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Analysis of Financial Performance of Companies in the BIST Transportation and Storage Sector with Multi-Criteria Decision-Making Techniques[1]

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BIST Ulaştırma ve Depolama Sektöründeki Şirketlerin Finansal Performanslarının Çok Kriterli Karar Verme Teknikleri ile Analizi[2]

Abstract

This study calculates the profitability, growth rates, and financial performance of BIST Transport and Storage Sector enterprises between 2013 and 2022, using financial statement values obtained from the Public Disclosure Platform (KAP). In this context, the importance of the criteria was determined by the Entropy method, using eight evaluation criteria, and then both individual and sectoral financial performance scores of the companies were determined using MAIRCA (Multi Attributive Ideal-Real Comparative Analysis) and MABAC (Multi-Attributive Border Approximation Area Comparison) methods. The findings showed that the companies' profit-loss status was affected by the increase or decrease in their assets, equity, sales and other items in both individual and sectoral financial success rankings, and the particular situation notifications of the companies were also effective.

Keywords : Financial Performance, Profitability and Growth Rates, Entropy, MAIRCA, MABAC, Transport and Storage Sector.

JEL Classification Codes : L25, L91.

Öz

Bu çalışmada, 2013-2022 yılları arasında BIST Ulaştırma ve Depolama Sektöründe faaliyet gösteren işletmelerin kârlılık ve büyüme oranları ile finansal performanslarının Kamuyu Aydınlatma Platformu'ndan (KAP) elde edilen finansal tablolardaki değerler kullanılarak hesaplanması amaçlanmıştır. Bu kapsamda, 8 değerlendirme kriteri kullanılarak Entropi yöntemi ile kriterlerin önem derecesi belirlenmiş, ardından şirketlerin hem bireysel hem de sektörel finansal performans puanları MAIRCA (Multi Attributive Ideal-Real Comparative Analysis) ve MABAC (Multi-Attributive Border Approximation Area Comparison) yöntemleri kullanılarak belirlenmiştir. Elde edilen bulgulara göre, şirketlerin kâr-zarar durumlarının şirketlerin hem bireysel hem de sektörel finansal başarı

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sıralamalarında aktiflerinde, öz kaynaklarında, satışlarında ve diğer kalemlerinde meydana gelen artış veya azalışlardan etkilendiği, şirketlerin özel durum bildirimlerinin de etkili olduğu görülmüştür.

Anahtar Sözcükler : Finansal Performans, Kârlılık ve Büyüme Oranları, Entropi, MAIRCA, MABAC, Ulaştırma ve Depolama Sektörü.

1. Introduction

Along with globalisation, changing and developing technology has eliminated the notion that countries' trade is limited to local markets, allowing countries to open up to international markets. Logistics activities are the backbone of countries' opening up to international markets and competing. The level of development and logistics performance in a country's logistics activities has a significant impact on the country's position in the global market.

Economic indicators are one of the key components of a country's development and economic growth. Another factor that enables these economic indicators to develop and change is logistics. (Türkoğlu & Duran, 2019: 89). The effective and efficient continuation of logistics activities, representing a significant part of the global economy, significantly contributes to national economies and businesses. With logistics activities, the goods and services produced by the enterprises can be offered to the international market without time and space restrictions. The country's crucial geopolitical position makes significant contributions to Türkiye's economy through global trade, positively impacting the development of the logistics sector. Logistic activities are involved in producing the product from its raw state until it reaches the final consumer and in the reverse process of this progression. A healthy supply chain process is essential for delivering goods and services of the highest quality to customers at the desired location and time, at the lowest cost, both in local and international markets, effectively and efficiently.

Due to the uncertainty problems arising from changes in global markets and financial crises, the importance of efficiency in complex financial decision-making is gradually increasing (Tunahan & Çınaroğlu, 2018: 317). These situations have led to the need to calculate financial results for businesses. The evaluation of financial results reveals the continuity of companies, their current success, investment levels, what they do and do not do correctly in terms of their activities, their risks, and how effectively and efficiently they use their resources. Additionally, financial results enable businesses to identify their strengths and weaknesses both individually and sectorally. In this direction, it can produce solutions to eliminate its weaknesses and develop strategies to protect its strengths. In addition, financial success is crucial for businesses to gain a competitive advantage through effective cost management in their sector and international markets, ensuring continuous growth. Companies can determine their financial results status and make predictions about their future goals to create accurate plans and take necessary measures in advance to mitigate any potential negativity.

It is a well-established fact that the primary objectives of businesses are to achieve sustainable long-term growth while also minimising costs and maximising profits. To achieve all these goals, the financial success of the enterprises must be high. It is known that many factors play an essential role in determining their economic success. It is generally considered that the most critical measure of financial success among these factors is making a profit. Said and Ali (2016) *defined profitability as the ability of a company to generate a profit from its sales, total assets, and capital*. Therefore, they emphasised that profitability analysis is crucial for long-term investors. Additionally, countries must have a sustainable and profitable economy to compete in global markets and provide sufficient financial resources. Accordingly (Nguyen & Nguyen, 2020: 47), identifying the different factors that directly or indirectly affect profitability has been an important research topic in economics, strategic management, accounting, and finance. In addition, growth rates indicate the company's position in the sector (Farrokh et al., 2016: 365; Rezaie et al., 2014: 5035). Growth rates show the increase or decrease of an amount compared to the previous year (Rezaie et al., 2014: 5035). Businesses need an analysis of their growth rates to determine their position in the sector and to take measures against the contractions they experience.

In this study, the financial results of 7 companies operating in the Transportation and Storage sector on the BIST were analysed using Entropy, MAIRCA, and MABAC methods, which examined profitability and growth rates based on financial statements obtained from KAP between 2013 and 2022. A total of eight evaluation criteria were used: asset profitability, main operating profit, net profit, and equity profitability ratio, as well as four profitability measures and four growth rates: asset growth, primary operating profit growth, net profit growth, and equity growth. First, the individual financial results of the companies for the specified years were calculated, and then their financial results within the sector were analysed. Thus, it aims to provide the necessary information to the company managers, investors, lenders, company stakeholders, and the government about the financial results of 7 companies operating in the Transportation and Storage sector. When an investor is considering investing in a company, they often struggle to make a decision solely based on the company's financial results. Therefore, the investor chooses which company to invest in by examining the company's financial results individually as well as within the broader sector. In this respect, this article's study provides information to the reader in various aspects, including the investor's investment decision, the lending institution's decision on whether to grant a loan and the state's opinion about the company.

2. Literature Review

More than one financial ratio is used to calculate a business's financial results, which are analysed and examined through various econometric models and methods. This study encompasses literature reviews on calculating the financial results of logistics sectors, regardless of the ratio discussed and the multi-criteria decision-making techniques employed.

In the article studies of Feng and Wang (2000), it was aimed to calculate the financial results of five airlines operating in Taiwan using a total of 22 variables and the TOPSIS method. The findings have shown that financial ratios can be more effective when used in conjunction with other factors to evaluate airline performance.

