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ANALYSIS AND ASSESSMENT OF COMPETITIVENESS OF ENTREPRENEURIAL STRUCTURES IN AZERBAIJAN

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Highlights

- The study evaluates the competitiveness of entrepreneurial structures in Azerbaijan using a comprehensive, multi-methodological approach that integrates financial, operational, and dynamic assessment tools.
- Analysis is based on key economic indicators such as the number of active enterprises, number of employees, and average monthly salaries, with a focus on their impact on added value creation.
- The methodological approach integrates a multifactor production function model alongside correlation-regression analysis to quantify the impact of core variables on enterprise efficiency.
- Findings reveal statistically significant correlations ($r > 0.9$) between added value and the examined indicators, highlighting their critical influence on competitive performance.
- Practical recommendations emphasize the adoption of advanced technologies, increased labor productivity, and strategic support for high value-added sectors to strengthen entrepreneurial competitiveness.

Abstract

Introduction: This study addresses the urgent need for a comprehensive assessment framework for evaluating the competitiveness of entrepreneurial structures—an issue of increasing relevance in modern economic science. The research focuses on identifying the key determinants of competitiveness and understanding the underlying mechanisms that contribute to the development of competitive advantages in business entities.

Methods: To achieve this, the authors apply an integrated methodological approach, encompassing financial and economic indicator analysis, matrix and product-based methods, operational and dynamic assessments, as well as production function modeling and multi-criteria optimization. A novel dynamic methodology is developed, which is grounded in the analysis of primary performance indicators. Additionally, correlation-regression analysis is employed to examine the influence of various economic factors on added value generation.

Results: The comparative analysis of different assessment techniques highlights their respective strengths and limitations in terms of practical applicability and reliability. The proposed production-function-based model successfully identifies key factors impacting competitiveness, while the regression analysis reveals strong correlations between added value and variables such as enterprise count, workforce size, and wage levels.

Discussion: The findings confirm that a dynamic and multifactorial evaluation approach offers a more nuanced and accurate understanding of enterprise competitiveness. The comparison between actual and predicted values of added value further validates the model and provides insights into the current performance and future potential of entrepreneurial structures in Azerbaijan. These results serve as a foundation for strategic decision-making and policy recommendations aimed at enhancing competitive performance.

Keywords

Entrepreneurial structures, assessment methodology, correlation-regression analysis, added value, multi-criteria optimization.

JEL classification: L26, M21, O20.

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Introduction

The significance of this study is driven by the fact that ensuring the competitiveness of entrepreneurial structures necessitates an integrated approach that combines both theoretical foundations and practical methodologies. The application of these scientific and practical tools highlights the necessity of an in-depth examination of the underlying processes that shape and enhance business competitiveness [29]. This requires a comprehensive analysis of competitiveness factors and the development of sophisticated evaluation mechanisms. From a practical standpoint, various assessment methodologies are employed to evaluate competitiveness, serving as a basis for strategic growth approaches at the enterprise, industry, and regional levels [20]. These methodologies play a crucial role in identifying strengths and weaknesses, as well as opportunities for improvement within entrepreneurial structures [21]. Despite significant advancements in the theoretical understanding of competition and competitiveness [27], there remains no universally accepted definition of competitiveness or a standardized methodology for its assessment [5]. This conceptual ambiguity complicates the development of universally applicable evaluation models [8]. The study aims to establish a systematic framework for assessing business competitiveness by integrating analytical and methodological approaches. The assessment of competitiveness in the entrepreneurial sector is inherently rooted in the structured analysis of economic entities and the identification of a hierarchical structure of competitiveness factors. Addressing this complex challenge requires a multidisciplinary approach that bridges theoretical insights with practical evaluation methods. Within the existing body of knowledge, approaches to assessing the competitiveness of business entities are generally classified into two broad categories: analytical methods and graphical techniques [26].

It is essential to emphasize that the methodologies employed in competitiveness assessment are inherently scientific, characterized by methodological precision and conceptual rigor. The diversity of approaches to defining and evaluating competitiveness underscores the multifaceted nature of the concept itself. Variations in theoretical foundations, combined with differing evaluation objectives, necessitate the development of specialized systems tailored to address specific organizational or industry-related challenges. This methodological flexibility enables a more accurate and context-sensitive evaluation of business competitiveness. Regardless of the diverse methods and forms of competitiveness assessment, a fundamental priority for every business entity is the development of effective competitive strategies and the establishment of sustainable competitive advantages to ensure market success. In this regard, competition acts as a catalyst, compelling businesses to enhance product quality, improve operational efficiency, reduce production costs, and increase labor productivity. Competitiveness as a concept can be deconstructed into three fundamental components. The first relates to the quality and operational characteristics of products. The second encompasses aspects related to distribution, sales, post-sales service, and the economic capabilities and constraints of consumers. The third component reflects an

