

FACTORS INFLUENCING THE RANKING OF MARITIME TRANSPORT IN THE GLOBAL COMPETITIVENESS REPORT: THE DEVELOPING COUNTRY CASE

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Abstract

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The main purpose of this study is to increase the ranking of maritime transport of the Republic of Azerbaijan in the Global Competitiveness Report and to study the relationship between the main indicators of maritime transport. A review of the conceptual framework shows that many studies assess the potential level of maritime transport in different ways based on different factors (Abdullayev, 2022). The methodology of econometric and correlation analysis of economic indicators on maritime transport is taken as the research methodology. The proposed methodological approaches have calculated several factors affecting the development of maritime transport. Statistical data on the development indicators of the maritime transport sector for 2016–2020 were obtained from the National Bureau of Statistics. The EViews software package was used in the research using the least squares method (LSM). The results of the rating showed that there are some problems in the development of maritime transport in the Republic of Azerbaijan. The results of the correlation analysis revealed a link between maritime transportation incomes and transportation expenditures as well as investment and transportation expenditures. Recommendations to improve the international rating of maritime transport of the Republic of Azerbaijan and regulate its activities were given.

Keywords: Transport, Development, Competition, Transit, Maritime Transport, Investment

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1. INTRODUCTION

The Global Competitiveness Report uses annual statistical data prepared by the World Bank, the International Monetary Fund (IMF), and the results of surveys conducted by the World Economic Forum. These surveys are conducted

with the help of local collaborating research organizations and business centers in the countries included in the report. The Global Competitiveness Report also explores the factors that play an important role in creating an effective business environment in the country. At the same time, this report defines the competitiveness and production

level of each country. The prepared report makes it possible to identify the strengths and weaknesses of the country from a political and economic point of view (Abdullayev, 2022). As a result, the main directions for the implementation of political reforms in the country are determined.

The reports of the World Economic Forum examine the level of use by countries of their available resources to improve the level of well-being and ensure an increase in the wages of citizens, the level of qualification of the workforce, and labour productivity. The World Economic Forum has the opportunity to inform countries on the direction of ensuring economic development by country and identify problems and ways to solve them. The annual report, reflecting the results of the Global Competitiveness Index for all countries of the world, contains detailed information on the activities of the public and private sectors. The corresponding index is more often used to compare competitiveness between countries of the world (Abdullayev, 2022). At the same time, a rating of 141 countries is being formed according to this report. The compiled index allows country leaders to pay more attention to important factors of economic growth, income level, and productivity, and analyze and compare the results of reforms in different countries. The competitiveness index makes it possible to identify existing gaps in the sectors of the national economy and determine the directions of their development.

The conducted analyzes show that there are no scientific studies in the field of improving the position of maritime transport in the international ratings of developed countries (including post-Soviet countries) in foreign scientific statistics. The main purpose of the study is to identify areas for improving the position of the maritime transport of the Republic of Azerbaijan according to the Global Competitiveness Report (Abdullayev, 2022). Maritime transport in the Republic of Azerbaijan is in the public sector. As a result, every year there is a tendency to reduce the volume of maritime transport. That is why it is necessary to create a private maritime transport sector (Bobrovska, 2022). Already in developed countries, the activities of private companies in maritime transport are more widely spread (Holovch, Dybchuk, & Serednytska, 2022). Previously, maritime transport in these countries was in the public sector, but as a result of the ongoing privatization policy, the activity of the private sector has been provided. The study is relevant from the point of view of increasing the position of maritime transport in international ratings, privatization of state-owned companies, and determining the directions for creating new private companies in the Republic of Azerbaijan (Abdullayev, 2022). It is considered important that the developing post-Soviet countries use this experience (Holovchuk & Pchelianska, 2022). The least squares method (LSM) was used as the research methodology. For this, the EViews software package was used. As the main novelty of the article, the direct impact of income from maritime transport on the gross domestic product (GDP) of the Republic of Azerbaijan, the definition of indicators that affect income from maritime transport, increasing the role of maritime transport in the Europe-Caucasus-Asia transport corridor, maritime transport of income and investment, as

well as the ratio between income and costs, the rationale for creating a private sector, etc. can be shown.

The rest of this paper is structured as follows. Section 2 reviews the relevant literature. Section 3 analyzes the methodology that has been used to conduct empirical research on the least squares method. The results of the study are discussed in Section 4. Section 5 presents the results and suggestions resulting from the analysis. Section 6 concludes.

2. LITERATURE REVIEW

Maritime transport nowadays is considered the main mode of transport carrying out interstate commodity exchange and international economic relations of Azerbaijan. Maritime transport is considered an important industry, as it carries out 60–65% of international trade traffic. It should be noted that the main advantages of maritime transport are the fact that the water basin of the globe covers a very large part of the Earth's land, reduction in the cost of transportation (including operational), including operational, in contrast to other modes of transport, etc. (Abdullayev, 2022). These reasons also play an important role in the delivery of large volumes of cargo flows (including passenger ones) from producing countries to consumer countries. Unlike other modes of transport, the main characteristics of sea transport are considered as advantages: the availability of low tariffs for freight and passenger transportation, ensuring high competitiveness due to heavy-duty vehicles and passenger capacity, availability of an uninterrupted work schedule regardless of weather conditions, the possibility of ensuring mobility in terms of the direction of marine vehicles to any destination (Abdullayev, 2022). The main disadvantages of sea transport are mainly considered to be low copying capabilities, due to the limited frequency of movement (for example, only large volumes of cargo and passengers are known to be transported at a time from the point of departure), the high cost of packing cargo, the high insurance cost of passengers and cargo, etc. The analyses carried out show that, since maritime transport in the post-Soviet countries is in the public sector, there is a decrease in traffic and income. That is why it is necessary to create private companies in maritime transport. Therefore, it is necessary to conduct scientific analyses in this direction.

