Yudina Olena
Doctor of Economics, Professor,
University of Customs and Finance
Nebaba Nataliia
Doctor of Economics, Associate Professor,
Oles Honchar Dnipro National University
Altunin Kirill
Higher Education Student,
University of Customs and Finance

Юдіна О.І.
Університет митної справи та фінансів
Небаба Н.О.
Дніпровський національний університет імені Олеся Гончара
Алтунін К.О.
Університет митної справи та фінансів

MODELING COMPETITIVE POSITIONS OF RESTAURANT ENTERPRISES IN DNIPROPETROVSK REGION USING A GRAPH-ANALYTICAL METHOD

МОДЕЛЮВАННЯ КОНКУРЕНТНИХ ПОЗИЦІЙ РЕСТОРАННИХ ПІДПРИЄМСТВ ДНІПРОПЕТРОВСЬКОЇ ОБЛАСТІ ГРАФОАНАЛІТИЧНИМ МЕТОДОМ

The article evaluates the competitive state and identifies development opportunities for restaurant enterprises in the Dnipropetrovsk region using modern methodological tools. The main objective of this article is to determine the competitiveness and development directions of the potential of restaurant enterprises by modeling their market positions using a graph-analytical method. Using the graph-analytical method, the paper identifies the characteristics of the current state and development dynamics of the potential of the studied enterprises based on evaluative parameters of competitiveness. The content of the calculation operations of the process of creating graph-analytical models for assessing the competitive positions of restaurant establishments is characterized, including: determining the evaluative indicators of the competitive potential of the enterprise and establishing their optimal value; normalizing and ranking the indicators according to criterion features taking into account the evaluative coefficient; calculating the vector length by summing up the enterprise's positions established for each criterion indicator; constructing a potential polyhedron (competitive position assessment model) of the establishment considering the obtained vector length and determining the rating assessment of the competitive position of the enterprises. By modeling the business positions of the studied restaurants using the graph-analytical method, their average rating assessments and potential development zones were identified. Based on the results of modeling the competitive positions of restaurant enterprises in the Dnipropetrovsk region using the graph-analytical method, the competitiveness level and development potential of the restaurants "Kvitan", "Silver", "Magnum", "Oasis" were established, as well as the directions and methods to improve their rating. It was determined that the "Kvitan" restaurant has the lowest rating assessment, creating a large development zone in areas such as improving the atmosphere, enhancing the interior, increasing the quality of services, the level of comfort, and staff qualifications. Modeling the development of business processes in a changing market environment based on the graph-analytical method allows tracking the dynamics of the criterion parameters of restaurant enterprises and timely adjusting their activities to strengthen their competitive positions.

Keywords: *restaurant, graph-analytical model, restaurant services market, competitiveness, rating assessment, analysis, method, criterion parameters.*

У статті здійснено оцінку конкурентного стану та виявлено можливості розвитку закладів ресторанного господарства Дніпропетровської області за допомогою сучасного методичного інструментарію. Основною метою цієї статті є визначення конкурентоспроможності та напрямів розвитку потенціалу ресторанних підприємств шляхом моделювання їх ринкових позицій графоаналітичним методом. За допомогою графоаналітичного методу визначено особливості поточного стану та динаміки розвитку потенціалу досліджуваних підприємств за оцінювальними параметрами конкурентоспроможності. Охарактеризовано зміст розрахункових операцій процесу створення графоаналітичних моделей оцінки конкурентних позицій ресторанних закладів, до яких відносяться: визначення оцінювальних показників конкурентного потенціалу підприємства та встановлення їх оптимальної величини; нормалізація та ранжирування показників за критеріальними ознаками з урахуванням оцінювального коефіцієнта; розрахунок довжини

