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FINANCIAL PERFORMANCE ASSESSMENT OF LARGE SCALE CONGLOMERATES VIA TOPSIS AND CRITIC METHODS

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ABSTRACT

In this study, TOPSIS method was used to analyze financial statements of the fourteen large-scale conglomerates which are traded on Istanbul Stock Exchange (ISE). At first, the study used CRITIC METHOD to calculate nineteen financial ratios of these holdings over three periods (2009-2011), and found their financial ratio weights. TOPSIS method was applied to the nineteen financial ratio calculated, and the conglomerates were given financial performance scores in accordance with the results reached. Financial performance scores of these conglomerates were compared in order to make an inference as to their future behaviors.

Keywords: Financial performance, Conglomerate, Topsis method, Critic method.

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1. INTRODUCTION

The ability of a business to survive depends directly on their ability to compete with their rivals, enhance their competitive edge and improve their financial performance. Measurement of whether the financial performance has improved or not provides insight into whether what was planned has been actualized or not. Health growth of a business requires measurement and analysis of their financial performance. Businesses may employ performance measurement to monitor implementation of their plans, and to identify when these plans failed and how to improve them (Citron, 1992).

At this point, as decision makers are using performance measurements and assessments for successful use and supervision of important outputs of a business such as costs, manufacturing and workforce etc., they have to decide on the most appropriate option from among those which serve different ends and sometimes contradict with each other. Multi-Objective Decision Making (MODM) is being employed to provide resolution of a problem which involves multiple and usually conflicting criteria (Amiri *et al.*, 2009).

A MODM analysis is capable of combination of multiple criteria (evaluation factor) and their alternative (decision point) to provide a simultaneous solution. This is an important advantage allowing for making the right choice in the face of complexity of real life personal or corporate problems, in particular when a business is taking a strategic and critical decision (Hwang and Yoon, 1981; Bülbül and Ve Köse, 2009).

Various methods are being used to make and compare choices. One of these methods is TOPSIS, which provides significant advantage by considering certain weights to allow for combined evaluation of all criteria. Performance assessment efforts by a business pose great importance to their efforts to take future decisions and attain their strategic goals (Arbel and Orgler, 1990; Azis, 1990). It is critically important for executives to mitigate as much as possible the financial risks they could encounter in the financial sense, and to attain favorable results both from the viewpoint of lending institutions and company shareholders.

This study analyzed financial performances of fourteen Istanbul Stock Exchange (ISE) registered large-scale conglomerates by means of their financial statements covering the years 2009-2011(*http://www.imkb.gov.tr)*, and employed the TOPSIS method, one of the multi criteria decision making (MCDM) as its analysis method. The first section of the study presents the literature review conducted in this area. The following section provided brief information about the analysis method, conducted ratio analysis on these conglomerates to identify their financial indicators, and used the TOPSIS method to evaluate financial performance of the industry.

2. LITERATURE REVIEW

A review of the literature suggests that various studies were conducted to demonstrate financial standings of ISE-traded large-scale conglomerates. These studies usually employ Multi Objective Decision Making (MODM) methods as a frequent-used way of identifying the ideal choice and conducting performance evaluation efforts for many industries. The MODM approach was initially used in 1970's in operations research and decision theory areas, and later on it was applied to the financing area as well. With its ability to combine both qualitative and quantitative criteria, the TOPSIS Method is easy to apply, and is capable of providing evaluation by different criteria and creating performance index or score. Hwang and Yoon (1981) laid the foundations of the TOPSIS method, which is an effective method to contribute in decision-making processes of businesses. Feng and Ve Wang (2000) studied the performance of airline companies. They employed the TOPSIS method by using 22 variables as transport and financial indicators of five Taiwanese airline companies, and reached the conclusion that financial indicators prove to have more impact.

In their study, Kalogeras *et al.* (2005) reviewed 1993-1998 performances of 12 food production and 8 food distribution companies from Greece, by considering profitability, adequacy and managerial variables, in order to evaluate financial performance of Greek agricultural food companies. In their study, Hao and Ve Qing-Sheng (2006) established a model to pick the best bid

in production company tenders. Again, they used the TOPSIS method to determine which of the bids from four companies is the most befitting, by considering 12 financial indicators. This method can be employed for financial performance assessment in container transport business (Khodam *et al*., 2008); performance appraisal of real estate investment companies operating in the capital market (Kim *et al*., 1997); selection of the best place in Asian countries to make foreign direct investment (Karimi *et al*., 2010); risks identification for industrial investment projects (Cheng-Ru *et al*., 2008; Christodoulou *et al*., 2010); selection and assessment of the best technological source (Taghavifard *et al*., 2011).

When we look at the studies conducted in Turkey; Yurdakul and Ve İç (2003) used the TOPSIS method to appraise 1998-2001 financial performance of five large-scale automotive companies traded on ISE, and results of the study which used seven financial ratios and the ISE list by stock value proved consistent with each other. Sevim (2008); Bülbül and Ve Köse (2009) in their study on ISE-listed food industry companies, applied TOPSIS and ELECTRE methods by using eight ratios as calculated over financial statements covering the years 2005-2008, and the results separately attained via these methods confirmed each other. Another study, conducted by Özer *et al*. (2010) on food industry for the years 2007 and 2008, used the Data Envelopment Analysis (DEA), Cluster Analysis and TOPSIS Analysis; and it was found out that results yielded from the cluster analysis conflicted with the results from other analyses.Sue-Fen and Ching-Hsue (2012) propose an objective based attributes selection method to solve group multiple attributes decision making problem. Angelo *et al*. (2012) deal with the analytic hierarchy process (AHP) to find weights of SWOT groups and weights of sub-factors within each groups; and they make use of the technique for order preference by similarity to ideal solution (TOPSIS) methodology to determine strategies priority.

