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Comparison of Export Performance of Organization of Turkic States: CRITIC and LOPCOW Based CoCoSo Application

Türk Devletleri Teşkilatı Ülkelerinin İhracat Performanslarının Karşılaştırılması: CRITIC ve LOPCOW Tabanlı CoCoSo Uygulaması

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ABSTRACT

In this study, the export performance of the member countries of the Organization of Turkic States (Azerbaijan, Kazakhstan, Kyrgyzstan, Türkiye, Uzbekistan) between 2019 and 2023 was analysed comparatively using Multi-Criteria Decision-Making (MCDM) methods. The evaluation of export performance was based on the following criteria: net export value, export per capita, export unit value index, global market share in exports, export growth rate, high-tech exports, the share of goods exports in GDP, and export product diversity. In the study, the CRITIC and LOPCOW methods were first used to weight the criteria, followed by a common weighting method created by integrating these two methods. The CoCoSo method was then applied to determine the rankings of the countries. As a result of the analysis, Azerbaijan ranked first as the country with the highest overall export performance in all methods. Kazakhstan generally ranked second, Uzbekistan third, Kyrgyzstan and Türkiye fourth and fifth, respectively. The findings indicate that the most important criteria affecting export performance are product diversity, export unit value index, and net export value. The study contributes to the analysis of export performance among members of regional economic organisations using MCDM methods and provides guidance on developing current gaps, particularly for the countries of the Organization of Turkic States.

ÖZ

Bu çalışmada Türk Devletleri Teşkilatı üye ülkelerinin (Azerbaycan, Kazakistan, Kırgızistan, Türkiye, Özbekistan) 2019-2023 yılları arasındaki ihracat performansları, Çok Kriterli Karar Verme (ÇKKV) yöntemleri kullanılarak karşılaştırmalı olarak analiz edilmiştir. İhracat performansının değerlendirilmesinde net ihracat değeri, kişi başına ihracat, ihracat birim değer endeksi, ihracatta dünya pazar payı, ihracat büyüme oranı, yüksek teknoloji ihracatı, mal ihracatının GSYİH içindeki payı ve ihracat ürün çeşitliliği kriterleri esas alınmıştır. Çalışmada öncelikle kriterlerin ağırlıklandırılmasında CRITIC, LOPCOW ve bu iki yöntemin bütünleştirilmesi ile oluşturulan ortak ağırlıklandırma yöntemi kullanılmıştır. Ardından ülkelerin sıralamalarının belirlenmesi için CoCoSo yöntemi uygulanmıştır. Analiz sonucunda Azerbaycan tüm yöntemlerde genel olarak en yüksek ihracat performansına sahip ülke olarak ilk sırada yer almıştır. Kazakistan ise genellikle ikinci sırada bulunmuş, Özbekistan üçüncü, Kırgızistan ve Türkiye ise sırasıyla dördüncü ve beşinci sırada yer almıştır. Elde edilen bulgular, ihracat performansını etkileyen en önemli kriterlerin ürün çeşitliliği, ihracat birim değer endeksi ve net ihracat değeri olduğunu göstermiştir. Çalışma, ÇKKV yöntemleri ile bölgesel ekonomik örgüt üyelerinin ihracat performanslarının analizine katkı sağlamakta ve özellikle Türk Devletleri Teşkilatı ülkeleri için mevcut eksik alanların geliştirilmesi yönünde rehberlik sunmaktadır.

1. Introduction

International trade continues to be important for many countries because it offers economic opportunities. As the global economy is developing rapidly, every country needs to have a place on the global trade map. Every country is constantly creating new competitive advantages in order to withstand international pressures arising from constantly changing and increasing competition (Caglio, 2017). One of the most important keys to success in competition is exports. Exports, which refer to the sale of goods and

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services abroad by a country in a given year, are of great importance in terms of countries' macroeconomic processes (İmamoğlu and Coşkun, 2023). With the acceleration of trade liberalisation worldwide, the relationship between exports and economic growth has gained prominence in development literature and has been one of the most studied topics by both national economies and economists, especially since the Second World War (Güven, 2021). Increasing exports has been one of the policy objectives of the real sector (Çelik and Çatuk, 2023). The increase in export capacity brings with it an upward trend in countries' economic performance. Export is of critical importance in terms of achieving a balanced of payments, job creation, economic vitality and growth, especially for less developed and developing countries experiencing capital shortages (Bulut and Yaşar, 2023).

In economic growth, a country's choice of what to export is as important as how much it exports (Cheong, 2023). Along with the increase in exports, diversification in exports will also contribute to reducing countries' vulnerabilities and creating a more resilient economic environment against external shocks (Acaravcı and Kargı, 2015). In addition, diversification in exports reduces dependence on a limited product range and accelerates economic growth by providing access to global markets (Sultanova and Naser, 2024). A country's focus on exports can have positive effects on economic efficiency and growth thanks to the adoption of modern technology, increased competition, and accelerated learning processes. In today's global economy, where uncertainties are increasing, countries have developed various mechanisms to make economic development more stable (Gökdoğan, 2016). One of these mechanisms is the export of advanced technology. Through the export of products containing advanced technology, countries create added value and make exports more sustainable (Şeker, 2019). Components such as export diversification and high-tech product exports not only make exports more sustainable but are also frequently used when comparing countries' export performance. In addition to these components, factors such as per capita exports, export unit value index, and net trade balance are also used in evaluating export performance and have found their place in the literature.

International organisations and economic cooperation agreements are important entities in terms of increasing countries' exports. Member states of these organisations take steps in many areas, such as removing trade barriers, reducing tariffs and facilitating logistics processes, thereby stimulating economic activity between them. The Organization of Turkic States (OTS) is one such organisation. OTS refers to an organisation formed by states that gained independence following the dissolution of the Soviet Union, with its foundation laid at the First Summit held in Türkiye in 1992 (Çınar and Uzun, 2023). With the strengthening of relations between Turkish-speaking countries, the Cooperation Council of Turkic-Speaking States - Turkic Council was established as an international organisation in 2009 with the Nakhchivan Agreement (Akçapa, 2023). At the 8th Summit held in Istanbul in 2021, some important decisions were made regarding the future of the organisation. One of these was to change the name of the organisation to the 'Organization of Turkic States' (TDT, 2025). Despite its international organisational

structure, the name of the organisation did not have a counterpart in the Turkic States, so the name 'Organization' was given to the union in order to have a common language (Çınar and Uzun, 2023). The initial purpose of the organization was to take steps in the areas of common language, history and culture. However, over time, projects were developed in many areas such as economy, transportation, energy, security, technology, and agriculture, thereby expanding the scope of the organization (Sarıca, 2024).

OTS countries have always been attractive in terms of international trade due to their dynamic structure, strategic locations, and effective roles in trade routes dating back to ancient times. A review of the literature reveals that although many studies have been conducted on OTS, there are few studies on economic performance. In particular, no studies using Multi-Criteria Decision-Making (MCDM) methods have been found. In this regard, the study is expected to contribute to the literature. The aim of this study is to examine the export performance of OTS countries according to selected criteria, rank the countries according to their export performance, and identify which criteria stand out in export performance. Within the scope of the study, CRITIC, LOPCOW and common weighting methods were used to determine the criteria with the highest degree of importance for export performance. The CoCoSo method was used to rank the countries. The first section of the study discusses the importance of exports for countries and provides information about OTS. The second section reviews the literature on export performance. The third section provides information about the criteria and methods used in the study. The fourth section presents the findings obtained from the MCDM methods used in the study. The final section includes the conclusion, discussing the limitations and contributions of the study.