вектору шляхом підсумовування позицій підприємства, встановлених за кожним критеріальним показником; побудова багатогранника потенціалу (моделі оцінки конкурентних позицій) закладу з урахуванням довжини отриманого вектору та визначення рейтингової оцінки конкурентної позиції підприємств. Шляхом моделювання ділових позицій досліджуваних ресторанів графоаналітичним методом визначено їх середні рейтингові оцінки та зони розвитку потенціалу. За результатами моделювання конкурентних позицій ресторанних підприємств Дніпропетровської області графоаналітичним методом встановлено рівень конкурентоспроможності та розвитку потенціалу ресторанів «Квітан», «Silver», «Магнум», «Оазис», а також напрями та способи підвищення їх рейтингу. Визначено, що заклад ресторанного господарства «Квітан» має найнижчу рейтингову оцінку, що створює велику зону розвитку за такими напрямами, як покращення атмосфери, удосконалення інтер'єру, підвищення якості послуг, рівня комфорту та кваліфікації персоналу. Моделювання розвитку бізнес-процесів у мінливому ринковому середовищі на основі графоаналітичного методу дозволяє відстежувати динаміку критеріальних параметрів ресторанних підприємств та вчасно коригувати їх діяльність для зміцнення конкурентних позицій.

Ключові слова: *ресторан, графоаналітична модель, ринок ресторанних послуг, конкурентоспроможність, оцінка рейтингів, аналіз, метод, критеріальні параметри.*

Problem statement. In the process of modeling the competitive positions of enterprises in the restaurant services market, approaches to assessing and forecasting the directions of their potential development, as well as choosing research methods, are of great importance. The methodology for modeling and assessing the competitive positions and development of business entities consists of a set of special rules and methods. In modern science, there are more than a hundred different methods and techniques for performing these operations, which differ in their tools, scope of application, and scientific validity. An important task in the modeling process is the selection of a method that best meets the tasks and principles of studying a given phenomenon or object.

The comparative method of graph-analytical analysis is one of the tools used to determine and assess the competitiveness of restaurant enterprises. This method is based on the use of graphs to visualize and identify the characteristics of connections between elements of the market system, which includes enterprises, their competitors, suppliers, consumers, and other external environment factors.

Analysis of recent research and publications. The issues of modeling enterprise competitiveness have been the focus of many scientific studies. General theoretical and practical aspects of competition are highlighted in the works of F. Kotler and M. Porter among other authors. The features of modeling enterprise competitiveness based on the development of technological potential were discussed in the work of V.B. Zakhozha [1]. Models of vector interaction of competitiveness factors and the level of competitiveness of business entities were investigated in the works of T.O. Zagornaya [2] and E.M. Smirnov [3]. However, the models and methods for assessing the competitive positions of restaurant enterprises in the food services market remain insufficiently explored.

The aim of this article is to determine the competitiveness and development directions of the potential of restaurant enterprises by modeling their market positions using a graph-analytical method.

Presentation of the main material. One of the key elements of the graph-analytical method is the creation of a graph, where nodes represent the selected elements (criterion parameters) of the analyzed system, and edges represent the connections between them. For example, the nodes may be restaurant enterprises, and the edges reflect the connections between them, such as the degree of partnership, level of competition, supply of products and raw materials, etc.

The application of the graph-analytical method helps to identify the enterprises that dominate the industry, identify their strengths and weaknesses, determine potential threats, and assess the features of their competitive position in the market. Through graphs, complex connections and the structure of interactions of economic units in the restaurant services market are modeled and visualized, providing the opportunity to assess the potential of business entities and justify strategic decisions.

Using the graph-analytical method of assessment and diagnosis of a restaurant enterprise's potential, it is possible, based on the created graphical model, to establish qualitative and quantitative parameters of interaction between its functional components, the level of business process development, and competitiveness. This method allows for the analysis of both individual opportunities and the overall potential of the establishment. Based on the obtained values of evaluative parameters, timely and justified managerial decisions can be made to improve the efficiency of the enterprise's functioning.

The construction of a graph-analytical model of the current state of the enterprise according to given parameters provides the opportunity to determine the dynamics and directions of potential development in various activities, giving an idea of its problem areas. However, with the increasing number of factors affecting the formation and development of potential, the process of creating such models becomes more complex and is based on the implementation of certain calculation operations, which include:

1. Determination of evaluative indicators characterizing individual components of the enterprise's competitive potential.

2. Establishment of evaluative indicators with the best values (b_{ij}) for each component of the enterprise's potential and their normalization by dividing the value of each criterion parameter (b_{ijn}) from the total set by the benchmark value (b_{max}):

$$b_{ij} = \frac{b_{ijn}}{b_{max}}, \qquad (1)$$

The input data is written in the form of a matrix (bij).