Dumanoğlu and Ve Ergul (2010) used the TOPSIS method to analyze eleven tech companies listed on ISE during 2006-2009, and these companies were compared in terms of their success. In their study on Financial Leasing Industry, Ergul and Ve Akel (2010) used eight financial ratios to analyze six companies for a total of four periods (2005-2008), and provided an evaluation of these results in parallel with crisis periods. Demireli (2010) used the TOPSIS method in an attempt to identify financial performance of three public banks operating across the country, by using ten ratios for 2001-2007. The studies conducted by Ozden (2009) the performance of the bank deposite and Ozden (2011) used 2009 economic indicators of EU member and candidate countries as data to list these countries by their economic development level in line with relevant criteria and the Maastricht Criteria and to identify where Turkey ranks in this list. Akyuz *et al*. (2011) used nineteen financial ratios to evaluate financial performance of a ISE-listed ceramics company for the years 1999-2008.

3. RESEARCH METHOD

Research objects of this study are primaryto analyze financial statements of the fourteen large-scale conglomerates which are traded on ISE. As performance criteria, Liquidity Ratios, Activity Ratios, Profitability Ratios and Financial Structure Ratios were taken a concrete case.In order to continuation the research, firstly; the study used CRITIC METHOD to calculate nineteen financial ratios of these conglomerates over three periods (2009-2011), and found their financial ratio weights. Secondly; among multi-criteria decision making methods, the TOPSIS method was employed to measure and evaluate performances of 14 large-scale ISE-listed conglomerates. Weights of the financial ratios were calculated using the CRITIC METHOD.

3.1. TOPSIS Method

Based on the concept that the alternatives chosen should have the shortest distance from the positive ideal solution (PIS) and the longest distance from the negative ideal solution-(NIS), Hwang and Yoon (1981) developed to the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method (Cheng-Ru *et al*., 2008). The method was applied by Zeleny (1982) and Drake *et al*. (2009) and Wang and Elhag (2006) were further developed by Yoon (1987) as well as (Secme *et al*., 2009). The TOPSIS method primarily compares benefits and costs (Wang *et al*., 2010). According to the TOPSIS method, while PIS is the solution point with highest benefit and lowest cost, NIS is the solution point with lowest benefit and highest cost. Underlying the TOPSIS approach is the concept that the most-preferred alternative is not only the one closest to the positive ideal solution but it is also the one with longest distance from the negative ideal solution.

To be able to put financial standings of the ISE-listed large-scale conglomerates; firstly, relevant decision matrices relating to these conglomerates' activities are created, their decision matrices are standardized, the weighted standard decision matrix is created, ideal and negative ideal solutions are created, separation measures are calculated and then relative closeness to the ideal solution is calculated so that relative order of their performance can be demonstrated. Steps of the TOPSIS method will be used to implement these steps.

The TOPSIS method consists of the following application stages. (Cheng-Ru et al., 2008; Taklif et al., 2011; Banks Association Of Turkey (TBA), 2009).

Step 1: Creation of Decision Matrix (A)

Lines and columns of the decision matrix represent the decision points in order of preference and evaluation factors for use in decision-making, respectively. The matrix A is the starting matrix created by the decision maker. The decision matrix is shown as below:

$$A_{ij} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}$$

$$A_{ij}$$

Adım 2: Creation of Standard Decision Matrix (R)

The Standard Decision Matrix is calculated by means of elements of the Matrix A, using the following formula.

$$r_{ij} = \frac{a_{ij}}{\sqrt{\sum_{k=1}^{m} a_{kj}^2}} \qquad (1)$$

The matrix R is calculated as follows:

$$R_{ij} = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix}$$

Step 3: Creation of Weighted Standard Decision Matrix (V)

Primarily, weight values (w_i) relating to evaluation factors will be determined.

$$(\sum_{i=1}^{n} w_i = 1) \qquad (2)$$

And then, elements in each column of the matrix R will be multiplied by the corresponding w_i value to create the Matrix V. The matrix V is shown below:

$$V_{ij} = \begin{bmatrix} w_1 r_{11} & w_2 r_{12} & \dots & w_n r_{1n} \\ w_1 r_{21} & w_2 r_{22} & \dots & w_n r_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ w_1 r_{m1} & w_2 r_{m2} & \dots & w_n r_{mn} \end{bmatrix}$$

Step 4: Creation of Ideal (A^*) and Negative Ideal (A^-) Solutions

TOPSIS assumes that each evaluation factor is inclined to monotonically increase or decrease.

To establish the set of ideal solutions, highest ones of the weighted evaluation factors- column values- of the matrix V (or the lowest values if the relevant evaluation factor is minimization-directed) will be selected. Finding the set of ideal solutions is shown in the following formula:

$$A^* = \left\{ (\max_i v_{ij} \,\middle|\, j \in J), (\min_i v_{ij} \,\middle|\, j \in J' \right\} \qquad (3)$$

The set to be calculated from the formula (3) may be shown as $A^* = \{v_1^*, v_2^*, ..., v_n^*\}$.