2. Literature Review

A review of the extant literature on export performance reveals a preponderance of studies conducted on the export performance of companies and small and medium-sized enterprises. The performance of countries is evaluated in terms of macroeconomic indicators, and studies conducted using direct export performance criteria are limited. The AHP and TOPSIS methods were utilised as MCDM methods. The following section provides a summary of the extant literature pertaining to export performance studies. To the best of the present author's knowledge, no studies have been conducted on OTS countries in the literature. From this standpoint, the objective of the present study is to make a contribution to the extant literature.

Wierts et al. (2014) conducted a study that measured the degree of correlation between export composition and the export performance of European countries. The study covered the period from 1988 to 2009. The findings of the study demonstrated that high-tech exports constituted a greater proportion of total exports. Balcılar et al. (2014) sought to identify the factors affecting export performance. In the present study, the Autoregressive Distributed Lag (ARDL) bounds test method was employed, utilising a range of economic variables, including the real effective exchange rate, productivity, per capita income, and Gross Domestic Product (GDP). The analysis conducted on the Turkish economy covered the period 1995-2012. The

analysis revealed that increases in productivity and foreign demand resulted in an increase in exports. Karagöz (2016) conducted a study to ascertain the factors that influence Türkiye's export potential. The data set utilised for this analysis encompassed the period from 1980 to 2010. The findings indicated that a depreciation in the domestic currency exerted a favourable influence on exports. The study concluded that foreign direct investment and the foreign demand index were found to be insignificant. Işık et al. (2017) conducted a study using the AHP and TOPSIS methods to compare the export performance of 22 developing countries. In the present study, the performance criteria were determined as follows: the export value index, the export cost per container, the number of documents required for export, the ratio of goods exports to high-income countries, goods and services exports (percentage of GDP), high-tech product exports (percentage of industrial products), and industrial product exports (percentage of goods exports). Türkiye was positioned 17th out of 22 countries in the overall ranking, while the Philippines attained the top position as the best country in the overall ranking, partly due to its high-tech export ratio. Gouveia and Santos (2018) conducted a study covering the years 1999-2014 with the aim of examining the export performance of four Balkan countries. The study identified the following export performance indicators: trade openness, trade balance, share of exports in the world market, and share of high-tech product exports. The study revealed that persistent trade deficits have been declining since 2008 and that the share of medium and high-tech products in exports has increased. In addition, it was observed that Bulgaria, Greece, and Croatia have a trade surplus in the service sector. Karabıyık and Karabıyık (2018) conducted a study that employed MCDM, namely TOPSIS and AHP, to assess the international trade performance of OECD countries. The study utilised the following performance indicators: per capita export volume, normalised trade balance, and foreign trade ratio. The findings indicate that Norway, Ireland, and Germany demonstrated the most favourable outcomes, while Türkiye, the United States, and Greece exhibited the least favourable outcomes. Del Rosal (2019) conducted a study to measure the relationship between export diversification and export performance, using Spain as an example country. Utilising data from 1999 to 2011, the study identified a positive correlation between export concentration and export performance by target market. Kuşat (2019) undertook a comparative analysis of the competitiveness of Türkiye and European Union candidate countries between 2006 and 2016, utilising the comparative export performance (CEP) index. The sectors evaluated for export performance were determined to be six in number: manufacturing, agriculture, food, textiles, iron and steel, and chemicals. The study's findings indicated that Türkiye possesses a substantial competitive advantage over its competitors in the textile sector. Akay (2021) conducted a study comparing the export performance of EU countries and Türkiye based on advanced technology export data. The study covered the period between 2007 and 2018, and time series cluster analysis was used to determine Türkiye's position among EU countries. Türkiye was placed in the first cluster, indicating notable similarities with the majority of EU countries. Yaşar and Bolat (2023) conducted a study

to determine which countries demonstrated superior economic performance. This was achieved by comparing the foreign trade data, goods trade, and per capita GDP data of BRICS countries and Türkiye. The study encompassed the years 2010-2020 and utilised the TOPSIS method, a MCDM, as the analytical framework. The criteria employed in the study encompassed per capita GDP, goods and services exports, goods and services imports, and high-tech exports. The analysis indicated that Russia and China demonstrated the most effective performance. Avşar (2025) conducted a study with the objective of identifying both similarities and differences between countries by means of an analysis of export performance. The analysis of countries was conducted using data obtained from the World Bank between 2013 and 2022. The Expectation Maximisation algorithm, a clustering method, was employed during the analysis. The export performance of countries was evaluated according to the criteria of goods and services exports, high-tech exports, and commercial services exports. The study focused on 95 countries, with a particular emphasis on the G7 countries, China, and Türkiye. The study revealed that G7 countries exhibited comparable performance with regard to high-tech exports, while Germany and the United States demonstrated analogous performance in terms of goods and services exports. With regard to the analysis of commercial services exports, the study identified that the United States demonstrated a high level of performance when compared to all other countries.

The literature review revealed that there were no studies on the export performance of OTS countries. Furthermore, the MCDM methods CRITIC, LOPCOW, common weighting, and CoCoSo were used together for the first time to determine export performance. This comprehensive approach to the export performance of OTS countries fills an important gap in the literature.

3. Data and Methods

3.1. Data

This study compares the export performance of the member states of the OTS between 2019 and 2023. The criteria for evaluating export performance were obtained through a literature review, and the values for the criteria were found using secondary data. A wide range was determined to ensure objectivity when determining the years for which data was collected. However, due to certain constraints, the range of years was limited to five years. For example, since there were no data available for high-tech product exports for Kazakhstan, Kyrgyzstan, and Uzbekistan for the year 2024, data up to 2023 were included in the evaluation. The sources and criteria for the secondary data are presented in Table 1.