3. Selection of the optimal value and ranking of indicators based on criterion features, considering the evaluative coefficient, determining the enterprise's position based on the ranking results of these parameters.

4. Transformation of the sum determined by individual criterion indicators of each researched enterprise's positions into a vector length according to the formula:

$$F_j = \sum_{i=1}^{n} b_{ij} * K_u, \qquad (2)$$

where F_j – the sum of positions based on the ranking results; b_{ij} – the position occupied by the enterprise based on the ranking results; K_u – the evaluative coefficient; $i = 1 - n$ – the number of evaluative indicators; $j = 1 - m$ – the number of enterprises.

5. Plotting the length of the obtained vector on the axis, which reflects the corresponding potential in the graphical representation.

The sum of (F_j), i.e., the matrix column or the magnitude of the indicators characterizing a specific enterprise, equals the length of the vector, creating a potential polyhedron of the restaurant enterprise.

To determine the resulting assessment of the enterprise's competitive position, a comparison of criterion parameters for each functional block is performed. The obtained numerical characteristics are compared with the indicators of a conditional benchmark enterprise or a real leading enterprise, which has the best performance results in the market. Therefore, the rating assessment of the competitive position and the level of entrepreneurial potential utilization is based not on subjective expert opinions (which is characteristic of most other assessment methods) but on real achievements obtained in competitive struggle.

This approach corresponds to the principles of market competition, where every producer of goods and services strives to surpass their competitors in all areas of activity.

According to the analysis, the "Kvitan" restaurant, located in Kamianske, Dnipropetrovsk region, has certain competitive advantages and opportunities for developing its potential. The main advantages of the establishment include its location in a residential area of the city. This area has developed infrastructure and favorable transport links, allowing visitors to reach the restaurant by both public transport and their own cars. Additionally, a positive characteristic of this enterprise is the presence of a large and convenient parking area.

The assessment of internal potential, limitations, as well as the identification of opportunities and threats of the external environment of the "Kvitan" restaurant enterprise, is carried out using SWOT analysis. This allows determining the positive and negative external and internal factors affecting the enterprise's potential state and development.

SWOT analysis of the "Kvitan" restaurant showed that its strengths include a high rating by guests for the taste of the food, which generally meets visitors' expectations. Weaknesses include consumer dissatisfaction with the price-quality ratio of service and the restaurant's atmosphere. Therefore, an important step in the development path for this restaurant enterprise is to develop strategic directions for improving positions in the ratings of popular media evaluation services, which will help attract regular customers, increase sales, and the average check amount. The analysis found that the overall rating of the "Kvitan" restaurant is 4.7 out of 5, the food rating is 4.8, meaning that visitors are satisfied with the establishment and wish to continue using its services. The scores for the "Kvitan" restaurant and competitor enterprises "Silver", "Magnum", "Oasis" on such criterion parameters as food taste, service quality, price-quality ratio, atmosphere, and establishment rating are presented in Figure 1.
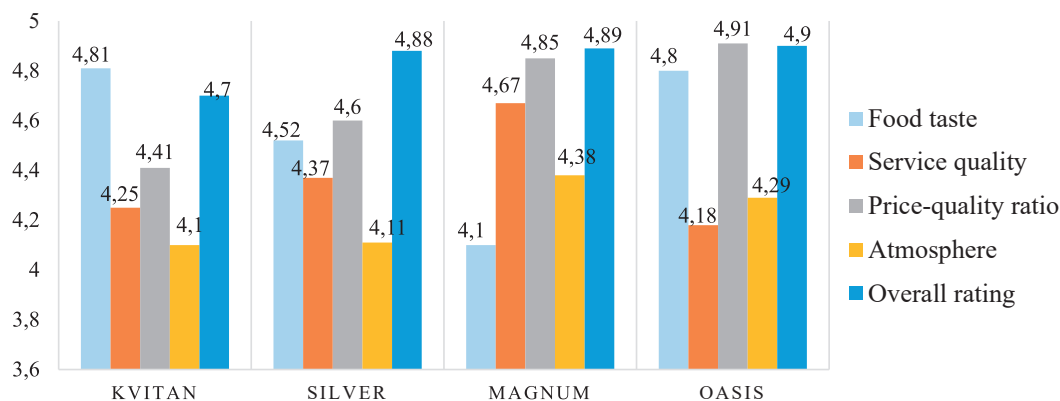

Figure 1. Performance rating indicators for restaurants "Kvitan", "Silver", "Magnum", and "Oasis"

Source: Compiled by the author

It is necessary to identify the strengths and weaknesses of the aforementioned thematically similar restaurant enterprises. A comparative analysis of the competitive positions of this restaurant with similar enterprises operating in this market segment is carried out by modeling the business positions of the studied business entities based on the graph-analytical method according to the above evaluative indicators.