In the countries of the post-Soviet space, the modern requirements of the market of international maritime transport services have created a demand for economic reforms in maritime transport. In these countries, maritime transport activities are under the control of the state. The method of state regulation is used in the functioning of the transport services market. In the countries of the post-Soviet space, maritime transport is mainly in a monopoly position (Ilchenko, Khobta, Razvodovska, & Grebelnik, 2022). As a result, there is a trend of annual decline in freight and passenger transportation and economic income received by maritime transport (Alexiou, 2009).

For this reason, it is necessary to study the impact of maritime transport on the country's economy. Necessary measures should be taken to improve the quality of shipping services in the post-

Soviet region. This requires the liberalization of maritime transport management. In developed countries, equal opportunities have been created for the activities of the private and public sectors in maritime transport (Yang, Wong, & Ting-Yu, 2021). As a result, the transport costs of newly emerging private maritime transport companies are reduced and their competitiveness increased. The volume of income from transport services is also increasing (Lagoudis, Theotokas, & Broumas, 2017).

The participation of the public and private sectors in maritime transport is also useful for financing new infrastructure projects (Khmelevskiy, 2021). At this time, it becomes easy to attract investments in maritime transport infrastructure (Grynko, Hvinashvili, & Aleshchenko, 2021). The liberalization of the maritime transport services market in the post-Soviet countries can also have a positive impact on economic development (Boiko, 2020). The activities of new private maritime transport companies can also influence the increase in tourist flows (Sun, Liu, Zhang, Jin, & Zhuo, 2022). Therefore, maritime transport companies, which are invitation monopolists, should be privatized. New private transport companies should be created in the next years.

Economic measures should be taken to increase the competitiveness of maritime transport companies of the post-Soviet countries in the market for international transport services (Grechanyk, Khliebnikova, & Temchenko, 2022).

3. RESEARCH METHODS

The article carried out econometric analyses using the EViews software package based on statistical indicators covering 2016-2020 for maritime transport using the least squares method (Paranytsia, Paranytsia, & Bulychov, 2022). Based on the analyses carried out, the economic links between the main economic indicators of maritime transport are determined (Promaxina, 2009). In the study, we will consider x as the sum of n , unknown variables. $f_i(x)$, $i = 1, \dots, m$, $m > n$ — we will consider the sum of these variables as a series of functions. The main goal here is to choose x values. It should be noted that the values of these functions should be close to some values of y_i (Hyrnchak, 2020).

The solution of the system of equations is taken as a basis $f_i(x) = y_i, i = 1, \dots, m$ (Goltvenko, 2019).

The essence of the least squares method is to find the sum of the squared deviations of the left and right sides $|f_i(x) - y_i|$. Thus, the essence of the least squares method can be expressed as follows:

$$\sum_i e_i^2 = \sum_i (y_i - f_i(x))^2 \rightarrow \min x \quad (1)$$

It should be borne in mind that if the system of equations has a solution, then the smallest value of the sum of squares will be zero (Hrybinenko, 2019; Munim & Saeed, 2019). It should be noted that the correct solution to the system of equations can be found analytically or, for example, by various numerical optimization methods (Hrynchak, 2020). The essence of the least squares method (LSM) is that is based on the minimum of the sum of the squared deviations of the values of y from the resulting regression equation. In general, the linear regression equation takes the following form:

$$\bar{y}_x = d_1 x + d_0 \quad (2)$$

It should be noted that d_1 , d_0 are the coefficients of the linear regression equation. In equation (2), d_1 is an independent variable and d_0 — dependent variable (Promaxina, 2009).

To determine the average value \bar{y}_x , it is necessary to find the parameters d_0 and d_1 . To do this, you need to use the least squares method. To do this, it is necessary to solve two systems of linear equations (3) and (4):

$$\sum y = n d_0 + b d_1 \quad (3)$$

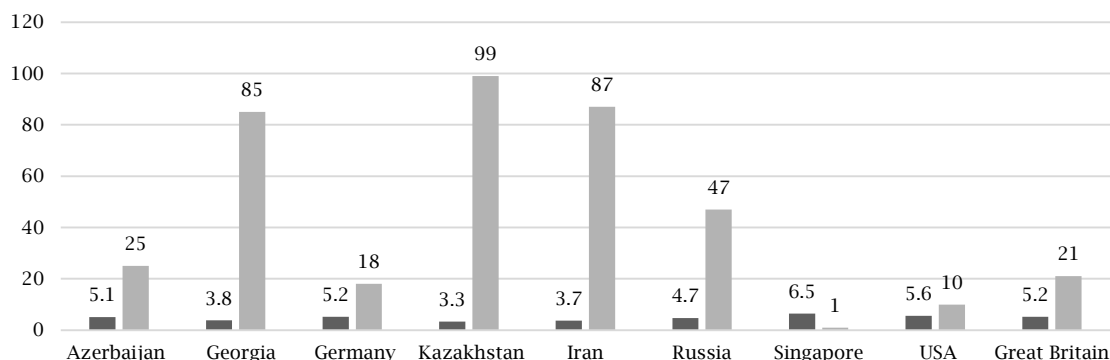
$$\sum yx = d_0 \sum x + d_1 \sum x^2 \quad (4)$$

By solving the indicated system equation, it is possible to determine the parameters d_0 and d_1 .

4. RESULTS

In recent years, in the Global Competitiveness Report 2019 (Schwab, 2019), significant changes have been recorded in the sea transport rating indicators of the Republic of Azerbaijan compared to other countries. For example, in 2019, among the 144 countries on the performance of seaport services, Singapore ranked in 1 position (Figure 1).

Figure 1. The efficiency of seaport services according to the Global Competitiveness Report (best 1-7)



Source: Schwab (2019).