In the study conducted by Wang and Lee (2009), the financial results of three large container shipping companies operating in Taiwan were evaluated using the GIA method. The strength and weakness indices of these enterprises were determined by assessing their financial results, and the performance ranking was established based on total values.

In their study, Korkmaz and Uygurtürk (2010) evaluated the financial results of 20 enterprises operating in the maritime transportation sector, which were registered on US stock exchanges, using their financial statements from 2008 to 2010. "Ratio analysis" and "TOPSIS method" were used. In general, it has been determined that the 'C' values of the enterprises have been close to each other over the years. In addition, according to the performance values listed based on 'C' values, it was determined that there was an increase for some enterprises (CKH, EGLE, and SFL-coded enterprises) and a decrease for others (SSW and DAC-coded enterprises).

In their study, Başdeğirmen and Tunca (2017) examined the financial success of nine companies in the logistics sector, which were among the "Top 500 Big Businesses" published by Capital magazine in 2016, using the GIA method. The study used the following evaluation criteria: export, number of employees, turnover, total assets, profit before tax, and equity. The results revealed that the equity and total active evaluation criteria were the most critical factors affecting financial results for the logistics sector, with the criterion of lower importance being the pre-tax profit criterion.

In Özbek's (2018) article, a model was developed to evaluate the performance of 8 companies in the logistics sector, as listed in the 2017 Fortune 500, which incorporates national and international activities using SWARA, COPRAS, GIA, and TOPSIS methods.

In their study, Perçin and Aldalou (2018) aimed to develop a financial analysis model using an integrated "Fuzzy AHP" and "Fuzzy TOPSIS" method. With this model, the financial results of Pegasus and Turkish Airlines Inc., which were registered on the BIST in 2015 and 2016, were calculated. The results showed that Pegasus had better financial success.

Tunahan and Çınaroğlu (2018) aimed to evaluate and rank the financial success of the top 5 airlines in Europe between 2012 and 2016 using AHP and TOPSIS methods. Eight financial evaluation criteria were used for the analysis. As of the years mentioned above, Ryanair and EasyJet have achieved the best financial success, while Lufthansa has experienced the lowest financial success.

Meydan et al. (2018) examined the relationship between financial openness and the financial results of the Transportation and Storage sector between 1996 and 2016. Financial

results were evaluated using the ratio analysis method, and financial transparency was assessed through the VAR Model. The results showed that while the financial openness rate initially reacted negatively to changes in the borrowing and current ratio, this reaction became positive in subsequent periods.

In the study by Oral and Kipkip (2019), the financial successes of eight transportation sector enterprises listed on BIST between 2014 and 2018 were examined using the "TOPSIS" and "PROMETHEE" methods. According to the TOPSIS method, the results showed that the TLMAN transportation enterprise ranked first in terms of performance in 2014, 2016, 2017, and 2018. According to the "PROMETHEE" method, TLMAN transportation enterprise ranked first in 2014, fifth in 2015, fourth in 2016, third in 2017 and second in 2018.

In their study, Tufan and Kılıç (2019) evaluated the financial results of six logistics sector enterprises registered on the BIST for the period 2014-2018, using data from their financial statements through the "TOPSIS" and "VIKOR" methods. According to the analysis methods, companies with high financial results exhibit distinct differences, while those with low financial results display similar characteristics.

In the article by Macit and Göçer (2020), the financial results of Pegasus Air Transportation Inc. and Turkish Airlines Inc. registered in the BIST transportation and storage sector in 2008, were analysed using the GIA method. The results showed that Pegasus Air Transportation Inc. had higher financial results. On the other hand, Turkish Airlines Inc. had better profitability rates.

In the article by Sakarya and Aksu (2020), the financial results of enterprises operating in the transportation sector, as recorded in the BIST between 2013 and 2017, were evaluated using the TOPSIS method. As a result of the findings, they were listed as the enterprises with the most successful financial results in the form of RYSAS, CLEBI, CLEBI, BEYAZ and CLEBI in 2013-2017. On the other hand, THYAO, BEYAZ, RYSAS, PGSUS and THYAO have been ranked as the enterprises with the most unsuccessful financial results over the years.

In a study by Özbek and Ghouchi (2021), the financial results of the five most successful airlines in Europe between 2009 and 2018 were analysed using the WASPAS and EDAS methods. Twelve evaluation criteria were used in the study. The findings showed that Ryanair's business had the highest financial results in these years, while Lufthansa's company had the lowest.

In the article by Elmas and Özkan (2021), the financial results of companies registered in the "BIST Transportation and Storage Sector" between 2015 and 2019 were calculated using integrated SWARA-OCRA methods. The results showed that BEYAZ was the company with the best financial results over these years. Although the ranking changed over five periods, it was determined that Doco was among the top three companies.

Additionally, it was noted that RYSAS and THYAO were among the companies with the lowest financial results, although their rankings fluctuated over the five periods.

Huang et al. (2021) aimed to investigate the financial results of nine US-based airlines between 2015 and 2019 using data envelopment analysis and truncated regression. The research results revealed that the operating efficiency of the airlines increased continuously; however, the efficiency at the profitability stage remained stationary, indicating that resource allocations were necessary for the airlines to make further progress in overall efficiency.

In their study, Sakarya and Saçkes (2022) aimed to calculate the profitability-oriented financial results ranking of businesses using the Analytical Hierarchy Process (AHS) integrated Gray Relations Analysis (GIA) methods of 8 companies registered in the "BIST Transportation and Storage Sector" between 2018-2020 and to analyse the changes experienced during the Covid-19 pandemic. Fifteen cash-based financial ratios were used as criteria for evaluating financial results. In 2018, it was determined that the TLMAN enterprise's highest performance was in the THYAO enterprise's last place. While the enterprise with the highest performance in 2020 was BEYAZ, it was determined that the THYAO enterprise was in last place, as it had been in 2018.

Upon examining the literature, it was found that most studies measured companies' financial results and success within their respective sectors. In this study, unlike in the literature, both individual and sectoral financial results and success rankings of companies were determined. In addition, the small number of studies that consider profitability and growth rates together as evaluation criteria has increased the study's originality.

3. Research Methodology

Both subjective and objective methods are used to determine criterion weights in MCDM techniques. In this study, the importance of the criteria was determined using numerical values in the decision matrix, thereby eliminating the influence of the decision maker's opinion. This was achieved by applying the Entropy method, a well-established objective method, to calculate the importance weights of the criteria. In addition, when studies conducted using MCDM techniques in the literature were examined, the TOPSIS method was most frequently preferred. In this study, financial results success score values were determined separately using both methods, selecting the most up-to-date MAIRCA (2014) and MABAC (2015) methods, which were chosen based on the years of their emergence in MCDM techniques. The necessary information about the methods is given below.

3.1. Entropy Method

Rudolph Clausius first defined entropy as a measure of disorder and uncertainty in 1865. Later, in 1948, Shannon expressed the discrete probability distribution as a measure of uncertainty (Ayçin, 2020: 132). Entropy weight is defined as a parameter that expresses

how close different alternatives with a particular attribute approach each other (Wang & Lee, 2009: 8962).