The "Kvitan" restaurant received the following ratings in these categories: food taste – 4.81; service quality – 4.25; price-quality ratio – 4.41; atmosphere – 4.1; overall rating – 4.7. The constructed model for assessing the competitive positions of this establishment is presented in Figure 2. The strengths of the restaurant include the taste of the food, which leads to repeat visits and the formation of a circle of regular customers.

This significantly impacts the overall rating of the restaurant, as the enterprise excellently meets the main expectations of visitors for this criterion. However, among the weaknesses, the inconsistency between the price and the quality of service and the atmosphere of the restaurant, from the consumers' perspective, can be highlighted. Guests expect lower service prices and consider the quality to be insufficient. This factor negatively affects the enterprise's success. It has been established that to eliminate this drawback and improve service activities, it is necessary to enhance staff qualifications through master classes and implementing checklists for hall workers. Additionally, the low rating of the created atmosphere in the restaurant indicates the need for a plan to improve guest comfort. During the study, a comparative analysis of competitor establishments in the city's restaurant services market was conducted. According to similar evaluative parameters, the "Silver" restaurant received the following ratings: food taste – 4.52; service quality – 4.37; price-quality ratio – 4.65; atmosphere –

4.11; overall rating – 4.9. Based on these indicators, a graph-analytical model of the establishment's competitive positions was formed (Figure 3).

According to the obtained data, the "Silver" restaurant has a high rating, indicating its high popularity and guest satisfaction. This can result from combining factors such as excellent food taste, quality service, pleasant atmosphere, and optimal price-quality ratio. The "Magnum" restaurant is characterized by the following evaluative indicator values: food taste – 4.1; service quality – 4.76; price-quality ratio – 4.85; atmosphere – 4.38; overall rating – 4.9. Using these data, a corresponding graph-analytical model of the enterprise's competitive positions was created (Figure 4).

One of the advantages of the "Magnum" restaurant is its favorable location in the city center in an economically developed area. Generally, guests visit this place for relaxation, but according to consumer ratings, the "food taste" indicator has a low value. The next competitor enterprise, the "Oasis" restaurant, received the following ratings for the selected criteria: food taste – 4.8; service quality – 4.18; price-quality ratio – 4.92; atmosphere – 4.29; overall rating – 4.9. These indicators are reflected in the graphical model in Figure 5.

The points located on the graph, corresponding to the number of points for certain evaluative parameters, indicate the outstanding gastronomic offerings of the restaurant, high quality of service, favorable price-quality ratio, and the existence of a comfortable atmosphere in the restaurant.

Thus, based on the calculations, the average rating assessments of the studied restaurant enterprises were determined and their ranking was conducted (Table 1).

The average rating level (degree of competitiveness) of the "Kvitan" restaurant is 4.45, and based on the ranking results, it is in the fourth and last place, which ne-
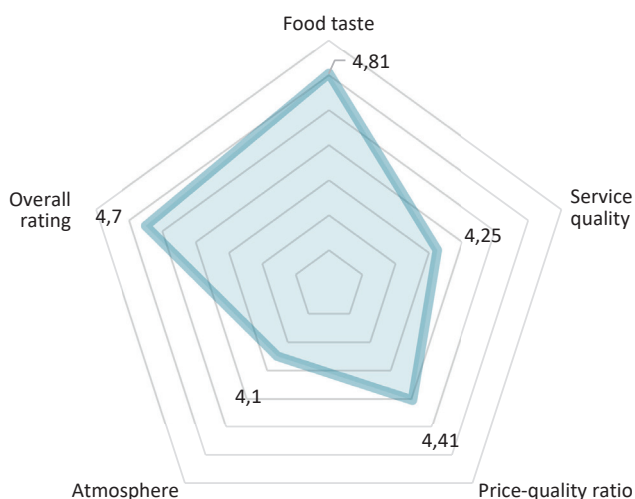