To establish the set of negative solutions, lowest ones of weighted evaluation factors- column values- of the matrix V (or the highest values if the relevant evaluation factor is maximization-directed) will be selected. Finding the set of negative solutions is shown in the following formula:

$$A^- = \left\{ (\min_i v_{ij} \,\middle|\, j \in J), (\max_i v_{ij} \,\middle|\, j \in J' \right\} \qquad (4)$$

The set to be calculated from the formula (4) may be shown as $A^- = \{v_1^-, v_2^-, ..., v_n^-\}$.

In both formulas, J shows the benefit (maximization) value, and J' show the missing (minimization) value.

Both sets of ideal and negative ideal solutions consist of *m* number of elements, which are evaluation factors.

Step 5: Calculation of Separation Measures

The Euclidian Distance Approach is used in the TOPSIS method to calculate deviation of each decision point-related evaluation factor value from the sets of ideal and negative ideal solutions. The decision point-related deviation values calculated in this way are called Ideal Separation (S_i^*) Measure and Negative Separation (S_i^*) Measure. Calculation of the ideal separation (S_i^*) measure and of the negative ideal (S_i^-) separation measures are shown in the formulas (5) and (6) respectively.

$$S_i^* = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^*)^2} \qquad (5) \qquad\qquad S_i^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2} \qquad (6)$$

The numbers S_i^* and S_i^- calculated from will naturally be in the same number as the decision point number.

Step 6: Calculation of Relative Closeness to the Ideal Solution

Ideal and negative ideal separation measures are used to calculate relative closeness of each decision point to the ideal solution (C_i^*). The criterion used here is the share of the negative ideal separation measure in the total separation measure. Calculation of the value of relative closeness to the ideal solution is shown in the formula below:

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^*} \qquad (7)$$

Here the value C_i^* will be $0 \le C_i^* \le 1$; and $C_i^* = 1$ and $C_i^* = 0$ will demonstrate absolute closeness of the relevant decision point to the ideal solution and negative ideal solution respectively.

3.2. CRITIC Method

Weights of the criteria are affected as much from characteristics of the criteria as from subjective point of view of the decision-maker. Such subjective weighting of the criteria is usually shaped by the decision-makers experience, knowledge and perception of the problem. For this reason, various subjective weighting methods have been developed. Such subjective weightings lead to doubt about reliability of the results. To overcome such problems, objective weighting methods are used. For this purpose Diakoulaki *et al.* (1995) proposed the CRITIC method. In this way, both standard deviation of the criterion and its correlation between other criteria are included in the weighting process. In this regard, provided that performance weight of the j'th criteriais w*j*,

$$w_j = \frac{C_j}{\sum_{k=1}^{c} C_k} \qquad j = 1, \ldots, c \qquad (8)$$

Table- 1. List of The IEC-Listed Conglomerates Studied

No	Cod	Name Of Conglomerates
1	AKFN	Akfen Holding
2	ALAAK	Alarko Holding
3	DOHOL	Doğan Holding
4	GLYO	Global Yat. Holding
5	SAHOL	Sabanci Holding
6	DYHOL	Doğan Yayin Holding
7	ISYHO	Işiklar Yat. Holding
8	ITTFH	İttifak Holding
9	KCHOL	Koç Holding
10	MZHLD	Mahzar Zorlu Holding
11	NTHOL	Net Holding
12	TAVHL	Tav Hava Limanlari Holding
13	TRNSK	Transtürk Holding
14	YAZIC	Yazicilar Holding

It is expressed as in above. Here the result is Cj, with the as σj standard deviation of the j'th criterion and rjk as the correlation coefficient between the j'th and k'th criteria.

$$C_j = \sigma_j \sum_{k=1}^{c} (1 - r_{jk}) \quad (9)$$

3.3. Data Used in Research

The data relating to 14 conglomerates examined as part of the study, and names thereof, were obtained from ISE and are listed in the Table 1. The study analyzed financial performances of the ISE-listed conglomerates by means of their financial statements covering the years 2009-2011, and employed the TOPSIS method as its method of analysis. The ability of a business to survive and attain sustainable growth requires that such business exhibit outstanding competitive and adaptive skills in the market. Measurement and assessment of financial performance of a business is critical for a proficient analysis of their sustainable growth.

The performance criteria used to apply the method are the ratios used in financial ration analysis. These are given below in the table 2. (Sevim, 2008)

I. Liquidity Ratios

L1. Current Ratio: Current Assets / Short Term Liabilities

L2. Acid-test Ratio: Current Assets - Inventory / Short Term Liabilities

L3. Cash Ratio: Liquid Assets + Securities / Short Term Liabilities

Table- 2. Performance Criteria

Performance Criteria	
Liquidity Ratios	Current Ratio
	Acid-Test Ratio
	Cash Ratio
Activity Ratios	Inventory Turnover Rate
	Receivables Turnover Rate
	Equity Turnover Rate
	Net Working Capital Turnover Rate
	Fixed Assets Turnover Rate
	Liquid Assets Turnover Rate
	Assets Turnover Rate
Profitability Ratios	Net Profit / Equity Ratio
	Net Profit / Total Assets Ratio
	Gross Sales Profit / Net Sales Profit Ratio
	Operating Income / Net Sales Ratio
	Net Income / Net Sales Ratio
Financial Structure Ratios	Total Debt / Total Assets Ratio
	Short-Term Liabilities / Total Assets Ratio
	Long-Term Liabilities / Total Assets Ratio
	Equity / Total Assets Ratio