enterprise's ability to comprehensively meet customer demands and preferences, which constitutes the primary objective of this study. It is important to note that the assessment of entrepreneurial competitiveness has traditionally focused on tangible and production-related factors, which are considered key drivers. However, a more nuanced perspective acknowledges the critical role of intellectual capital and intangible assets in shaping and sustaining competitive advantages [7]. Elements such as innovation, brand equity, and knowledge resources serve as decisive factors in securing long-term business competitiveness [11]. In the modern economic landscape, businesses are increasingly exposed to rising competitive pressures, highlighting the growing importance of competition as a systemic factor. A pronounced trend of intensified competitive dynamics is observed across various industries. Consequently, the scientific novelty of this study lies in the systematic analysis of competitors, as well as the identification and evaluation of their level of competitiveness. These aspects are becoming critical strategic imperatives for achieving superior business performance and attaining sustainable market success.

Literature review

The assessment of the competitiveness of an entrepreneurial entity serves as a multifaceted tool with applications across various strategic and operational dimensions. This process provides critical insights and actionable data that can be utilized for a range of purposes, as outlined by V.E. Esipov, G.A. Makhovikova, S.K. Mirzazhanov [16]: a) Facilitating informed decision-making in relation to specific investment strategies; b) Enhancing the efficiency and effectiveness of currently implemented management practices; c) Optimizing the execution of transactions involving the purchase and sale of company shares or other securities in financial markets; d) Conducting more effective negotiations and processes for the acquisition or sale of an entrepreneurial entity, either in whole or in part; e) Determining the equitable share of a co-owner during property-related operations within the entrepreneurial structure; f) Streamlining and executing processes related to the restructuring of an entrepreneurial entity to ensure adaptability and growth; g) Evaluating the creditworthiness of the entrepreneurial entity, as well as determining the value of specific assets that can serve as collateral in obtaining loans; h) Generating essential financial and operational data required for compliance with tax regulations and reporting obligations.

By applying a rigorous and systematic approach to the evaluation of competitiveness, entrepreneurial entities can achieve a deeper understanding of their market position, thereby enabling more informed strategic decisions and fostering long-term sustainability. In modern economic literature, there is no unified or universally accepted concept regarding the assessment of the competitiveness of entrepreneurial activities. Various authors present differing perspectives and methodologies on this issue, reflecting the multifaceted and complex nature of the topic. Nevertheless, based on the results of extensive research and theoretical analysis, the following approach can be considered more precise and methodologically sound. The evaluation of the competitiveness of an entrepreneurial entity represents a systematic procedure aimed at determining the objective value of

the entity under consideration. This valuation serves as a fundamental basis for conducting operations involving the entity and addressing a wide range of strategic and operational objectives. The added value derived from such an evaluation is not only a reflection of the entity's intrinsic worth but also establishes a justified price level for market transactions and facilitates informed managerial decision-making within a market economy framework. The ability to accurately determine this added value is essential, as it directly impacts the efficiency of various processes, including investment decisions, restructuring initiatives, and the overall strategic positioning of the entrepreneurial entity [10].

A.A. Thompson and A.J. Strickland propose a comprehensive framework for evaluating the competitiveness of an entrepreneurial entity, emphasizing the consideration of various critical factors that influence its market position [25]. These factors, which collectively shape the competitive potential of an enterprise, include the following: a) Product quality and features, as these directly impact consumer satisfaction and market demand; b) Production volume and innovative opportunities, which determine the scalability and adaptability of the entity to market changes; c) Utilization of advanced technologies, ensuring efficiency and alignment with modern industry standards; d) Dealer network and distribution capabilities, which are essential for effective market penetration and customer reach; e) Material resources, providing a foundation for sustainable production processes; f) Cost efficiency compared to competitors, influencing the entity's pricing strategies and profitability; g) Customer service quality, which plays a pivotal role in fostering customer loyalty and enhancing brand reputation.

This holistic approach underscores the necessity of integrating both tangible and intangible factors in the assessment process, thus enabling a more accurate and nuanced understanding of an entity's competitive standing in dynamic market environments. The outlined set of factors inherent to an entrepreneurial entity, while significant, does not unilaterally determine its overall competitiveness. These factors, depending on the context and the manner in which they are managed, can exert both positive and negative influences on the operational and strategic activities of the entity. Their impact is largely contingent upon the external environment, the effectiveness of internal management practices, and the entity's ability to adapt to dynamic market conditions. This underscores the necessity of a comprehensive and nuanced approach to evaluating competitiveness, which considers the interplay of these factors within the broader organizational and industry-specific context.

