for the analysis of product characteristics, business entities);

$a_i$ – weighting factor for the i-th indicator;

$x_i$ – the value of the i-th indicator.

In particular, Ukrainian scientists proposed the calculation of the integral index of competitiveness of the industry (agriculture) using this approach:

$$I_{КП} = 0{,}2{\times}E_P + 0{,}15{\times}E_П + 0{,}14{\times}П + 0{,}08{\times}Ф_С + 0{,}18{\times}E_З + 0{,}25{\times}E_{ЗЕД}, \tag{3}$$

where ICP is the integral index of competitiveness of agriculture;

ER – index of economic development of the industry;

EP – agricultural productivity index;

P – index of profitability of agriculture;

FS – index of financial stability and solvency of the industry;

EZ – index of business activity of the industry, efficiency of sales organization and promotion of goods on the market;

EZED is an index of participation in foreign economic activity [5].

A similar approach to the calculation of the integral indicator can be applied in the assessment of any subject of competition, as well as products. In turn, we note that when calculating the integral indicator, the problem of determining the weighting coefficients of the indicators arises. To some extent, this problem can be solved by using a point system of evaluation. Threshold values for individual indicators are determined to assign points. Points are assigned to indicators based on the correspondence of the actual indicator to a certain defined value or range of values. The integral indicator in this case will be determined by summing the points for individual indicators.

At the same time, the next stage after calculating the competitiveness indicator is its comparison with the results of competitors. In addition, it is advisable to carry out this comparison

for previous periods as well, that is, in dynamics in order to assess how the situation is changing, how certain factors affect changes in competitiveness.

Note that the calculation of the integral indicator according to formula (2) contains errors due to the different dimensions of the indicators that reflect certain characteristics, therefore, in many methods of calculating the integral indicators by the method of sums, it is proposed to use the relative values of individual indicators, which are obtained by comparing the competitiveness indicator by a separate characteristic and th type of products with the competitiveness indicator according to the same characteristics of the reference type of products or products of a competitor [5]

$$K_l = \sum_{i=0}^{n} a_i \frac{x_i}{x_{i0}} \qquad (4)$$

where Kl is an integral indicator of the competitiveness of the lth type of products;

n is the number of indicators (selected for the analysis of the characteristics of products, business entities);

$a_i$ – weighting factor for the i-th indicator;

$x_i$ – the value of the i-th indicator for the l-th type of product;

$x_{i0}$ – the value of the i-th indicator for the reference product type.

V. Seredynska and O. Zagorodnya offer a similar calculation of the competitiveness indicator, but taking into account the relative group indicator [14].

$$K_l = \sum_{i=0}^{n} a_i \frac{x_i}{x_{i0}} + \frac{x_l}{x_{l0}} \qquad (5)$$

where Kl is an integral indicator of the competitiveness of the lth type of product;

n is the number of indicators (selected for the analysis of product characteristics, competition subjects);

$a_i$ is the weighting factor for the i-th indicator;

$x_i$ – the value of the ith indicator for the lth type of product;

$x_{i0}$ – the value of the i-th indicator for the reference type of products;

$x_l$ – the integral indicator of the competitiveness of the l-th type of products;

$x_{l0}$ – the integral indicator of the competitiveness of the reference type of products.

Fishbein's product competitiveness assessment model [5] is based on the method of sums:

$$E_l = \sum_{i=0}^{n} a_i e_i$$

where El – the consumer's assessment of the competitiveness of the product l;

n – number of evaluations of product characteristics;

$a_i$ – weighting factor for the i-th indicator;

$e_i$ – the value of the consumer's assessment of the ith parameter of the product.

Also close in terms of the calculation is the calculation by the ideal point method, in which competitiveness is assessed through the deviation of the actual consumer estimates from ideal perceptions [5].

$$EE_l = \sum_{i=0}^{n} a_i(e_{i0} - e_i)$$

where $EE_l$ is the consumer's assessment of the competitiveness of product l;

n – number of evaluations of product characteristics;

$a_i$ – weighting factor for the i-th indicator;

$e_{i0}$ is the reference value of the evaluation of the i-th parameter of the product;

$e_i$ – the value of the consumer's assessment of the ith parameter of the product.