The variables in the formulas used to calculate the entropy value are defined as follows (Ayçin, 2020: 132-133);

A_i: i decision alternative (i= 1,2,⋯ ,m)

C_j: j evaluation criterion (j = 1,2,⋯ ,n)

x_{ij}: j the value received by alternative i according to the evaluation criterion

p_{ij}: j normalised value received by alternative i according to the evaluation criterion

k: Entropy coefficient

e_j: Entropy value

d_j: f degree of agglomeration

w_j: j weight of evaluation criterion (j = 1,2, …..,n)

The Entropy Method consists of five steps. These are (Lotfi & Fallahnejad, 2010: 55);

1. Step: "Creating the decision matrix"

$$D = \begin{matrix} A_1 \\ A_2 \\ \vdots \\ A_m \end{matrix} \begin{bmatrix} x_{11} & x_{12} \dots & x_{1n} \\ x_{21} & x_{22} \dots & x_{2n} \\ \vdots & \vdots & \vdots \\ x_{m1} & x_{m2} & x_{mn} \end{bmatrix} \quad (1)$$

2. Step: "Normalization of the decision matrix"

$$P_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}}} \; ; \; \forall_{i,j} \quad (2)$$

3. Step: Calculation of Entropy values related to the criteria:

$$e_{ij} = -k \sum_{j=1}^{n} P_{ij} \, . \ln(P_{ij}) \; ; \; i = 1,2, \dots, m \text{ ve } j = 1,2, \dots, n \quad (3)$$

4. Step: Calculation of degrees of differentiation:

$$d_j = 1 - e_j \qquad (j = 1,2, \dots..,n) \quad (4)$$

5. Step: Calculation of entropy criteria weights;

In the fifth step, which is the last step, the degree of differentiation of each criterion is proportioned to the total degree of differentiation, and such Entropy criterion weights are calculated.

$$W_j = \frac{d_j}{\sum_{j=1}^{n} d_j} \tag{5}$$

As shown in Formula 3, the natural logarithm function is used when calculating entropy values. Since the negative values in the decision matrix can cause problems in calculations, they should be converted into positive values using various correction methods found in the literature. These values are transformed using the Z-Score standardisation transformation developed by Zhang et al. (2014). In the entropy method, firstly, the negative values in the decision matrix are converted into positive ones using Formula 6 with the Z-score standardisation transformation (Ayçin, 2020: 134).

$$Z_{ij} = \frac{X_{ij} - \bar{X}_j}{\sigma_j} \tag{6}$$

$\bar{X}_j$ and σ_j, j in Formula 6 represents the mean and standard deviation of the criterion. After obtaining the mean and standard deviation values, the negative values in the decision matrix are converted to positive values using Formula 7.

$$z'_{ij} = z_{ij} + A \; ; A > \left| min z_{ij} \right| \tag{7}$$

In Formula 7, after determining the lowest z_{ij} value calculated for the criterion, a constant A number higher than the absolute value of this value was added to all values in the criterion and its z_{ij} values z'_{ij} were converted into positive values (Ayçin, 2020: 134).

3.2. MAIRCA Method:

The MAIRCA method, as defined by Pamucar et al. in 2014 (Ayçin, 2020: 190; Yıldızbaşı and Çalık, 2021: 443), assumes that determining the gap between ideal and empirical weights constitutes the basic assumption of the MAIRCA method. The stages of the MAIRCA method are given below (Pamucar et al., 2018: 1646; Gigovic et al., 2016: 11).

1. Step: Creating the decision matrix;

$$X = \begin{matrix} A_1 \\ A_2 \\ \vdots \\ A_m \end{matrix} \begin{bmatrix} x_{11} & x_{12} \dots & x_{1n} \\ x_{21} & x_{22} \dots & x_{2n} \\ \vdots & \vdots & \vdots \\ x_{m1} & x_{m2} \dots & x_{mn} \end{bmatrix} \tag{8}$$

2. Step: Identifying the priorities of alternatives;

The decision maker is neutral regarding all other options and does not have a priority among them. All alternatives are equal for the decision maker. Here, m represents the total number of other options, and i represents the alternative priority.

$$P_{Ai} = \frac{1}{m} \tag{9}$$

$$\sum_{i=1}^{m} P_{Ai} = 1 \qquad i = 1,2,\dots,m \tag{10}$$

$$P_{A1} = P_{A2} = \cdots = P_{Am} \tag{11}$$

3. Step: Creating a theoretical rating matrix;

$$T_p = \begin{bmatrix} P_{A1}w_1 & P_{A1}w_2 \dots & P_{A1}w_n \\ P_{A2}w_1 & P_{A2}w_2 \dots & P_{A2}w_n \\ \vdots & \vdots & \vdots \\ P_{Am}w_1 & P_{Am}w_2 & P_{Am}w_n \end{bmatrix} \tag{12}$$

4. Step: Creation of the actual rating matrix;

- For benefit type criterion (preferred higher criterion value):

$$t_{rij} = t_{pij} \cdot \left(\frac{x_{ij} - x_{ij}^{-}}{x_{ij}^{+} - x_{ij}^{-}} \right) \tag{13}$$

- For cost type criterion (preferred sub-criterion value):

$$t_{rij} = t_{pij} \cdot \left(\frac{x_{ij} - x_{ij}^{+}}{x_{ij}^{-} - x_{ij}^{+}} \right) \tag{14}$$

$$T_r \quad \begin{bmatrix} t_{r11} & t_{r12} \dots & t_{r1n} \\ t_{r21} & t_{r22} \dots & t_{r2n} \\ \vdots & \vdots & \vdots \\ t_{rm1} & t_{rm2} & t_{rmn} \end{bmatrix} \tag{15}$$

5. Step: Creating the total gap matrix;

$$g_{ij} = t_{pij} - t_{rij} \; g_{ij} \; \nabla \; [0, \infty) \tag{16}$$

$$G = T_p - T_r = \begin{bmatrix} g_{11} & g_{12} \dots & g_{1n} \\ g_{21} & g_{22} \dots & g_{2n} \\ \vdots & \vdots & \vdots \\ g_{m1} & g_{m2} & g_{mn} \end{bmatrix} \tag{17}$$

6. Step: Identification of the total gap with alternatives;

As a result of the calculations, if the (A_i) theoretical degree and the actual degree of (t_{pij}) an alternative (C_j) for a criterion (t_{rij}) are equal to each other and have a non-zero value, the gap will be zero$(g_{ij} = 0)$. When such a situation arises, it is emphasized $(A_i^+$that the relevant alternative will be the (A_i)ideal alternative (C_j) for the relevant criterion. However, if the (A_i) theoretical degree (t_{pij}) and the actual degree of an alternative $(C_j)$for

a criterion are equal (t_{rij}) to zero, the gap value will also be zero($t_{pij} = t_{rij} = g_{ij} = 0$). In such a case, the relevant alternative (A_i^-) will be (A_i) the worst alternative $(C_j)$for the relevant criterion (Ayçin, 2020: 192).