Table 1. Criteria Used for Export Performance and Sources of the Criteria

Criteria	Characterisation	Reference Data	Reference Study	Direction
Trade balance (USD Thousand) (C1)	Net trade refers to the difference between the value of a country's exports and its imports. Serving as a robust measure of national economic performance, it reflects the extent of global production integration and the vertical specialization of nations across different stages of the production chain (Mimouni et al., 2007). A negative net trade value denotes a trade deficit, while a positive value signifies a trade surplus. (Chakrabartty and Sinha, 2022; UNCTAD, 2025).	Trade Map (2025)	Mimouni et al. (2007); Chakrabartty and Sinha (2022)	Maximum
Per capita exports (C2)	Per capita exports refer to the ratio of a country's total merchandise exports to its population. This measure serves as an indicator of the country's degree of outward economic orientation and reflects the extent to which its population participates in and contributes to the global market. (Mimouni et al., 2007). This indicator reflects a country's productivity and export performance. (Majerova and Nevima, 2018)	Trade Map (2025) and World Bank (2025a)	Mimouni et al. (2007); Majerova and Nevima (2018), Karabıyık and Karabıyık (2018)	Maximum
Export unit value index (C3)	The Export Unit Value Index (EXUVI) is an statistical indicator that uses the unit value of exported commodities and reflects the change in their prices over a specific period (World Bank, 2025)	World Bank (2025b)	Işık et al. (2017)	Maximum
(Export) Share in world market (%) (C4)	The ratio of a country's total exports to the global total of exports worldwide (Mimouni et al., 2007).	Trade Map (2025)	Mimouni et al. (2007); Gouveia and Santos (2018)	Maximum
Export growth rate (%) (C5)	This metric is derived by taking the difference between a country's export value in a given year and that of the previous year, and then dividing this difference by the export value of the previous year.	Trade Map (2025)	Gonçalves and Richtering (1987); Mimouni et al. (2007)	Maximum
High-technology exports (%) (C6)	This indicator reflects the proportion of a country's manufactured exports that consists of high-technology products. (Wierts et. al., 2014; Gouveia and Santos, 2018).	World Bank (2025c)	Wierts et. al. (2014); Avşar (2025), Gouveia and Santos (2018); Işık et al. (2017); Akay (2021); Yaşar and Bolat (2023)	Maximum
Exports of goods (% of GDP) (C7)	This indicator reflects the total value of a country's merchandise exports relative to its gross domestic product (GDP), expressed as a percentage, and is commonly used to assess the significance of exports within the overall economy.	Trade Map (2025) and IMF (2025)	Gonçalves and Richtering (1987); Işık et al. (2017); Gouveia and Santos (2018)	Maximum
(Export) Product diversification (C8)	Product diversification is a factor that can offset any negative situation by reducing dependence on a small number of products (Aydemir, 2024; Mimouni et al. 2007)	UNCTADstat (2025)	Mimouni et al. (2007)	Maximum

3.2. Methods

Within the scope of the study, CRITIC, LOPCOW, and Common Weighting methods from the MCDM methods were used to determine the weights of the criteria. Since different results can be obtained for each weighting method, the common weighting method was preferred to eliminate these differences. The CoCoSo method was also integrated with the weighting methods to obtain the ranking results. The CRITIC and LOPCOW methods were identified as the optimal solution for the weighting process among MCDM methods, owing to their ability to provide results derived from the objective evaluation of secondary data, thereby ensuring a more reliable outcome when compared with the subjective results derived from expert opinions. Both methods eliminate the influence of decision-makers on the decision because they process real data to reach the result. The CoCoSo method, which was determined as the ranking method, emerged through the integration of the SAW (Simple Additive Weighting) and EWP (Exponentially Weighted Product) methods. It has been demonstrated to exhibit high stability, robustness, and reliability in the ranking of alternatives (Ecer, 2020). Furthermore, in the CoCoSo method, the addition of a new alternative to the analysis or the removal of an existing alternative from the analysis exerts a lesser influence on the ranking results in comparison to other MCDM methods. This factor was a primary consideration in the selection of the method for the ranking process.

3.2.1. CRITIC Method

The CRITIC method, introduced by Diakoulaki et al., is another objective technique used to determine criterion weights. This approach is suitable for complex decision problems involving multiple conflicting criteria (Diakoulaki et al., 1995). It incorporates the intensity of contrast and correlation between criteria. The method includes five steps (Diakoulaki et al., 1995; Krishnan et al., 2021):

Step 1: Forming the decision matrix and recording performance scores for each alternative x_{ij}

$$X = \begin{bmatrix} x_{11} & x_{12} & ... & x_{1n} \\ x_{21} & x_{22} & ... & x_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ x_{m1} & x_{m2} & .... & x_{mn} \end{bmatrix} \quad (1)$$

Step 2: Normalization using max-min values for each criterion.

$$r_{ij} = \frac{x_{ij} - x_j^{min}}{x_j^{max} - x_j^{min}} \quad (2)$$

$$r_{ij} = \frac{x_j^{max} - x_{ij}}{x_j^{max} - x_j^{min}} \quad (3)$$

The r_{ij} values are found using the formulas Equality (2) for benefit-based criteria and Equality (3) for cost-based criteria.

Step 3: Calculation of inter-criterion relationships through correlation coefficients P_{jk}

$$P_{jk} = \frac{\sum_{i=1}^{m}(r_{ij} - r_j)(r_{ik} - r_k)}{\sqrt{\sum_{i=1}^{m}(r_{ij} - r_j)^2 \sum_{i=1}^{m}(r_{ik} - r_k)^2}} \quad (4)$$

j,k=1,2,…,n

Step 4: Computation of contrast and information content (C_j) for each criterion.

$$\sigma_j = \sqrt{\frac{\sum_{i=1}^{m}(r_{ij}-r_j)^2}{m}} \quad (5)$$

$$C_j = \sigma_j \sum_{k=1}^{n}(1 - P_{jk}) \quad (6)$$

j=1,2,3,…,n

Step 5: Determination of final weights by normalizing the C_j values.

$$W_j \frac{C_j}{\sum_{k=1}^{n}(C_k)} \quad (7)$$

(j,k=1,2,3,…,n)

3.2.2. LOPCOW Method

The LOPCOW method, introduced to the literature by Ecer and Pamucar in 2022, is one of the objective weighting methods. The method eliminates the gap caused by the size of the series by considering the percentage of the mean square and standard deviation of the series. One of the most important features of the method is that it is not affected by negative values. The steps of the LOPCOW method are as follows: (Ecer ve Pamucar, 2022; Yaşar, 2023; Kahreman, 2024)

Step 1: Initial Decision Matrix

The initial decision matrix is obtained with the same formula as in Equation 1.

Step 2: Normalized Decision Matrix

At this stage, the normalization process is performed using different methods depending on whether the criteria are cost- or benefit-oriented. The relevant equations are shown below.

$$r_{ij} = \frac{x_{max}-x_{ij}}{x_{max}-x_{min}} \text{ (for cost-based criteria)} \quad (8)$$

$$r_{ij} = \frac{x_{ij}-x_{min}}{x_{max}-x_{min}} \text{ (for benefit-based criteria)} \quad (9)$$

Step 3: Calculating the Percentage Values (PV) of the Criteria

$$PV_{ij} = \left| ln\left(\frac{\sqrt{\sum_{i=1}^{m}r_{ij}^2}}{\sigma}\right) * 100 \right| \quad (10)$$

Step 4: Determination of Criteria Weights

$$w_j = \frac{PV_{ij}}{\sum_{i=1}^{n}PV_{ij}} \quad (11)$$

The sum of the weights of the criteria obtained with the LOPCOW method should always be Equal to 1.

$$\left(\sum_{i=1}^{n}w_j = 1\right) \quad (12)$$

3.2.3. The Common Weighting Method

As suggested by Zavadskas and Podvezko (2016), common criteria weighting can be accomplished through the integration of multiple weighting techniques. In this context, the common application of the CRITIC and LOPCOW methods, both of which serve for objective criteria weighting, is illustrated in Equation 13. This

integration enables the decision-making process to benefit from the complementary strengths of both methods: CRITIC considers the contrast intensity and conflict among criteria through standard deviation and correlation analysis, whereas LOPCOW incorporates the entropy and proximity information of criteria performance. The combination of these methods thus enhances the robustness and reliability of the resulting weights by simultaneously accounting for dispersion, correlation, and information content within the dataset.

$$w_j = \frac{w_j CRITIC w_j LOPCOW}{\sum_{i=1}^{n} w_j CRITIC w_j LOPCOW} \quad (13)$$

3.2.4. CoCoSo Method

The Combined Compromise Solution (CoCoSo) method developed by Yazdani et al. in 2019 is based on an integrated simple additive weighting and exponential weighted product model. The steps of the method are shown below (Yazdani et. al. 2019; Dağlı ve Kuvvetli, 2023):

Step 1: Initial Decision Matrix

The initial decision matrix is obtained with the same formula as in Equation 1.

