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**EVALUATION OF THE LOGISTICS PERFORMANCE OF NORTH, MIDDLE AND SOUTH CORRIDOR COUNTRIES WITHIN THE SCOPE OF THE ONE BELT ONE ROAD INITIATIVE USING HYBRID MCDM METHODS**

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**ABSTRACT**

Global trade is increasingly driven by transport corridors, and a nation's competitiveness in global trade is closely linked to its logistics performance within these routes. This research explores the logistics efficiency of countries positioned along land-based segments of China's "One Belt One Road" initiative. Specifically, the study compares the middle corridor "formally known as the Trans-Caspian International Transport Route and inclusive of Türkiye" with the northern and southern corridors. Logistics performance index data for the years 2012, 2016, 2018, and 2023 were assessed using five multi-criteria decision-making methods: MEREC, CRITIC, Common Weighting Method (CWM), Aggregate Weighting Method (AWM) and MABAC. Results indicate that China consistently holds the top position in logistics performance, while Poland and Türkiye also demonstrate strong rankings. Conversely, countries such as Tajikistan and Kyrgyzstan exhibit notably low performance levels. The criterion weights determined using the CRITIC and MEREC methods varied from year to year, while the results obtained using the CWM and AWM common weighting methods were found to be similar. The weighting of performance criteria -such as customs efficiency, tracking capabilities, and infrastructure- varied across years, with different criteria gaining prominence at different times depending on the method used.

**Keywords:** *Transport Corridors, International Trade, LPI, One Belt One Road Initiative, MCDM*  
**Jel Classification:** *C44, D81, O18*

**BİR KUŞAK BİR YOL GİRİŞİMİ KAPSAMINDA KUZEY, ORTA VE GÜNEY KORİDOR ÜLKELERİNİN LOJİSTİK PERFORMANSLARININ HİBRİT ÇKKV YÖNTEMLERİYLE DEĞERLENDİRİLMESİ**

**ÖZ**

Küresel ticaret ulaştırma koridorları ile şekillenmekte, ülkelerin küresel ticaretteki başarıları da bu koridorlara entegre olarak gösterdikleri lojistik performans ile doğrudan ilişkili olmaktadır. Bu çalışmanın amacı, Çin'in "Bir Kuşak Bir Yol" girişimi kapsamında yer alan kara güzergâhlarındaki ülkelerin lojistik performanslarını analiz etmektir. Özellikle Türkiye'nin de dâhil olduğu orta koridor (Trans-Hazar Uluslararası Taşımacılık Rotası), alternatif güzergâhlar olan kuzey ve güney koridorlar ile karşılaştırmalı olarak değerlendirilmiştir. Lojistik performans endeksi verileri 2012, 2016, 2018 ve 2023 yıllarına ait olarak dikkate alınmış ve çok kriterli karar verme yöntemlerinden MEREC, CRITIC, CWM, AWM ve MABAC yöntemleriyle analiz edilmiştir. Elde edilen bulgulara göre, Çin tüm yıllarda en yüksek lojistik performansına sahip ülke olarak öne çıkarken, Polonya ve Türkiye üst sıralarda yer almıştır. Tacikistan ve Kırgızistan gibi ülkeler düşük performanslarıyla dikkat çekmiştir. CRITIC ve MEREC yöntemleriyle belirlenen kriter ağırlıkları yıllara göre farklılık göstermiş CWM ve AWM ortak ağırlıklandırma yöntemleri ile elde edilen sonuçlar ise benzer olarak bulunmuştur. Gümrük işlemleri, takip ve izleme, altyapı gibi kriterler dönemsel olarak ön plana çıkmıştır.

**Anahtar Kelimeler:** *Ulaştırma Koridorları, Uluslararası Ticaret, LPI, Bir Kuşak Bir Yol Girişimi, ÇKKV*  
**Jel Sınıflandırması:** *C44, D81, O18*

## **1. INTRODUCTION**

The increasing complexity of global trade means that economic, political, diplomatic and strategic tools have become crucial to trade processes. For this reason, countries have developed diplomatic strategies, paying particular attention to transport diplomacy. This refers to the diplomatic initiatives that states carry out through transport infrastructure and networks in order to achieve their foreign policy goals, strengthen regional cooperation, and gain strategic advantages in global trade (Ampleman, 2021). In modern international relations, transport is not just an infrastructure issue, it is also a geopolitical element in terms of trade security, continuity and diversity (Rodrigue et al., 2006).

Transport diplomacy is also a strategic approach used to facilitate trade flows between countries, reduce logistics costs, and provide access to new market areas. For instance, China's One Belt One Road (OBOR) and Türkiye's middle corridor (MC) strategy encompass physical infrastructure investments and trade corridors formed through multilateral diplomatic engagement (MFA, 2025). In this way, diplomatic spheres of influence are expanded through transport corridors, thereby reinforcing the role of countries in regional integration (Ayesu et al., 2024). As well as addressing technical issues such as the harmonisation of customs procedures and the integration of logistics centres, transport diplomacy involves establishing resilient networks to ensure the continuity of trade during times of crisis. The importance of diplomatic coordination in transport became more apparent during the 2020–2021 global pandemic, when the flow of trade was largely preserved thanks to alternative routes, multilateral agreements, and digital solutions (Notteboom et al., 2021).

China is among the countries that most effectively implement transportation diplomacy. While it has been argued that China uses this diplomacy to control countries by dragging them into debt (Yılmaz, 2020), China generates significant economic benefits for itself and many other countries through this diplomacy (Kopuk & Bakrač, 2021). One of China's most important projects in the context of transportation diplomacy is the OBOR project. China has implemented the OBOR project, which involves transport diplomacy, with the aim of increasing cooperation and interaction with all countries along the route, in terms of not only physical infrastructure, but also ports, logistics centres and railways (Ece, 2023). Many other countries, in addition to the China, are also taking similar steps. Due to its geographic location, Türkiye fulfils an essential role as a conduit between eastern and western civilisations. To strengthen its geo-strategic position, Türkiye is involved in, or pioneering, different corridors. The MC on the OBOR route and the North-South Development Road Project (Öztürk, 2024) are two important corridors in which Türkiye is involved. The China provides significant support for logistics infrastructure in countries along the OBOR route, enabling it to deliver its products to final markets faster and more efficiently (Yii et al., 2018). It is anticipated that this support will lead to an enhancement in the logistics performance of the involved countries.

An important rationale for this research is to evaluate Türkiye's effectiveness in international transport corridors through logistics performance index (LPI) indicators. To this end, the OBOR project, which includes countries comprising approximately half of the world's population and in which Türkiye is also involved, has been selected. In the study, the middle, southern and northern corridors, which are the land corridors within the scope of the OBOR project, were selected. The aim was to measure Türkiye's effectiveness among these countries by

determining the logistics performance of the countries located in the relevant corridors. MCDM methods were used to measure logistics performance in the study. Firstly, the criterion weights were calculated using the MEREC and CRITIC methods; these weights were synthesised using the Common Weighting Method (CWM) and the Aggregate Weighting Method (AWM) to increase statistical robustness. In the next stage, the ranking of alternative countries was obtained by integrating the criterion weights obtained from each method using the Multi-Attributive Border Approximation Area Comparison (MABAC) method. In the final stage, the rankings obtained from all weighting methods were combined using the Borda count method to create a consensus-based final ranking. The CRITIC and MEREC 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 (Keshavarz-Ghorabae et al., 2021). Both methods eliminate the influence of decision-makers on the decision because they process real data to reach the result. The CWM and AWM weighting methods are obtained by integrating multiple techniques (Meral, 2024; Özekenci, 2025). These methods were preferred in the study to increase statistical robustness. The MABAC method, which was determined as the ranking method, was chosen because it has easy and straightforward calculation processes, produces consistent solutions, and is a practical, useful, and reliable mathematical tool. Furthermore, the MABAC method was used in this study because it calculates potential gain and loss values, making the results as accurate as possible. (Ecer, 2020).