Formulas of these ratios are also shown in the following (King, 2001)

II. Financial Structure Ratios

M1. Total Debt / Total Assets Ratio

M2. Short-Term Liabilities / Total Assets Ratio

M3. Long-Term Liabilities / Total Assets Ratio

M4. Equity / Total Assets Ratio

III. Activity Ratios

F1. Inventory Turnover Rate: Cost of Goods Sold / Inventory

F2. Receivables Turnover Rate: Credit Sales / Trade Receivables

F3. Equity Turnover Rate: Net Sales / Equity

F4. Net Working Capital Turnover Rate: Net Sales / Net Working Capital

F5. Fixed Assets Turnover Rate: Net Sales / Fixed Assets

F6. Liquid Assets Turnover Rate: Net Sales / Liquid Assets

F7. Assets Turnover Rate: Net Sales / Total Assets

IV. Profitability Ratios

K1. Net Profit / Equity Ratio

K2. Net Profit / Total Assets Ratio

K3. Gross Sales Profit / Net Sales Profit Ratio

K4. Operating Income / Net Sales Ratio

K5. Net Income / Net Sales Ratio

Table- 3. Liquidity Ratios (2009)

Values	Floating Assets	İnventories	Liquid Assets	Securities	Short Term Liabilities
AKFEN	998.207	45.78	285.866	3.706	725.356
ALARAK	1.233.488.853	108.502.335	360.147.591	141.711.819	568.013.243
DOHOL	4.295.457	637.148	2.005.638	215.899	3.177.455
GLYHO	454.685.246	2.035.445	43.387.384	37.965.716	61.352.362
SAHOL	57.490.689	823.244	12.869.232	240.062	84.528.035
DYHOL	1.464.596	116.415	396.708	108.051	1.647.150
ISYHO	432.783.029	0.513.612	35.203.125	10.840	370.306.097
ITTFH	233.209.625	111.728.518	30.909.064	0	222.612.870
KCHOL	33.615.836	3.361.000	10.098.622	1.971.334	38.157.648
MZHLD	21.843.410	11.647.293	595.275	0	50.758.459
NTHOL	66.380.879	35.282.013	10.576.488	0	81.607.083
TAVHL	1.263.223.587	24.634.580	73.473.795	13.806.004	810.522.480
TRNSK	16.292.966	5.073..969	116.704	0	103.532.611
YAZIC	3.620.895	123.023	311.651	303.638	3.468.574

Financial statements of the ISE-listed conglomerates were utilized to find performance criteria values and tables on ratios were created. The method was applied by using 2009 data. The tables covering 2010 and 2011 data are provided in the attachment.

Table- 4. Profitability Ratios (2009)

Criteria	Quantity	Equity Capital	Capital To Assets	Gross Sales	Net Sales	Activities
AKFEN	168.468	629.008	3.322.286	186.920	1.029.267	106.926
ALARAK	1.229.296	79.633.723	$766.248.976	$14.292.322	$94.392.464	47.279.944
DOHOL	-316.316	4.241.252	9.544.537	965.529	10.316.502	-44.894
GLYHO	79.153.761	386.441.262	820.361.682	58.101.452	68.176.120	113.779.816
SAHOL	3.041.676	20.688.577	111.926.312	6.774.241	6.824.954	3.466.903
ISYHO	832.663	1.259.669	507.773.905	2.733.084	47.109.332	-344.718
ITTFH	$97.662	$93.694.890	888.545.444	152.331.998	949.339.494	8.135.779
KCHOL	2.640.585	18.782.045	66.386.432	8.884.411	39.450.305	3.471.060
MZHLD	7.349.847	-19.310.636	86.245.237	22.350.458	79.117.122	14.496.437
NTHOL	-358.292	208.623.042	326.670.864	25.117.036	69.771.155	-10.075.767
TAVHL	110.699.436	892.201.773	4.154.608.436	366.660.616	1.844.200.320	242.133.921
TRNSK	-1.676.019	-29.213.553	93.902.435	3.528.665	21.590.083	2.877.914
YAZIC	318.992	2.073.203	5.774.441	625.166	1.098.435	201.593

Table- 5. Activity Ratios (2009)

Criteria	Cost Of Goods Sold	İnventories	Sale On Credit	Trade Receivables	Net Sales
AKFEN	843.347	38.943	1.029.267	103.158	1.029.267
ALARAK	738.300.147	120.146.741	894.502.458	497.590.151	894.502.458
DOHOL	9.350.973	632.623	10.316.502	1.098.847	10.316.502
GLYHO	36.717.563	9.698.587	68.176.120	22.341.382	68.176.120
SAHOL	5.549.353	1.147.793	6.824.954	1.056.831	6.824.954
DYHOL	2.009.681	121.108	2.435.151	636.804	2.435.151
ISYHO	44.374.247	11.063.156	47.107.331	6.937.112	47.107.331
ITTFH	634.995.502	100.374.561	787.327.498	57.874.877	787.327.498
KCHOL	33.554.267	3.503.376	39.450.308	4.715.305	39.450.308
MZHLD	56.654.120	11.233.006	79.117.122	4.004.937	79.117.122
NTHOL	44.654.120	36.562.240	69.771.155	7.701.917	69.771.155
TAVHL	1.477.639.804	22.775.868	1.844.200.320	152.901.710	1.844.200.320
TRNSK	18.061.425	4.829.103	21.590.083	9.308.878	21.590.083
YAZIC	822.140	153.393	1.098.835	143.914	1.098.835