Step 2: Obtaining the Normalization Matrix

In this step, the normalization process is performed for benefit-based criteria with Equation 14 and for cost-based criteria with Equation 15.

$$r_{ij} = \frac{x_{ij}-x_{min}}{x_{max}-x_{min}} \text{ (for benefit-based criteria)} \quad (14)$$

$$r_{ij} = \frac{x_{max}-x_{ij}}{x_{max}-x_{min}} \text{ (for cost-based criteria)} \quad (15)$$

Step 3: Obtaining S_i and P_i Values

S_i represents the sum of the weighted comparability series of alternatives and is obtained according to the Grey Relational Approach. Equation 16 is used to obtain the relevant value.

$$S_i = \sum_{j=1}^{n}(w_j r_{ij}) \quad (16)$$

The P_i value represents the total power weight and is obtained according to the WASPAS multiplicative value. The relevant value is found using Equation 17.

$$P_i = \sum_{j=1}^{n}(r_{ij})^{w_j} \quad (17)$$

Step 4: Calculating Relative Weights of Alternatives

The relative weights of the alternatives, $0 \leq \lambda \leq 1$, are determined using three different methods. The relevant methods are illustrated in Equations 18, 19, and 20.

$$k_{ia} = \frac{P_i+S_i}{\sum_{i=1}^{m}(P_i+S_i)} \quad (18)$$

$$k_{ib} = \frac{S_i}{minS_i} + \frac{P_i}{minP_i} \quad (19)$$

$$k_{ic} = \frac{\lambda(S_i)+(1-\lambda)(P_i)}{(\lambda maxS_i+(1-\lambda)maxP_i)} \quad (20)$$

Step 5: Final Ranking of Alternatives

The ranking of alternatives is obtained with the help of Equality 21.

$$k_i = (k_{ia}k_{ib}k_{ic})^{\frac{1}{3}} + \frac{1}{3}(k_{ia}k_{ib}k_{ic}) \quad (21)$$

4. Findings

In the application section, the weighting process is based on the LOPCOW, CRITIC and Common Weighting methods, and the ranking process is carried out using the CoCoSo method from the MCDM methods. The export performance of the member countries of the OTS was evaluated and compared based on data from 2019, 2020, 2021, 2022, and 2023. The criteria employed in the evaluation of export performance in the decision-making process have been identified through a comprehensive literature review. These criteria encompass Net Export Value (C1), Exports Per Capita (C2), Export Unit Value Index (C3), (Export) Share in World Market (C4), Export Growth Rate (C5), High-Technology Exports (C6), Exports of Goods (% of GDP) (C7), and (Export) Product Diversification (C8). In the context of all weighting methods, the initial step entails the formulation of a decision matrix. In this regard, instead of the decision matrix for all years, only the decision matrix for 2019 and the average values for all years are shown in Table 2 and Table 3.

Table 2. Decision Matrix for 2019

	C1	C2	C3	C4	C5	C6	C7	C8
Azerbaijan	5.985.697	1.96	113.5	0.0010	0.01	5	0.41	0.829
Kazakhstan	19.366.278	3.00	112	0.0031	-0.06	29	0.32	0.781
Kyrgyzstan	-2.938.311	0.30	112,5	0.0001	0.09	7	0.21	0.721
Türkiye	-29.476.049	2.19	95.3	0.0096	0.07	3	0.24	0.409
Uzbekistan	-7.510.443	0.44	105.9	0.0008	0.24	1	0.21	0.802

Source: Trade Map (2025), World Bank (2025a), World Bank (2025b), World Bank (2025c), IMF (2025), UNCTADstat (2025).

Table 3. Decision Matrix for Average Years

	C1	C2	C3	C4	C5	C6	C7	C8
Azerbaijan	10.224.536	2.2464	138.02	0.0011	0.12	4.4	0.41	0.828
Kazakhstan	24.150.104,4	3.0980	133.18	0.0029	0.07	29.2	0.32	0.783
Kyrgyzstan	-3.846.035	0.2868	126.36	0.0001	0.03	10.2	0.21	0.709
Türkiye	-60.146.340,4	2.3663	100.92	0.0096	0.08	3.2	0.25	0.415
Uzbekistan	-8.679.245,6	0.4021	128.38	0.0007	0.07	0.6	0.19	0.763

An analysis of the results presented in Table 3 reveals that Kazakhstan has attained the highest net export value in comparison to the average of the specified years. Although Türkiye is in a good position in terms of export value, its net export value is low due to high import figures. Kazakhstan also ranks first in terms of export value per capita. Although Türkiye's exports are approximately four times those of Kazakhstan, it ranks second in terms of exports per capita due to its large population. Uzbekistan, despite its low export values, has the second-highest population among the member countries of the OTS after Türkiye, and its export value per capita is also low. When considering its share of the world market, Türkiye is far ahead. Kyrgyzstan, on the other hand, has a very small share of the global market due to its low export performance. Azerbaijan has achieved a good result in terms of export growth rate based on the average of the past five years. In terms of the proportion of high-tech product exports, Kazakhstan exports approximately one-third of its manufacturing exports as high-tech products.

Table 4. Weighting Result According to CRITIC Method

		C1	C2	C3	C4	C5	C6	C7	C8
2019	w_j	0.0933	0.1187	0.1199	0.1612	0.1689	0.1083	0.1114	0.1183
	Rank	8	4	3	2	1	7	6	5
2020	w_j	0.1253	0.1220	0.1403	0.1300	0.1306	0.1011	0.1162	0.1344
	Rank	5	6	1	4	3	8	7	2
2021	w_j	0.1097	0.1109	0.1488	0.1622	0.0967	0.1372	0.0980	0.1364
	Rank	6	5	2	1	8	3	7	4
2022	w_j	0.1179	0.1160	0.0937	0.2121	0.1139	0.1409	0.0867	0.1189
	Rank	4	5	7	1	6	2	8	3
2023	w_j	0.1042	0.1332	0.0977	0.1590	0.1619	0.1194	0.1192	0.1054
	Rank	7	3	8	2	1	4	5	6
Avr.	w_j	0.1151	0.1134	0.1233	0.1931	0.1010	0.1292	0.0922	0.1327
	Rank	5	6	4	1	7	3	8	2

The results obtained for 2019, 2020, 2021, 2022, 2023 and the average values for all years as a result of the processes aimed at obtaining the importance levels of the criteria using the CRITIC method are shown in Table 4. According to the results obtained, the Export Growth Rate (C5) criterion had the highest importance level in 2019 with a value of 0.1689. This criterion was followed by the (Export) Share in World Market (C4) criterion with a value of 0.1612. The criterion with the lowest importance level in 2019 was Net Export Value (C1) with a value of 0.0933. When the average values for all years for which the criterion weights were calculated are examined, it is seen that all criteria have different values and different rankings each year. As a result of the weighting performed for the average values of all years, the (Export) Share in World Market (C4) criterion was found to be the criterion with the highest importance level, with a value of 0.1931. This criterion was followed by the Export

Product Diversification (0.1327) and High-Tech Exports (0.1292) criteria, respectively.