N.K. Moiseyeva emphasizes the importance of specific criteria in evaluating the competitiveness of an enterprise, highlighting the need for a multidimensional and systematic approach. Among the criteria proposed, the following stand out as particularly significant: a) a criterion reflecting the dynamics of consumer satisfaction, which measures the enterprise's ability to meet evolving customer needs and preferences effectively; b) a time criterion of production efficiency, which evaluates the timeliness and productivity of the enterprise's operational processes [18]. In contrast, W. David Cravens proposes a slightly different perspective, asserting that the foundation of an enterprise's competitiveness should rest upon its

core competencies, which are shaped by three critical dimensions: a) The development and leverage of competitive advantages, which enable the enterprise to differentiate itself in the marketplace; b) Diversification, or the ability to maintain competitive superiority across various situations and market conditions; c) The complexity of replication, which ensures that the enterprise's unique strengths and capabilities are difficult for competitors to imitate.

These contrasting yet complementary viewpoints underscore the multifaceted nature of competitiveness, requiring enterprises to balance customer-centric performance metrics with strategic capabilities that ensure long-term sustainability in a dynamic market environment [6]. The evaluation of the competitiveness of entrepreneurial activities, as well as their constituent elements, can be effectively conducted through the application of three established methodological approaches: the income approach, the cost-based approach, and the comparative approach. Each of these approaches offers distinct perspectives and is grounded in specific theoretical principles and practical techniques. The income approach represents a methodologically robust framework in which the present value of the evaluated object is determined as the aggregate of anticipated future income derived from its utilization. This approach is particularly valuable for assessing the long-term profitability and sustainability of entrepreneurial entities [3]. The second approach, known as the cost-based approach, focuses on the valuation of an object based on the financial resources required for its reproduction or replacement. This approach relies on a systematic evaluation of costs associated with the creation, maintenance, and sale of the object, thereby reflecting its comprehensive economic value. Here, the value of the object is equated to the total costs incurred during its production and commercialization processes, effectively representing its full cost [23]. Finally, the comparative approach leverages the pricing information of similar entities within the market to assess competitiveness. By comparing the evaluated object with analogous entities, this approach provides a relative perspective on the competitive position of the object in question. It is particularly useful for benchmarking and identifying market-driven advantages or deficiencies [15]. Incorporating these approaches into the assessment of entrepreneurial competitiveness ensures a multidimensional analysis that captures both the intrinsic and extrinsic factors influencing competitive performance. Such a comprehensive evaluation facilitates more informed strategic decision-making and enhances the enterprise's adaptability in dynamic market environments.

Methodological Basis

Assessing the competitive position of a business entity within the framework of a market economy represents a fundamental and indispensable component of its overall operational and strategic activities. This process holds particular significance due to the dynamic and competitive nature of modern economic systems, where the ability to sustain and enhance competitiveness directly impacts the success and longevity of entrepreneurial entities. Consequently, the evaluation of an enterprise's competitiveness is not merely a supplementary task but an essential aspect of its comprehensive management strategy [9].

The determination of competitiveness serves a multifaceted purpose, enabling enterprises to identify their relative strengths and weaknesses in the marketplace. Specifically, the assessment of a business entity's competitiveness is crucial for achieving the following objectives: a) Formulation and development of measures aimed at enhancing competitiveness, which involves the identification of strategic initiatives and operational improvements necessary to strengthen the enterprise's position in the market; b) Selection of counterparties for collaborative activities, emphasizing the importance of identifying reliable and strategically aligned partners to achieve mutual goals and optimize resource utilization; c) Design and implementation of a program for the enterprise's entry into new markets, which requires a thorough analysis of market conditions, consumer behavior, and competitive dynamics to ensure successful expansion; d) Execution of investment activities, including the evaluation and prioritization of investment opportunities that align with the enterprise's long-term strategic objectives and contribute to sustainable growth; e) Facilitation of state-regulated economic activities, wherein the enterprise aligns its operations with regulatory frameworks and policies to ensure compliance, stability, and support for national economic development objectives.

By addressing these critical aspects, enterprises can effectively navigate the complexities of a competitive market environment, thereby fostering resilience and sustained growth. The primary objective of evaluating the competitiveness of an enterprise lies in identifying and analyzing its position within the targeted market. This evaluation is critical for understanding the enterprise's relative strengths and weaknesses, as well as for formulating effective strategies to enhance its competitive standing. The fundamental task of economists and researchers involved in studying this issue is to establish well-defined criteria for competitiveness, uncover its underlying sources, and analyze the factors that influence it [22].

A thorough review of the economic literature devoted to this subject reveals a diverse array of approaches aimed at addressing the challenge of assessing enterprise competitiveness. These approaches are distinguished by various classification frameworks, including theoretical content, the format in which evaluation results are presented, and the mathematical relationships between indicators used for assessment. Each classification reflects a unique perspective and methodology for tackling the complexity of competitiveness evaluation. By integrating these approaches, researchers and practitioners can achieve a more comprehensive understanding of competitiveness, enabling them to adapt their strategies to the dynamic requirements of the modern market environment. The evaluation of the competitiveness of entrepreneurial entities can be approached through a variety of methodological frameworks, each offering distinct perspectives and analytical tools. A generalized classification of these primary methods has been proposed by D.S. Voronov, P.P. Korsunov, V.V. Krivorotov, T.V. Matveeva [13], reflecting the diverse dimensions of competitiveness analysis.