7. Step: Calculating the Value of the Final Criteria Functions of Alternatives

$$Q_i = \sum_{j=1}^{n} g_{ij} \quad , \quad i = 1,2, \dots, m \tag{18}$$

3.3. MABAC Method

Pamučar and Ćirović introduced the MABAC method in 2015. This method evaluates the distances of the criterion functions of the decision alternatives to the boundary approach area. The symbols of the variables in the application phase of the method are expressed as follows (Pamučar & Ćirović, 2015: 3019; Ayçin, 2020: 160):

A_i: i decision alternative (i = 1, 2, …., m)

C_j: j evaluation criteria (j = 1, 2, …. , n)

x_{ij}: j the value received by alternative i according to the evaluation criterion

x_i^+: maximum values in the columns

x_i^-: minimum values in the columns

v_{ij}: weighted values

m : number of decision alternatives

Number of Criteria

q_i: distance value from border proximity area

G: boundary proximity area matrix

V: weighted decision matrix elements

Q: Distance of decision alternatives to the border proximity area

G^+: upper proximity area

G^-: lower proximity area

S_i: criterion function of each decision alternative

The MABAC method consists of seven steps. The following steps are outlined below (Pamučar & Ćirović, 2015: 3019; Ayçin, 2020: 160).

Step 1: Creating the decision matrix:

$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix}; i = 1,\dots \dots m \; and \; j = 1,\dots n \tag{19}$$

Step 2: Normalization of the decision matrix

- For benefit type criterion (preferred higher criterion value):

$$r_{ij} = \frac{x_{ij} - x_j^{min}}{\underset{x_j}{max_j^{min}}} \tag{20}$$

- For cost type criterion (preferred sub-criterion value):

$$r_{ij} = \frac{x_{ij} - x_j^{max}}{\underset{x_j}{min_j^{max}}} \tag{21}$$

Step 3: Weighting the decision matrix

$$v_{ij} = w_j * (1 + r_{ij}) \tag{22}$$

Step 4: Determine the boundary proximity field matrix

$$g_i = \left(\prod_{i=1}^{m} v_{ij}\right)^{1/m} \tag{23}$$

After calculating the g_i values for each criterion, a boundary proximity area matrix (G) in n*1 format is created.

$$G = [g_i]_{1*n}0 \tag{24}$$

Step 5: Determine the distances (Q) of each decision alternative to the boundary proximity area

The Q matrix is calculated for all criteria by determining the distances from the boundary proximity area using the following equation.

$$Q = (v_i - G) = \begin{bmatrix} v_{11} - g_1 & v_{12} - g_2 \dots v_{1n} - g_n \\ v_{21} - g_1 & v_{22} - g_2 \dots v_{2n} - g_n \\ \dots \; \dots \; \dots \; \dots & \\ v_{m1} - g_1 & v_{m2} - g_2 \dots v_{mn} - g_n \end{bmatrix} = \begin{bmatrix} q_{11} & q_{12} \dots q_{1m} \\ q_{21} & q_{22} \dots q_{2m} \\ \dots \; \dots & \dots \; \dots \\ q_{n1} & q_{n2} \dots q_{nm} \end{bmatrix} \tag{25}$$

Step 6: Creating the locations of decision alternatives according to the border proximity area

$$A_i \in \begin{cases} G^+ \; if \; q_{ij} > 0 \\ G \quad if \; q_{ij} = 0 \\ G^- \; if \; q_{ij} < 0 \end{cases} \tag{26}$$

Step 7: Sequence of decision alternatives

$$S_i = \sum_{j=1}^{n} q_{ij} \quad (27)$$

Sample of the Research and Data Collection Process:

The main population of the research was determined to be 10 enterprises operating in the Transportation and Storage Sector registered with BIST. The study covers 2013-2022, and the sample was formed by considering the quoted years of the enterprises operating in the Transportation and Storage Sector. Since GRSEL 2022, TLMAN 2018 and TUREX were listed on the stock exchange in 2021, they were excluded from the analysis. Research data was obtained from KAP. The names and stock exchange codes of the enterprises used within the scope of the analysis operating in the Transportation and Storage Sector traded in BIST are obtained from KAP and shown in Table 1.

Table: 1
Enterprises Analyzed in the Transportation and Warehousing Sector and Their Codes

Item	Code	Company Name
1	BEYAZ	Beyaz Filo Oto Kiralama A.Ş.
2	CLEBI	Çelebi Hava Servisi A.Ş.
3	DOCO	Do & Co Aktiengesellschaft
4	GSDDE	Gsd Denizcilik Gayrimenkul İnşaat Sanayi veTicaret A.Ş.
5	PGSUS	Pegasus Hava Taşımacılık A.Ş.
6	RYSAS	Reysaş Taşımacılık ve Lojistik Ticaret A.Ş.
7	THYAO	Türk Hava Yolları A.O.

The financial ratio data of the Transport and Storage enterprises in the study were calculated using formulas based on information obtained from their financial statements. The evaluation criteria and codes used in the research are given in Table 2.

Table: 2
Evaluation Criteria and Codes

Item	Code	Evaluation Criteria	Purpose
1	AK	Active Profitability	Maximum
2	EFK	Operating profit	Maximum
4	NK	Net profit	Maximum
5	ÖK	Return on Equity	Maximum
6	AB	Active Growth	Maximum
7	EFKB	Main Operating Profit Growth	Maximum
8	NKB	Net Profit Growth	Maximum
10	ÖB	Equity Growth	Maximum

4. Analysis and Findings of the Research

The research accessed data from KAP surveys conducted with seven companies operating in the BIST Transport and Storage Sector between 2013 and 2022. The values obtained from the financial statements, including four profitability and four growth rates used in the research, were examined for each company and each year. Then, the annual financial ratios of each company were arranged in the Excel program, and the importance of

the evaluation criteria was determined using the Entropy method. This method was used because it is objective and the decision maker's subjective intervention in the analysis results. Then, the businesses' individual and sectoral financial results rankings were calculated using MAIRCA and MABAC methods.

4.1. Analysis of Criteria Weights of Companies by Entropy Method

The entropy method is an objective method used to determine the severity () w_j of the criteria consisting of 5 steps. In addition, since including negative values in the research data can cause problems in calculating the method, it consists of 6 steps, which involve converting negative values into positive values using the Z-Score conversion process developed by Zhang (2014) (Ayçin, 2020: 132). These steps were calculated separately for each company and year using the Excel program, and a decision matrix was generated. Then, the importance weight ratings (w_j) of the criteria were determined. Because each step is excessive, the w_j values obtained by calculating only with formula 5 in the study are given in Table 3 and Table 5. Table 3 presents horizontal evaluation criteria and vertical w alt j values of companies.