The study is significant in that it measures the logistics performance of countries along the OBOR route, which holds an important place in the global logistics network, contributes to the literature in an area that has been little studied before, and combines different MCDM methods. It is also important in that it provides insights to policymakers and decision-makers and suggests areas for improvement. The study is organized into five main sections. The first section emphasizes the role of transport diplomacy and the strategic importance of transport corridors in global trade. The second section introduces the OBOR, transport corridors, and LPI concepts. The third section provides a review of existing literature concerning MCDM methods and LPI. The fourth section contains the empirical analysis and interpretation of the findings. The final section presents the conclusion, including the study's objectives, limitations, and key evaluations.

## **2. CONCEPTUAL FRAMEWORK**

### **2.1. One Belt One Road Initiative**

Following his travels to a number of countries in 2013, the President of China, Xi Jinping, unveiled OBOR in Astana, the capital of Kazakhstan (Yetgin & Yilmaz, 2022). The project is an ambitious global development strategy aiming to integrate Asia, Europe and Africa through infrastructure investments, logistics networks and energy corridors. This modern reinterpretation of the ancient silk road not only increases China's economic influence, but also creates transport, investment and trade opportunities for participating countries (Summers, 2016). The proposal encompasses two key elements. Firstly, it includes the "Silk Road Economic Belt" as a terrestrial route, and secondly, it incorporates the "21st Century Maritime Silk Road" as a maritime route. (Palu & Hilmola, 2023). The OBOR initiative is important for China not only in improving

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economic activities but also in ensuring energy security through strategic ports and important infrastructure investments (Malik, 2021).

The Silk Road Economic Belt comprises six principal overland economic corridors as classified by Sarker et al. (2018):

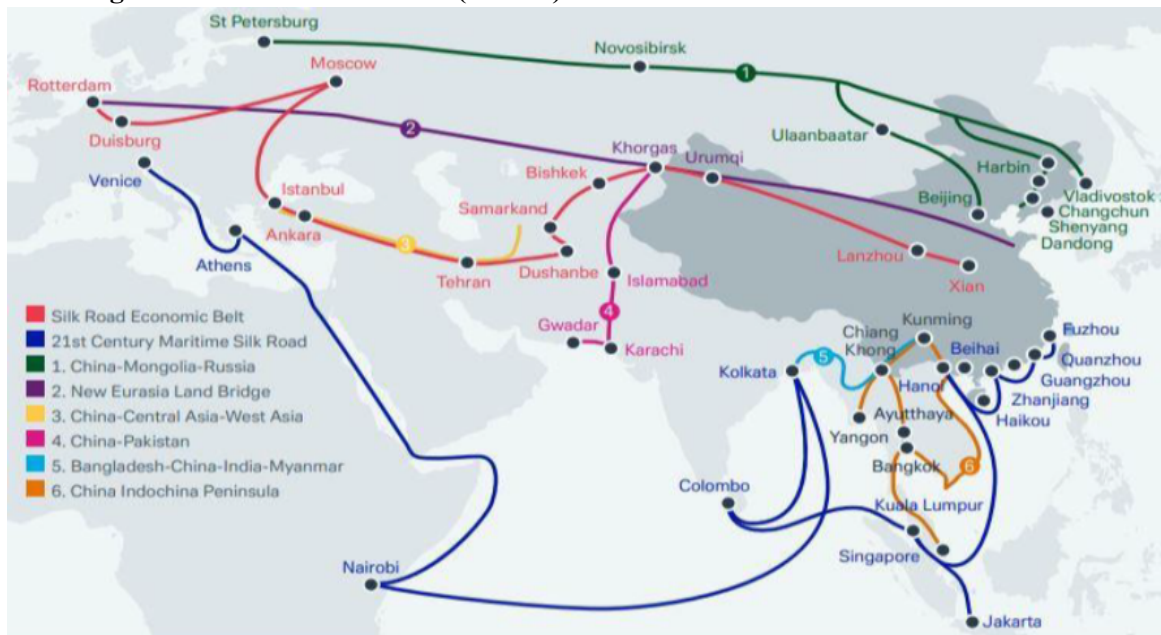
- The New Eurasian Land Bridge Corridor (NELB),
- The China-Mongolia-Russia Route,
- The China-Central Asia-West Asia Route (CCWAEC),
- The China-Indochina Peninsula Route,
- The China-Pakistan Route
- The Bangladesh-China-India-Myanmar (BCIM) Corridor.

The NELB and the CCWAEC serve as overland links between Europe and China. Alongside these routes, MC, which passes through Türkiye, intersects with the OBOR and contributes to China’s silk road economic belt initiative.

The NELB refers to the railway starting from Lianyungang Port in China, crossing Kazakhstan, Russia, and Belarus, and reaching Poland and other parts of Europe (Yılmaz, 2020). Also known as the northern corridor, this route is considered cost-efficient compared to other alternatives (Dijk & Martens, 2016). With a railway length of 10,800 km, the northern corridor plays a pivotal role in connecting nearly 30 countries (Omonkulov, 2020). Nevertheless, there has been a decline in its competitiveness since the onset of the Russia-Ukraine war (OECD, 2023).

The second land route, the CCWAEC — or southern corridor — follows the historic silk road, linking China to Europe through Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan, Kyrgyzstan, Iran and Türkiye (Mungunbayar, 2020; Ying, 2025).

**Figure 1: One Belt One Road (OBOR) Routes**



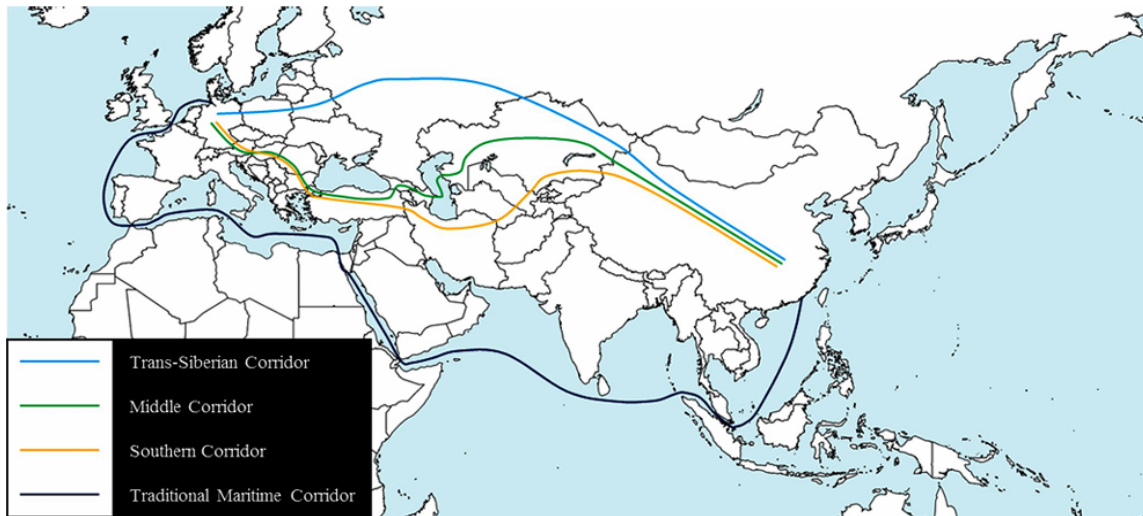
Source: Mungunbayar (2020).

