

COMPREHENSIVE ASSESSMENT OF THE COMPETITIVENESS OF COMPANIES PROVIDING FREIGHT TRANSPORTATION SERVICES IN THE REPUBLIC OF MOLDOVA

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Abstract: *The article provides a comprehensive assessment of the competitiveness of companies offering freight transportation services in the Republic of Moldova, highlighting the importance of this sector for national economic development. An analysis of existing methodological approaches to competitiveness assessment was conducted, and the most appropriate methodology for the industry was identified, based on the composite index proposed by N. Penishin. This index incorporates key coefficients, including service liquidity, quality, profitability, diversity of transport services, and resource availability. Applying this methodology, the competitiveness of six Moldovan freight transport companies was evaluated for 2022 and 2023. The results revealed considerable variation in the competitive positions of the companies analysed, with liquidity and profitability coefficients exerting the greatest influence on the composite index. However, limitations of the current formula were identified, as some components were deemed insufficiently informative and practical. Consequently, it is recommended that the composition of the composite index be revised to enhance the accuracy and objectivity of competitiveness assessments. The findings may be used to support strategic decision-making aimed at improving efficiency and strengthening competitive advantages within the freight transportation sector.*

Keywords: *competitiveness, freight transportation, composite index, assessment methodology, transport companies.*

Jel Classification: *L91, R41.*

1. Introduction

Given the geographical conditions of the Republic of Moldova, road freight transport constitutes a vital infrastructural component of the national economy. The potential of the national transport sector determines the country's capacity for effective economic development and growth, while the competitiveness of companies within this sector serves as a key indicator of scientific advancement and overall progress (Gheorghita and Sestenco-Diacek, 2025).

Enhancing competitiveness is a primary objective for any company operating within a market economy, as it enables firms to secure a greater market share and increased profitability. In an environment of intensifying competition – driven by both domestic and international factors – effective assessment of competitiveness allows companies to analyze their market position relative to rivals, identify internal weaknesses, and develop strategic measures to improve efficiency and gain a competitive advantage.

To manage competitiveness effectively and implement timely enhancement strategies, managers must have access to appropriate evaluation and analytical tools. As these assessments directly influence the quality and effectiveness of managerial decision-making, identifying robust methodological approaches for evaluating freight transport companies is a highly relevant and timely issue for expanding their future development potential.

2. Materials and methods

2.1. Methodological approaches for assessing the competitiveness of transport companies: a literature review.

Various methodological approaches exist for evaluating company competitiveness. While Klyueva Yu. (Klyueva, 2017) classifies these methods into graphical and analytical groups, others scholars (Abolentseva N., Vinogradova T., Semiletova Ya.) extend this classification to include three categories: graphical, matrix-based, and calculation-analytical (Abolentseva, 2008; Vinogradova and Semiletova, 2016).

A third group of researchers (Zhuran E., Grintsevich L., Mogildya S.) proposes categorising competitiveness assessment methods into four groups: matrix methods; methods based on the evaluation of a company's products or services; methods grounded in the theory of effective competition; and comprehensive methods (Zhuran, 2011; Grintsevich, 2021; Moghildea, 2023). Krivorotov V., Tarasenko A., Tikhanov E., and Chepur P. expand upon these classifications by including graphical methods, such as the competitiveness polygon and various matrix approaches (Krivorotov et al., 2018). Consequently, an analysis of the literature reveals a wide variety of assessment methods; however, ensuring an accurate evaluation requires consideration of the specific characteristics of the industry.

Considering the specific characteristics of transport companies, the methods proposed by N. Penishin merit special attention (Penishin, 2010). The author suggests determining a transport company's competitiveness using a composite index (K_0), calculated as the average of various coefficients according to the following formula:

(1)

where:

- K_{SD} - supply and demand coefficient;
- K_R - service quality coefficient;
- K_P - profitability coefficient (ratio of income to expenses);
- K_D - service diversity coefficient (number of transport service types provided by the company);
- K_R - resources coefficient (availability of the production and technical base and rolling stock);
- n - total number of indicators.

A similar methodology is adopted by Y. Pogorelitseva (Pogorelitseva, 2015). Meanwhile, V. Timiriyanova (Timiriyanova, 2010). It proposes evaluating the competitiveness of service providers, including those in the transportation sector, using the following formula:

$$K = Y_1 p_1 + Y_2 p_2 + \dots + Y_m p_m \quad (2)$$

where:

- K – competitiveness index;
- Y_i – component of the index K ;
- p_i – weight of the component (its significance in index formation).