Table- 6. Activity Ratios (Continued) (2009)

Equity Capital	Operation Capital	Tangible Fixed Asstes	Liquid Asstes	Total Securities	Floating Asstes	Short Term.
529.008	272.671	306.166	285.866	3.322.286	998.027	725.356
370.633.723	665.475.610	218.780.045	360.147.591	1.765.248.075	1.233.488.853	568.013.243
4.241.252	1.118.002	1.610.907	2.055.639	9.544.827	4.295.457	3.177.455
386.441.262	193.332.884	63.329.615	43.387.384	820.361.582	454.685.246	261.352.362
20.688.577	-27.037.346	3.961.411	12.869.232	11.926.312	57.490.689	84.528.035
1.388.823	-182.554	655.961	396.708	4.194.789	1.464.596	1.647.150
133.620.775	137.467.811	25.078.054	35.203.125	507.773.908	507.773.908	370.306.097
373.674.870	10.596.755	176.293.516	30.909.064	690.545.833	233.209.625	222.612.870
18.782.046	-4.541.812	10.629.539	10.098.622	66.386.432	33.615.836	38.157.648
-19.340.635	-28.915.049	13.376.164	595.275	86.245.237	21.843.410	50.758.459
208.623.042	-15.226.204	140.808.715	10.576.488	326.570.869	66.380.879	81.607.083
892.201.773	452.701.107	253.894.801	73.473.795	4.154.508.434	1.263.223.587	810.522.480
-29.213.563	-87.239.845	67.911.731	116.704	93.902.485	16.292.966	103.532.611
2.073.203	152.321	276.293	311.651	5.774.441	3.620.895	3.468.574

Table- 7. Financial Structure Ratios (2009)

Criteria	Net Worth	Short Term Liabilities	Long Term Liabilities	Capital To Assets	Equity Capital
AKFEN	4.287.088	1.287.177	2.999.911	5.438.969	1.151.881
ALARAK	1.024.730.199	581.309.356	443.420.843	2.069.094.744	1.044.364.545
DOHOL	4.797.002	2.027.289	2.769.713	8.648.071	3.851.069
GLYHO	854.224.533	417.353.724	436.888.809	1.529.211.060	674.986.527
SAHOL	125.641.062	113.432.029	12.209.033	151.114.204	25.473.142
DYHOL	3.615.473	1.836.145	1.779.328	4.677.203	1.061.730
ISYHO	79.453.431	70.855.067	8.598.364	352.413.050	272.959.619
ITTFH	389.271.566	291.804.033	97.467.533	807.789.017	418.517.451
KCHOL	75.350.263	62.031.471	13.318.792	98.621.087	23.270.824
MZHLD	121.243.570	84.332.867	36.910.703	91.625.351	-29.618.219
NTHOL	175.524.501	142.280.173	33.244.328	497.114.391	321.589.890
TAVHL	3.711.704.900	1.070.038.103	2.641.666.797	5.086.155.628	1.374.450.734
TRNSK	151.110.616	90.812.096	60.298.520	124.819.882	-26.290.734
YAZIC	6.641.554	5.8323.574	808.980	9.178.356	2.536.802

4. METHOD APPLICATION

Step 1: Creation of Decision Matrix

As a first step of the TOPSIS method, the decision matrix will be created. The study uses 14 decision points (conglomerates) and 19 evaluation factors (financial ratios). These criteria were weighted such that their impact on the financial performance is 1, and their weight coefficient (W) was determined. (Eleren *et al*., 2009) was taken as the example.

Table- 8. Standard Decision Matrix (2009)