Figure 2. Graph-analytical model for assessing the competitive positions of the "Kvitan" Restaurant
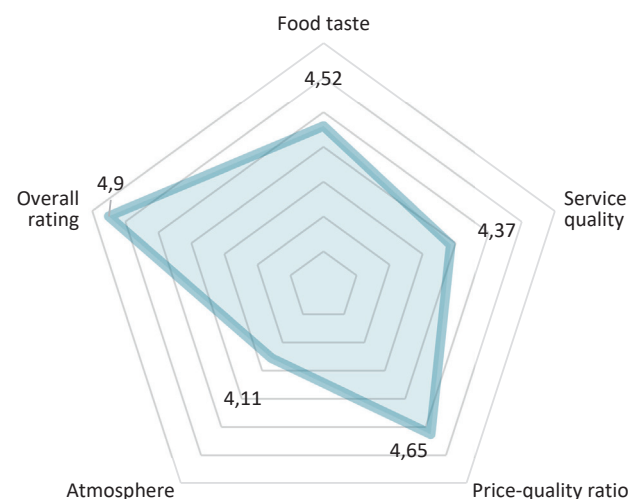
Source: Compiled by the author

Figure 3. Graph-analytical model for assessing the competitive positions of the "Silver" Restaurant

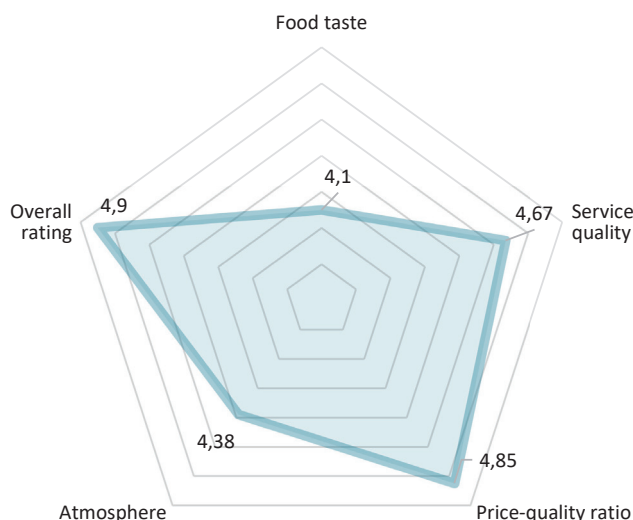*Source: Compiled by the author*

Figure 4. Graph-Analytical Model for Assessing the Competitive Positions of the "Magnum" Restaurant
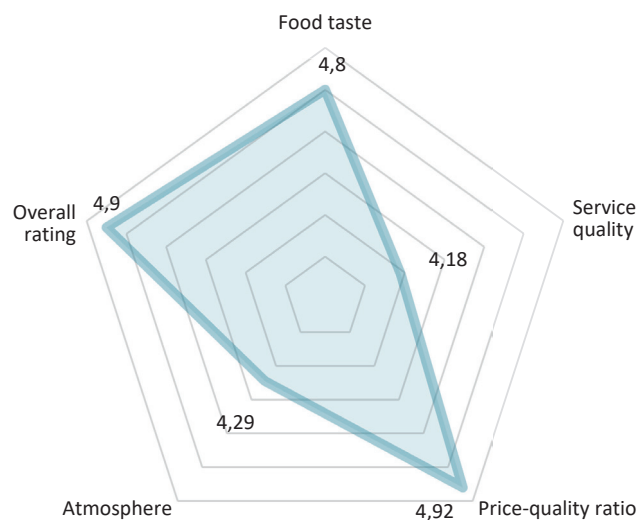
Source: Compiled by the author

Figure 5. Graph-analytical model for assessing the competitive positions of the "Oasis" Restaurant.

Source: Compiled by the author

cessitates the formation of a strategy aimed at improving the relevant areas of this establishment's activities to achieve better competitive positions. Based on the results of modeling the competitive state of enterprises in the restaurant services market using the graph-analytical method, their cumulative rating has been determined, and the development zones of the analyzed establishments have been established (Figure 6).