This classification includes the following: a) Matrix methods, which focus on the strategic evaluation of an entrepreneurial entity's product portfolio, enabling the identification of optimal resource allocation strategies and market positioning; b)

Product-oriented methods, emphasizing the detailed assessment of the competitiveness of specific products, thereby linking product attributes to market demand and consumer preferences; c) Operational methods, which involve analyzing various components of the entrepreneurial entity's operational activities, with the aim of improving efficiency, productivity, and overall performance; d) Market value-based evaluation methods, where the focus is on determining the competitiveness of the entrepreneurial entity through the lens of its market valuation, reflecting external perceptions and financial health; e) Dynamic methods, which track and analyze key economic indicators of the entrepreneurial entity over time, offering insights into its long-term growth, adaptability, and sustainability; f) Production-focused methods, which rely on the analysis of factor variables influencing the entity's final outcomes, highlighting the impact of resources, processes, and external conditions on performance.

This comprehensive classification underscores the importance of integrating multiple analytical approaches to capture the multifaceted nature of competitiveness, thereby facilitating informed decision-making and strategic planning in dynamic market environments. The utilization of the majority of the aforementioned methods primarily facilitates the analysis of the competitiveness of an individual entrepreneurial entity. While these methods provide valuable insights into the performance and strategic positioning of a single enterprise, their applicability is often limited when it comes to conducting a comparative evaluation of multiple entrepreneurial entities within a competitive landscape. To address this limitation, it is methodologically justified to adopt a dynamic approach, which is based on the comprehensive assessment of economic indicators over time. This approach enables the comparative analysis of competitiveness across several entrepreneurial entities, offering a broader and more nuanced understanding of their relative strengths and weaknesses. In light of these considerations, it is imperative to systematically analyze the principal methods employed for assessing the competitiveness of enterprises engaged in entrepreneurial activity. Furthermore, it is essential to critically evaluate and summarize the distinctive advantages and inherent limitations of these methods, thereby providing a balanced perspective on their practical utility and applicability in diverse market scenarios.

Operational Methods

The evaluation of enterprise competitiveness through the application of operational methods necessitates a systematic and scientifically grounded approach. At the initial stage, it is critical to define a comprehensive list of operations and indicators that play a pivotal role in ensuring the competitive positioning of the enterprise. These indicators are typically categorized into key groups, including marketing, economic, production, organizational, and personnel-related metrics. Such categorization reflects the multifaceted nature of competitiveness and the diverse factors influencing it. The specific composition and structural hierarchy of the evaluated indicators and operations may vary significantly depending on the particular methodology adopted for analysis. This variability underscores the necessity of tailoring the approach to the unique characteristics of the enterprise and

its operational environment. In this context, both well-established indicators recognized within economic science and novel metrics proposed by researchers are utilized, ensuring a robust and adaptable framework for assessment. To accurately determine the competitive standing of the enterprise under study, each selected indicator is systematically compared with analogous indicators of a competing entrepreneurial entity. This comparative analysis allows for the calculation of partial efficiency coefficients for each operation, providing a detailed and quantifiable measure of performance. These coefficients serve as a foundation for identifying areas of strength and opportunities for improvement, thereby contributing to the development of effective strategies aimed at enhancing overall competitiveness.

$$K_I = i_a / i_e \quad (1)$$

K_I – represents the partial efficiency coefficient for the i -th operation; i_a – the value of the i -th indicator for the enterprise under study; i_e – the reference value of the i -th indicator.

In accordance with the chosen methodological framework, the partial efficiency coefficients derived during the evaluation process undergo various forms of mathematical processing to generate an integrated assessment of the enterprise's competitiveness. This step is pivotal in transforming fragmented data into a comprehensive and interpretable competitiveness indicator. A widely employed approach involves determining the enterprise's overall competitiveness index by calculating the weighted average of the partial efficiency ratios. This method ensures that each individual indicator's contribution to the overall competitiveness is proportionally represented, taking into account its relative importance within the context of the enterprise's strategic objectives and operational priorities. The weighting factors assigned to each indicator are typically based on their perceived significance, which may be determined through expert judgment, empirical analysis, or a combination of both.

$$K = \sum a_i k_i \quad (2)$$

K – the competitiveness index of the evaluated enterprise; a_i – the weight coefficient assigned to the i -th operation (determined through expert assessment); k_i – the partial efficiency coefficient for the i -th operation.