## 2.2. Middle Corridor

The middle corridor (MC) connects China and the European Union via Central Asia, the Caucasus, and Türkiye (Kenderdine & Bucsky, 2021). The initiative was launched with the signing of the “Coordination Committee for the Development of the TITR” by Kazakhstan, Azerbaijan, and Georgia on 7 november 2013 (Hussain, 2022). Since its accession in 2018, Turkish State Railways has played a significant role in the project. Initially aimed at transporting oil and gas from caspian states to western markets (Akçay & Changgang, 2023), this route although not formally a part of China’s OBOR naturally intersects with it (Beifert et al., 2025).

In 2022, a roadmap agreement was signed, delineating the measures necessary to enhance the effectiveness of the MC and logistics activities between Kazakhstan, Georgia, Azerbaijan and Türkiye. In 2023, the governments of Azerbaijan, Georgia and Kazakhstan reached a consensus on the establishment of a collaborative logistics entity. (WB, 2023). The MC, which also includes Türkiye, has a geo-strategic position that shortens the distance by approximately 2,000 km compared to the NELB, giving it superiority over alternative corridors (Mutlu, 2021). However, due to infrastructure inadequacies, train transport takes approximately 14–18 days in the MC, compared to 12–14 days in the northern corridor (Mardell, 2019). Despite its inadequate infrastructure and complex structure, the MC has become an attractive alternative in light of the ongoing conflict between Russia and Ukraine (OECD, 2023).

**Figure 2: OBOR Northern, Middle and Southern Corridors**



**Source: Tehrani and Khavas (2024).**

Türkiye has assumed a pivotal role in the MC, having made substantial investments in transport infrastructure, and its significance to China’s OBOR initiative is continually escalating. One such investment is the Baku-Tbilisi-Kars (BTK) railway project, which will connect Türkiye with the South Caucasus, increasing its potential as an alternative route to the northern corridor (NELB) (Kurtoğlu & Tatar, 2023). Thanks to its strategic location, the BTK project has also been defined as a ‘flagship project’ within the MC (Kemoklidze, 2021). Apart from the BTK, Türkiye’s major transport investments in the MC include Istanbul Airport, the Eurasia Tunnel, Marmaray, the Yavuz Sultan Selim Bridge, the Dardanelles Bridge, the Filyos Port, the Çandarlı Port and the

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Mersin Port (MFA, 2025). Table 1 gives information on the countries in the northern, middle and southern corridors as part of the OBOR project. These corridors connect China and Europe. Because the same states in Europe are reached at the end of all corridors, only the countries outside Europe were considered.

**Table 1: Countries Located on The North, Middle and Southern Corridors**

	Land Corridors		
	North Corridor	Middle Corridor	Southern Corridor
<b>Countries</b>	China	China	China
	Kazakhstan	Kazakhstan	Kazakhstan
	Russia	Azerbaijan	Turkmenistan
	Poland	Georgia	Uzbekistan
		Türkiye	Kyrgyzstan
			Tajikistan
			Iran
			Türkiye

**Source: Created by the author with information obtained from OECD.**

### 2.3. Logistics Performance Index

Based on a global survey of international freight and express operators, the LPI is a benchmarking tool developed by the World Bank (WB) and published periodically to measure the performance of a country’s logistics supply chain. This index helps countries identify challenges and opportunities and improve their logistics performance. The LPI consists of six key components, scored from 1 to 5. (Arvis et al., 2007). The LPI, which has been published since 2007, was renewed in 2023 due to the pandemic and methodological updates after 2018. The first time in 2023, several key performance indicators (e.g., container/mail flow times, port/line phases) derived from “big data”-based supply chain tracking data (CargoIQ, MDS Transmodal, TradeLens, Universal Postal Union) are integrated into the report. Due to its survey-based nature, country scores are presented with an 80% confidence interval; the average confidence interval is ~0.25 points (on a scale of 1–5). The range widens in small markets/low-response countries (Arvis et al., 2023). The LPI is determined through the evaluation of six primary criteria: customs, infrastructure, international shipments, logistics competence & quality, tracking & tracing, and timeliness (Stevic et al., 2024). However, the equal weighting of all criteria and the lack of detailed sensitivity analysis using MCDM methods have been criticised (Baydaş et al., 2024). For this reason, many studies in the literature propose calculating country logistics performance using a more flexible and objective approach, re-evaluating LPI data with MCDM methods such as AHP, TOPSIS, VIKOR, MOORA, PROMETHEE, Entropy, SWARA, EDAS and MARCOS. In fact, rather than taking a uniform approach to all countries, determining criterion weights using different methods and applying alternative ranking techniques with MCDM methods can increase the reliability and explanatory power of LPI rankings (Özdil et al., 2025).

### 3. LITERATURE REVIEW

A considerable number of studies and analyses have been conducted on the OBOR initiative in recent years, with a particular focus on the MC. The extant literature has

predominantly concentrated on the economic ramifications of the MC, as well as the opportunities and threats it presents. The literature summary of the studies is shown in Table 2.

**Table 2: Studies on The Middle Corridor**

Authors	Methods	Scope	Key Findings
Palu & Hilmola (2023)	Compilation and situation analysis	The MC and related economies (e.g. Finland, Estonia)	Recent geopolitical developments, particularly sanctions against Russia, have opened strategic opportunities for the MC, although nations like Finland and Estonia have faced challenges in scaling investments due to ongoing conflict-related constraints.
Cengiz (2023)	Qualitative design case study and descriptive analysis	MC route	While the Russia-Ukraine war disrupted global supply chains, it was found that the MC passing through Türkiye gained importance as an alternative route. It was also determined that significant growth was observed in road and rail freight transportation within the MC throughout the period of war.
Akçay and Changgang (2023)	Descriptive analysis (review of history and objectives; risk and opportunity assessment)	MC and OBOR	The importance of integrating the OBOR-MC was emphasised, as was the fact that it would provide Türkiye with alternative financing opportunities, as well as presenting opportunities and risks for the region.
Zhumanov et al. (2024)	Quantitative simulation modeling	Railway infrastructure of the MC (focused on Kazakhstan)	Although the route has high transit potential, it has been determined that it cannot be used at full capacity due to high sea and rail transport tariffs and long transport times. The study shows that improving the infrastructure on the MC can significantly reduce transit time.
Yermekbayev et al. (2024)	Qualitative situation analysis	MC and Kazakhstan	Although there are no transit restrictions to Europe via Russia, it is stated that there are serious difficulties that increase transportation time. The study emphasises that the MC could strengthen Kazakhstan's economic position and diplomatic potential, but that many difficulties must be overcome, such as developing infrastructure and overcoming tariff barriers.
Biro and Vasa (2024)	Multi-method analysis (historical analysis, comparative route analysis, GIS mapping, statistical analysis)	Countries on the MC route (Kazakhstan, Azerbaijan, Georgia, Türkiye, EU)	The study showed that, compared with traditional routes such as the Northern route and Suez, the MC has become a critical alternative in Asia-Europe trade by offering shorter transit times and higher transportation security. Additionally, the study emphasises the strategic importance of the MC, revealing its role in reviving the modern Silk Road.
Rentschler et al. (2025)	Qualitative exploratory analysis	MC and partner countries (Central Asia and Europe)	Through interviews, the study identified the five main stakeholder groups and their geopolitical motivations that shaped the corridor. It has been established that the MC serves as both a transportation route and a geopolitical tool.