The results obtained from the weighting of criteria using LOPCOW are shown in Table 5. As with the CRITIC method, the importance levels of the criteria exhibited variability across the years of the study. However, the results for different years were found to be more closely aligned with each other in the LOPCOW method. The Export Product Diversification (C8) criterion was the second most significant criterion in 2020 and 2022, while it was the most important criterion in all other years, including the average of all years. Conversely, the (Export) Share in World Market (C4) criterion was determined to be the criterion with the lowest importance level in all years except 2019.

Tablo 5. Weighting Result According to the LOPCOW Method

		C1	C2	C3	C4	C5	C6	C7	C8
2019	w_j	0.1811	0.1395	0.2160	0.0274	0.1025	0.0184	0.0628	0.2523
	Rank	3	4	2	7	5	8	6	1
2020	w_j	0.2341	0.1124	0.0882	0.0187	0.1888	0.0222	0.1049	0.2308
	Rank	1	4	6	8	3	7	5	2
2021	w_j	0.1658	0.1143	0.1983	0.0159	0.1603	0.0540	0.0826	0.2089
	Rank	3	5	2	8	4	7	6	1
2022	w_j	0.2447	0.1333	0.1516	0.0311	0.1041	0.0313	0.0830	0.2209
	Rank	1	4	3	8	5	7	6	2
2023	w_j	0.2118	0.1339	0.1872	0.0243	0.1162	0.0626	0.0301	0.2338
	Rank	2	4	3	8	5	6	7	1
Avr.	w_j	0.1967	0.1277	0.2128	0.0221	0.1241	0.0290	0.0689	0.2186
	Rank	3	4	2	8	5	7	6	1

Table 6. Common Weighting Result

		C1	C2	C3	C4	C5	C6	C7	C8
2019	w_j	0.0616	0.0641	0.0771	0.0234	0.0638	0.0157	0.0402	0.0805
	Rank	5	3	2	7	4	8	6	1
2020	w_j	0.0816	0.0585	0.0541	0.0163	0.0772	0.0182	0.0551	0.0850
	Rank	2	4	6	8	3	7	5	1
2021	w_j	0.0660	0.0563	0.0850	0.0145	0.0603	0.0387	0.0448	0.0825
	Rank	3	5	1	8	4	7	6	2
2022	w_j	0.0796	0.0620	0.0579	0.0271	0.0544	0.0256	0.0424	0.0773
	Rank	1	3	4	7	5	8	6	2
2023	w_j	0.0698	0.0668	0.0642	0.0211	0.0677	0.0411	0.0240	0.0726
	Rank	2	4	5	8	3	6	7	1
Avr.	w_j	0.0726	0.0601	0.0781	0.0198	0.0557	0.0237	0.0394	0.0826
	Rank	3	4	2	8	5	7	6	1

The common weighting method obtained by combining the CRITIC and LOPCOW weighting methods yielded results similar to those obtained with the LOPCOW method, and the results are shown in Table 6. The Export Product Diversification (C8) criterion was the criterion with the highest importance rating except for 2021 and 2022. The Share in World Market (Export) (C4) criterion was the criterion with the lowest importance level in the LOPCOW method, except for 2019, while in the Common Weighting Method, it was the criterion with the lowest importance level, except for 2022. The Export Unit Value Index (C3) criterion yielded fluctuating and varying results across all years; however, following the weighting process based on average values, it was determined to be the second most important criterion.

Table 7. CRITIC-CoCoSo Integrated Method Results

		Azerbaijan	Kazakhstan	Kyrgyzstan	Türkiye	Uzbekistan
2019	k_i	1.8567	1.9001	1.0786	1.0161	1.3637
	Rank	2	1	4	5	3
2020	k_i	1.1688	1.8038	1.3139	1.1296	1.0881
	Rank	3	1	2	4	5
2021	k_i	2.0299	2.3250	0.9700	1.1155	1.3103
	Rank	2	1	5	4	3
2022	k_i	2.6021	2.7155	1.3101	1.0962	1.1339
	Rank	2	1	3	5	4
2023	k_i	1.6181	2.1330	1.3614	0.9976	1.2356
	Rank	2	1	3	5	4
Avr.	k_i	2.0938	2.2956	1.0004	1.0850	1.1365
	Rank	2	1	5	4	3

The ranking results obtained according to the CRITIC-CoCoSo integrated decision-making method are shown in Table 7. According to these results, Kazakhstan ranked first in all years of the assessment. Azerbaijan followed Kazakhstan. Azerbaijan ranked second in all years except 2020. Other member states of the organization, apart from

Kazakhstan and Azerbaijan, generally obtained different results in the years when the evaluations were conducted. Kyrgyzstan ranked fourth in 2019, rose to second place in 2020, and remained in fifth and last place when the average of all years' data was taken into account. According to the CRITIC weighting method, the criteria with the highest importance were (Export) Share in World Market (C4),

Export Product Diversification (C8), and High-Tech Exports (C6). Kazakhstan generally had high values in all years for the relevant criteria, so it can be said that it ranked first as a result of the ranking method. Similarly, Kyrgyzstan had the lowest value in the criterion with the highest importance, Share in World Market (C4), which led to Kyrgyzstan ranking last.

Table 8. LOPCOW-CoCoSo Integrated Method Results

		Azerbaijan	Kazakhstan	Kyrgyzstan	Türkiye	Uzbekistan
2019	k_i	3.0854	2.9694	1.8244	0.9751	2.1226
	Rank	1	2	4	5	3
2020	k_i	1.5200	2.1051	1.6327	1.0961	1.4145
	Rank	3	1	2	5	4
2021	k_i	2.7451	2.8178	1.2114	1.0842	1.7405
	Rank	2	1	4	5	3
2022	k_i	4.0469	3.6224	1.7719	0.9027	1.7955
	Rank	1	2	4	5	3
2023	k_i	2.6824	3.3296	2.1347	0.9641	2.1405
	Rank	2	1	4	5	3
Avr.	k_i	3.2186	3.0720	1.4764	0.9847	1.7791
	Rank	1	2	4	5	3

When the results of the LOPCOW-CoCoSo integrated method were examined, it was seen that similar results were obtained with the CRITIC-CoCoSo method. Azerbaijan and Kazakhstan ranked first as the countries with the highest average scores. Uzbekistan ranked third in all years except 2020. Türkiye, on the other hand, has the worst ranking based on the average scores it has achieved in all years. Türkiye's poor performance can be attributed to its low scores in the criteria with the highest importance levels in the LOPCOW method, namely (Export) Product Diversification (C8), Export Unit Value Index (C3), and Net Export Value (C1).

The steps involved in the integrated use of the CoCoSo ranking method with the common weighting method obtained by combining the LOPCOW and CRITIC weighting methods are shown in Table 9. In the table

created using the average values for all years, the k_{ia}, k_{ib} and k_{ic} values were obtained using the S_i and P_i values. The k_i value was then determined by combining all three values using Equation 21, and the rankings of the countries were established. The results of the Common Weighting-CoCoSo integrated method for the years 2019, 2020, 2021, 2022, and 2023, along with the average values for all years, are presented in Table 10.