The USA was in 10th place, but Great Britain was in 21st place. Compared with the neighboring countries, Azerbaijan was in 25th place with 5.1 points. According to this indicator, the Republic

of Azerbaijan surpassed Georgia (85th place), Iran (87th place), Russia (47th place), and Kazakhstan (99th place) (see Figure 1).

Table 1. Dynamics of changes in indicators by the transport sector and their effect on the volume of GDP of the Republic of Azerbaijan (USD 1 = AZN 1.70)

Years	Income from maritime transportation services, thousand manats (AZN), (X1)	Income from air transportation services, thousand manats (AZN), (X2)	Income from railway transportation services, thousand manats (AZN), (X3)	GDP of the Republic of Azerbaijan thousand manats (AZN), (Y)
2016	160095.9	1053949	262435	60000000
2017	179724.5	1647341	279202	70000000
2018	170566.6	2066918	270841	80000000
2019	180484.4	2396355	299772	82000000
2020	168987.0	3035229	274827	72000000

Source: Compiled as a result of the calculation performed by the author according to the data of the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

The volume of GDP of the Republic of Azerbaijan is influenced by several factors in the transport sector (Table 1). These include income from sea transportation services, income from air

transportation services, income from rail transportation services, etc. To carry out a regression analysis of the dependencies between these indicators, we can use the EViews 12 software package.

Table 2. Regression dependence on factors affecting the volume of GDP in the Republic of Azerbaijan by the transport sector

Variable	Coefficient	Std. error	t-statistic	Prob.
X1	355.2635	1178.585	0.301432	0.8136
X2	4.650362	7.914659	0.587563	0.6618
X3	148.8706	754.7367	0.197248	0.8760
C	-39080802	1.15E+08	-0.339214	0.7918
R-squared	0.645412	Mean dependent variable		72800000
Adjusted R-squared	-0.418352	S.D. dependent variable		8786353.
S.E. of regression	10464072	Akaike info criterion		35.15536
Sum squared resid.	1.09E+14	Schwarz criterion		34.84291
Log-likelihood	-83.88839	Hannan-Quinn criterion		34.31677
F-statistic	0.606725	Durbin-Watson statistics		2.222513
Prob. (F-statistic)	0.710622			

Source: The analysis carried out by the author on the EViews 12 software package.

Using the EViews 12 software package, based on the statistical data in Table 1, we can get the following result:

$$Y = 355.26 * X1 + 4.65 * X2 + 148.87 * X3 - 39080802.1591 \quad (5)$$

Based on the established model of interconnection, the following results can be noted: an increased volume of income from sea transportation services (X1) by one unit leads to an increase in the GDP of the Republic of Azerbaijan by 355.26 units, an increase of air transportation services (X2) by one unit leads to an increase in the GDP by 4.65 units, an increase of income from railway transportation services (X3) by one unit, leads to an increase in the GDP by 148.87 units (Table 2, equation (5)).

If we calculate the coefficient of elasticity that determines the change of GDP (dependent variable) as a percentage, due to a 1% change in factors affecting GDP (in our analysis there are 3 free variables), using equation (5) and Table 2, we will get the following results:

$$E(1) = \frac{k_1 \bar{x}_1}{\bar{y}} = \frac{355.26 * 171971.6}{73000000} = 0.83 \quad (6)$$

where, $E(1)$ is the elasticity coefficient of income from maritime transportation services.

$$E(2) = \frac{k_2 \bar{x}_2}{\bar{y}} = \frac{4.65 * 2039958.4}{73000000} = 0.12 \quad (7)$$

where, $E(2)$ is the coefficient of elasticity of income from air transportation services.

$$E(3) = \frac{k_3 \bar{x}_3}{\bar{y}} = \frac{148.72 * 277415.4}{73000000} = 0.56 \quad (8)$$

where, $E(3)$ is the coefficient of elasticity of income from railway transportation services.

The overall results can be grouped based on the elasticity coefficient. For example, an increase in the income from maritime transportation by 1% leads to an increase in the GDP of the Republic of Azerbaijan by 0.83% (equation (6)), and an increase in the income from air transportation by 1% leads to an increase of the GDP of the Republic of Azerbaijan by 0.12% (equation (7)), an increase in the income from railway transportation by 1%, leads (led) to an increase in the GDP of the Republic of Azerbaijan by 0.56% (equation (8)).

In recent years, there have been significant changes in the volume of freight and passenger transportation by maritime transport of the Republic of Azerbaijan. For example, in 2016, 5807.3 thousand tonnes of cargo were transported by maritime transport in Azerbaijan, in 2017 this figure increased by 2537.2 thousand tonnes and amounted to 8344.5 thousand tonnes (Table 3). However, compared to 2017, during 2018-2020, there was an annual decrease in the volume of cargo transportation by maritime transport.

Table 3. Statistical indicators registered in maritime transport of the Republic of Azerbaijan in recent years

<i>Indicators</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>
Goods transportation, thousand tonnes	5807.3	8344.5	8236.1	5968.7	5981.9
Export, thousand tonnes	510.0	369.0	319.1	313.1	312.8
Transit goods transportation, thousand tonnes	4208.3	6871.7	6535.3	4288.8	4331.7
Between foreign ports, thousand tonnes	749.1	853.4	1141.3	1141.3	957.4
Passengers transportation, thousand passengers	19.6	17.1	15.7	22.2	20.4

Source: Compiled as a result of the calculation performed by the author according to the data of the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

Compared to 2019, the volume of cargo transportation in 2020 increased by 13.2 thousand tonnes and amounted to 5981.9 thousand tonnes. The volume of goods transported by maritime transport has also declined in recent years. For example, compared to 2016, the volume of cargo exported by maritime transport in 2020 decreased by 197.2 thousand tonnes and amounted to 312.8 thousand tonnes.