Timiriyanova suggests evaluating the competitiveness of freight carriers using a set of parameters, including delivery speed, cargo security, service regularity, accessibility, safety,

environmental impact, and cost-effectiveness. The framework also considers demand fulfillment at both the points of origin and destination, as well as price elasticity. Consequently, the formula primarily emphasizes the customer's perspective on service quality and pricing, while neglecting the internal interests of the transport enterprise. The methodology proposed by A. Mottaeva (Mottaeva, 2017) involves measuring the competitiveness of road transport companies using a total competitiveness index:

$$C_{MTE} = CTS \cdot X_1 + II \cdot X_2 + IMS \cdot X_3 + IOF \cdot X_4 \quad (3)$$

where:

- C_{MTE} - composite competitiveness index of the road transport enterprise, $C_{MTE} \in (0,1]$;
- CTS - competitiveness index of the transport service based on the market model;
- II - enterprise image indicator;
- IMS - market share indicator;
- IOF - indicator of fulfilled obligations;
- X_i - weight of the coefficient corresponding to the i-th evaluation indicator.

According to Belozertseva N. and Yaraikina M. (Belozertseva and Yaraikina, 2013), the aforementioned methodologies employ overly complex criteria and pay insufficient attention to service quality from the consumer's perspective. Consequently, they proposed the following methodology for assessing the competitiveness of freight-forwarding companies and logistics operators:

$$R = \frac{D+L+P+S}{4} \quad (4)$$

where:

- R - competitiveness rating (index);
- D - consumer preference criterion;
- L - logistics service complexity (comprehensiveness) criterion;
- P - company's market position criterion;
- S - customer satisfaction criterion.

The factors influencing an enterprise's competitiveness are reflected in corresponding indicators. However, as Penishin notes, "it is practically impossible to account for the entire range of indicators used to evaluate the competitiveness of motor transport enterprises" (Penishin, 2010).

A key requirement for assessing competitiveness is quantitative definiteness, which enables the comparison of both quantitative and qualitative characteristics. For example, a group of authors suggests that when determining the competitiveness level of a transport enterprise, one should consider not only the price and quality of services provided but also the volume of transportation. In our view, this indicator reflects the level of customer demand for services.

2.2 Selected methodology for assessment of the competitiveness of road freight transport enterprises in the Republic of Moldova.

The diversity of approaches to assessing the competitiveness of a transport enterprise stems from the multifaceted nature of this phenomenon, which encompasses economic, technical, organizational, and social dimensions.

Based on our analysis, a strong set of indicators for measuring a trucking company's competitiveness should follow these key principles:

- **Comprehensiveness** – covers the most important factors that drive competitive success.
- **Data accessibility** – relies on information that is readily available and cost-effective to obtain.
- **Computational practicality** – uses straightforward calculations so that managers can conduct their own assessments.
- **Efficiency** – minimizes the time required to compile and analyse the data.
- **Commensurability** – allows for easy comparison between different indicators without the need for complex conversions.

Considering these principles, the methodology proposed by Penishin N. (Penishin, 2010) for assessing the competitiveness of transport enterprises engaged in freight road transport appears to be the most appropriate. This methodology is particularly relevant for application in the freight transport market of the Republic of Moldova.

This method is based on calculating the integrated competitiveness index for the transport company (K_o).

In the formula for calculating the integrated competitiveness index (K_o), Penishin replaced the coefficients of supply and demand, income, and expenses with the average values of service liquidity and profitability. Thus, the formula for determining the integrated competitiveness index of the transport company (K_o) is expressed as follows:

$$K_o = \frac{K_L + K_R + K_P + K_D + K_R}{n} \quad (5)$$

where:

- K_L - service liquidity coefficient;
- K_R - service quality coefficient;
- K_P - profitability coefficient;
- K_D - service diversity coefficient (number of transport service types provided by the company);
- K_R - resources coefficient (availability of the production-technical base and rolling stock);
- n - total number of indicators.

Below are the formulas for calculating these coefficients.

The **service liquidity coefficient** is calculated using the following formula:

$$K_L = \frac{A_C}{L_C} \cdot 100\% \quad (6)$$

where:

- A_C - current assets, MDL;
- L_C - short-term liabilities, MDL.

The return on assets (ROA) is used as the **profitability coefficient** and is calculated using the following formula:

$$K_P = \frac{P_b}{C_a} \cdot 100\% \quad (7)$$

where:

- P_b - book profit of the enterprise, MDL;
- C_a - value of the enterprise's assets, MDL.