The assessment of competitiveness can be carried out on the basis of the development of a rating assessment of products or the subject of competitiveness, taking into account the cumulative impact of the components of competitiveness.

The rating is based on a set of indicators of the components of competitiveness. The coefficients included in the set are evaluated in points, the value of which depends on the value of the given coefficient as an evaluation criterion and on the degree of compliance with the normative, quantitatively expressed level. Scientists have also suggested using multidimensional rating analysis to assess competitiveness.

Evidence of the competitiveness of the products of a certain manufacturer will be the value of its share in the market, which is calculated on the basis of both physical and value indicators. Also, in economic science, a number of indicators are used to assess the level of competition in the market of a certain type of product. Its main indicators are:

- four-part concentration indicator (characterizes the total share of the largest four manufacturers in a certain product market);

- the Herfindahl-Hirschman index (calculated as the sum of the squares of the market shares of competitors, respectively, the more competitors, the smaller their share, and the smaller the value of this index will be; as the level of concentration in the industry increases, the Herfindahl-Hirschman index increases, and in conditions of a pure monopoly, the value of the index is equal to 1);

- the Rosenbluth index (takes into account the ranking of shares of enterprises from maximum to minimum and the number of the enterprise obtained on the basis of such ranking; in monopoly conditions it approaches 1);

- an indicator of the intensity of competition, which takes into account the profitability of the market;

- an indicator of the intensity of competition, which takes into account the growth rate of the volume of sales;

- general indicators of the intensity of competition [5].

In today's conditions of globalization, it is impossible to do without taking into account the world market in assessing the competitiveness of products. Economic science has developed quite a large set of indicators regarding the competitiveness of products on the world market. In particular, such indicators are

1) the index of actual comparative advantages or the Balassa index (Revealed Comparative Advantage, RCA), which is calculated as the ratio of the share of the value of the export of a certain product in the total export of the country and the share of the export of this product in the total volume of world exports.

2) index of relative export advantages (Relative Export Advantage, RXA) – a modified version of the RCA indicator, which is similar to it, but in the calculation of which certain types of products (services) are not taken into account;

3) the index of relative trade advantages (Relative Trade Advantage, RTA), which is calculated as the difference between the index RXA and RMA (index of relative import dependence);

4) trade coverage index (Trade Coverage, TC), which is equal to the ratio of the cost of exporting a certain product to a certain country or group of countries to the cost of importing this product from this country or group of countries;

5) export market share (Export Market Share, EMS) – an indicator that assesses what share of the world market of a certain product is covered by a certain manufacturer (country) and others.

In particular, the scientific works of S. Kvashi, O. Zhemoyda, and O. Luka presented the calculations of indices of actual comparative advantages (RCA) and indices of relative trade advantages (RTA), which confirmed the competitiveness of agricultural products of Ukraine as a whole and its main types (cereals, sunflower seeds and sunflower oil, beef, butter, skimmed milk powder) on the world market [5].

It should be noted that the calculation of these indices is based on the actual indicators of export and import of a certain type of product in a certain country, their shares in world export and import, and these indicators reflect the actual state of competitiveness of the industry or its individual types of products on the world market, but do not allow establishing factors of such competitiveness and assess potential competitiveness.