Compared to 2017–2018, the volume of transit cargo transportation in 2020 decreased and

amounted to 4331.7 thousand tonnes. Compared to 2018–2019, the volume of foreign interport cargo transportation in 2020 decreased and reached 957.4 thousand tonnes. Compared to 2016, the volume of passenger transportation in 2017–2018 decreased and amounted to 17.1 thousand and 15.7 thousand passengers. Compared to 2019, the volume of passenger transportation decreased to 20.4 thousand passengers in 2020.

Table 4. The income from cargo and passenger transportation by maritime transport in the Republic of Azerbaijan (USD 1 = AZN 1.70)

<i>Years</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>
Income from transportation, thousand manats (AZN)	160095.9	179724.5	170566.6	180484.4	168987.0
Expenditures on transportation, thousand manats (AZN)	173959.9	162393.9	174676.7	169633.2	168796.2
Investments in fixed capitals, thousand manats (AZN)	53136.8	112256.5	115409.2	98387.4	53310.1

Source: Compiled as a result of the calculation performed by the author according to the data of the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

In recent years, there has been a significant change in the volume of incomes from freight and passenger transportation and investments to fixed capitals in the Republic of Azerbaijan (Table 4). For example, the income from maritime transportation increased in 2017–2019 compared to 2016. Compared to 2019, the amount of income from transportation decreased and amounted to 168987.0 thousand manats in 2020.

Compared to 2016, the volume of expenditures on maritime transport increased and amounted to

174676.7 thousand manats in 2018. Compared to 2019, transportation costs in 2020 decreased by 837 thousand manats and amounted to 168796.2 thousand manats.

Compared to 2018–2019, the volume of investments in fixed capitals in maritime transport in 2020 decreased and reached 53310.1 thousand manats.

Table 5. The income from maritime transportation of the Republic of Azerbaijan and the dynamic changes in the indicators affecting it in recent years (USD 1 = AZN 1.70)

<i>Years</i>	<i>Expenditures on goods transportation, thousand manats (AZN), (X1)</i>	<i>Expenditures on passenger transportation, thousand manats (AZN), (X2)</i>	<i>Investments in fixed capitals, thousand manats (AZN), (X3)</i>	<i>Putting into operation of fixed assets, thousand manats (AZN), (X4)</i>	<i>Income from transportation, thousand manats (AZN), (Y)</i>
2016	170702.8	3257.1	53136.8	73341.6	160095.9
2017	159354.0	3039.9	112256.5	96150.0	179724.5
2018	171413.9	3262.8	115409.2	57047.0	170566.6
2019	166464.6	3168.6	98387.4	22316.0	180484.4
2020	165743.2	3053.0	53310.1	106059.0	168987.0

Source: Compiled by the author based on the information from the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

It should be noted that several factors affect the income from maritime transportation in the Republic of Azerbaijan (Table 5). These include the expenditures on freight and passenger transportation and investments in fixed capitals,

putting into operation of fixed assets, etc. We can use the EViews 12 software package to perform a regression analysis of the dependencies between these indicators (Voloshko, 2021).

Table 6. Regression relationship between factors affecting the income from maritime transportation in the Republic of Azerbaijan

Dependent variable: Y	Sample: 2016-2020			
Method: LS	Included observations: 5			
Date: 12/11/21				
Time: 16:13				
Variable	Coefficient	Std. error	t-statistic	Prob.
X1	-0.064721	NA	NA	NA
X2	-67.36719	NA	NA	NA
X3	0.133439	NA	NA	NA
X4	-0.159018	NA	NA	NA
C	395137.8	NA	NA	NA
R-squared	1.00000	Mean dependent variable		171971.7
S.D. dependent variable	8433.406	Akaike info criterion		-33.53753
Sum squared resid.	1.08E-16	Schwarz criterion		-33.92809
Log-likelihood	88.84383	Hannan-Quinn criterion		-34.58576
Durbin-Watson statistics	1.998272			

Source: The analysis carried out by the author on the EViews 12 software package.

The regression equation of the obtained result will look as follows:

$$Y = -0.065 * X1 - 67.37X * 2 + 0.133X * 3 - 0.159X * 4 + 395137.82 \quad (9)$$

Based on the established communication equation (9), it can be concluded that an increase in the volume of expenditures on maritime transportation in the Republic of Azerbaijan by one unit (X1) leads to a decrease in the income from transportation by 0.065 units, an increase in the passenger transportation expenditures by one unit (X2) leads to a decrease in the income from transportation by 67.37 unit, an increase in the investments in fixed capitals by one unit (X3) leads to an increase in the income from transportation by 0.133 units, an increase of putting into operation of fixed assets by one unit (X4) led to a decrease of incomes from transportation by 0.159 units (equation (9)). The analysis shows that the main influencing factor on the income from maritime transportation is the investments in fixed assets. Based on the fact that the correlation coefficient is $R = 1$, we can say that there is a functional relationship between the indicators.

If we use equation (9) to calculate the coefficient of elasticity that determines the degree of change in the dependent variable (income from transportation) due to a 1% change in factors (free variables) affecting income from transportation by maritime transportation (according to Table 6), we can obtain the following indicators:

$$E(1) = \frac{k_1 \bar{x}_1}{\bar{y}} = \frac{-0.065 * 166735.7}{171971.68} = -0.06 \quad (10)$$

where, $E(1)$ is a coefficient of elasticity for goods transportation expenditures.

$$E(2) = \frac{k_2 \bar{x}_2}{\bar{y}} = \frac{-67.37 * 13339}{171971.68} = -5.22 \quad (11)$$

where, $E(2)$ is a coefficient of elasticity for passenger transportation expenditures.

$$E(3) = \frac{k_3 \bar{x}_3}{\bar{y}} = \frac{0.1334 * 86500}{171971.68} = 0.06 \quad (12)$$

where, $E(3)$ is a coefficient of elasticity for investments in fixed capitals.

$$E(4) = \frac{k_4 \bar{x}_4}{\bar{y}} = \frac{0.1590 * 70982.7}{171971.68} = 0.06 \quad (13)$$

where, $E(4)$ is a coefficient of elasticity for putting into operation of fixed assets.