Since the LPI was first published, many studies have used MCDM methods. However, no studies have been done on the countries that are on the land route of the OBOR project. The literature of the studies related to the LPI is shown in Table 3.

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**Table 3: Literature on Determining LPI with MCDM Methods**

Authors	Methods	Scope	Data	Key Findings
Andrejic & Kilibarda (2014)	DEA	10 Central European	LPI 2007 & 2014	Croatia and Hungary had the highest LPI values, while Russia had the lowest LPI values.
Martí et al. (2017)	DEA	160+ countries	LPI 2014	High-income groups performed best.
Gök Kısa and Ayçin (2019)	EDAS SWARA	OECD Countries	LPI averages for 2012, 2014, 2016 and 2018	Germany currently leads the LPI rankings, followed by the Netherlands.
Oguz et al. (2019)	TOPSIS	7 Asian countries	LPI 2018	Singapore ranked 1st, Indonesia last.
Orhan (2019)	ENTROPY EDAS	Türkiye and 28 EU Countries	LPI 2018	Germany had highest LPI, Türkiye mid-ranked among EU, Malta and some Eastern EU states lower.
Ulutaş & Karaköy (2019)	SWARA CRITIC PIV	28 EU Countries	LPI 2018	Germany performed best in EU, Eastern EU countries remained at the bottom.
Biswas and Anand (2020)	PSI + PIV	G7 and BRICS Countries	Extended LPI with ICT and CO <sub>2</sub>	Technology readiness and sustainability were included in LPI. G7 countries were found to outperform BRICS in logistics competitiveness.
Stojanović and Puška (2021)	FMABAC FCRITIC	Gulf Cooperation Council Countries	LPI 2012, 2014, 2016, 2018	The findings of the study indicated that, on average across all periods, the quality of the logistics service was identified as the most significant factor. Furthermore, the United Arab Emirates has consistently ranked first in all periods.
Amar et al. (2022)	CRITIC MARCOS	5 Western Balkans countries	LPI 2018	Serbia received the highest and Albania the lowest. Timeliness criterion was the most important criterion
Arıkan (2022)	ENTROPY WASPAS	OECD Countries	LPI 2018	According to the ranking results, the first five countries are Germany, Sweden, Denmark, Netherland, and Austria.
Arman and Organ (2023)	MEREC CoCoSo	27 EU countries and 8 candidate countries	LPI 2023	The top five countries with the highest LPI were Finland, Germany, Denmark and the Netherlands.
Ecemiş and Avşar (2023)	CRITIC CODAS	Türkiye and Türkiye's Leading Trading Partners	LPI 2018	Germany, Netherlands and UK were the best performing countries, while Iraq and Russia were the worst.
Miškić et al. (2023)	MEREC MARCOS	27 EU countries	LPI 2018	Germany was found to have the highest LPI score. The Netherlands followed Germany.

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Authors	Methods	Scope	Data	Key Findings
Hadžikadunić et al. (2023)	CRITIC FUCOM MARCOS	European Union Countries	LPI 2023	Finland has become the best logistics performance, while Cyprus has been the worst performance country.
Pehlivan et al. (2024)	TOPSIS Cluster Analysis	G20 Countries	LPI 2023	19 of 27 rankings gave the same result as the official LPI. Clustering divided countries into high, medium and low logistics performance clusters.
Stević et al. (2024)	MCRAT SAW TOPSIS FUCA	The 118 countries included in the LPI	LPI 2010, 2012, 2014, 2016, 2018, 2023	The findings indicate that large data sets provide more robust information for sensitivity analyses and that broader combinations of weighting coefficients render the data more meaningful.
Özekenci (2024)	ENTROPY CRITIC LOPCOW EDAS	OPEC Countries	LPI 2018	United Arab Emirates has the highest logistics performance score, while Angola has shown the lowest performance.
Özekenci (2025)	SD, CRITIC LOPCOW MEREK CRADIS	OECD Countries	LPI 2023	Finland was the country with the best performance, while Costa Rica came in last place.
Yürüyen and Altay (2025)	SIWEC CRITIC LOPCOW MACONT	OBOR Countries	LPI 2023	Germany performed best in all three of the north, south and middle corridors. Mongolia in the northern corridor, Iran in the southern corridor, and Kyrgyzstan in the central corridor have performed the worst.
Yılmaz (2025)	CRITIC TOPSIS	The top 23 countries in the LPI	LPI 2023	Countries ranked at the top of the LPI also scored highly on digitalisation indices.

## 4. DATA AND METHOD

### 4.1. Data

The study used the LPI, published by the WB, and analysed data from 2012, 2016, 2018 and 2023 for the relevant countries. As the LPI data for 2007 contained seven criteria and this number was reduced to six in subsequent years, this year's data has been excluded from the analysis to avoid inconsistencies in determining the criteria weights. As the main objective of the study is to examine the performance of countries that could be alternatives to Türkiye, the years 2010 and 2014 were also excluded from the assessment due to the unavailability of data for Belarus and Iran, respectively, in order to broaden the scope of countries. During the analysis, the CRITIC, MEREK, CWM and AWM methods were used for weighting and the MABAC method for ranking, all integrated together. The results obtained from both weighting methodologies were then amalgamated by means of the Borda counting method.

## 4.2. Method

### 4.2.1. MEREC Method

The MEREC methodology, as advanced by Ghorabae et al. (2021), constitutes an objective weighting technique. In this method, the significance of each criterion is determined by temporarily excluding it and observing the change in the total performance score. The steps are as follows (Ayçin, 2022; Ghorabae et al., 2021):

**Step 1:** Construction of the initial decision matrix using Equation 1.

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

**Step 2:** Normalization of the matrix using Equation 2 for benefit-based and Equation 3 for cost-based criteria.

$$n_{ij} = \frac{\min x_{ij}}{x_{ij}} \quad (2)$$

$$n_{ij} = \frac{x_{ij}}{\max x_{ij}} \quad (3)$$

**Step 3:** Calculation of the performance values ( $S_i$ ) for all alternatives.

$$S_i = \ln \left( 1 + \left( \frac{1}{m} \sum |\ln(n_{ij}^x)| \right) \right) \quad (4)$$

**Step 4:** Recalculation of performance after removing each criterion individually.

$$S_i = \ln \left( 1 + \left( \frac{1}{m} \sum_{k, k \neq j} |\ln(n_{ik}^x)| \right) \right) \quad (5)$$

**Step 5:** Summation of absolute deviations using Equation 6.

$$E_j = \sum_{i=1}^n |S'_{ij} - S_i|, j=1, \dots, m \quad (6)$$

**Step 6:** Final computation of criterion weights using Equality 7.

$$w_j = \frac{E_j}{\sum_k E_k} \quad (7)$$

#### 4.2.2. 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; Hassan et al., 2023):

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

$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix} \quad (8)$$

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

$$r_{ij} = \frac{x_{ij} - x_j^{\min}}{x_j^{\max} - x_j^{\min}} \quad (9)$$

$$r_{ij} = \frac{x_j^{\max} - x_{ij}}{x_j^{\max} - x_j^{\min}} \quad (10)$$

The  $r_{ij}$  values are found using the formulas Equality (9) for benefit-based criteria and Equality (10) for cost-based criteria.