Among the significant advantages of operational methods is their ability to encompass a wide array of diverse aspects related to the enterprise's activities. This multifaceted approach establishes optimal conditions for achieving a highly accurate and comprehensive assessment of the enterprise's competitiveness. By integrating various dimensions of enterprise performance, operational methods provide a robust analytical framework for evaluating competitive standing in a dynamic market environment [19]. However, it is important to recognize certain limitations inherent in these methods. A notable drawback lies in their primary focus on identifying and analyzing the multitude of factors influencing the competitiveness of entrepreneurial

entities. While this emphasis on capturing a maximum number of relevant factors contributes to a more detailed evaluation, it can also lead to challenges in prioritizing and managing these factors effectively. The creation of an exhaustive list of factors, while beneficial for comprehensiveness, may inadvertently complicate the analytical process and obscure the identification of the most critical determinants of competitiveness. This duality of strengths and weaknesses highlights the necessity of balancing the depth of analysis with practical applicability, ensuring that the evaluation remains both detailed and actionable in guiding strategic decision-making.

Assessment Methods

The methodological approaches to evaluating competitiveness are grounded in the premise that financial indicators such as sales volume, profit, cost structure, and other related metrics represent intermediate characteristics reflecting specific economic aspects of an enterprise's activity. These indicators, while crucial, do not fully encompass the broader economic and strategic context of the enterprise. Instead, the ultimate criterion for evaluating financial stability and economic efficiency is often considered to be market value—a comprehensive indicator that integrates the key parameters of both the external and internal environments of the entrepreneurial entity. From a theoretical standpoint, the business value emerges as an integral measure of the overall development trajectory of an entrepreneurial entity. The dynamic comparison of business values across various enterprises provides a valuable basis for benchmarking their results and evaluating their competitive prospects within the market [1].

This approach allows for a more nuanced understanding of competitiveness, offering insights into both current performance and future potential. However, it is important to acknowledge a significant limitation associated with the practical application of market-value-based evaluation methods. The inherent complexity and data-intensiveness of such approaches often limit their feasibility in real-world scenarios. The reliance on accurate and comprehensive market data, coupled with the need for sophisticated analytical tools, can pose challenges for widespread implementation. Despite these constraints, market-value-based assessments remain a valuable tool in providing a holistic perspective on enterprise competitiveness, particularly when used in conjunction with other evaluation methodologies.

Dynamic Methods

The dynamic method for assessing the competitiveness of an enterprise is predicated on the theoretical assumption that the primary mechanism for generating profit in a market economy is the sale of products and the creation of added value. This approach emphasizes the dynamic interplay between production efficiency and market positioning, offering a comprehensive framework for evaluating the competitive potential of an entrepreneurial entity. Within this methodological construct, two fundamental sources of competitiveness are distinguished: operational efficiency and strategic positioning. Operational efficiency reflects the enterprise's ability to effectively utilize its economic resources, thereby ensuring cost-effective production and delivery of goods and services. Strategic positioning,

on the other hand, characterizes the enterprise's ability to occupy and sustain a favorable position within its target market segments. These dimensions are interrelated, as improvements in operational efficiency can reinforce strategic positioning, and vice versa. The evaluation process is carried out by comparing the enterprise's relevant performance indicators with those of its competitors. This comparative analysis enables the identification of operational efficiency and strategic positioning coefficients, which quantitatively represent the enterprise's relative standing in these areas. To derive an integrated measure of competitiveness, these coefficients are mathematically synthesized into a single composite indicator. This consolidated measure not only facilitates a holistic evaluation of the studied enterprise but also provides actionable insights for enhancing its competitive strategy. By employing this dynamic methodology, enterprises can gain a clearer understanding of their competitive advantages and areas for improvement, enabling more informed decision-making in an ever-evolving market environment.

$$K = K_r \times K_l \quad (3)$$

K – competitiveness of the studied enterprise; K_r – operating efficiency ratio; K_l – strategic positioning factor.

Operational efficiency, as a critical dimension of enterprise competitiveness, entails the execution of analogous activities with superior performance compared to competitors. This efficiency serves as a cornerstone for generating profits, particularly through the effective realization of surplus value in market transactions. The concept underscores the enterprise's ability to optimize its processes and resources, thereby ensuring maximum profitability while maintaining competitive advantage within its industry segment. From an economic standpoint, operational efficiency embodies the enterprise's capacity to achieve cost minimization and output maximization concurrently. This dynamic directly correlates with the profitability of the enterprise, positioning operational efficiency as both a strategic goal and a measurable performance metric. The evaluation of operational efficiency is typically expressed through a formalized mathematical framework, represented by the following formula:

$$K_r = B/C \quad (4)$$

K_r – operational efficiency of the enterprise; B – income from the sale of the company's products; C – costs of production and sale of the company's products.