Based on the calculated elasticity coefficient, the following results were obtained: an increase in goods transportation expenditures by 1% leads to a decrease in the transportation income by 0.06% (equation (10)), an increase in passenger transportation expenditures by 1% leads to a decrease in the transportation income by 5.2% (equation (11)), an increase in the investments in fixed capitals by 1% leads to an increase in the transportation income by 0.06% (equation (12)), an increase of putting into operation of fixed assets by 1% leads to an increase in the transportation income by 0.06% (equation (13)).

Table 7. The activity of maritime transport on Transport Corridor Europe-Caucasus-Asia (TRACECA) on the territory of the Republic of Azerbaijan

Indicators	2016	2017	2018	2019	2020
Transported goods in the transport corridor, thousand tonnes	50302	52733	52674	52762	38491
Transported goods by maritime transport, thousand tonnes	4992	7423	6875	4824	5015
Transportation of transit goods by maritime transport, thousand tonnes	4208	6840	6300	4281	4250
Passengers transportation by maritime transport, thousand passengers	20	17	16	22	20
Income from goods transportation by maritime transport, thousand manats (AZN)	131686	136834	121528	138116	130913
Income from passengers transportation by maritime transport, thousand manats (AZN)	698	932	1615	2284	1128

Source: Compiled as a result of the calculation performed by the author according to the data of the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

In recent years, the activities of maritime transport in TRACECA have changed (Haider et al., 2021). For example, compared to 2016, the volume

of cargo transportation along this corridor decreased to 38491 thousand tonnes in 2020 (Table 7). Compared to 2017-2018, the volume of

cargo transportation by maritime transport along the transport corridor in 2020 decreased and amounted to 5015 thousand tonnes. Compared to 2017-2019, the volume of transit cargo transportation in 2020 decreased and amounted to 4250 thousand tonnes.

Compared to 2016, the volume of passenger transportation in 2018 decreased and amounted to

16 thousand passengers. Compared to 2019, the volume of passenger transportation in 2020 decreased by 20 thousand passengers.

The volume of incomes from cargo and passenger transportation by sea transport along the transport corridor decreased in 2019 and amounted to 130913 thousand and 1128 thousand manats.

Table 8. Main technical indicators of maritime transport in the Republic of Azerbaijan

Indicator	2016	2017	2018	2019	2020
Number of ships, unit	67	50	50	50	52
Gross registered, thousand tonnes	395.4	321.7	321.7	321.7	335.6
The deadweight capacity of ships, thousand tonnes	405.8	324.1	324.1	324.1	337.6
Passenger capacity of ships, passenger places	336	336	336	336	436

Source: Compiled as a result of the calculation performed by the author according to the data of the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

In recent years, the process of reducing the number and capacity of vessels has also been observed in the maritime transport of the Republic of Azerbaijan. For example, if in 2016 there were 67 vessels in Azerbaijan's marine transport fleet, then in 2020 this figure decreased by 15 units and reached 52. If in 2016, compared to 2020, the full cargo capacity of ships decreased by 59.8 thousand

tonnes and amounted to 335.6 thousand tonnes, the deadweight of the vessel decreased by 88.2 thousand tonnes and amounted to 337.6 thousand tonnes (Table 8). The analysis shows that in recent years there has been a decrease in the number of vessels and indicators of their technical operation.

Table 9. Dynamics of changes in indicators of the income and expenditures of maritime transportation in the Republic of Azerbaijan in recent years (USD 1 = AZN 1.70)

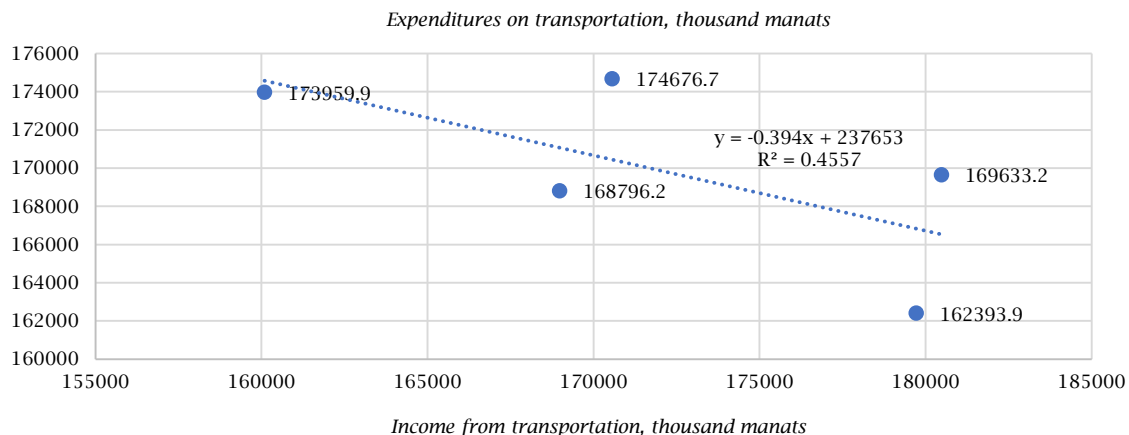
Years	Income from transportation, thousand manats (AZN), (X)	Expenditures on transportation, thousand manats (AZN), (Y)
2016	160095.9	173959.9
2017	179724.5	162393.9
2018	170566.6	174676.7
2019	180484.4	169633.2
2020	168987.0	168796.2

Source: Compiled as a result of the calculation performed by the author according to the data of the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

In addition, we can define a determination and correlation relationship between the income from maritime transportation and expenditures on transportation in the Republic of Azerbaijan

(Table 9). If we conduct a regression analysis of the relationship between the indicators using tabular data, we will get the following results:

Figure 2. Regression relationship between the income and expenditures of maritime transportation in the Republic of Azerbaijan in recent years



Source: Figure 2 is compiled in the MS Excel 2021 software package based on Table 9.