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

$$P_{jk} = \frac{\sum_{i=1}^m (r_{ij} - r_j)(r_{ik} - r_k)}{\sqrt{\sum_{i=1}^m (r_{ij} - r_j)^2 \sum_{i=1}^m (r_{ik} - r_k)^2}} \quad (11)$$

$$j, k = 1, 2, \dots, n$$

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

$$\sigma_j = \sqrt{\frac{\sum_{i=1}^m (r_{ij} - r_j)^2}{m}} \quad (12)$$

$$C_j = \sigma_j \sum_{k=1}^n (1 - P_{jk}) \quad (13)$$

$$j = 1, 2, 3, \dots, n$$

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

$$W_j = \frac{C_j}{\sum_{k=1}^n (C_k)} \quad (14)$$

$$(j, k = 1, 2, 3, \dots, n)$$

### 4.2.3. The Common Weighting Method

In MCDM methods, there are methods that combine the results obtained from these criteria, in addition to objective and subjective weighting methods. CWM is one such method. This method ensures more reliable results. As proposed by Zavadskas and Podvezko (2016), common criterion weighting can be achieved by integrating multiple criterion weighting techniques. The common weighting of methods used for objective criterion weighting is shown below (Peng and Huang, 2020):

$$W_j = \frac{w_{j,x} * w_{j,y}}{\sum_{j=1}^m w_{j,x} w_{j,y}} \quad (15)$$

### 4.2.4. Aggregate Weighting Method

Another method that helps minimize uncertainty by combining all weighting methods is the AWM. In this method, previously used weighting methods are summed and divided by the total number of methods. The relevant formula is shown in Equation 16 (Özekenci, 2025);

$$W_{Aggregated} = \frac{w_{j,x} + w_{j,y}}{n} \quad (16)$$

### 4.2.5. MABAC Method

The MABAC (Multi-Attributive Border Approximation Area Comparison) method, proposed by Pamučar and Ćirović (2015), evaluates alternatives based on their distances to a defined approximation area. The method emphasizes both loss and potential gain in decision-making and calculates final scores accordingly (Pamućar & Ćirović, 2022; Öztürkçü & Aydemir, 2024):

**Step 1:** Creation of the decision matrix (Equation 1).

**Step 2:** Normalization using Equation 17 for benefit-based and Equation 18 for cost-based criteria.

$$n_{ij} = \frac{x_{ij} - x_i^+}{x_i^- - x_i^+} \quad (17)$$

$$n_{ij} = \frac{x_{ij} - x_i^+}{x_i^- - x_i^+} \quad (18)$$

**Step 3:** Obtaining the weighted matrix (V)

$$v_{ij} = w_i \cdot n_{ij} + w_{ij}$$

$v_{ij}$  = weighting of standardised values

$w_i$  = i. weight of criteria

**Step 4:** Creation of the boundary approach area matrix for each criterion.

$$g_i = \left( \prod_{j=1}^m v_{ij} \right)^{\frac{1}{m}} \quad (19)$$

$m$ ; is the overall quantity of alternatives. The boundary proximity area matrix of width  $n \times 1$  is obtained after the  $g_i$  values are calculated according to the specified criteria, as outlined in Equation 20.

$$G = \begin{bmatrix} C_1 & C_2 & \dots & C_n \\ g_1 & g_2 & \dots & g_n \end{bmatrix} \quad (20)$$

**Step 5:** Obtaining the distances of decision alternatives to the boundary approach area matrix

$$Q = B - G \begin{bmatrix} b_{11} - g_1 & b_{12} - g_2 & \dots & b_{1n} - g_n \\ b_{21} - g_1 & b_{22} - g_2 & \dots & b_{2n} - g_n \\ \dots & \dots & \dots & \dots \\ b_{m1} - g_1 & b_{m2} - g_2 & \dots & b_{mn} - g_n \end{bmatrix} \begin{bmatrix} q_{11} & q_{12} & \dots & q_{1n} \\ q_{21} & q_{22} & \dots & q_{2n} \\ \dots & \dots & \dots & \dots \\ q_{m1} & q_{m2} & \dots & q_{mn} \end{bmatrix} \quad (21)$$

The situations with respect to the boundary area for each alternative are obtained with the help of Equation 22. Accordingly;

$$A_i \varepsilon \begin{cases} G^+ & \text{if } q_{ij} > 0 \\ G & \text{if } q_{ij} = 0 \\ G^- & \text{if } q_{ij} < 0 \end{cases} \quad (22)$$

For an alternative to be the best alternative, most of the  $q_{ij}$  values are greater than 0, that is, this alternative is in the upper approximation area ( $G^+$ ) according to many criteria. In this case, when  $q_{ij} > 0$ , the decision alternative is the best alternative, and when  $q_{ij} < 0$ , the decision alternative is the worst alternative.

**Step 6:** Measuring the performance of alternatives

For each decision alternative, the sum of the distances to the limit approach rates is calculated and the calculated values are ranked from largest to smallest.

$$S_i = \sum_{j=1}^n q_{ij}, \quad j=1,2,\dots,n \quad i=1,2,\dots,m \quad (23)$$

## 5. FINDINGS

This section presents the findings on the LPI performance of the countries located on the OBOR project road route. LPI criteria are determined as customs (K1), infrastructure (K2), international shipments (K3), logistics competence & quality (K4), tracking & tracing (K5) and timeliness (K6), respectively. The countries along the OBOR route are also coded as follows: China (A1), Kazakhstan (A2), Georgia (A3), Türkiye (A4), Kyrgyzstan (A5), Tajikistan (A6), Uzbekistan (A7), Iran (A8), Russia (A9), Belarus (A10), and Poland (A11). The years 2012, 2016, 2018, and 2023 were considered in determining the data. The study aimed to compare and evaluate LPI results from different years to provide a general overview of the countries at the final stage. While the LPI included seven criteria in 2007, the first year it was published, it was reduced to six criteria for all subsequent years. Because this would negatively impact the evaluation when

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determining the criteria weights, the 2007 LPI results were not included in the analysis. Since the primary objective of the study was to analyze the performance of countries that could be alternatives to Türkiye, data for Belarus in 2010 and Iran in 2014 were not available to allow for the inclusion of more countries in the analysis, and these years were also excluded. Because the most recent data is for 2023, the results from these years are of particular importance. Therefore, since data for Azerbaijan for 2016, 2018, and 2023 and Turkmenistan for 2012 and 2023 were not available, these countries were excluded from the analysis. The relative importance of the criteria was determined using the objective weighting methods MEREC and CRITIC. The weights obtained from the MEREC and CRITIC criteria were then combined with the CWM and AWM methods to obtain more reliable results. The rankings of the alternative countries were obtained by integrating the criteria weights obtained from the MEREC, CRITIC, CWM, and AWM methods with the MABAC method. Finally, the results obtained from all weighting methods were combined using the Borda Count Method to determine the final rankings.