The operational efficiency indicator is characterized by a range of permissible values on the positive segment of the abscissa axis, indicating that its value cannot fall below zero. This theoretical restriction aligns with fundamental economic principles, as negative efficiency would contradict the notion of resource optimization. If the operational efficiency indicator assumes a value less than one, this signals that incurred costs exceed generated income, thereby rendering the business activity economically unviable or unprofitable. Conversely, when the

indicator exceeds one, it reflects a scenario where the enterprise operates profitably, effectively leveraging its resources to generate a surplus. Strategic positioning, as an integral aspect of competitive strategy, entails the deliberate implementation of activities aimed at creating unique value propositions for the market. This involves the establishment of a competitive position founded on a distinctive combination of activities, setting the enterprise apart from its competitors. The fundamental purpose of strategic positioning is the facilitation of value realization through the creation, retention, and expansion of sales markets, ensuring long-term competitive advantage. The conceptual core of strategic positioning lies in market share, which is quantitatively defined as the ratio of revenue derived from product sales to the overall market capacity. This metric serves as a vital indicator of an enterprise's relative market presence and its ability to capitalize on market opportunities [27]. The strategic positioning coefficient, as a quantitative measure, can be expressed mathematically using the following formula:

$$K_I = \sqrt{I/I^s} \quad (5)$$

K_I – Strategic Positioning Factor; I – Index of Changes in the Enterprise's Revenue Volumes; I^s – Index of Changes in the Enterprise's Income Volume.

Based on expression (3), the following result is derived:

$$K = B/C \times \sqrt{I/I^s} \quad (6)$$

The value of the strategic positioning coefficient, denoted as K , serves as a key indicator of the relative competitiveness of the studied entrepreneurial entity. It is crucial to note that the coefficient K falls within the range $0 < K < \infty$. The interpretation of K is such that, when the value of K lies between 0 and 1, the competitiveness of the enterprise is considered relatively low. In this context, the closer K is to zero, the more pronounced the deficiency in competitiveness becomes. Conversely, when K equals 1, the enterprise's competitive standing is comparable to that of its peers, indicating parity in market positioning. If K exceeds 1, it signifies that the enterprise's competitiveness surpasses that of its competitors, thus reflecting a favorable competitive advantage [14].

The primary advantage of utilizing the dynamic method for assessing the competitiveness of an enterprise lies in its reliance on key final indicators of competitiveness—namely, profitability and market share. These criteria are instrumental in determining the overall competitive standing of an enterprise within the context of a market-driven economy. By focusing on these crucial aspects, the dynamic method enables a comprehensive evaluation of the enterprise's performance, reflecting its ability to generate sustainable profits and capture a significant portion of the market. These factors collectively serve as a reliable gauge of the enterprise's long-term viability and competitive strength.

Production Methods

The core principle of the methodological approach to constructing production functions revolves around identifying the factor variables that influence the ultimate parameter of competitive efficiency in entrepreneurial activities. This approach further involves conducting a correlation-regression analysis to assess the extent of their impact on the competitive performance of the enterprise. In practice, when evaluating the efficiency of entrepreneurial development, the production function is frequently employed in its multiplicative form. This form represents a generalized structure that encapsulates the relationship between various input factors and their effect on the competitive outcomes of business activities. The most general expression of this production function is as follows:

$$Y = A_0 \times X_1 A_1 \times X_2 A_2 \times \dots \times X_n A_n \quad (7)$$

In this context:

- Y represents the indicator of the final efficiency of the competitive development of the entrepreneurial entity.
- $X_1, X_2, \dots, X_n$ are the factor variables that characterize the quantitative parameters of the entrepreneurial entity's activities within the model.
- $A_1, A_2, \dots, A_n$ denote the elasticity coefficients associated with the specified production function.
- A_0 is the constant term of the production function.
- n indicates the total number of factor variables.

This methodological approach facilitates the identification of the key factor variables that are critical for ensuring the overall efficiency of entrepreneurial activity. By focusing on these essential determinants, it enables a more precise understanding of the dynamics affecting business performance. However, a notable limitation of this approach is that its results are inherently probabilistic in nature, introducing a degree of uncertainty in the final assessment.

Results and discussion

To effectively ensure the competitive development of entrepreneurial entities, the timely mobilization of the factors and resources that directly impact their operations is contingent upon the precision of the methods used to assess the efficiency of business development. It is important to recognize that the concept of competitiveness within entrepreneurial entities is multifaceted and subject to considerable debate within economic theory. Initially, various indicators are employed to represent the efficiency of these entities, with the most fundamental ones being:

- Efficiency as a ratio between the outcomes of entrepreneurial activities and the associated costs required to achieve these outcomes, which serves as a quantitative indicator for assessing efficiency.
- Efficiency (quantitative indicator), defined as the increase in the market value of the entrepreneurial structure, reflecting the economic growth and potential of the enterprise.

– Efficiency (qualitative indicator), characterized by the extent to which the actual developmental parameters of the entrepreneurial entity align with the predefined objectives and goals set by its management body [12].