As can be seen from Figure 2, the functional relationship (Table 9) between the income and expenditures of maritime transport is expressed by the regression equation:

$$y = -0.394X + 237653 \quad (14)$$

The correlation coefficient in equation (14) is $R = 0.6$. The coefficient of determination $R^2 = 0.4557$

means that the corresponding regression equation is explained by the indicators of the result of variance of 45.57% and 54.43% is explained by the influence of other factors. The low degree of determinism is explained by the fact that the regression equation expresses the initial data worse. This is because as a result, a smaller part of the factor (45.57%) is not explained by the factors included in the model (Figure 2).

According to the report, the correlation coefficient is equal to $R = 0.6$. This also shows the level of dependence between the two values (0.3–0.5) per the Cheddok scale.

Using the data in Table 9 and the regression model (equation (14)), we can determine the coefficient of elasticity, which determines the change of

percentage ratio between incomes from shipping and transportation expenditures. Currently, we can get the following indicators:

$$E(1) = \frac{k_1 \bar{x}_1}{\bar{y}} = \frac{0.394 * 171971.68}{473725.14} = -0.14 \quad (15)$$

If we study the coefficient of elasticity, we can get the following result. An increase in the income from transportation by 1% leads to a decrease in transportation expenditures by 0.14% (equation (15)). From the resulting communication equation, it can be concluded that with an increased volume of income from transportation per unit, the volume of transportation expenditures decreases by 0.39 units.

Table 10. Dynamics of changes in expenditures and investments in fixed capitals of maritime transport in the Republic of Azerbaijan (USD 1 = AZN 1.70)

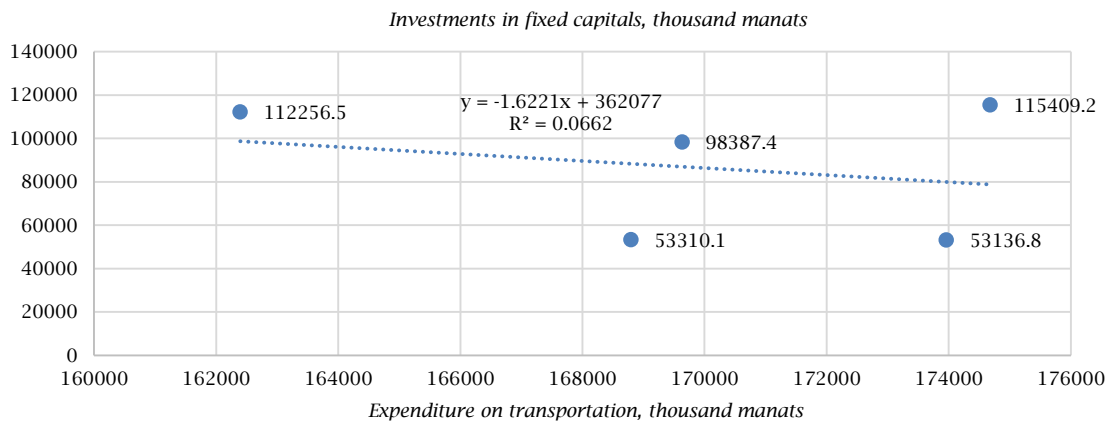
Years	Expenditures on transportation, thousand manats (AZN), (X)	Investments in fixed capitals, thousand manats (AZN), (Y)
2016	173959.9	53136.8
2017	162393.9	112256.5
2018	174676.7	115409.2
2019	169633.2	98387.4
2020	168796.2	53310.1

Source: Compiled by the author based on the information from the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

In addition, we can define a determination and correlation relationship between the expenditures on maritime transportation and investments directed to fixed capitals in the Republic of Azerbaijan

(Table 10). If we conduct a regression analysis of the relationship between the indicators using tabular data, we will get the following results:

Figure 3. Regression relationship between investments in fixed capitals and expenditures on maritime transportation in the Republic of Azerbaijan in recent years



Source: Figure 3 is compiled in the MS Excel 2021 software package based on Table 10.

As can be seen from Figure 3, the relationship between shipping expenditures and investments in fixed capitals is expressed by the regression equation:

$$y = -1.6221X + 362077 \quad (16)$$

From the resulting communication equation, it can be concluded that an increase in transportation costs by 1 unit will lead to a decrease in fixed capital investments by 1.62 units (Figure 3). The fact that the coefficient of determination $R^2 = 0.0662$ means that the corresponding regression equation is explained by the indicators of the variance result of 6.62%. And 93.38% is explained by the influence of other factors. The low coefficient of determination is

explained by the fact that the regression equation expresses the initial data more weakly. This is because a smaller part of the outcome factor (6.62%) cannot be explained by the factors included in the model.

According to the report on the correlation coefficient, it is $R = 0.25$. This also indicates a weak correlation between both indicators on the Cheddock scale (0.1–0.3). It should be noted that using the data from Table 10 and regression equation (16), we can determine the elasticity coefficient in the regression equation of maritime transportation, which determines the change in the percentage ratio between investments in fixed capitals and transportation expenditures. At this time, we can get the following results:

$$E = \frac{k_1 \bar{x}_1}{\bar{y}} = \frac{-1.6221 \cdot 169891.98}{86500} = -3.18 \quad (17)$$

Based on the fact that the coefficient of elasticity $E = -3.18$, we can say that an increase in transportation income by 1% leads to a decrease in investments in fixed capitals by 3.18% (equation (17)).

The issues determine the creation of private entrepreneurship in maritime transportation of goods and passengers, maintenance and operation of infrastructure, and logistics services.

5. DISCUSSION

In several developed countries of the world, for example, the USA, France, Germany, the UK, Canada, and South Korea, the share of the private sector in maritime transport is on average considered to be above 60% (Table 11).