**5.1. Weighting Results with CRITIC Method**

The decision matrix for 2012 is presented in Table 4. The decision matrix encompasses data pertaining to customs, infrastructure, international shipments, logistics competence & quality, tracking & tracing and timeliness criteria.

**Table 4: Decision Matrix**

Countries	Customs	Infrastructure	International Shipments	Logistics Competence & Quality	Tracking & Tracing	Timeliness
Criterion Aspects	Max	Max	Max	Max	Max	Max
A1	3.25	3.61	3.46	3.47	3.52	3.8
A2	2.58	2.6	2.67	2.75	2.83	2.73
A3	2.9	2.85	2.68	2.78	2.59	2.86
A4	3.16	3.62	3.38	3.52	3.54	3.87
A5	2.45	2.49	2	2.25	2.31	2.69
A6	2.43	2.03	2.33	2.22	2.13	2.51
A7	2.25	2.25	2.38	2.39	2.53	2.96
A8	2.19	2.42	2.49	2.66	2.49	2.66
A9	2.04	2.45	2.59	2.65	2.76	3.02
A10	2.24	2.78	2.58	2.65	2.58	2.87
A11	3.3	3.1	3.47	3.3	3.32	4.04

**Table 5: Weighting Results**

	Customs	Infrastructure	International Shipments	Logistics Competence & Quality	Tracking & Tracing	Timeliness
$Q_j$	0.3636	0.3260	0.3349	0.3516	0.3391	0.3549
$c_j$	0.3464	0.1361	0.0944	0.0729	0.0774	0.1359
$w_j$	0.4014	0.1577	0.1094	0.0844	0.0896	0.1575

As demonstrated in Table 5, the CRITIC method provides a quantitative representation of the relative importance of the criteria for 2012. The results obtained indicated that the customs criterion was the most significant, with a value of 0.4014. The criterion is followed by infrastructure, which has a value of 0.1577, and timeliness, which has a value of 0.1575. The criterion with the lowest degree of importance was logistics competence and quality, with a value of 0.0844.

As displayed in Table 6, the comparative significance levels of the criteria for the years 2012, 2016, 2018 and 2023 are shown in a combined format.

**Table 6: Weights of Criteria for The Years 2012, 2016, 2018 and 2023**

	2012		2016		2018		2023	
	Weight	Ranking	Weight	Ranking	Weight	Ranking	Weight	Ranking
K1	0.4014	1	0.2093	1	0.3885	1	0.1633	3
K2	0.1577	2	0.1598	4	0.1372	3	0.1866	2
K3	0.1094	4	0.1224	6	0.1122	4	0.1512	5
K4	0.0844	6	0.1408	5	0.1021	6	0.1498	6
K5	0.0896	5	0.1819	3	0.1092	5	0.1890	1
K6	0.1575	3	0.1857	2	0.1508	2	0.1601	4

As demonstrated in Table 6, the customs criterion is the most significant, with the exception of the 2023 data. While the tracking & tracing criterion was ranked fifth in terms of importance in 2012, it was found to be the most important factor in 2023. With the exception of the year 2016, the logistics competence & quality criterion has been of minimal importance in determining the selection process. It has been observed that the criteria generally exhibit different importance weights for each year of the evaluation.

## 5.2. Weighting Results with MEREC Method

The MEREC method was used to determine the importance levels of the criteria for 2012, as shown in Table 7.

**Table 7: Weights of Criteria for 2012 According to MEREC Method**

	Customs	Infrastructure	International Shipments	Logistics Competence & Quality	Tracking & Tracing	Timeliness
$w_j$	0.1661	0.1688	0.1694	0.1649	0.1670	0.1638

As demonstrated in Table 7, the international shipments criterion has been identified as the most significant factor, with a value of 0.1694. The criterion is followed by infrastructure (0.1688), tracking & tracing (0.1670), customs (0.1661), logistics competence and quality (0.1649) and timeliness (0.1638).

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**Table 8: Weights of Criteria for 2012, 2016, 2018 and 2023 According to MEREC Method**

	2012		2016		2018		2023	
	Weight	Ranking	Weight	Ranking	Weight	Ranking	Weight	Ranking
K1	0.1661	4	0.1665	2	0.1719	1	0.1647	4
K2	0.1688	2	0.1660	4	0.1677	2	0.1643	5
K3	0.1694	1	0.1646	6	0.1658	5	0.1641	6
K4	0.1649	5	0.1663	3	0.1659	4	0.1689	2
K5	0.1670	3	0.1651	5	0.1670	3	0.1706	1
K6	0.1638	6	0.1714	1	0.1617	6	0.1674	3

As demonstrated in Table 8, the relative importance of the criteria exhibited fluctuations on an annual basis. While the international shipments criterion was the most significant criterion in 2012, with a value of 0.1694, it was the least significant criterion in 2016 and 2023, with values of 0.1646 and 0.1641, respectively. In a similar vein, the timeliness criterion was found to be the least important factor, with a value of 0.1638 in 2012 and 0.1617 in 2018, while it was found to be the most important factor, with a value of 0.1714 in 2016.

### 5.3. Weighting Results with Common Weighting Method

CWM was used to determine the importance levels of the criteria for 2012, as shown in Table 9.

**Table 9: Common Weighting Method Results for 2012**

	Customs	Infrastructure	International Shipments	Logistics Competence & Quality	Tracking & Tracing	Timeliness
$w_j$	0.4004	0.1598	0.1113	0.0836	0.0899	0.1549

According to the results obtained from Table 9, the customs criterion had the highest importance with a value of 0.4004. This criterion was followed by infrastructure (0.1598), timeliness (0.1549), international shipments (0.1113), tracking & tracing (0.0899), and logistics competence & quality (0.0836).

**Table 10: Weights of Criteria for 2012, 2016, 2018 and 2023 According to Common Weighting Method**

	2012		2016		2018		2023	
	Weight	Ranking	Weight	Ranking	Weight	Ranking	Weight	Ranking
K1	0.4004	1	0.2089	1	0.3976	1	0.1613	3
K2	0.1598	2	0.1590	4	0.1370	3	0.1839	2
K3	0.1113	4	0.1208	6	0.1107	4	0.1489	6
K4	0.0836	6	0.1404	5	0.1009	6	0.1517	5
K5	0.0899	5	0.1800	3	0.1086	5	0.1934	1
K6	0.1549	3	0.1909	2	0.1452	2	0.1607	4

#### 5.4. Weighting Results with Aggregate Weighting Method

AWM was used to determine the importance levels of the criteria for 2012, as shown in

**Table 11: Aggregate Weighting Method Results for 2012**

	Customs	Infrastructure	International Shipments	Logistics Competence & Quality	Tracking & Tracing	Timeliness
$w_j$	0.2838	0.1632	0.1394	0.1246	0.1283	0.1606

According to AWM results, the customs criterion had the highest importance with a value of 0.2838. This was followed by infrastructure (0.1632), timeliness (0.1606), international shipments (0.1394), tracking & tracing (0.1283), and logistics competence & quality (0.1246).