Scientists have developed coefficients that allow assessing the state of competitiveness in terms of the cost-price component both in the past and current periods, as well as its future prospects [5]. In particular, the coefficient of the internal cost of resources (Domestic Resource Cost ratio, DRC) is equal to the ratio of the alternative costs of a certain production (the cost of the main resources – land, labor, capital according to their alternative use, as well as the cost of services that cannot be purchased) with the added value at world prices market. Thus, it makes it possible to assess whether a country has real advantages in production costs and prices of certain products, or whether such advantages are the result of state export subsidies or non-equivalence, in which the level of income does not provide normal conditions for the reproduction of resources involved in the production of the products under study. This coefficient is calculated according to the formula [5].

$$DRC_i = \frac{\sum_{j=k+1}^{l} a_{ij} \cdot V_j}{VA_i^b},$$

$$VA_i^b = P_i^b - \sum_{n=1}^{k} a_{in} \cdot P_n^b,$$

where $DRC_i$ is the coefficient of the internal cost of resources used in the production of the i-th type of product;

$a_{ij}$ is the technological coefficient for the j-th resource in the production of the i-th type of product;

$V_J$ is the alternative internal price of the j-th resource;

$VA_i^b$ is the added value of i-th type of product at world prices;

$P_i^b$ – the price of the ith type of product on the world market;

$a_{in}$ – the technological coefficient for the nth resource in the production of the ith type of product;

$P_n^b$ is the price of the nth resource on the world market.

Accordingly, if the DRC is greater than one, then domestic production, even at current competitiveness, does not have its stock and is inefficient when taking into account alternatives for the use of resources, since the alternative cost of resources is higher than the added value at world prices. The alternative cost of resources represents the social price of these resources at the marginal efficiency of their use. For example, the price of hired labor can be accepted as the payment of labor of similar quality, taking into account the accrual of mandatory social and pension insurance. The rent for land of a given quality can be accepted as the land price. Based on the calculations of this indicator, an assessment of the competitiveness of agricultural production of Slovenia was carried out in the works of S. Boynets, of Hungary in the works of M. Banze, T. Bargel and others [5], which revealed the relative nature of the current competitiveness of some types of agricultural products in these countries and the lack of real advantages for them, which was confirmed by the strengthening of openness and the accession of these countries to the European Union. The assessment of the price competitiveness of agro-food products of Ukraine, which would take into account the alternative costs of production, has not yet found adequate coverage.

The Private Resource Cost ratio (PRC) is similar to DRC in terms of calculation method, but takes into account actual production costs and the amount of costs for alternative use of resources in the national economy [5].

$$PRC_i = \frac{\sum_{j=k+1}^{l} a_{ij} \cdot V_j}{VA_i^d},$$

$$VA_i^d = P_i^d - \sum a_{in} \cdot P_n^d,$$

where $PRC_i$ is the coefficient of the private cost of resources employed in the production of the i-th type of product;

$a_{ij}$ is the technological coefficient for the j-th resource in the production of the i-th type of product;

$V_J$ is the alternative internal price of the j-th resource;

$VA_i^d$ is the added value of i-th type of product at actual domestic prices;

$P_i^d$ – the price of the ith type of product on the domestic market;

$a_{in}$ – the technological coefficient for the nth resource in the production of the ith type of product;

$P_n^d$ is the price of the nth resource on the domestic market.

Accordingly, the value of the PRCi coefficient greater than one will indicate that the alternative (effective) cost of resources is higher than their actual cost, and, therefore, about the price advantages of products that were formed when using labor, land, and capital at lower prices when they are used alternatively in the economy. Under such conditions, there are threats to the outflow of resources from this production and deterioration of competitiveness. On the contrary, when the value of the coefficient of the private cost of resources is less than one, the exchange ratio provides additional benefits for this producer, since the owners of resources employed in this production receive incomes above their social level.

But the calculation of these coefficients requires data that are not always easily and quickly available in the company's management. Applying this methodological approach to the assessment of efficiency and the cost-price component of competitiveness, we suggest, among other indicators, to calculate such an indicator as the coefficient of modified cost of production (MdCR), which is calculated on the basis of the actual costs (cost) of a certain production and their modification on

the basis of the alternative cost of resources (in the national economy or at world market prices). This cost modification can be applied to change all cost elements. For further assessment of competitiveness, the value of the modified cost price is compared with the price of products on the domestic or, accordingly, foreign markets. In the event that the modified cost price remains less than the market prices, correspondingly, the coefficient of the modified cost price is less than 1, the producer has a valid potential for competitiveness, because even at the alternative cost of resources, the level of his costs allows generating profit.

$$MdCR = \frac{MdC}{P}$$

where MdCR is the coefficient of the modified cost of production, MdC is the modified cost of production, P is the price of products.