Table 9. Common Weighting-CoCoSo Method Stages

Countries	S_i	P_i	k_{ia}	k_{ib}	k_{ic}	k_i
Azerbaijan	0.3635	7.8748	0.2555	5.1022	1.0957	2.6273
Kazakhstan	0.3505	7.8888	0.2555	4.9819	1.0909	2.5723
Kyrgyzstan	0.1716	4.7907	0.1539	2.6323	0.6418	1.2293
Türkiye	0.1051	4.8386	0.1533	2.0100	0.6141	0.9889
Uzbekistan	0.2017	5.6580	0.1817	3.1004	0.7576	1.4888

Table 10. Common Weighting-CoCoSo Method Ranking Results

		Azerbaijan	Kazakhstan	Kyrgyzstan	Türkiye	Uzbekistan
2019	k_i	2.3660	2.2304	1.3735	0.9895	1.7380
	Rank	1	2	4	5	3
2020	k_i	1.3147	1.8645	1.4198	1.0847	1.2433
	Rank	3	1	2	5	4
2021	k_i	2.4583	2.5736	1.1154	1.0788	1.6467
	Rank	2	1	4	5	3
2022	k_i	3.1274	2.8930	1.5040	0.9134	1.4586
	Rank	1	2	3	5	4
2023	k_i	2.0030	2.5564	1.6829	0.9812	1.6243
	Rank	2	1	3	5	4
Avr.	k_i	2.6273	2.5723	1.2293	0.9889	1.4888
	Rank	1	2	4	5	3

The results obtained by integrating the CoCoSo ranking method with the common weighting method obtained by combining the CRITIC and LOPCOW weighting methods with the help of Equation 21 are shown in Table 10. The results are similar to those obtained with the LOPCOW-CoCoSo integrated method. Only in 2022 and 2023 did the positions of Kyrgyzstan and Uzbekistan differ. According to the ranking results, Azerbaijan ranked first with 2.6273 points based on the average values of all years, followed by

Kazakhstan with 2.5723 points and Uzbekistan with 1.4888 points. The last two places were taken by Kyrgyzstan with 1.2293 points and Türkiye with 0.9889 points. The results obtained were based on criteria determined through a literature review. The importance of the criteria varies depending on the method applied. In this study, high-tech exports ranked third according to the CRITIC method and seventh according to the LOPCOW and common weighting methods. In the study conducted by Işık et al. (2017), high-

tech exports were the criterion with the highest importance level, followed by exports of goods to high-income countries and the export unit value index. Yaşar and Bolat (2023), on the other hand, accepted the criteria they determined as having equal importance in their study, and advanced technology exports received a value of 0.25. In this study, the importance levels of the criteria were obtained using different methods with the aim of minimising uncertainties. Countries that achieved better results in criteria with higher importance levels were also found to have better rankings in this regard.

5. Conclusions

The ability to engage in international trade is a critical component of a nation's competitiveness. A significant indicator of this success is export performance. Export performance can be evaluated on a company basis, as well as export performance analysis by country. A multi-tiered system of sub-criteria has been developed for the purpose of determining the level of export performance. The consideration of a solitary criterion has the potential to engender misleading results. Consequently, a multifaceted evaluation approach is imperative, encompassing a range of criteria. The objective of this study is to undertake a comparative analysis of the export performance of member countries of the OTS. To this end, MCDM methods will be utilised, with the selection of criteria based on those frequently employed in extant literature.

The criteria were weighted using three different methods: CRITIC, LOPCOW, and the Common Weighting method. Weighting methods show which criterion is more important. The importance levels obtained help in ranking the alternatives. As a result of the weighting process carried out with CRITIC, the criteria with the highest importance levels were found to be (Export) Share in World Market (C4) with a value of 0.1931, (Export) Product Diversification (C8) with a value of 0.1327, and High-Tech Exports (C6) with a value of 0.1292. As a result of the weighting process performed with LOPCOW, the criteria with the highest importance levels were found to be Product Diversification (C8) with a value of 0.2186, Export Unit Value Index (C3) with a value of 0.2128, and Net Export Value (C1) with a value of 0.1967. In the application conducted using the Common Weighting method, similar results were obtained as with the LOPCOW method, and the C8, C3, and C1 criteria were found to be the criteria with the highest importance levels. Although the importance levels of the criteria differed for each of the three methods, it was observed that the C8 criterion was among the criteria with the highest importance levels in all three methods. The weights obtained using the CRITIC, LOPCOW, and Common Weighting methods were integrated with the CoCoSo method, and the rankings of the member countries of the OTS were determined based on their export performance. According to all three weighted methods, Kazakhstan and Azerbaijan obtained the highest scores in all years and ranked first and second. Uzbekistan, on the other hand, ranked third on average and in general, although its ranking varied in some years. Kyrgyzstan and Türkiye shared the last two places, ranking fourth and fifth..

Azerbaijan has demonstrated consistent and notable export growth over the past five years, with an average annual growth rate that is notably high. The Azerbaijani economy is heavily dependent on oil and natural gas, with the majority of its exports consisting of these raw materials. In this regard, it can be posited that the export rate of high-tech products is low. The combination of a relatively small population and substantial energy reserves, which are exported, results in a high export per capita. Should it succeed in converting these advantages and natural resources into high-tech products, it stands to gain a larger share of the global export market.

Kazakhstan has achieved favourable results in terms of net trade balance. This finding suggests that the company has successfully maintained a favourable import-export balance, with a greater emphasis on exports. The exportation of approximately one-third of its GDP, with a significant proportion of this being high-tech products, has been demonstrated to increase export revenues. Furthermore, the high rate of diversification in its exported products serves to reduce export vulnerability and demonstrates the country's ability to withstand potential shocks. Although Kazakhstan has a positive net export value and a high export per unit, its export unit value index ranks second only to Azerbaijan. This indicator suggests that Kazakhstan needs to increase the average value of its exports, in other words, the quality of its exports. This will lead to improved export performance. Although the weight of the export growth rate is relatively low, increasing the number of countries to which Kazakhstan exports or increasing the amount of exports to existing markets will have a positive impact on its performance. To this end, it can identify new target markets and support this with e-commerce applications.

Uzbekistan was placed third in all of the CRITIC-CoCoSo, LOPCOW-CoCoSo, and Common Weighting-CoCoSo methods. The third-place ranking of Uzbekistan can be attributed to its lower values in terms of net trade balance and high-tech product exports, when considered against the other criteria. The lower value in the net trade balance stems from the fact that imports exceed exports. This can be achieved by improving the quality of exported products. Looking at the products exported by Uzbekistan, it can be seen that gold, copper, cotton and agricultural products are the most prominent (WITS, 2025). Transforming these raw exported products into value-added products can both increase the export unit value index and improve the net trade balance. Furthermore, Uzbekistan's trading partners are primarily neighbouring countries (Trademap, 2025). Export performance can be improved by exporting value-added products to higher-income countries, rather than to these countries, which typically have lower per capita incomes (World Bank, 2025d).