Table: 3
My Criteria Determined by Entropy Method Importance Weight Ratings

Companies/Criterias	AK	EFK	NK	ÖK	AB	EFKB	NKB	ÖB
BEYAZ	0,1045	0,1184	0,0867	**0,0609**	0,1702	0,1618	**0,2083**	0,0892
CLEBI	0,0945	**0,0240**	0,0942	0,0832	0,2198	0,1653	0,0634	**0,2557**
DOCO	0,0847	0,0569	**0,0550**	0,0648	**0,2467**	0,2131	0,1433	0,1356
GSDDE	0,1630	0,1137	0,1049	0,0869	0,1320	0,0677	**0,0489**	**0,2828**
PGSUS	0,0990	0,0710	0,0698	0,1099	0,1001	**0,0601**	0,1411	**0,3491**
RYSAS	0,1130	**0,0231**	0,1262	0,0517	0,1329	0,1205	0,0669	**0,3658**
THYAO	0,1255	0,1796	0,0947	0,1071	0,1049	0,0894	**0,0852**	**0,2136**

When Table 3 is examined, for BEYAZ, the most crucial criterion for the company is Net Profit Growth, while the least important criterion is Return on Equity. For CLEBI, GSDDE, PGSUS, RYSAS, and THYAO companies, the most crucial criterion is Equity Growth. For CLEBI and RYSAS, the least important criterion is Operating Profit; for GSDDE and THYAO, it is Net Profit Growth; and for PGSUS, it is Operating Profit Growth. The most crucial criterion for DOCO is Asset Growth, while the least important criterion is Net Profit. Table 3 shows that the Equity Growth criterion is generally the most important, followed by Net Profit Growth.

4.2. Analysis of Annual Financial Performance of Companies by MAIRCA and MABAC Methods

The MAIRCA method is a 7-step method used to determine the gap between ideal and empirical weights (Ayçin, 2020: 190). The MABAC method, on the other hand, calculates score values by taking into account their distance to the border approach area and consists of 7 steps (Pamučar & Ćirović, 2015: 3019; Ayçin, 2020: 160). The decision matrices and w_j values determined for each company and each year through the Entropy

Method were used in MAIRCA and MABAC methods. Score values were calculated by determining the steps required for both methods separately for each year and company. As in the entropy method, the score values obtained only for each company and each year in this study are shown in Table 4 and Table 6 due to the high number of evaluation steps in both methods.

Table 4 presents the financial performance score values of the companies obtained using the MAIRCA and MABAC methods used in the research. The MAIRCA method (X) and MABAC method (Y) symbols are shown in Table 4 to facilitate the interpretation and comparison of the results by financial information users.

Table: 4
Results Obtained by MAIRCA and MABAC Methods

Companies/Years	BEYAZ		CLEBI		DOCO		GSDDE		PGSUS		RYSAS		THYAO	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
2013	6	6	8	8	2	2	4	4	1	1	3	3	7	7
2014	9	9	7	7	6	6	6	6	7	7	4	4	5	5
2015	1	1	6	6	4	4	8	8	6	6	8	8	3	3
2016	5	5	9	9	8	8	10	10	9	9	9	9	8	8
2017	7	7	4	4	9	9	9	9	5	5	6	6	9	9
2018	10	10	3	3	3	3	3	3	4	4	10	10	4	4
2019	2	2	5	5	7	7	5	5	3	3	7	7	6	6
2020	4	4	10	10	10	10	7	7	10	10	1	1	10	10
2021	8	8	1	1	5	5	1	1	8	8	5	5	2	2
2022	3	3	2	2	1	1	2	2	2	2	2	2	1	1

When Table 4 is examined, it is observed that according to the MAIRCA and MABAC methods, the years in which companies were successful and unsuccessful in terms of individual financial performance are equal. It is assumed that this situation demonstrates the applicability of CKKV techniques in calculating financial performance and confirms the method's superiority. For BEYAZ, the year with the most successful financial performance was 2015, while the year with the least successful performance was 2018. For CLEBI, the most successful year was 2021, while the least successful year was 2020. For DOCO, the most successful year was 2022, while the least successful year was 2020. For GSDDE, the most successful year was 2021, while the least successful year was 2016. For PGSUS, the most successful year was 2013, while the least successful year was 2020. For RYSAS, the most successful year was 2020, while the least successful year was 2018. THYAO's most successful year was 2022, while its least successful year was 2020. It is believed that both the COVID-19 pandemic in 2020 and factors such as companies' profitability, sales levels, loss conditions, and the unique situation announcements made by companies in their public disclosures support the years in which companies were successful or unsuccessful.

4.3. Analysis of Annual Criteria Weights by Entropy Method

The findings are presented in Table 5, with the evaluation criteria listed horizontally and the years listed vertically.

Table: 5
Significance Weight Ratings of the Criteria Determined by Entropy Method

Years/Criteria	AK	EFK	NK	ÖK	AB	EFKB	NKB	ÖB
2013	0,1258	**0,0583**	0,0837	0,1263	0,1935	0,0845	0,1157	**0,2122**
2014	0,1321	0,1124	0,0689	0,0932	0,1041	0,0694	**0,0683**	**0,3516**
2015	0,1208	**0,0477**	0,0493	0,1057	0,0578	**0,4367**	0,0535	0,1285
2016	0,1535	0,0822	**0,0745**	**0,1821**	0,1180	0,1635	0,0934	0,1330
2017	0,1358	0,0816	0,0811	0,1897	0,1124	0,1485	**0,0779**	**0,1728**
2018	0,1138	0,1322	0,1358	**0,0866**	0,1234	**0,1698**	0,1325	0,1058
2019	0,0985	0,0967	**0,0550**	0,0995	0,0766	0,1282	**0,3572**	0,0884
2020	0,1423	0,0602	0,0763	0,0953	0,0428	0,2309	**0,0424**	**0,3099**
2021	0,1429	0,1844	0,1573	0,0771	0,0863	0,0638	**0,0709**	**0,2174**
2022	0,1258	**0,0583**	0,0837	0,1263	0,1935	0,0845	0,1157	**0,2122**

Table 5 shows that the Equity Growth criterion is generally the most important, followed by the Main Operating Profit Growth criterion.

4.4. Analysis of Annual Financial Performance of Companies by MAIRCA and MABAC Methods

The MAIRCA and MABAC methods used in the research rank financial performance from best to worst. Table 6 presents the rankings using the MAIRCA method (X) and the MABAC method (Y) symbols.

Table: 6
Results Obtained by MAIRCA and MABAC Methods

Companies / Years	2013		2014		2015		2016		2017		2018		2019		2020		2021		2022	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
BEYAZ	5	5	7	7	2	2	1	1	3	3	7	7	1	1	2	2	5	5	4	4
CLEBI	7	7	1	1	3	3	4	4	1	1	1	1	3	3	5	5	2	2	2	2
DOCO	3	3	4	4	5	5	2	2	4	4	5	5	6	6	3	3	6	6	6	6
GSDDE	6	6	6	6	1	1	7	7	7	7	2	2	7	7	6	6	1	1	1	1
PGSUS	1	1	5	5	6	6	6	6	2	2	4	4	2	2	7	7	7	7	7	7
RYSAS	2	2	3	3	7	7	5	5	5	5	6	6	5	5	1	1	4	4	5	5
THYAO	4	4	2	2	4	4	3	3	6	6	3	3	4	4	4	4	3	3	3	3

When Table 6 is examined, the sectoral financial performance success rankings of companies between 2013 and 2022 can be observed. The companies' success or failure in terms of financial performance has been explained by examining both financial statement items and special circumstance disclosures.