	LIQUIDITY RATIOS			PROFITABILITY RATIOS					OPERATING RATIOS							Financial Structure Ratios			
Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
AKFEN	1,38	0,40	1,31	0,29	0,05	0,18	0,10	0,15	21,06	9,98	1,95	3,77	3,36	3,60	0,31	0,84	0,22	0,62	0,16
ALARAK	2,17	0,88	1,98	0,06	0,03	0,17	0,05	0,06	6,14	1,80	1,03	1,34	4,09	2,48	0,51	0,51	0,32	0,19	0,49
DOHOL	1,35	0,71	1,15	-,07	-,03	0,09	0,00	-,03	14,78	9,39	2,43	9,23	6,40	5,02	1,08	0,56	0,33	0,22	0,44
GLYHO	1,74	0,31	1,73	0,21	0,10	0,85	1,67	1,17	3,79	3,05	0,18	0,35	1,08	1,57	0,08	0,53	0,32	0,21	0,47
SAHOL	0,68	0,16	0,67	0,15	0,03	0,99	0,51	0,45	4,83	6,46	0,33	-0,25	1,72	0,53	0,06	0,82	0,76	0,06	0,18
DYHOL	0,89	0,31	0,82	-,32	-,11	0,17	-,12	-,18	16,59	3,82	1,75	-13,3	3,71	6,14	0,58	0,67	0,39	0,28	0,33
ISYHO	1,17	0,10	1,14	0,66	0,00	0,06	-,01	0,02	4,01	6,79	0,35	0,34	1,88	1,34	0,09	0,74	0,73	0,01	0,26
ITTFH	1,05	0,14	0,55	0,00	0,00	0,19	0,01	0,00	6,33	13,60	2,11	74,30	4,47	25,47	1,14	0,45	0,32	0,14	0,54
KCHOL	0,88	0,32	0,79	0,14	0,04	0,23	0,09	0,07	9,58	8,37	2,10	-8,69	3,71	3,91	0,59	0,72	0,57	0,14	0,28
MZHLD	0,43	0,01	0,20	-,38	0,09	0,28	0,18	0,09	5,05	19,75	-,09	-2,74	5,91	132,91	0,92	1,22	0,59	0,64	-0,2
NTHOL	0,81	0,13	0,38	0,00	0,00	0,36	-,14	-,01	1,22	9,06	0,33	-4,58	0,50	6,60	0,21	0,36	0,25	0,11	0,64
TAVHL	1,56	0,11	1,53	0,12	0,03	0,20	0,13	0,06	64,88	12,06	2,07	4,07	7,26	25,10	0,44	0,79	0,20	0,59	0,21
TRNSK	0,16	0,00	0,11	0,06	-,02	0,16	0,13	-0,8	3,74	2,32	-,74	-0,25	0,32	185,00	0,23	1,31	1,10	0,21	-0,31
YAZIC	1,04	0,18	0,15	0,15	0,05	0,57	0,18	0,28	5,36	7,64	0,53	7,21	3,98	3,53	0,19	0,64	0,60	0,04	0,36

Step 2: Normalization of Decision Matrix

The normalized decision matrix was found by reducing each value on a column to a single denominator through dividing each such value to the square root of sum of squares of all values on such column. The normalized decision matrix, created by means of r_{ij} values calculated according to the formula below, is shown in the Table 4.

Example calculation of r_{ij} *value*

$$r_{11} = \frac{1,38}{\sqrt{1,38^2 + 2,17^2 + 1,35^2 + 1,74^2 \ldots\ldots\ldots\ldots + 1,04^2}} = 0,31$$

Step 3: Weighting of Normalized Decision Matrix

Table 13 below shows the weights of each financial ratio created according to the CRITIC METHOD. According to this method; standard deviation of the criteria were calculated first (Table 10). Then correlation values of each criterion with other criteria were calculated (Table 11). Correlation values of each criterion were deducted from 1 and multiplied by standard deviation values. (9). (Table 12) For each criterion, C_j values and their sum were calculated. Weight of each criterion was calculated by dividing their Cj value to sum of C_j values (8). (Table 13).

Table- 9. Normalized Decision Matrix (2009)

	LIQUIDITY RATIOS			PROFITABILITY RATIOS					OPERATING RATIOS							Financial Structure Ratios			
Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
AKFEN	0,31	0,29	0,32	0,31	0,24	0,11	0,06	0,11	0,29	0,28	0,29	0,05	0,22	0,02	0,14	0,29	0,11	0,52	0,11
ALARAK	0,48	0,65	0,48	0,06	0,15	0,11	0,03	0,04	0,08	0,05	0,15	0,02	0,27	0,01	0,23	0,18	0,16	0,15	0,35
DOHOL	0,30	0,52	0,28	-0,08	-0,17	0,06	0,00	-0,02	0,20	0,27	0,36	0,12	0,42	0,02	0,50	0,19	0,16	0,19	0,31
GLYHO	0,39	0,23	0,42	0,22	0,49	0,54	0,93	0,89	0,05	0,09	0,03	0,00	0,07	0,01	0,04	0,18	0,16	0,18	0,33
SAHOL	0,15	0,11	0,16	0,15	0,14	0,63	0,28	0,34	0,07	0,18	0,05	0,00	0,11	0,00	0,03	0,28	0,37	0,05	0,13
DYHOL	0,20	0,23	0,20	-0,34	-0,55	0,11	-0,07	-0,14	0,22	0,11	0,26	-0,17	0,25	0,03	0,27	0,23	0,19	0,23	0,23
ISYHO	0,26	0,07	0,28	0,70	0,01	0,04	0,00	0,01	0,05	0,19	0,05	0,00	0,12	0,01	0,04	0,26	0,36	0,01	0,19
ITTFH	0,23	0,10	0,13	0,00	0,01	0,12	0,00	0,00	0,09	0,39	0,31	0,96	0,30	0,11	0,53	0,16	0,16	0,11	0,38
KCHOL	0,20	0,23	0,19	0,15	0,20	0,14	0,05	0,05	0,13	0,24	0,31	-0,11	0,25	0,02	0,27	0,25	0,28	0,12	0,20
MZHLD	0,10	0,01	0,05	-0,40	0,43	0,18	0,10	0,07	0,07	0,56	-0,61	-0,04	0,39	0,58	0,42	0,42	0,29	0,53	-,16
NTHOL	0,18	0,10	0,09	0,00	-0,01	0,23	-0,08	0,00	0,02	0,26	0,05	-0,06	0,03	0,03	0,10	0,13	0,12	0,09	0,45
TAVHL	0,35	0,08	0,37	0,13	0,14	0,13	0,07	0,05	0,88	0,34	0,31	0,05	0,48	0,11	0,20	0,27	0,10	0,49	0,15
TRNSK	0,23	0,13	0,25	0,16	0,27	0,36	0,10	0,22	0,07	0,22	0,08	0,09	0,26	0,02	0,09	0,22	0,30	0,03	0,25
YAZIC	0,23	0,13	0,25	0,16	0,27	0,36	0,10	0,22	0,07	0,22	0,08	0,09	0,26	0,02	0,09	0,22	0,30	0,03	0,25