Kyrgyzstan ranks fourth after Uzbekistan. Kyrgyzstan has the lowest per capita export rate among the countries evaluated. This data shows that Kyrgyzstan exports at a very low rate. Its low share of the world market also confirms this situation. In addition, the growth rate of exports is low. Considering that the export of high-tech products and the export unit value index are relatively high, it is understood that the main problem stems from the low export figures. To overcome this situation, additional support can be provided to producers to encourage them to export. Furthermore, training can be provided to producers and exporters to help

them find new target markets, and these processes can be supported with scientific methods.

Türkiye was positioned in last place in all years, according to the average weight method, with the lowest score. Türkiye is the largest country in terms of GDP, export figures and population among the countries of the OTS. However, the discrepancy between export and import figures has resulted in Türkiye experiencing a foreign trade deficit. Türkiye also has the lowest rate of high-tech product exports after Uzbekistan. This outcome underscores the necessity for Türkiye to transition away from labour-intensive manufacturing processes and instead concentrate on the production and export of technology-driven, high-value-added goods. Furthermore, considering that the export unit value index has a high criterion weight, it is clear that Turkey needs to increase the average value of its exported products. Türkiye also occupies a prominent position in global rankings, consistently performing well in terms of GDP. However, an analysis of export figures reveals that the ratio is approximately one-quarter of its GDP. In consideration of Türkiye's demographic profile, it is hypothesised that the nation should prioritise the augmentation of its production capacity and the expansion of its export horizons. When evaluating Türkiye, despite its large economy and population structure, the fact that it has low values in criteria with high weighting ratios as a result of MCDM methods has placed Türkiye at the bottom of the rankings.

This study aims to rank and compare the members of the OTS according to their export performance using MCDM methods. It has been observed that studies on export performance in the literature have mostly been conducted at the firm level. Countries' performance has generally been evaluated based on macroeconomic factors. However, studies that directly consider export criteria and evaluate countries' export performance using MCDM methods are very limited. This study is based on the integration of the CRITIC, LOPCOW, and Common Weighting methods with the CoCoSo ranking method. Minimising uncertainties, comparing rankings obtained through different weighting methods, and using current MCDM methods are also important. In today's world, where regional economic integration is gaining importance, it is thought that the fact that the member countries of the OTS, which have great potential due to their geography, form the main subject of the study will contribute to the literature in this context. The study not only presents the rankings of the relevant countries but also indicates the areas in which they generally lag behind, providing ideas on which areas need improvement. In areas requiring improvement, more reliable results can be achieved with a scientific basis by utilizing MCDM methods. For example, countries that are recommended to increase exports by identifying target markets can use MCDM methods to select the most suitable alternative markets. Similarly, methods such as the comparative advantage index can be used to identify the most suitable products for export to a country of operation. In future studies, changes in the export performance of OTS countries can be analysed using different MCDM methods and criteria, and guidance can be provided on the main areas where improvements should be made in the relevant countries.

References

Acaravcı, A., & Kargı, G. (2015). Türkiye'de ihracatın çeşitlendirilmesi ve ekonomik büyüme. *Uluslararası Ekonomi ve Yenilik Dergisi, 1*(1), 1-16. https://doi.org/10.20979/ueyd.182891

Akay, Ö. (2021). Yüksek teknoloji ihracatında Türkiye'nin yeri ve belirleyicileri. *Duzce University Journal of Science and Technology, 9*(4), 1128-1141. https://doi.org/10.29130/dubited.861464

Akçapa, M. (2023). Türk Devletleri Teşkilatı'nın tarihsel gelişimi: Teşkilatın dünü, bugünü ve yarını. *Avrasya Uluslararası Araştırmalar Dergisi, 11*(34), 473-491. https://doi.org/10.33692/avrasyad.1223099

Avşar, İ. İ. (2025). Countries by export performance: G7, China and Türkiye. *Trends in Business and Economics, 39*(2), 158-180. https://doi.org/10.16951/trendbusecon.1536037

Aydemir, M. F. (2024). Product concentration and diversification in international trade: A comparison between Türkiye and China. *Tarsus Üniversitesi Uygulamalı Bilimler Fakültesi Dergisi, 4*(2), 151-166. https://dergipark.org.tr/en/pub/tauubf/issue/87925/1504675

Ayvaz Güven, E. T. (2021). İhracata dayalı büyüme modeli: Türkiye örneği (1980-2020). *Aksaray Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 13*(1), 63-70. http://aksarayiibd.aksaray.edu.tr/tr/pub/issue/60890/881999#article_cite

Balcılar, M., Bal, H., Algan, N., & Demiral, M. (2014). Türkiye'nin ihracat performansı: İhracat hacminin temel belirleyicilerinin incelenmesi 1995-2012. *Ege Akademik Bakış, 14*(3), 451-462. https://doi.org/10.21121/eab.2014318030

Bulut, E., & Yaşar, Z. R. (2023). Determinants of export performance in emerging market economies: New evidence from a panel quantile regression model. *İstanbul İktisat Dergisi, 73*(1), 453-472. https://doi.org/10.26650/ISTJECON2022-1213878

Caglio, C. (2017). Trade liberalization and export performance: A literature review. *Revue d'économie politique, 127*(1), 25-46. https://shs.cairn.info/revue-d-economie-politique-2017-1-page-25?lang=en

Chakrabartty, S. N., & Sinha, D. (2023). A Single measure of overall export performance. *Margin: The Journal of Applied Economic Research*, 16(3-4), 278-308. https://doi.org/10.1177/09738010231153057

Çelik, E., & Çatuk, C. (2023). Uluslararası ticarette ihracat ve işletmelerin ihracat performansını etkileyen faktörler. Uzun, E. & Özbaş, H. (Eds.), *Uluslararası ticaret ve lojistik kapsamında yönetim, finans ve muhasebe yaklaşımları* (pp. 51-75). DOI: https://doi.org/10.58830/ozgur.pub270

Çınar, Y., & Uzun, Y. U. (2023). Köklü geçmişten güçlü geleceğe Türk Devletleri Teşkilatı: Küresel ekonomik-siyasal potansiyeli ve teşkilatın geleceğine dair öngörüler. *MANAS Sosyal Araştırmalar Dergisi, 12*(Özel Sayı), 141-156. https://doi.org/10.33206/mjss.1296831

Dağlı, S., & Kuvvetli, B. İ. (2023). Farklı kriter ağırlıklandırma teknikleri ve CoCoSo yöntemi ile katılım bankalarının performans değerlendirmesi. *Çukurova Üniversitesi Mühendislik Fakültesi Dergisi, 38*(4), 917-931. https://doi.org/10.21605/cukurovaumfd.1410252

Diakoulaki, D., Mavrotas, G., & Papayannakis, L. (1995). Determining objective weights in multiple criteria problems: The critic method. *Computers & Operations Research, 22*(7), 763-770. https://doi.org/10.1016/0305-0548(94)00059-H

Ecer, F. (2020). *Çok kriterli karar verme: Geçmişten günümüze kapsamlı bir yaklaşım*. Seçkin Yayınevi.