To determine the **service quality coefficient** of road freight operations, it is essential to consider actual transport volumes, the willingness of service users to adhere to schedules, and the capacity of enterprises to organize shipments in the agreed quantities. Consequently, the overall coefficient reflecting transportation quality is calculated using the following formula:

$$K_K = \frac{K_S + K_{ts}}{2} \quad (8)$$

where:

- K_S - level of vehicles specialization;
- K_{ts} - on-time delivery level.

The **level of vehicle specialization** is defined as the proportion of specialised vehicles (dump trucks, refrigerated trucks, container trucks, tankers) to the total number of freight vehicles, calculated using the following formula:

$$K_S = \frac{As}{A} \cdot 100\% \quad (9)$$

where:

- As - number of specialized motor vehicles, units;
- A - total number of freight vehicles, units.

The **on-time delivery level**, a key indicator of service quality, is defined as the ratio of actual shipments completed according to schedule to the total volume agreed upon in contractual obligations. This metric serves as a quality coefficient reflecting customer satisfaction with the enterprise's operations and is calculated using the following formula:

$$K_{ts} = \frac{Q_{gr}}{Q_{agreed}} \cdot 100\% \quad (10)$$

where:

- Q_{gr} – actual volume of transportation performed on schedule, tons;
- Q_{agreed} – agreed and approved volume of transportation, tons.

The **profitability coefficient** (K_P), which reflects the relationship between income and expenses, enables an evaluation of a company's financial efficiency and operational performance. It can be calculated using the following formula:

$$K_P = \frac{I/E}{1.3} \quad (11)$$

where:

- I - enterprise income for a given period, MDL;
- E - enterprise expenses for the same period, MDL;
- 1.3 - threshold income-to-expense ratio corresponding to $K_P = 1$.

To calculate the competitiveness ratio based on the number of transportation types (service diversity coefficient) and services offered by a motor transport enterprise (K_D), the current state of the transport services market is considered. A maximum competitiveness ratio of $K_D=1$ is assigned to enterprises providing three or more types of transportation services. For enterprises offering two types of transportation, the coefficient is reduced to $K_D=0.8$. When only one type of transportation service is offered, the coefficient decreases further to $K_D=0.6$.

The resources competitiveness coefficient of a transport enterprise (K_R) is calculated as the ratio of the active part of fixed production assets (rolling stock) to the total value of fixed production assets (production base). This criterion incorporates a specific weighting for the

production base, set at 40% of the rolling stock value when $K_R=1$. Therefore, the resource competitiveness ratio is determined using the following formula:

$$K_R = \frac{(PB \cdot 100)}{RS} / 40 \quad (12)$$

where:

- PB - value of the production base, MDL;
- RS - value of rolling stock, MDL;
- 40 - the specific weight of the production base within the rolling stock when the competitiveness ratio $K_R=1$.

The **correspondence of the fleet's carrying capacity to its optimal level** is determined using the following formula:

$$Q_{avg} = \frac{Q_f \cdot A_f + Q_d \cdot A_d + Q_v \cdot A_v + Q_t \cdot A_t + Q_o \cdot A_o}{A_f + A_d + A_v + A_t + A_o} \quad (13)$$

where:

- Q_{avg} - average carrying capacity of vehicles corresponding to the rational level, for flatbed trucks, dump trucks, vans, tankers, and other vehicles, respectively;
- A_f, A_d, A_v, A_t, A_o - average number of vehicles by type of specialization.

If the actual carrying capacity of the vehicles corresponds to the optimal level, then the transport enterprise can be considered to meet the transportation requirements, with **resources competitiveness coefficient** K_R equal to 1.

3. Results and discussions

Using the selected methodology, the competitiveness levels of six transportation enterprises in the Republic of Moldova were assessed.

The following criteria were applied in selecting enterprises for the competitiveness analysis:

- Industry and legal form uniformity: ensuring the comparability of operational conditions.
- Ownership of rolling stock: identified as a key resource for a transport enterprise.
- Availability and completeness of data: enabling accurate financial and economic analysis.
- Comparability of operational scale: minimizing distortions in analysis.

According to the classification established by Article 5 of Law No. 179 (dated July 21, 2016) "On Small and Medium-Sized Enterprises", four of the six analysed companies are classified as small enterprises, while two are categorized as medium-sized. This selection ensures that the sample is representative of typical participants in the studied segment. Small and medium-sized enterprises (SMEs) make the most significant contribution to the development of the road freight sector in the Republic of Moldova, confirming the suitability of the chosen sample for further analysis.

The data used for the comprehensive assessment of the selected enterprises' competitiveness include key financial, economic, and operational metrics that reflect their current performance and development trends. Based on this information, a step-by-step calculation of the integrated competitiveness coefficient was performed for each enterprise. The summary results for 2022 and 2023 are presented in tables nr. 1 and nr. 2, allowing for an analysis of changes in their competitive positions over the specified period.