Table- 10. Standard Deviation of Criteria (CRITIC METHOD)

	LIQUIDITY RATIOS			PROFITABILITY RATIOS					OPERATING RATIOS							Financial Structure Ratios			
Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
AKFEN	0,31	0,29	0,32	0,31	0,24	0,11	0,06	0,11	0,29	0,28	0,29	0,05	0,22	0,02	0,14	0,29	0,11	0,52	0,11
ALARAK	0,48	0,65	0,48	0,06	0,15	0,11	0,03	0,04	0,08	0,05	0,15	0,02	0,27	0,01	0,23	0,18	0,16	0,15	0,35
DOHOL	0,30	0,52	0,28	-0,08	-0,17	0,06	0,00	-0,02	0,20	0,27	0,36	0,12	0,42	0,02	0,50	0,19	0,16	0,19	0,31
GLYHO	0,39	0,23	0,42	0,22	0,49	0,54	0,93	0,89	0,05	0,09	0,03	0,00	0,07	0,01	0,04	0,18	0,16	0,18	0,33
SAHOL	0,15	0,11	0,16	0,15	0,14	0,63	0,28	0,34	0,07	0,18	0,05	0,00	0,11	0,00	0,03	0,28	0,37	0,05	0,13
DYHOL	0,20	0,23	0,20	-0,34	-0,55	0,11	-0,07	-0,14	0,22	0,11	0,26	-0,17	0,25	0,03	0,27	0,23	0,19	0,23	0,23
ISYHO	0,26	0,07	0,28	0,70	0,01	0,04	0,00	0,01	0,05	0,19	0,05	0,00	0,12	0,01	0,04	0,26	0,36	0,01	0,19
ITTFH	0,23	0,10	0,13	0,00	0,01	0,12	0,00	0,00	0,09	0,39	0,31	0,96	0,30	0,11	0,53	0,16	0,16	0,11	0,38
KCHOL	0,20	0,23	0,19	0,15	0,20	0,14	0,05	0,05	0,13	0,24	0,31	-0,11	0,25	0,02	0,27	0,25	0,28	0,12	0,20
MZHLD	0,10	0,01	0,05	-0,40	0,43	0,18	0,10	0,07	0,07	0,56	-0,61	-0,04	0,39	0,58	0,42	0,42	0,29	0,53	-,16
NTHOL	0,18	0,10	0,09	0,00	-0,01	0,23	-0,08	0,00	0,02	0,26	0,05	-0,06	0,03	0,03	0,10	0,13	0,12	0,09	0,45
TAVHL	0,35	0,08	0,37	0,13	0,14	0,13	0,07	0,05	0,88	0,34	0,31	0,05	0,48	0,11	0,20	0,27	0,10	0,49	0,15
TRNSK	0,23	0,13	0,25	0,16	0,27	0,36	0,10	0,22	0,07	0,22	0,08	0,09	0,26	0,02	0,09	0,22	0,30	0,03	0,25
YAZIC	0,23	0,13	0,25	0,16	0,27	0,36	0,10	0,22	0,07	0,22	0,08	0,09	0,26	0,02	0,09	0,22	0,30	0,03	0,25
SS	0,11675	0,18787	0,13668	0,26485	0,26097	0,17925	0,25227	0,25222	0,22036	0,13861	0,25273	0,26891	0,14323	0,2453	0,16856	0,0936	0,12801	0,17795	0,19058