It is assumed that PGSUS's launch of a new route in 2013 led to an expansion of flight operations and increased sales revenue, contributing to a rise in profitability and sectoral success. On the other hand, it is assumed that CLEBI's increasing financial expenses in 2013, along with a decline in profit and resulting losses, led to the company having the lowest financial performance in the sector.

In 2014, it is believed that CLEBI's significant increase in sales revenue and net profit compared to the previous year, along with the capital increase it carried out, contributed to its success in the sector. Additionally, when examining the financial figures of companies for 2014, it is observed that while other companies in the sector made a profit, BEYAZ

company incurred a loss in 2014. This is considered to have led to the company's financial underperformance within the sector.

In 2015, GSDDE acquired financial fixed assets. Additionally, the company saw an increase in its total assets, equity, and sales revenue compared to previous years. These factors are believed to have positively impacted the company's financial success. On the other hand, RYSAS experienced a decline in its total assets, equity, and sales revenue in 2015. It is assumed that these declines had a negative impact on the company's financial performance.

In 2016, it is assumed that BEYAZ's increases in equity, sales revenue, gross profit, and operating profit led to it becoming the company with the best financial performance in the sector. In 2016, GSDDE experienced a significant decline in gross and operating profit, resulting in a net loss. This decline is believed to have negatively impacted the company's financial performance, making it the least successful in the sector in terms of financial performance.

In 2017, the increase in sales revenue, along with the rise in gross profit and operating profit at CLEBI company, is assumed to have been reflected in the net profit margin, resulting in a significant increase compared to the previous year. This positive development is believed to have supported the company's financial success within the sector. In 2017, GSDDE company, like in 2016, incurred losses, which is thought to have negatively impacted its financial performance within the sector.

The increases in total assets, sales revenue, gross profit, and operating profit of CLEBI significantly boosted its net profit for the period. These increases are assumed to have supported the company's position as the most financially successful in 2018. In 2018, the downturn in the automotive sector significantly reduced BEYAZ's sales revenue. This led to a substantial decline in its net profit compared to the previous year, which is believed to have lowered its financial performance and success within the sector.

In 2019, BEYAZ company's total assets, equity, sales revenue, gross profit, and operating profit increased compared to the previous year, which significantly boosted the company's net profit for the period. It is believed that these positive developments contributed to the company's financial success, making it the most successful company in the sector in terms of financial performance in 2018. On the other hand, GSDDE experienced a decline in sales revenue, gross profit, and operating profit, which negatively impacted its net profit for the period, resulting in a loss. It is assumed that these factors negatively affected the company's sectoral performance.

In 2020, RYSAS made a significant contribution to the logistics sector and the national economy by carrying out Türkiye's first export block train operation. Additionally, the company purchased containers due to increased international railway transportation. Furthermore, RYSAS experienced increased sales revenue, gross profit, and operating profit

compared to previous years, while the growth rate of the company's assets also rose. It is believed that these positive developments led to the company becoming the most successful in its sector. The COVID-19 pandemic, a global outbreak, led to restrictions that negatively impacted many industries, including aviation. In 2020, the limits resulted in a decline in PGSUS's flight and passenger numbers, which decreased the company's sales revenue. At the same time, the company experienced significant decreases in gross and operating profit, and in 2020, it incurred its most crucial loss in recent years. This harmful situation is also assumed to have negatively impacted the company's sectoral performance.

In 2021, GSDDE's capital increase, significant growth in sales revenue, and substantial increases in gross profit and operating profit compared to the previous year are believed to have positively impacted its net profit, thereby enhancing its sectoral performance. At the same time, due to the COVID-19 pandemic, increased waiting times at ports led to higher freight rates. This situation is considered to have had a positive impact on the maritime sector. For PGSUS, the effect of the pandemic's restrictions continued into 2021, and the company's net profit declined further, resulting in losses. This situation is thought to have negatively affected the company's performance within its sector.

In 2022, the increase in sales revenue, equity, total assets, gross profit, and operating profit at GSDDE is believed to have contributed to the company's sectoral financial performance. On the other hand, the significant declines in net profit growth and core operating profit of PGSUS in 2022 are thought to have negatively impacted the company's sectoral financial performance.

5. Concluding Remarks

In an increasingly global and competitive environment, companies require financial results analysis to achieve a maximum profit and minimum cost policy, which is one of their primary objectives, and to foster sustainable growth. Additionally, financial results analysis can determine the extent to which companies utilise their resources efficiently. At the same time, it is closely related to both internal and external stakeholders. In this case, internal and external stakeholders are informed about the company's current success status, its profitability, and the extent to which it fulfils financial procedures. At the same time, an investment policy is determined, and investors are provided with direction in decision-making. The financial results of enterprises are calculated based on the values in the financial statement items.

Today, the logistics sector is the lifeblood of countries, supporting the development of international trade, providing a global competitive advantage, ensuring the continuity of production without disruption, facilitating the adequate provision of import and export activities, and facilitating the complete transmission of information flow between companies. The growth and development of the logistics sector contribute significantly to the country's economy. Logistics activities are involved in each process, from the raw state of the product to its production and delivery to the customer. Their ability to carry out

warehousing activities, one of the logistics activities, effectively and efficiently also enables the production process to be carried out entirely without errors. Additionally, businesses can gain a cost advantage by utilising transportation activities effectively, thereby increasing efficiency. Considering all these reasons, companies can gain a competitive advantage in the global market by using their procurement processes and logistics activities effectively and efficiently.

It has been determined that MCDM techniques have been frequently preferred in the literature in recent years in financial result studies. In most of the studies, the company's sectoral financial results were analysed year by year. In this study, unlike in the literature, companies' individual and sectoral financial results were calculated by analysing them year by year. Furthermore, the scarcity of studies in the literature that combine profitability and growth rates makes this research unique among other studies.

The study employed eight evaluation criteria, comprising four profitability and four growth rate metrics, considering profit maximisation and the mission of achieving sustainable growth, which are among the enterprises' primary objectives. The financial results of seven companies in the Transportation and Storage Sector traded on the BIST between 2013 and 2022 were analysed.