Table nr. 1. Results of the Integrated Competitiveness Index Calculation for Road Freight Transport Enterprises in the Republic of Moldova, 2022

No.	Coefficient	Enterprise nr.					
		1	2	3	4	5	6
1	Average value of liquidity and profitability indicators	1.4	4.05	1.37	2.26	4.98	4.5
2	Quality	0.5	0.5	0.5	0.52	0.5	0.5
3	Income-to-expense ratio	0.98	1.42	0.99	1.06	0.95	1.39
4	Number of transport types and services	0.8	0.6	0.6	0.8	0.6	0.6
5	Resources	3.72	2.5	2.97	2.5	2.5	2.5
6	Integrated competitiveness index	1.48	1.81	1.28	1.42	1.90	1.89

Source: Calculated by the author based on the financial and operational data of the analysed enterprises.

Table 2. Results of the Integrated Competitiveness Index Calculation for Road Freight Transport Enterprises in the Republic of Moldova, 2023

No.	Coefficient	Enterprise nr.					
		1	2	3	4	5	6
1	Average value of liquidity and profitability indicators	2.13	2.27	1.52	2.38	11.07	2.43
2	Quality	0.5	0.5	0.5	0.54	0.5	0.5
3	Income-to-expense ratio	0.90	1.18	0.91	0.95	0.95	1.49
4	Number of transport types and services	0.8	0.6	0.6	0.8	0.6	0.6
5	Resources	2.59	2.5	3.63	2.5	2.5	2.5
6	Integrated competitiveness index	1.38	1.41	1.43	1.43	3.12	1.50

Source: Calculated by the author based on the financial and operational data of the analysed enterprises

The calculation results indicate that in 2022, the analysed enterprises exhibited varying levels of competitiveness. Enterprises No. 5 and No. 6 demonstrated the highest competitiveness indicators. In 2023, Enterprise No. 5 further strengthened its competitive position, driven by a significant increase in the coefficient representing the average value of service liquidity and profitability indicators –from 4.98 in 2022 to 11.07 in 2023.

The integrated competitiveness coefficient for Enterprise No. 6 decreased in 2023, causing the enterprise to fall to second place. The primary factor contributing to this decline was a significant drop in the average service liquidity and profitability coefficient, which fell from 4.5 in 2022 to 2.43 in 2023. Enterprise No. 2, which held the second position in 2022, experienced a decline in 2023. This downturn was driven by reductions in its average liquidity, profitability indicators, and income-to-expense ratio. Conversely, Enterprise No. 3 improved its standing to third place in 2023, following growth in its liquidity and profitability metrics and an increase in available resources. Enterprise No. 1 consistently demonstrated the lowest level of competitiveness throughout the analyzed period (2022–2023).

The study results, based on N. Penishin's methodology, revealed significant disparities in the competitive positions of road freight enterprises in the Republic of Moldova. However, an analysis of the indicators used to calculate the integrated competitiveness index suggests that some metrics may have limited informativeness or relevance within the model. This finding underscores the need to refine the formula's components to improve the accuracy and objectivity of future competitiveness assessments.

4. Concluding remarks

The transport sector plays a crucial role in the national economy of the Republic of Moldova. Although road transport competes with other modes, the majority of freight transportation in the country is conducted by road due to its geographical location. Small and medium-sized enterprises are particularly important in the development of this sector. Their stability and flexibility enable them to quickly adapt to changing market conditions. One of the key tools for achieving and maintaining competitive advantage is the assessment of competitiveness levels.

Currently, numerous methodologies exist for assessing competitiveness levels; however, an accurate evaluation must consider the specific characteristics of the industry. After analysing various approaches, it was concluded that the methodology proposed by N. Penishin for evaluating the competitiveness of freight road transport enterprises is the most suitable. This methodology was applied to assess several road transport enterprises in the Republic of Moldova.

The study confirmed significant differences in the competitiveness levels of freight road transport enterprises in the Republic of Moldova. The analysis revealed that liquidity and profitability ratios have the greatest impact on the integrated competitiveness index, highlighting the importance of financial stability and efficient resource utilization. However, limitations of the applied methodology were identified: some indicators are insufficiently informative and do not always accurately reflect the enterprise's true market position. This indicates the need to revise the composition of the integrated index components to enhance the accuracy and objectivity of competitiveness assessments. It is recommended to include additional criteria that consider service quality, the level of innovation, and customer satisfaction.

The results of this research provide a foundation for transport managers to develop robust competitive strategies and serve as a basis for enhancing methodological approaches to evaluating industry-specific competitiveness.

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