Table 11. Share of the private sector of maritime transport in different countries

Country	Percentage
USA	70%
Canada	65%
South Korea	60%
Great Britain	100%
Germany	65%
France	70%
Georgia	50%
Russia	50%
Turkey	50%

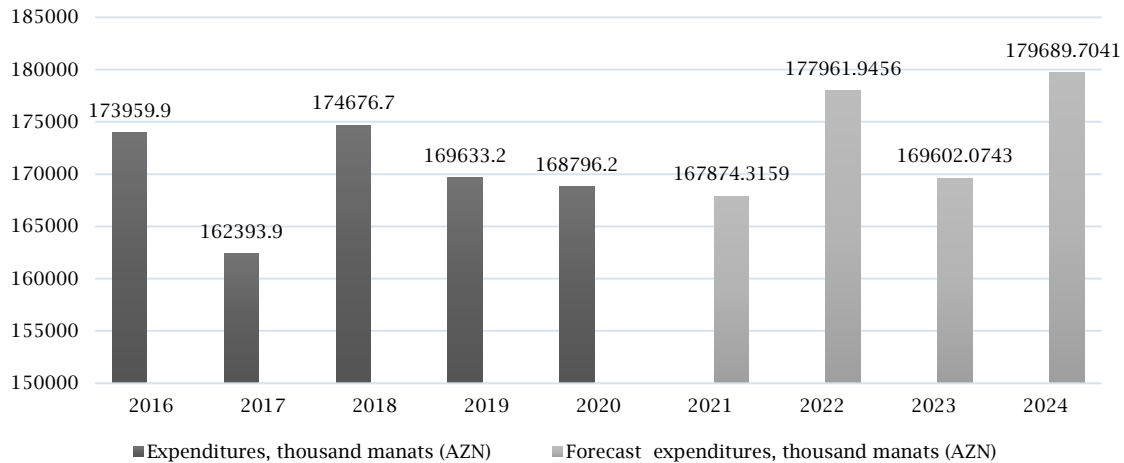
Source: Strategic roadmap for development of logistics and trade in the Republic of Azerbaijan (2016).

As a result of the direct influence of the private sector in these countries, the logistical support of this sphere has been strengthened, the activities of globally competitive private maritime transport companies for cargo and passenger transportation have been ensured, and the network of connected transport infrastructure has been modernized, new regional private seaports have been built, international logistics services have been expanded, the volume of investment flows from international financial institutions and private investors has increased in several times, also the increase in tax payments was secured (Abdullayev, 2022).

For example, in Russia, when privatizing the infrastructure of seaports, it is envisaged to retain 51% of the state's part in the form of shares. Georgia has several models for the privatization of maritime transport. For example, the Batumi seaport was transferred to the management of a foreign company for 49 years. The sale of 49% of the shares of Batumi ports to shareholders from the UAE has been secured. As can be seen from the analysis, the state occupies a dominant position in the management of transport ports. In Turkey, 11 ports have been leased to the private sector for 30 years (Abdullayev, 2022).

During the privatization of seaports in most cities of Poland, shares were initially sold to employees of seaports, and at a subsequent stage — to industrial enterprises. Only after that, the remaining share of shares was sold to foreign investors.

Figure 4. Forecast indicators of expenditures on maritime transport in the Republic of Azerbaijan for the next years (2021–2024)



Source: Figure 4 is compiled in the MS Excel 2021 software package on the statistical report of the State Statistical Committee of the Republic of Azerbaijan (www.stat.gov.az).

If we analyze the projected indicators of maritime transportation costs by indicators covering the next years (Figure 4), we can get the following results. Analysis of the statistical data of the Republic of Azerbaijan shows that during 2016–2020 there was a significant change in the expenditures on maritime transportation services (Figure 4). For example, if in 2016, the expenditures on maritime transportation

amounted to 173959.9 thousand manats, then in 2018 this figure reached 162393.9 thousand manats. In 2020, compared to the previous year, the expenditures on maritime transportation decreased and amounted to 168796.2 thousand manats. The forecast analysis shows that during 2021–2024 transportation expenditures will increase and amount to 179689.7 thousand manats.

6. CONCLUSION

The creation of a private sector in maritime transport is very important for post-Soviet countries (Svirko, 2021). It should be taken into account that the share of the state in the management of maritime transport in a number of countries is still high (Tulchinskiy, 2021). That is why revenues in the transportation industry are declining every year. Therefore, it is necessary to transfer maritime transport to the private sector (Kantsur, Kononova, & Khmarska, 2022).

The main reason for the limited nature of this study is the fact that maritime transport in the Republic of Azerbaijan is under state control. That is why maritime transport is still operating at a loss (Berdar & Yevtushevska, 2021). That is why it is difficult to find the necessary economic statistics on maritime transport on websites and in the scientific literature (Voronenko, 2022). In particular, information on the privatization policy in the field of maritime transport is not analyzed (Grynko et al., 2021).

The analysis shows that in the countries of the post-Soviet space, including in some countries of the world, the sphere of maritime transport is in complete state monopoly (Tkachuk, Plotnikova, Ovdyyuk, Kurylenko, & Nazimov, 2022). In recent years, there has been a tendency in the post-Soviet countries to reduce the volume of traffic in the maritime transport sector, according to economic indicators (Krasovska, 2021; Shalashna, 2021). Thus, large-scale public investments in the development of maritime transport are not carried out in these countries (Smoliar, Zhygalkevych, & Tiukh, 2022). In maritime transport, vehicles and infrastructure are not being upgraded. The competitiveness of maritime transport companies, which are in the state monopoly of post-Soviet countries, in the international market of transport services is decreasing every year (Vdovenko, Sukhomlyn, Bachkir, & Hnatenko, 2021). In developed countries, more and more private transport companies are working in the field of maritime transportation. Private maritime transport companies operate absolutely cost-effectively (Durman, 2021). The economic income of private maritime transport companies from transportation is growing every year (Kniazieva & Demianchuk, 2020; Omelyanenko, 2022). A large amount of investment is carried out by the private sector in the purchase of new vehicles, and the development of infrastructure (Verbivska, Zaichko, & Tymchenko, 2022). As a result, the international rating of the maritime transport sector of developed countries is growing every year (Shtan, 2022).