Ecer, F., & Pamucar, D. (2022). A novel LOPCOW-DOBI multi-criteria sustainability performance assessment methodology: An application in developing country banking sector. *Omega Elsevier, 112*, 1-17. https://doi.org/10.1016/j.omega.2022.102690

Goncalves, R., & Richtering, J. (1987). Intercountry comparison of export performance and output growth. *Developing Economies*, 25(1), 3–18. https://doi.org/10.1111/J.1746-1049.1987.TB00096.X

Gouveia, S., & Santos, M. (2018). Export performance of southeastern european countries. Karasavvoglou, A., Goić, S., Polychronidou, P., & Delias, P. (Eds), *Economy, finance and business in southeastern and central europe* (pp.195-211). https://doi.org/10.1007/978-3-319-70377-0_14

Gökdoğan, O. (2016). İhracatta KDV iade sisteminin incelenmesi ve bir uygulama (Yüksek Lisans Tezi). Nişantaşı Üniversitesi.

Hussaini, N., Anuradha, B., & Desai, K. (2021). Linkage between enterpreneurial orientation and export performance of south asian countries. *International Journal of Entrepreneurship, 25*(3), 1-8. https://www.abacademies.org/articles/linkage-between-entrepreneurial-orientation-and-export-performance-of-south-asian-countries-10247.html

International Monetary Fund (IMF). (2025). *GDP, current prices.* https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD

Işık, N., Engeloğlu, Ö., & Karaoğlan, S. (2017). Evaluation of the export performance of emerging market economies with fuzzy ahp and topsıs method. *Anadolu University Journal of Social Sciences, 18*(3), 113-128. https://doi.org/10.18037/ausbd.552531

İmamoğlu, İ. K., & Coşkun, H. (2023). The future of export-based growth policies in the turkish economy: An econometric simulation approach. *Erzurum Teknik Üniversitesi Sosyal Bilimler Enstitüsü Dergisi,* (*17*), 39-56. https://doi.org/10.29157/etusbed.1265732

Kahreman, Y. (2024). D8 ülkelerinin ekonomik performanslarının CRITIC/LOPCOW-CoCoSo modeli ile değerlendirilmesi. *Anadolu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 25*(1), 534-559. https://doi.org/10.53443/anadoluibfd.1340466

Karabıyık, C., & Kutlu Karabıyık, B. (2018). OECD ülkelerinin uluslararası ticaret performans değerlendirmesi: TOPSIS ve AHP yaklaşımları. *Gaziantep Üniversitesi Sosyal Bilimler Dergisi, 17*(1), 239-251. https://doi.org/10.21547/jss.267381

Karagöz, K. (2016). Determining factors of Turkey's export performance: an empirical analysis. Procedia economics and finance, 38, 446-457. https://doi.org/10.1016/S2212-5671(16)30216-7

Krishnan, A. R., Kasim, M. M., Hamid, R., & Ghazali, M. F. (2021). A modified CRITIC method to estimate the objective weights of decision criteria. *Symmetry*, 13(6), 973. https://doi.org/10.3390/sym13060973

Kuşat, N. (2019). Karşılaştırmalı ihracat performansı (CEP) indeksine göre Türkiye'nin AB28 aday ülkeleri karşısındaki rekabet gücü (2006-2016). *Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 37*(1), 111-133. https://doi.org/10.17065/huniibf.364137

Majerova, I., & Nevima, J. (2014). Influence of national competitiveness indicators on the export performance of the visegrad group plus countries. *Law, Economics and Social Issues Review, 9*(1), 19-36. https://doi.org/10.2478/danb-2018-0002

Mimouni, M., Fontagne, L., & Kircbach, F. V. (2007). The trade performance index technical notes.

Pioch, M. (2017). BRICS in trade clusters: the prospects of convergent trade policies of large emerging economies. *St Petersburg University Journal of Economic Studies, 33*(2), 282-302. https://cyberleninka.ru/article/n/brics-in-trade-clusters-the-prospects-of-convergent-trade-policies-of-large-emerging-economies/viewer

Rosal, I. D. (2019). Export diversification and export performance by destination country. *Bulletin of Economic Research, 71*(1), 58-74. https://doi.org/10.1111/boer.12181

Sarıca, B. (2024). *Yeni bölgeselcilik tartışmaları perspektifinde Türk Devletleri Teşkilatı*. Avrasya İncelemeleri Merkezi. https://avim.org.tr/public/images/uploads/files/Berna%20Sar%C4%B1ca%20Rapor.pdf

Sultanova, G., & Naser, H. (2024). The impact of information and communication technologies on export diversification: Evidence from developing countries. *The Journal of International Trade & Economic Development*, 1–35. https://doi.org/10.1080/09638199.2024.2419406

Şeker, A. (2019). Teknolojik gelişme ve yüksek teknoloji ihracatının ekonomik karmaşıklık endeksi üzerindeki etkisi: Türkiye örneği. *Yönetim ve Ekonomi Dergisi, 26*(2), 377-395. https://doi.org/10.18657/yonveek.581397

Trade Map, (2025). *Export-import values.* https://www.trademap.org/Index.aspx

Türk Devletleri Teşkilatı Tarihçesi. (2025, 17 June). https://www.turkicstates.org/tr/organizasyon-tarihcesi. (Accessed on June 17, 2025).

UNCTAD. (2025). *Merchandise: Product concentration and diversification indices of exports and imports, annual (analytical).* https://unctadstat.unctad.org/datacentre/dataviewer/US.ConcentDiversIndices

WITS. (2025). *Trade summary for Uzbekistan.* https://wits.worldbank.org/countrysnapshot/en/UZB/textview

Wierts, P., Kerkhoff, H. V., & Haan, J. D. (2014). Composition of exports and export performance of eurozone countries. *Journal of Common Market Studies, 52*(4), 928-941. https://doi.org/10.1111/jcms.12114

World Bank. (2025a). *Gender statistics, population.* https://databank.worldbank.org/source/gender-statistics/Series/SP.POP.TOTL

World Bank. (2025b). *World development indicators, export unit value index.* https://databank.worldbank.org/source/world-development-indicators/Series/TX.UVI.MRCH.XD.WD

World Bank. (2025c). *High-technology exports (% of manufactured exports).* https://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS

World Bank. (2025d). *GDP per capita (current US$).* https://data.worldbank.org/indicator/NY.GDP.PCAP.CD

Yaşar, E., & Ünlü, M. (2023). Üniversitelerde sürdürülebilirliğin incelenmesi: LOPCOW ve MEREC tabanlı CoCoSo yöntemleriyle çevreci üniversitelerin analizi. *İşletme Akademisi Dergisi, 4*(2), 125-142. https://doi.org/10.26677/TR1010.2023.1246

Yaşar, F., & Bolat, İ. (2023). BRICS countries and Turkey's economic performance investigated using foreign trade data using the TOPSIS method. *Erzincan University Journal of Social Sciences Institute, 16*(2), 181-194. https://doi.org/10.46790/erzisosbil.1371542

Yazdani, M., Zarate, P., Kazimieras Zavadskas, E., & Turskis, Z. (2019). A combined compromise solution (CoCoSo) method for multi-criteria decision-making problems. *Management Decision, 57*(9), 2501-2519. https://doi.org/10.1108/MD-05-2017-0458

Zavadskas, E. K., & Podvezko, V. (2016). Integrated determination of objective criteria weights in MCDM. *International Journal of Information Technology & Decision Making, 15*(02), 267-283. https://doi.org/10.1142/S0219622016500036