If MdCR $\geq$ 1, then the manufacturer does not have competitive advantages in terms of costs, its competitiveness is due to the use of resources when they are paid for at prices lower than with alternative consumption. For MdCR < 1, the modified cost of products is lower than the price of such products on the domestic or world markets, therefore, such products have real competitive advantages in terms of cost-price competitiveness.

An additional indicator based on this approach can be the Modified Cost Change Index (MdCSI), which is equal to the percentage deviation of the modified cost from the actual:

$$MdCCI = \frac{MdC}{C} 100\% - 100\%$$

where MdCCI is the modified cost change index;
    MdC is the modified cost of production;
    C is the cost of production.

Note that the modification of costs can be carried out when using alternative prices for the resources of the market for which the competitiveness of products is evaluated, and in the calculation, both individual and all elements of costs can be modified.

It is advisable to compare the index of changes in the modified cost price with the profitability of sales of products on the domestic market (p') or their export (pe'). If MdCSI < p', MdCSI < pe', the product has the potential to be competitive on the domestic and global markets, respectively.

In the case of MdCSI $\geq$ p', MdCSI $\geq$ pe', the product, the competitiveness of which is being investigated, does not have the potential of competitiveness for the domestic and/or world market, respectively.

Among the advantages of using the proposed indicators are ease of calculation, availability of data, the possibility of modification based on the alternative value of various resources, sensitive to which is the cost price of a certain type of product.

Among the main methods of presenting indicators of competitiveness, we note: the method of discrete indicators; tabular; matrix; graphic.

Among the graphic methods of competitiveness assessment, such as the polygon of competitiveness, the radar of competitiveness, the method of profiles, the model of consumer satisfaction and others are quite common.

Polygonal competitiveness is a figure that is built by combining the values of the company's product evaluations (and separately, competitors' products) according to the most significant

criteria, for example, price, quality, brand recognition, service, etc. The quantitative value of the parameters (characteristics) of the products is deposited in the coordinate plane in the form of dots on the axes, the number of which corresponds to the number of estimated characteristics of the competitiveness of the products. Connecting the dots for a certain type of product forms a polygon that clearly shows the differences between competing products according to certain criteria. When one polygon is superimposed on another, the parameters of the characteristics of the product under study are compared with the parameters of competitors. However, based on this method, it is difficult to obtain a generalized indicator of competitiveness, since all components are considered equal.

RADAR was proposed by the European Foundation for Management (EFQM). The model is based on the so-called RADAR logic, which consists of the following elements: Results, Approach, Development, Assessment, Refinement. This method clearly demonstrates the assessment of competitiveness according to certain criteria, and also allows you to calculate a generalizing (integral) indicator according to these criteria.

The competitiveness radar is built according to the following rules [8]:

- key indicators of competitiveness are selected according to various components (criteria), based on which an assessment of the current competitiveness of products is carried out, and a comparative assessment can be carried out in terms of frequency and space (compared to the products of other manufacturers);