The efficiency of an entrepreneurial entity's development is assessed based on its capacity to achieve the established goals and objectives by fostering competitive advantages and generating financial resources accordingly. Consequently, under contemporary economic conditions, there is a synthesis of both quantitative and qualitative aspects of efficiency, which establishes a direct relationship between the efficiency of operations and the competitiveness of the entrepreneurial entity. Utilizing the methodological framework for constructing production functions, we identified the key factors influencing the competitive performance of entrepreneurial entities. Furthermore, a correlation-regression analysis was conducted to assess the impact of these factors on the added value generated as a result of their operational activities. The quantity of active entrepreneurial enterprises and their workforce significantly influences the added value generated, necessitating a targeted approach to these critical factors. This is primarily because many production and technical-technological processes rely heavily on human input [17]. The outcomes of improvements in labor productivity are evident in either the increase in the volume of products produced over a specified period or in the reduction of labor time required per unit of output [2]. Given the aforementioned considerations, it is essential to evaluate the impact of various factors, which significantly contribute to the competitiveness of entrepreneurial entities, on the added value derived from their business activities. Notably, the added value generated as a result of entrepreneurial operations stands as one of the most crucial indicators of their competitiveness.

Table 1. Dynamics of Added Value Generated by Business Entities and the Key Indicators Influencing Its Formation

Years	Added Value Created (million man) (Y)	Active Entrepreneurial Entities (X ₁)	Number of Employees (thousands) (X ₂)	Average Monthly Nominal Salary, man (X ₃)
2018	9836.6	244883	283.4	445.3
2019	11071.7	271304	332.2	531.0
2020	10941.0	316370	348.7	612.3
2021	13956.1	355906	357.8	632.2
2022	17170.4	377842	370.1	707.9
2023	20087.1	401149	390.8	765.8

Source: created by the authors based on official data of the State Statistics Committee of the Azerbaijan Republic

The presented data was meticulously calculated and analyzed by the authors through the application of advanced computational capabilities of Microsoft Excel software.

Table 2. Correlation Coefficients Analysis

	Added value created	Active Entrepreneurial Entities	Number of Employees (thousands)	Average Monthly Nominal Salary
Added value created	1			
Active Entrepreneurial Entities	0.918564	1		
Number of employees	0.957012	0.968332	1	
Average monthly nominal salary	0.943921	0.970535	0.991486	1

Source: calculated by the authors

The conducted analysis of Pearson's correlation coefficients demonstrates that each identified factor exerts a substantial influence on the added value generated by entrepreneurial entities, as evidenced by the statistical data (Sreedevi S., 2022). Notably, the correlation coefficients for all factors exhibit significant values exceeding 0.9, specifically: $R_{yx1}=0.919$, $R_{yx2}=0.957$ and $R_{yx3}=0.944$. These findings underscore the existence of a strong and direct correlation between the added value created by business entities and key variables such as the number of active entrepreneurial entities, the total number of employees, and the average monthly nominal salary.

Table 3. Multifactor Linear Regression Model

Regression Statistics	
Multiple R (Multifaceted R)	0.944299
R ² Coefficient of Determination	0.8917
Normalized R (Normalized R)	0.72925
Standard Error	2110.104
Observations	6

Source: calculated by the authors

Table 4. Results of the Multivariate Regression Analysis on Factors Influencing the Value Added by Entrepreneurial Activities

	Coefficient
Intersection	8542.571
X ₁	0.015681
X ₂	-93.9118
X ₃	53.20714

Source: calculated by the authors

The coefficient of determination, denoted as R-squared ($R^2 = 0.8917$), indicates a strong fit of the model. This value signifies that 89.2% of the variance in the dependent variable can be attributed to the predictors included in the regression equation, while the remaining 10.8% is accounted for by other factors. An R^2 of 89.2% suggests that the regression model effectively captures the relationships in the original data, highlighting that a significant portion of the variation in the

outcome variable (89.2%) is explained by the factors incorporated in the analysis. The correlation coefficient for indicators from 2018 to 2023 is calculated as $r = \sqrt{R} = \sqrt{0.72925} = 0.85396$. According to the Chaddock scale, r values from 0.7 to 0.9 indicate a strong correlation relationship, which indicates a strong consequence-factor relationship of factors such as the number of active enterprises (X_1), the number of employees in thousand people (X_2), the average nominal monthly salary in national currency (manat) (X_3) on the amount of created value added in million manat (U) obtained from entrepreneurial activity in the Republic of Azerbaijan.

Let's examine the results generated in MS Excel along with their interpretation. The calculated coefficients are as follows: $a=0.0157$, $b=-93.9118$, $c=53.2071$, and the dependent variable $d=8542.571$. This establishes a linear functional relationship between the added value created by entrepreneurial activities and the influencing factors, which can be represented by the following regression equation:

$$Y = 8542.571 + 0.0157x_1 - 93.9118x_2 + 53.2071x_3$$

Using the obtained regression equation, we can calculate the level of added value generated by the activities of entrepreneurial entities as predicted by the model.