The developed model for assessing the ratings of restaurant establishments reflects their competitive positions in the services market and indicates that the "Kvitan" enterprise, compared to other studied establishments, has lower rating scores based on established evaluation criteria but is a leader in the "food taste" indicator. According to the analysis, the majority of visitors recognize the excellent taste of the dishes created by experienced chefs; however, the scores characterizing the atmosphere of the establishment and the quality of service are the lowest among competitors. Thus, to strengthen the competitive positions of the "Kvitan" restaurant, it is necessary to improve service activities and the interior of the trading premises.

Conclusions. As a result of the study, modeling competitive positions of restaurant enterprises using the graph-analytical method established the level of competitiveness and development potential of enterprises in the restaurant services market of the Dnipropetrovsk region, as well as the directions and methods for improving their ratings. It has been determined that the "Kvitan" restaurant has the lowest rating score among competitor establishments, creating a large area for its development in such areas as improving the atmosphere, enhancing the interior, increasing the quality of services, level of comfort, and staff qualifications. The use of the graph-analytical method and modeling the
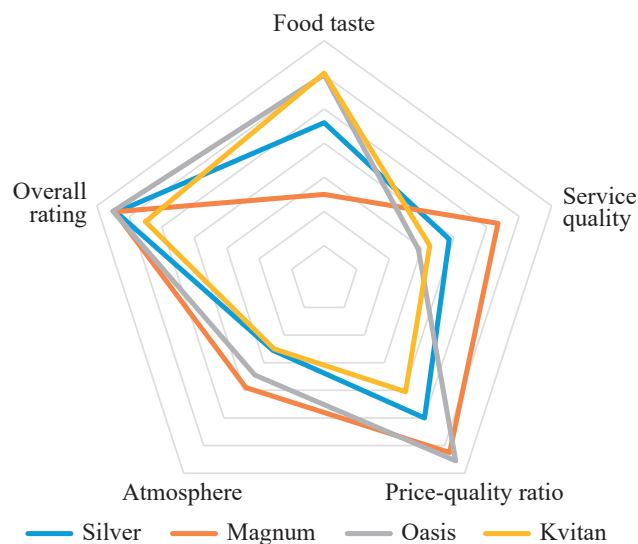
Table 1

Average Rating Assessments of Restaurants

Name of Enterprise	Average Score	Indicator Ranking
Silver	4,51	3
Magnum	4,58	2
Oasis	4,62	1
Kvitan	4,45	4

Source: Compiled by the author

Figure 6. Comparative Graph-Analytical Model for Assessing the Ratings of Restaurant Establishments.

Source: Compiled by the Author

development processes of business entities based on it in a changing market environment allows tracking the dynamics of the criterion parameters of restaurant enterprises and timely adjusting their activities to strengthen competitive positions.

References:

1. Zakhozhai, V. B. and Koretska, O. V. (2016) Analitychna modelʹ konkurentospromozhnosti pidpryyemstva v konteksti yoho konkurentnoho tekhnolohichnoho potentsialu [Analytical model of competitiveness enterprises in the context of its competitive technological potential]. *Naukovi pratsi MAUP*, vol. 49(2), pp. 120–124.

2. Zagornaya, T. O. (2013) Modelʹ vektornoyi vzayemodiyi faktoriv konkurentospromozhnosti pidpryyemstv rozdribnoyi torhivli [Vector interaction model of factors of retailers' competitiveness]. Marketynh i menedzhment innovatsii, vol. 3, pp. 35–44.

3. Smyrnov, Ye. M. (2013) Modelyuvannya rivnya konkurentospromozhnosti torhovelʹnoho pidpryyemstva [Modelling the level of competitiveness of the trade enterprise]. *Akademichnyi ohliad*, vol. 1 (38), pp. 92–97.

Список літератури:

1. Захожай В. Б., Корецька О. В. Аналітична модель конкурентоспроможності підприємства в контексті його конкурентного технологічного потенціалу. *Наукові праці МАУП*. 2016. Вип. 49(2). С. 120–124.

2. Загорна Т. О. Модель векторної взаємодії факторів конкурентоспроможності підприємств роздрібної торгівлі. *Маркетинг і менеджмент інновацій*. 2013. № 3. С. 35–44.

3. Смирнов Є. М. Моделювання рівня конкурентоспроможності торговельного підприємства. *Академічний огляд*. 2013. № 1(38). С. 92–97.