- a circle is built and divided into equal sectors by radial evaluation scales, the number of which is equal to the number of criteria, while the scales on the radial lines are graduated so that all criteria values lie inside the evaluation circle and as the distance from the center of the circle increases, the value of the criterion improves. Note that the calculated values of competitiveness indicators according to different criteria will have different dimensions and measurement units, so they should be presented in a comparable form;
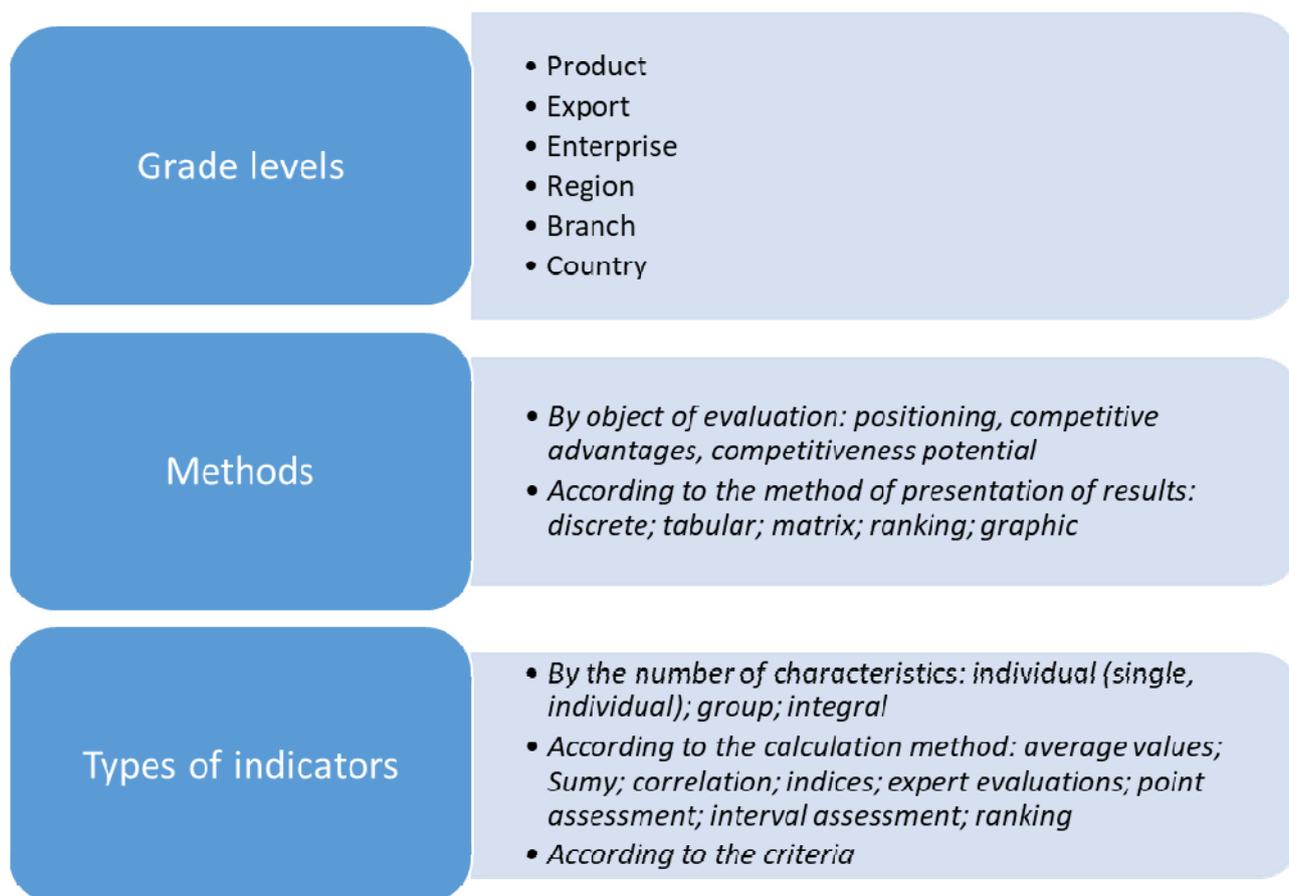
- to compare competitiveness in time and space, radars of previous estimates or estimates for competitors' products are built in the same circle.

Based on the calculation and comparison of the areas of the evaluation figures, the integral indicator of product competitiveness can be determined, and its comparison with others obtained for previous periods, products of competitors or reference products, also makes it possible to quantitatively assess the relative competitiveness of products and its changes over time.