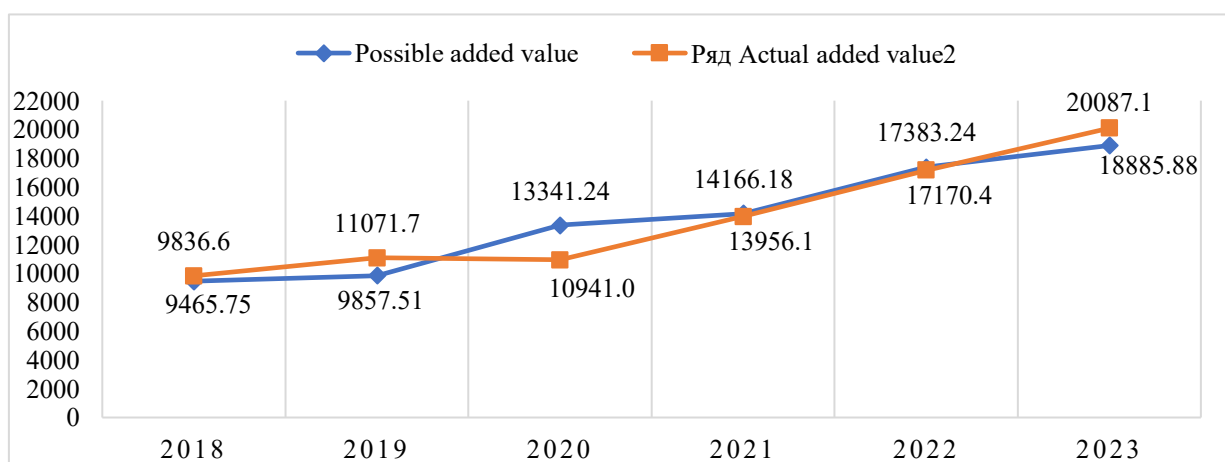


Fig. 1. Actual and predicted levels of value added generated by business activities, measured in millions of AZN 2018–2023

Source: created by the authors based on official statistics from the State Statistics Committee of the Republic of Azerbaijan

The diagram illustrates that the actual levels of consumer spending and those predicted by the regression model exhibited varying trends throughout the study period. Notably, the actual added value created surpassed the growth rate of the predicted added value in 2018, 2019, and 2023. Conversely, in 2020 and 2021, the predicted added value grew more than the actual added value. This divergence can primarily be attributed to the impact of the Coronavirus (COVID-19) pandemic,

which affected Azerbaijan and the global economy in 2020, 2021 and 2022, leading to significant challenges across various sectors.

Available data

No available data.

Conclusions

This research demonstrates that competitiveness is influenced by a variety of factors and can be evaluated through multiple criteria. Accordingly, the criterion for assessing competitiveness can be defined as both the qualitative and quantitative attributes that form the foundation for evaluating a product's competitive standing. While qualitative characteristics have a direct impact on the competitive potential of entrepreneurial entities, challenges in quantifying these factors often highlight the greater reliability of quantitative indicators in overall assessments. In this context, the analysis of the factors used to evaluate the competitiveness of entrepreneurial entities and the added value generated from entrepreneurial activities indicates a consistent upward trend from 2018 to 2023. Specifically, the number of entrepreneurial entities increased by 63.8% compared to 2018, the number of individuals engaged in entrepreneurial activities rose by 37.9%, the average monthly nominal salary grew by 72.0%, and the added value created surged by 104.2%. The assessment of the impact of the number of entrepreneurial entities, the workforce engaged in entrepreneurial activities, and the average monthly nominal salary on the generated added value indicates that these factors collectively account for 89.2% of the variation in added value. The remaining 10.8% is attributed to unconsidered factors. Analyzing the level of value added generated by entrepreneurial activity, both based on actual data and regression model results, it can be observed that there are no significant discrepancies between these indicators. This emphasizes the need to explore new opportunities to enhance the competitiveness of business entities. Based on the conducted research on the competitiveness of small and medium enterprises, the following proposals have been developed.

To stimulate entrepreneurial activity and strengthen competitive positions, it is necessary to address several key issues:

- Promote the adoption of modern technologies and work methods while simultaneously increasing the number of qualified employees to strengthen the competitive advantages of entrepreneurs.
- Create strategic advantages over competitors by supporting the development of industries that generate high value-added products.
- Enhance labor productivity by leveraging the scale effect.
- Encourage the efficient use of production resources within business structures.
- Facilitate the modernization of technological processes to increase the role of entrepreneurs in the value creation chain, as well as promote other initiatives.

CRedit authorship contribution statement

Pari Hasanova Coordination. Inga Khan-Khoyskaya Data interpretation, Gunel Sultanova Writing – Original draft preparation.

Declaration of competing interest

The authors declare that he has no conflicts of interest.

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