According to the results of the Entropy Analysis, the criterion importance weight ratings were obtained on a company basis. While net profit growth was the most crucial criterion for the BEYAZ company, equity profitability was identified as the criterion with the lowest importance. While the criterion with the highest significance level for the CLEBI company is the equity growth criterion, the criterion with the lowest significance level is determined to be the primary operating profit. While the highest criterion of importance for DOCO is active growth, the lowest criterion is net profit. It was concluded that the highest importance criterion of the GSDDE company was the equity growth criterion, and the lowest criterion was the net profit growth. It has been determined that the most crucial criterion for the PGSUS company is equity growth, and the least critical criterion is primary operating profit growth. While the criterion with the highest level of importance belonging to the RYSAS company was the equity growth criterion, the lowest criterion was the main operating profit. Finally, it has been concluded that the highest criterion of the importance level of THYAO company is the equity growth criterion, and the lowest criterion is the net profit growth criterion.

According to the MAIRCA and MABAC Analysis results, the findings were obtained based on the ranking of companies' financial results in terms of individual years, categorised as most successful and most unsuccessful. While BEYAZ's most successful year was 2015, its least successful year was 2018. While 2021 was the best year for CLEBI, 2020 was the worst. While the year in which DOCO showed the highest financial results was determined as 2022, the lowest year was defined as 2020. It was concluded that 2021 was the most successful year for the GSDDE company, while 2016 was the least successful. It has been reached that the year with the highest financial results for PGSUS company is 2013, and the

year with the lowest performance is 2020. While RYSAS had the best performance in 2020, it had the worst in 2018. Finally, THYAO company's best year was 2022, while its worst was 2020.

According to the findings of the Entropy Analysis, the yearly criterion was the most crucial criterion for 2013; the highest criterion was the equity growth criterion, while the lowest criterion was the main operating profit. In 2014, the criterion with the highest severity was the equity growth criterion, while the criterion with the lowest severity was net profit growth. In 2015, it was found that the criterion with the highest importance level was the main operating profit growth criterion, and the lowest criterion was the main operating profit criterion. While the criterion with the highest severity for 2016 was the equity profitability criterion, the lowest criterion was the net profit criterion. For 2017, it was found that the criterion with the highest degree of importance was equity growth, and the lowest criterion was net profit growth. In 2018, the criterion with the highest importance weighting was the main operating profit growth criterion, while the criterion with the lowest importance weighting was equity profit. For 2019, the highest degree of importance criterion was net profit growth, while the lowest criterion was net profit. It has been concluded that the criterion with the highest degree of importance for 2020 is equity growth, and the criterion with the lowest degree of importance is net profit growth. In 2021, the criterion of highest importance was determined as the equity growth criterion, while the criterion of lowest importance was defined as the net profit growth criterion. In 2022, the criterion of highest importance was determined as the net profit criterion, while the criterion of lowest importance was defined as the equity profitability criterion.

According to the results of MAIRCA and MABAC Analyses, the findings were obtained based on the ranking of companies with the most successful and least successful annual financial results within the sector. In 2013, the best company was PGSUS, while the worst was CLEBI. In 2014, while BEYAZ showed the worst financial results, CLEBI ranked first in financial success. While GSDDE showed the best financial success in 2015, RYSAS was determined as the company with the worst financial success. In 2016, while GSDDE ranked last, CLEBI ranked first. While CLEBI company had the best financial results in 2017 and 2018, GSDDE in 2017 and BEYAZ company in 2018 were determined to be the worst companies in terms of financial results. While the financial results of the GSDDE company fell to last place in 2019, the BEYAZ company achieved the best financial results. In 2020 and 2021, PGSUS ranked last among the most affected companies in the sector due to pandemic restrictions. RYSAS in 2020 and GSDDE in 2021 were the companies that achieved the best financial results. Finally, in 2022, GSDDE ranked first in the sector, while DOCO was the most unsuccessful company.

According to the MAIRCA method, the values in the financial results ranking were obtained by ranking from the most minor to the largest, whereas according to the MABAC method, the values in the financial results ranking were obtained by ranking from the largest to the most minor. Whether the values are ranked from small to large or from large to small, it has been observed that the individual and sectoral financial results rankings of companies

between 2013 and 2022 show similar results. This situation reveals that MCDM techniques are effective methods for calculating financial results.

When the Entropy Analysis results are evaluated, the following suggestions can be made to companies operating in the Transportation and Storage Sector registered with BIST to increase their financial results individually;

- It has been determined that the equity growth criterion is of the highest importance and weight in the CLEBI, GSDDE, PGSUS, RYSAS, and THYAO companies. These enterprises must pay attention to increases in equity growth rates to further enhance their financial results.
- It was observed that the net profit growth criterion of BEYAZ company was determined to be the criterion with the highest importance. BEYAZ can move its financial results to the top by focusing on net profit growth. BEYAZ company can increase its net profit growth rate by keeping its expenses and costs to a minimum.
- Finally, it has been determined that DOCO company's asset growth criterion is the most crucial. DOCO can enhance its financial performance by increasing its profit, liquidity, real estate holdings, stock, and other assets.

When the Entropy Analysis results are evaluated, the following suggestions can be made to companies operating in the Transport and Storage Sector registered with BIST to improve their financial results in terms of the sector;

- It was determined that equity growth was the most critical criterion in 2013, 2014, 2017, 2020 and 2021. In line with this result, it can be said that the companies analysed in the Transportation and Storage Sector should emphasise the increase in equity capital to increase their financial results in the years in question.
- In 2015, the main operating profit growth criterion was the highest degree of importance criterion. Therefore, to increase their sectoral financial results in 2015, these companies should emphasise the primary operating profit growth rate increase. Companies can increase their profitability by maintaining their core business efficiently and effectively.
- In 2016, the criterion with the highest management weight was equity profitability. For these companies to improve their sectoral financial results in 2016, they need to focus on increasing the return on equity ratio.
- In 2019, the criterion with the highest severity was the net profit growth criterion. To increase their sectoral financial results in 2019, these companies must consider increasing their net profit growth rate. Net profit is the profit of the enterprise after tax. These companies can increase their net profit growth rates by maximising their profits and reducing expenses and costs.
- Finally, it was concluded that the net profit criterion was the most critical in 2022. As in 2019, companies can enhance their financial performance by increasing their net profits while reducing costs.

The research results provide businesses within the sector with the opportunity to compare themselves to their competitors, and investors who will invest in the sector have the chance to compare firms within it. In addition, determining the companies' financial results individually and every year allows them to assess their current situation, protect their strengths, and take measures against the negative aspects they may encounter by identifying their weaknesses. Additionally, it has been demonstrated that the profitability and growth rates used as evaluation criteria can be considered financial result indicators by financial information users. Upon examining the research results, it was found that studies on Transportation and Storage companies in the literature did not yield similar findings. We can explain that the reason for this situation is that the MCDM methods used, the evaluation criteria discussed (profitability and growth rates), the periods covered by the research (2013-2022) and the economic and social factors experienced in these periods differ and the limited number of companies listed on the stock exchange affects this situation.

The findings obtained in this study are considered to be the limitations of the study, including the sample (BIST Transport and Storage Sector), the financial results evaluation criteria used (profitability and growth rates), the method chosen (MAIRCA & MABAC), the ranking of importance levels (Entropy), and the scope for the 2013-2022 period. The limitations of the research limit the research findings obtained in this context.