**Table 12: Weights of Criteria for 2012, 2016, 2018 and 2023 According to Aggregate Weighting Method**

	2012		2016		2018		2023	
	Weight	Ranking	Weight	Ranking	Weight	Ranking	Weight	Ranking
K1	0.2838	1	0.1879	1	0.2802	1	0.1640	3
K2	0.1632	2	0.1629	4	0.1524	3	0.1755	2
K3	0.1394	4	0.1435	6	0.1390	4	0.1577	6
K4	0.1246	6	0.1536	5	0.1340	6	0.1593	5
K5	0.1283	5	0.1735	3	0.1381	5	0.1798	1
K6	0.1606	3	0.1786	2	0.1563	2	0.1637	4

The results obtained from the CWM and AWM methods are shown in Table 10 and Table 12. The rankings of the importance levels of the criteria were the same for both methods. In both methods, the customs criterion ranked first, except for 2023. The logistics competence & quality criterion ranked last in the years when the assessments were conducted. The tracking & tracing criterion ranked fifth in 2012 and 2018, third in 2016, and first in 2023.

#### 5.5. CRITIC-MABAC Integrated Findings

In this section of the study, the ranking results of the countries were obtained by employing the MABAC method integrated with CRITIC. The ranking results for the years 2012, 2016, 2018 and 2023 are displayed in Table 13.

**Table 13: Rankings of Countries in 2012, 2016, 2018, 2023 According to CRITIC-MABAC Integrated Method**

Countries	2012		2016		2018		2023	
	Si	Ranking	Si	Ranking	Si	Ranking	Si	Ranking
A1	0.5426	1	0.6020	1	0.5815	1	0.6025	1
A2	-0.0305	5	0.0669	4	0.0443	5	-0.0611	6
A3	0.0970	4	-0.1663	9	-0.2175	10	-0.0589	5
A4	0.5207	2	0.4639	3	0.2275	3	0.4039	3
A5	-0.2024	7	-0.2912	10	-0.1001	7	-0.2997	11

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A6	-0.2617	11	-0.3498	11	-0.3720	11	-0.1615	9
A7	-0.2107	9	-0.1462	7	-0.2071	9	-0.1335	7
A8	-0.2207	10	-0.0365	5	0.0510	4	-0.2660	10
A9	-0.2045	8	-0.0573	6	-0.0407	6	-0.1415	8
A10	-0.1357	6	-0.1662	8	-0.1520	8	-0.0476	4
A11	0.5096	3	0.4696	2	0.5387	2	0.5300	2

As demonstrated in Table 13, China has consistently achieved the highest ranking and demonstrated the most accomplished performance in the LPI. Meanwhile, Poland, which ranked third in 2012 with a value of 0.5096, achieved second place in 2016, 2018, and 2023, with respective values of 0.4696, 0.5387, and 0.5300. Türkiye had the second-best performance in 2012 but ranked third in 2016, 2018 and 2023. Generally, countries had the same or similar rankings in all years. Georgia ranked 4th in 2012 with a  $S_i$  value of 0.0970, but then dropped to 9th in 2016 and 10th in 2018. Iran was in the lower ranks in 2012, but performed better in 2016 and 2018, ranking 5th and 4th respectively. However, it showed a poor performance in 2023 by ranking 10th again. Tajikistan was the country with the worst performance overall, ranking last in three of the four years of the evaluation.

### 5.6. MEREC -MABAC Integrated Findings

An analysis was conducted on the data of the countries for the years 2012, 2016, 2018 and 2023, utilising the MEREC-MABAC integrated method. The  $S_i$  values obtained from this analysis are presented in Table 14, alongside the corresponding ranking results.

**Table 14: Ranking Results According to MEREC-MABAC Integrated Method**

Countries	2012		2016		2018		2023	
	$S_i$	Ranking	$S_i$	Ranking	$S_i$	Ranking	$S_i$	Ranking
A1	0.5450	1	0.6055	1	0.5997	1	0.5995	1
A2	-0.0292	5	0.0631	4	0.0212	5	-0.0612	6
A3	0.0299	4	-0.1766	9	-0.2620	10	-0.0555	5
A4	0.5411	2	0.4621	3	0.2637	3	0.4057	3
A5	-0.2645	10	-0.2966	10	-0.1822	9	-0.3038	11
A6	-0.3224	11	-0.3464	11	-0.3378	11	-0.1534	9
A7	-0.1999	9	-0.1484	7	-0.1597	8	-0.1298	7
A8	-0.1797	8	-0.0296	5	0.0482	4	-0.2708	10
A9	-0.1155	7	-0.0510	6	-0.0244	6	-0.1455	8
A10	-0.0926	6	-0.1592	8	-0.1544	7	-0.0484	4
A11	0.4790	3	0.4651	2	0.5528	2	0.5294	2

According to the MEREC-MABAC integrated method, China had the best LPI values and was ranked first. This country is followed by Poland and Türkiye, respectively. Similar results were obtained using the MEREC-MABAC and CRITIC-MABAC integrated methods. Tajikistan had the lowest performance in both methods and was ranked last. Kyrgyzstan ranked 7th according to the CRITIC-MABAC method in 2012 but 10th according to the MEREC-MABAC method.

**5.7. Borda Count Results**

Table 15 shows the integrated results obtained using the CRITIC, MEREC, CWM and AWM criteria weighting methods in conjunction with the MABAC method. These results were then integrated with the borda counting method to determine the final ranking.

**Table 15: Sorting Results According to The Borda Count Method**

			A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
<b>2012</b>	CRITIC-MABAC	Ranking	1	5	4	2	7	11	9	10	8	6	3
		Score	10	6	7	9	4	0	2	1	3	5	8
	MEREC-MABAC	Ranking	1	5	4	2	10	11	9	8	7	6	3
		Score	10	6	7	9	1	0	2	3	4	5	8
	CWM	Ranking	1	5	4	2	7	11	9	10	8	6	3
		Score	10	6	7	9	4	0	2	1	3	5	8
	AWM	Ranking	1	5	4	2	10	11	9	8	7	6	3
		Score	10	6	7	9	1	0	2	3	4	5	8
<b>2016</b>	CRITIC-MABAC	Ranking	1	4	9	3	10	11	7	5	6	8	2
		Score	10	7	2	8	1	0	4	6	5	3	9
	MEREC-MABAC	Ranking	1	4	9	3	10	11	7	5	6	8	2
		Score	10	7	2	8	1	0	4	6	5	3	9
	CWM	Ranking	1	4	9	3	10	11	7	5	6	8	2
		Score	10	7	2	8	1	0	4	6	5	3	9
	AWM	Ranking	1	4	9	3	10	11	7	5	6	8	2
		Score	10	7	2	8	1	0	4	6	5	3	9
<b>2018</b>	CRITIC-MABAC	Ranking	1	5	10	3	7	11	9	4	6	8	2
		Score	10	6	1	8	4	0	2	7	5	3	9
	MEREC-MABAC	Ranking	1	5	10	3	9	11	8	4	6	7	2
		Score	10	6	1	8	2	0	3	7	5	4	9
	CWM	Ranking	1	5	10	3	7	11	9	4	6	8	2
		Score	10	6	1	8	4	0	2	7	5	3	9
	AWM	Ranking	1	5	10	3	7	11	9	4	6	8	2
		Score	10	6	1	8	4	0	2	7	5	3	9
<b>2023</b>	CRITIC-MABAC	Ranking	1	6	5	3	11	9	7	10	8	4	2
		Score	10	5	6	8	0	2	4	1	3	7	9
	MEREC-MABAC	Ranking	1	6	5	3	11	9	7	10	8	4	2
		Score	10	5	6	8	0	2	4	1	3	7	9
	CWM	Ranking	1	6	5	3	11	9	7	10	8	4	2
		Score	10	5	6	8	0	2	4	1	3	7	9
	AWM	Ranking	1	6	5	3	11	9	7	10	8	4	2
		Score	10	5	6	8	0	2	4	1	3	7	9
Borda	Ranking	160	96	64	132	28	8	49	64	66	73	140	
	Score	1	4	7	3	10	11	9	7	6	5	2	