That is why it is necessary to ensure the participation of the private sector in the activities of the maritime transport of the Republic of Azerbaijan (Abdullayev, 2022). The liberalization of the maritime transport services market can stimulate the attraction of foreign investment in the maritime transport infrastructure industry (Yang et al., 2021). The activities of new private offshore companies can have a positive impact on the economic development of the country (Grynko et al., 2021). In addition, it is important to carry out corporate governance in the maritime transport sector, to develop standards for the maintenance of

maritime transport (Kustrich, 2020; Ryakhovskaya, 2019). The article notes that the experience of the Republic of Azerbaijan in creating a private sector in maritime transport is of great importance for further research of the post-Soviet countries. Developing countries can also benefit from the experience of liberalizing the sphere of maritime transport (Kravchenko & Prudkiy, 2019; Murovana & Antoniuk, 2020). That is why this article is considered important from the point of view of the economic analysis carried out in the field of maritime transport and the results achieved.

For to improve the rating of maritime transport of the Republic of Azerbaijan in the Global Competitiveness Report, a private sector should be created in this direction. The following measures aimed at creating a private sector and entrepreneurship in maritime transport in the Republic of Azerbaijan should be implemented in the next years: the study and application of the experience of advanced countries that have developed a private sector and entrepreneurship in maritime transport in the Republic of Azerbaijan; modern logistics service centres should be created in private seaports of the Republic of Azerbaijan; with the creation of a private sector in the field of maritime transport, the process of regulating freight tariffs and fees at the port should be liberalized; the increased local and foreign investments in the maritime type of transport should be supported by the state; private multimodal operators specializing in the transportation of foreign trade goods by maritime transport should be created; wider use of multimodal transportation by rail and maritime transport in the part of the international transport corridors "North-South" and "East-West" (TRACECA) passing through Azerbaijan; considering that the Republic of Azerbaijan annually allocates large financial resources for the use of the services of the inspection of the Maritime Register of Russia in connection with shipping services, it is necessary to create a national inspection of the maritime register in the city of Baku (Azerbaijan) as per the standards of the International Maritime Organization (Abdullayev, 2022). In this case, other Caspian littoral countries will also be able to use the services of this organization; the creation of several new seaports, new logistics centers, and free economic zones in the cities around the Caspian Sea of Azerbaijan. In this case, it is possible to increase the volume of transit goods by maritime transport (along international transport corridors); new private maritime transport companies with high competitiveness in the international market of maritime transport services should be created in the Republic of Azerbaijan. To this end, incentive measures should be implemented for the privatization of the "Azerbaijan Caspian Shipping" Closed Joint-Stock Company (CJSC) and the creation of private entrepreneurship in this area (new small and medium-sized companies). At the same time, it is necessary to ensure better implementation of transport services, increase incomes from transportation and tax payments to the state budget, ensure free management, attract private investment, etc. can be implemented. The "Azerbaijan Caspian Shipping Company" CJSC should be gradually privatized and transformed into an open joint-stock company, its assets must be revalued by

the international experts, transport consultants from the European Union countries, involved in these processes, and eventually, the controlling part of the company should be offered to foreign and local investors in the form of open auctions, tenders, and placement of part of its shares on the stock exchange (Abdullayev, 2022). At the same time, it is possible to increase the financial efficiency of the “Azerbaijan Caspian Shipping” CJSC and the quality of service in the domestic and international markets (Abdullayev, 2022). The creation of a new small and medium-sized, large shipping company will lead to the development of the maritime transport services market. It is also advisable to privatize the structure of the “Azerbaijan Caspian Shipping” CJSC dividing it into two parts, and creating private maritime transport companies operating in the internal and external directions of the Caspian Sea, and different seas and oceans. The creation of small, medium, and large-scale low-budget private maritime transport companies (including cargo and passenger transportation, infrastructure maintenance, shipbuilding, repair enterprises, and new seaports) as part of the “Azerbaijan Caspian Shipping” CJSC or as legal entities, a controlling stake in individual shares owned by the state or the private sector (possibly in a mixed, public and private joint form), the establishment of minimum benefits for these companies, the implementation of phased reforms, related to monopolization, privatization and the creation of private entrepreneurship in the field of maritime transport, etc. are necessary (Abdullayev, 2022). In addition, it is necessary to

create mixed and joint (public and private) seaports, related infrastructure industries, where there is a full and private or state share of small and medium volumes; liberalizing the access of the Republic of Azerbaijan to the trans-European transport infrastructure system and to the transport services market and on a bilateral basis to strengthen cooperation with the European Union (reaching a bilateral agreement in this area); the achievement of bilateral agreements between Azerbaijan and the Russian countries to reduce the fee for passage through the Volga-Don channel of vessels sailing under the Azerbaijani flag (Abdullayev, 2022); the creation of new private shipbuilding and repair enterprises in the field of maritime transport (small and medium-sized) in Azerbaijan (with the provision of entrepreneurial activity) and stimulating the attraction of local and foreign investors; increasing the capacity of national seaports and the carrying capacity of the sea transport fleet (in this case, the quantitative and qualitative demand in seaports for the projected national export-import cargo and international transit cargo will be ensured, the potential of foreign trade will increase, the volume of export transport services will significantly increase); determination of the transition to free tariff regulation in the field of natural monopolies, reimbursement of all costs, taking into account profitability to establish marginal prices for a long period; gradual abandonment of tariff regulation processes for loading and unloading operations in ports to increase competition in maritime transportation and etc.

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