This study selected the BIST Transportation and Storage sector. In future studies, different sectors enrolled in BIST or other countries can be chosen as samples, and a different perspective can be revealed by expanding the study based on the methods used, different evaluation criteria and different periods. Additionally, the entropy method determined the importance of the requirements in this study. Other MCDM techniques can be used to determine the severity of the criteria for future studies. Additionally, by increasing the number of companies operating in the logistics sector that can be reached, a comparison can be made between countries in the logistics sector, and a contribution can be made to the existing literature.

References

Ayçin, E. (2020), *Multi-Criteria Decision Making: Computer Applied Solutions*, (2. Edition), Ankara: Nobel Academic Publishing.

Başdeğirmen, A. & M.Z. Tunca (2017), "Evaluation of Financial Performance of Enterprises Operating in the Logistics Sector with Gray Relational Analysis", *Süleyman Demirel University Faculty of Economics and Administrative Sciences Journal*, 22(2), 327-340.

Elmas, B. & T. Özkan (2021), "Evaluation of Financial Performance of Transport and Storage Sector Enterprises with SWARA-OCRA Model", *Journal of the Academy of Business Administration*, 2(3), 240-253.

Farrokh, M. et al. (2016), "Two comparative MCDM approaches for evaluating the financial performance of Iranian basic metals companies", *Iranian Journal of Management Studies (IJMS)*, 9(2), 359-382.

Feng, C.M. & R.T. Wang (2000), "Performance Evaluation for Airlines Including the Consideration of Financial Ratios", *Journal of Air Transport Management*, 6(3), 133-142.

Gigovic, L. et al. (2016), "The combination of expert judgment and GIS-MAIRCA analysis for the selection of sites for ammunition depots", *Sustainability*, 8(4), 1-30.

Huang, C.C. et al. (2021), "An Evaluation of The Operational Performance and Profitability of The US Airlines", *International Journal of Global Business and Competitiveness*, 16(2), 73-85.

Korkmaz, O. & H. Uygurtürk (2010), "Determination of the financial performances of maritime transport enterprises with the TOPSIS method", *Journal of Financial Horizons*, 2, 35-54.

Lotfi, F.H. & R. Fallahnejad (2010), "Imprecise Shannon's entropy and multi-attribute decision-making", *Entropy*, 12(1), 53-62.

Macit, D. & S.G. Göçer (2020), "Measurement of Financial Performance of Airline Enterprises: The Case of Pegasus Air Transportation Inc. and THYAO", *Ordu University Institute of Social Sciences Journal of Social Sciences Research*, 10(3), 904-918.

Meydan, C. et al. (2018), "The Relationship between Financial Openness and Financial Performance: An Application in the Transportation and Storage Sector", in: *IV. International Caucasus-Central Asia Foreign Trade and Logistics Congress* (214-225), September 7-8, Didim / Aydın.

Nguyen, T.N.L. & V.C. Nguyen (2020), "The Determinants of Profitability in Listed Enterprises: A Study From Vietnamese Stock Exchange", *Journal of Asian Finance, Economics And Business*, 7(1), 47-58.

Oral, C. & E. Kipkip (2019), "Using TOPSIS and PROMETHEE Methods for Performance Measurement of the Transportation Sector: An Application on BIST", *Mehmet Akif Ersoy University Journal of Social Sciences Institute*, 11(30), 1005-1015.

Özbek, A. & M. Ghouchi (2021), "Performance Evaluation of Airlines Using Financial Ratios", *International Journal of Engineering Research And Development*, 13(2), 583-599.

Özbek, A. (2018), "Evaluation of Logistics Companies in the Fortune 500 List", *Afyon Kocatepe University Faculty of Economics and Administrative Sciences Journal*, 20(1), 13-26.

Pamučar, D. & G. Ćirović (2015), "The Selection of Transport and Handling Resources in Logistics Centers Using Multi-Attributive Border Approximation Area Comparison (MABAC)", *Expert Systems with Applications*, 42(6), 3016-3028.

Pamucar, D.S. et al. (2018), "New Hybrid Multi-Criteria Decision-Making DEMATELMAIRCA Model: Sustainable Selection of A Location for The Development of Multimodal Logistics Centre", *Economic Research- Ekonomska Istraživanja*, 31(1), 1641-1665.

Perçin, S. & E. Aldalou (2018), "Financial Performance Evaluation of Turkish Airline Companies Using Integrated Fuzzy AHP Fuzzy TOPSIS Model", *International Journal of Economic and Administrative Studies*, (18. EYİ Özel Sayısı), 583-598.

Rezaie, K. et al. (2014), "Evaluating Performance of Iranian Cement Firms Using an Integrated Fuzzy AHP-VIKOR Method", *Applied Mathematical Modeling*, 38(21-22), 5033-5046.

Said, M. & H. Ali (2016), "An Analysis on The Factors Affecting Profitability Level of Sharia Banking in Indonesia", *Banks & Bank Systems*, 11(3), 28-36.

Sakarya, Ş. & İ. Saçkes (2022), "Evaluation of Financial Performance of Companies Operating in BIST Registered Transport and Storage Sector by Analytical Hierarchy Process (AHS) and Gray Relational Analysis (GIA) Methods", *Journal of Economic, Administrative and Political Research*, 7(19), 366-388.

Sakarya, Ş. & M. Aksu (2020), "Evaluation of Financial Performance of Enterprises in Transportation Sector with Enhanced Entropy-Based TOPSIS Method", *Optimum Journal of Economics and Management Sciences*, 7(1), 21-40.

Tufan, C. & Y. Kılıç (2019), "Evaluation of the Financial Performance of Logistics Enterprises Traded in Borsa Istanbul with TOPSIS and VIKOR Methods", *C.U. Journal of Economics and Administrative Sciences*, 30, 119-137.

Tunahan, A. & E. Çınaroğlu (2018), "Financial performance evaluation of airline businesses with AHP-based TOPSIS approach", *Cumhuriyet University Journal of Economics and Administrative Sciences*, 19(1), 316-335.

Türkoğlu, M. & G. Duran (2019), "The Importance of the Logistics Sector and Its Contributions to Regional Development", *Journal of Applied Social Sciences and Fine Arts*, 1(2), 86-97.

Wang, T.C. & H.D. Lee (2009), "Developing A Fuzzy TOPSIS Approach Based On Subjective Weights and Objective Weights", *Expert Systems with Applications*, 36(5),8980-8985.

Yıldızbaşı, A. & A. Çalık (2021), "Evaluation of Technology Maturity Levels of SMEs in the Manufacturing Sector with the Fuzzy MAIRCA Method", in: M Kabak & B. Erdebilli (eds.), *Fuzzy Multi-Criteria Decision-Making Methods MS Excel and Software Solution Applications* (441-454), Nobel Publications, 1. Edition.

Zhang, X. et al. (2014), "Assessment Model of Ecoenvironmental Vulnerability Based on Improved Entropy Weight Method", *The Scientific World Journal*, 2014, 797814.