Also, by calculating the area of the radar of competitiveness and the area of the entire evaluation circle, where the length of the radius of the evaluation circle will be a specified number of conditional units, corresponding to the maximum possible number of points, the general indicator of competitiveness is calculated as the ratio of the area of the radar to the total area of the circle [4]. The larger the area of the competitiveness radar and, accordingly, the closer its value is to the area of the circle, the higher the competitiveness according to the specified criteria.

Among the advantages of the "competitiveness radar" method, scientists include [8]: the clarity of the image, as well as the fact that the weights for all indicators of the competitiveness of products are taken to be the same, which excludes the factor of subjectivity in the process of evaluation by the expert method. The disadvantages of the method are the time-consuming calculations, construction and calculation of the radar area, especially with a large number of indicators. But rightly noted that both the competitiveness polygon and the competitiveness radar have the following drawback: they do not take into account the importance of indicators [6]. In addition, in the competitiveness radar, the area of the radar depends, among other things, on the sequence of indicators (if the indicators are changed, the value of the generalized indicator changes), which reduces the objectivity of the assessment.

One of the widespread methods of assessing the competitiveness of products is the "profiles" method. This method allows you to evaluate the level of competitiveness of products taking into account a certain set of criteria. When applying the profile method, selected indicators of product competitiveness are graphically displayed according to certain rules. The profile of products, the competitiveness of which is being studied, is used to assess its level by comparing it with the profile of other products built on the same evaluation field [9]. For the graphic display of the profile, the most significant criteria are selected, their list is placed in the left part (column) of the profile, and the values of their indicators are placed in the right rectangular evaluation field. The width of the evaluation field is chosen arbitrarily. On the dividing scales, the qualitatively worst possible value of the product indicator is placed on the left, and qualitatively the most qualitatively possible better value is placed on the right. Each product indicator is placed on a dividing scale. As a result, the larger the area of the profile, that is, the shaded area of the evaluation field (the area of the figure is outlined by the line connecting the evaluation points), the higher the competitiveness of the products. The number of competitiveness criteria used for its assessment is unlimited. This is one of the advantages of this method of evaluating the competitiveness of products. Also, on the basis of this method, the integral indicator of competitiveness can be calculated according to the selected criteria, as the ratio of the area of the profile to the area of the rectangle; a comparison of competitiveness in frequency and space can be made.



**Grade levels**
- Product
- Export
- Enterprise
- Region
- Branch
- Country

**Methods**
- *By object of evaluation: positioning, competitive advantages, competitiveness potential*
- *According to the method of presentation of results: discrete; tabular; matrix; ranking; graphic*

**Types of indicators**
- *By the number of characteristics: individual (single, individual); group; integral*
- *According to the calculation method: average values; Sumy; correlation; indices; expert evaluations; point assessment; interval assessment; ranking*
- *According to the criteria*

*Source: generated by the author.*
*Fig. 1.* **Levels, methods and types of competitiveness assessment indicators**

The model of consumer satisfaction (attractive quality) by Noriaka Kano is based on the creation of a list of possible attributes, which for analysis and presentation in the coordinate plane

(the horizontal axis is used to display the level of product (service) quality, the vertical axis is the level of consumer satisfaction) are divided into 4 groups: 1) necessary, standard (must-be): those attributes of a product or service, in the absence of which the consumer does not even consider this product or service as an alternative. At the same time, the presence of these attributes or the increased quality of these attributes does not lead to high buyer satisfaction, because it is considered by the buyer as a given or the buyer is not ready to pay for the increased quality; 2) critical, one-dimensional: those attributes for which consumer satisfaction is higher.

Depending on the tasks of the research, the method of assessing competitiveness and a set of its indicators will be chosen. But a comprehensive assessment should take into account all the criteria of competitiveness and be based on the determination of indicators by all the criteria. In Table 1 we present possible indicators for evaluating the competitiveness of products of flour milling enterprises according to the proposed list of criteria (components): sustainability, cost-price, efficiency, quality and compliance with standards, innovativeness; social responsibility of the producer; environmental friendliness; availability and completeness of product information; reputation of the manufacturer; fair competition.