In the final stage, the results for each country were evaluated according to the CRITIC-MABAC, MEREC-MABAC, CWM-MABAC and AWM-MABAC integrated methods, and a score was obtained. Although there have been variations in some years, the same rankings have generally been obtained as a result of all methods in the years when evaluations were carried out. In terms of the CWM and AWM methods, different results were found only in 2012 for countries A5 (Kyrgyzstan), A8 (Iran) and A9 (Russia). The country with the lowest ranking received 0 points, the country with the second lowest ranking received 1 point, and the country with the best

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ranking received 10 points, since there were 11 countries evaluated. Table 15 shows the final ranking of the countries and their Borda scores. China (defined as A1) had the highest importance degree in all years, obtaining the maximum score of 10 each time and ranking first with 160 points. Poland followed China in second place with 140 points. Third place went to Türkiye with 132 Borda points, and fourth place to Kazakhstan with 96 points. The countries with the worst performance were Uzbekistan, Kyrgyzstan, and Tajikistan. Uzbekistan ranked 9th with 49 Borda points, while Kyrgyzstan ranked 10th with 28 points. Tajikistan ranked last with a Borda score of 8. When the data from Table 11 are analysed, it can be seen that countries in the northern and MC have achieved higher scores and ranked better than those in the southern Corridor.

### **6. DISCUSSION and CONCLUSION**

Transport corridors have exerted a substantial influence on the facilitation of international trade throughout the annals of history. Although political, military and diplomatic initiatives can help to establish dominance over transport corridors, a lack of infrastructure investment makes continuity difficult to achieve. It is evident that infrastructure investments will confer a dual benefit, both to the countries leading the initiatives and to the countries situated along transport corridors. A variety of indices have been developed to measure the impact of investments made by countries to facilitate trade and logistics activities on their performance. LPI, an index developed by the WB, is one of the most widely utilised of these indices.

The objective of this study is to undertake a comparative analysis of the logistics performance of the countries along the land routes within the scope of China's OBOR initiative. In particular, the strategic importance and performance of the MC which includes Türkiye, has been evaluated in comparison with other routes. In the course of the analysis, LPI data published by the WB were utilised, and these data were processed in an integrated manner with MEREC, CRITIC, CWM, AWM and MABAC, which are MCDM methods. The final ranking was obtained by means of the Borda Counting method.

The findings of the study demonstrate that China has exhibited the highest logistics performance in all years and has consistently maintained its leadership position. Following China, Poland and Türkiye were the second and third highest performers, respectively. This suggests that Türkiye's strategic investments and transport policies on the MC have had a positive impact on logistics performance. In particular, projects such as the Baku-Tbilisi-Kars Railway, the Marmaray project, investments in Istanbul Airport and port infrastructure have strengthened Türkiye's logistics system and increased its importance within the scope of the OBOR. Furthermore, it has been observed that the countries in the Northern Corridor and the MC have achieved superior results in terms of logistics performance when compared to the countries in the Southern Corridor. From this standpoint, it can be posited that the utilisation of the Northern and MC will facilitate more efficacious logistics operations between China and Europe. Furthermore, Türkiye's consistent ranking within the top three positions across all evaluation years indicates the efficacy of its logistics processes in comparison to the other 11 countries. In addition to its geo-strategic position, its investments and successful results in logistics performance have revealed its strategic importance within the transport corridors in the OBOR project.

The criterion weights determined by CRITIC and MEREC methods vary according to years. It is evident that criteria such as customs procedures, tracking and tracing, and infrastructure have become increasingly significant over time. According to the CWM and AWM

methods created by integrating the CRITIC and MEREC methods, although the weights of the criteria vary from year to year, the customs criterion was generally found to be the criterion with the highest degree of importance. International shipments and logistics competence & quality criteria, on the other hand, were generally the criteria with the lowest degree of importance. Arman and Organ (2023), in their study conducted for EU member and candidate countries, found that the most important criterion for the LPI 2023 using the MEREC method was infrastructure, while the criterion with the lowest importance rating was international shipments. In the current study, the criterion with the worst value was also found to be international shipments. However, the most important criterion was tracking & tracing. In the study conducted by Miškić et al. (2023) using LPI 2018 data with MEREC, the criteria of infrastructure and international shipments had the lowest values. Timeliness was found to be the most important criterion. It is observed that the weightings of the criteria vary depending on the studies. It is thought that this is due to the sample or the period being evaluated. Furthermore, the results, which vary from year to year, are important because they indicate which areas of logistics processes have improved or deteriorated over time.

In a similar study conducted recently, Yürüyen and Altay (2025) compared the LPI performance of countries in the three corridors of the OBOR project using different criteria. The study only considered LPI 2023 values, and comparisons were made for this year. However, as the present study compares LPI scores from four different periods, it can be said to be a more comprehensive analysis in this respect. When the two studies are compared, similar results are obtained. China, Poland and Türkiye ranked high in all three corridors, while Uzbekistan, Kyrgyzstan and Tajikistan shared the bottom ranks.

Although Türkiye ranks among the top three countries in terms of ranking methods, it must take certain steps to improve its logistics performance. Improving the ‘customs’ processes, which are of the highest importance, may be at the forefront of these steps. Digitalisation processes that accelerate customs crossings and procedures can have a positive impact on the process. Taking steps to minimise bureaucracy, such as a single window system, will also increase efficiency at customs. Infrastructure improvements related to logistics processes are also important. As part of the infrastructure process, road-rail-air connections need to be strengthened. In particular, differing axle spacing between countries significantly prolong transport times on railways. In this regard, integrating the railway infrastructure of countries along the OBOR route through a joint decision could contribute to both reducing costs and accelerating processes.

The limited issuance of transit documents, which are particularly necessary at border crossings, significantly prolongs logistics processes. Increasing the number of transit documents and facilitating cooperation between countries in this regard is also important in terms of logistics performance. Within the scope of Logistics 4.0, the use and adoption of smart systems by both companies and public institutions should be encouraged, and vocational training in higher education institutions should be provided with these values in mind.

The study has some limitations. First of all, since Belarus, one of the important countries on the corridors, did not have data for 2010 and Iran did not have data for 2014, the LPI data for the relevant years were not evaluated. Since Azerbaijan and Turkmenistan are not included in the LPI for 2023, which is important for comparison since it contains the latest and most up-to-date data, they are not included in the study. In addition, 2016 and 2018 data for Azerbaijan and 2012

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data for Turkmenistan are not available. It is recommended that future studies include countries not currently involved in working with new LPs in their analyses. Furthermore, it is advised that analyses be conducted using fuzzy MCDM methods and that the relevant corridors be analysed in the context of environmental sustainability, digitalisation, and energy logistics.

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