*Table 1*

### *Criteria and indicators of competitiveness*

| Criterion | Indicator |
|---|---|
| 1 | 2 |
| Constancy | Volumes of production and sale of products, net income from sale of products, their indices |
| | Market shares (local, regional, national, foreign) of flour, their indices |
| | The share of the export value in the net income from the sale of products, its index |
| | Export market share (EMS) |
| | index of actual comparative advantage (RCA), index of relative export advantage (RXA), index of relative trade advantage (RTA), index of trade coverage (TC) |
| Cost-price | The ratio of the price of certain products to the average (lowest, highest) price on the market |
| | The ratio of the cost price of a certain manufacturer's products to the lowest (average) cost price of competitors' products. |
| | Coefficients of internal and individual cost of resources (DRC, PRC) |
| | Modified Cost Ratio (MdCR) |
| | Modified Cost Change Index (MdCCI) |
| Efficiency | Profitability of production |
| | Profit from the sale of products |
| | Productivity |
| | Total Factor Productivity (TFP) |
| Quality and compliance with standards | The share of the highest and first class products in the volume of production |
| | Shares of certified products according to certain standards |
| | The share of products with the presence of harmful impurities |
| | Product storage period |
| | Share of organic products |
| | Level of consumer satisfaction |
| Innovativeness | Number of introduced innovations for the previous year |
| | Periodicity of product updates |
| | R&D expenditures |

*End of table 1*

| 1 | 2 |
|---|---|
| Social responsibility | The ratio of the actual wages of those employed in production to the average in the economy<br>The share of labor costs in the cost of production<br>The ratio of growth rates of profit and wages<br>Share of those dismissed during the research period at the initiative of the employer in the total number of employees, staff turnover rate<br>Industrial injury rate<br>Costs for improving working conditions per employee<br>Health care costs per employee<br>The ratio of social investment and profit<br>Index of corporate benevolence |
| Environmental friendliness | Generation of waste per unit of cost of manufactured products<br>Share of secondary use of certain types of waste<br>Energy intensity of production and its index<br>Share of organic products |
| Availability and completeness of product information | The level of consumer awareness of the product<br>The level of consumer awareness of the manufacturer |
| Reputation of the manufacturer | Brand Development Index (BDI),<br>Brand loyalty |
| Fairness of competition | Herfindahl-Hirschman index<br>Index of economic freedom (for region, industry, country). Producer Support Score (PSE) |

*Source: fairness of competition.*

**Conclusions.** Note that the proposed list of criteria and indicators for evaluating the competitiveness of products is not complete and can be specified for different types of products or special research tasks. The indicators were chosen based on the principles of information availability, expediency, objectivity, and economy. This list of indicators or a part of it can be used to calculate the integral indicator of product competitiveness or conduct its express analysis. We propose to evaluate the competitiveness of products in the following stages:

Stage 1. Determination of the type of evaluation: full, partial, express.

Stage 2. Selection of indicators according to criteria. Formation of a set of evaluation indicators.

Stage 3. Collection and formation of a database for calculating indicators.

Stage 4. Calculation of indicators. Completion of calculation results.

Stage 5. Comparative analysis of calculated indicators with similar products of competitors, reference products, with the value of indicators for previous periods. Formulation of conclusions regarding the actual level of competitiveness in space, its changes over time, threats to product competitiveness in the future.

Stage 6. Use of assessment results to develop and adopt management measures to ensure product competitiveness.

Statistical and financial reporting of enterprises, statistical information of the State Statistics Service of Ukraine, statistical services of other countries, and the World Trade Organization serve as sources of information for assessing competitiveness.

The evaluation of the competitiveness of products according to the proposed stages takes into account the variety of its methods and indicators, it can be adapted in accordance with the tasks of the research, available information, and time.

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