Table- 11. Correlation Values of Criteria

Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
L1	1,00	0,72	0,96	0,31	0,20	-0,03	0,26	0,32	0,31	-0,26	0,49	0,08	0,28	-0,64	-0,01	0,61	-0,68	0,05	0,61
L2	0,72	1,00	0,66	-0,04	-0,11	-0,18	-0,03	0,00	-0,02	-0,36	0,46	-0,07	0,27	-0,46	0,25	-0,47	-0,45	-0,05	0,47
L3	0,96	0,66	1,00	0,40	0,23	0,05	0,35	0,39	0,36	-0,37	0,46	-0,10	0,24	-0,61	-0,18	0,46	-0,54	0,07	0,46
K1	0,31	-0,04	0,40	1,00	0,25	0,07	0,18	0,27	0,00	-0,31	0,28	0,02	-0,37	-0,36	-0,60	0,15	0,14	-0,25	0,15
K2	0,20	-0,11	0,23	0,25	1,00	0,46	0,59	0,67	-0,07	0,30	-0,42	0,01	0,01	0,04	-0,22	0,13	-0,05	0,22	-0,13
K3	-0,03	-0,18	0,05	0,07	0,46	1,00	0,73	0,80	-0,25	-0,18	-0,21	-0,11	0,38	-0,20	-0,50	0,10	0,11	-0,26	0,10
K4	0,26	-0,03	0,35	0,18	0,59	0,73	1,00	0,97	-0,13	-0,25	-0,19	-0,08	0,30	-0,08	-0,38	0,04	0,02	0,03	0,04
K5	0,32	0,00	0,39	0,27	0,67	0,80	0,97	1,00	-0,16	-0,21	-0,15	0,06	0,30	-0,23	-0,44	0,16	0,09	0,09	0,16
F1	0,31	-0,02	0,36	0,00	-0,07	-0,25	-0,13	-0,16	1,00	0,23	0,39	-0,04	0,61	-0,11	0,10	0,06	-0,43	0,60	-0,06
F2	-0,26	-0,36	-0,37	-0,31	0,30	-0,18	-0,25	-0,21	0,23	1,00	-0,30	0,34	0,58	0,19	0,56	0,19	-0,23	0,53	0,19
F3	0,49	0,46	0,46	0,28	-0,42	-0,21	-0,19	-0,15	0,39	-0,30	1,00	0,25	0,18	-0,665	0,11	-0,61	-0,47	020	0,61
F4	0,08	-0,07	-0,10	0,02	0,01	-0,11	-0,08	-0,06	-0,04	0,34	0,25	1,00	0,21	-0,03	0,51	-0,28	-0,19	-0,12	0,28
F5	0,28	0,27	0,24	-0,37	0,01	-0,38	-0,30	-0,30	0,61	0,58	0,18	0,21	1,00	-0,09	0,70	0,00	-0,44	0,53	0,00
F6	-0,64	-0,46	-0,61	-0,36	0,04	0,20	0,08	0,23	-0,11	0,19	-0,66	0,03	0,09	1,00	0,13	0,83	0,61	0,31	-0,83
F7	-0,01	0,25	-0,18	-0,60	0,22	0,50	0,38	0,44	0,10	0,56	0,11	0,51	0,70	0,13	1,00	-0,06	-0,30	0,28	0,06
M1	-0,61	-0,47	-0,46	-0,15	0,13	-0,10	-0,04	-0,16	0,06	0,19	-0,61	-0,28	0,00	0,83	-0,06	1,00	0,67	0,45	-1,00
M2	-0,68	-0,45	-0,54	0,14	-0,05	0,11	-0,02	-0,09	-0,43	-0,23	-0,47	-0,19	-0,44	061	-0,30	-0,67	1,00	-0,36	-0,67
M3	0,05	-0,05	0,07	-0,35	0,22	-0,26	-0,03	-0,09	0,60	0,53	-0,20	-0,12	0,53	0,31	0,28	0,45	-0,36	1,00	-0,45
M4	0,61	0,47	0,46	0,15	-0,13	0,10	0,04	0,16	-0,06	-0,19	0,61	0,28	0,00	-0,83	0,06	-1,00	-0,67	-0,45	1,00

Table- 12. Correlation and C_j Values of Criteria and Their Sum

Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4	TOP	SS	TOPISS	W
L1	0,00	0,28	0,04	0,69	0,80	1,03	0,74	0,68	0,69	1,26	0,51	0,92	0,72	1,64	1,01	1,61	1,68	0,95	0,39	15,656	0,116749	1,828212	0,03
L2	0,28	0,00	0,34	1,04	1,11	1,18	1,03	1,00	1,02	1,36	0,54	1,07	0,73	1,46	0,75	1,47	1,45	1,05	0,53	17,41	0,187866	3,270888	0,05
L3	0,04	0,34	0,00	0,60	0,77	0,95	0,65	0,61	0,64	1,37	0,54	1,10	0,76	1,61	1,18	1,46	1,54	0,93	0,54	15,663	0,136675	2,136228	0,03
K1	0,69	1,04	0,60	0,00	0,75	0,93	0,82	0,73	1,00	1,31	0,72	0,98	1,37	1,36	1,60	1,15	0,86	1,35	0,85	18,12	0,264852	4,797974	0,07
K2	0,80	1,11	0,77	0,75	0,00	0,54	1,41	0,33	1,07	0,70	1,42	0,99	0,99	0,96	1,22	0,87	1,05	0,78	1,13	15,89	0,260975	4,146948	0,06
K3	1,03	1,18	0,95	0,93	0,54	0,00	0,27	0,20	1,25	1,18	1,21	1,11	1,38	1,20	1,50	1,10	0,89	1,26	0,90	18,09	0,179253	3,243334	0,05
K4	0,74	1,03	0,65	0,82	0,41	0,27	0,00	0,03	1,13	1,25	1,19	1,08	1,30	1,08	1,38	1,04	1,02	1,03	0,96	16,40	0,252267	4,137783	0,06
K5	0,68	1,00	0,61	0,73	0,33	0,20	0,03	0,00	1,16	1,21	1,15	1,06	1,30	1,23	1,44	1,16	1,09	1,09	0,84	16,33	0,252222	4,1195	0,06
F1	0,69	1,02	0,64	1,00	1,07	1,25	1,13	1,16	0,00	0,77	0,61	1,04	0,39	1,11	0,90	0,94	1,43	0,40	1,06	16,61	0,220336	3,660773	0,06
F2	1,26	1,36	1,37	1,31	0,70	1,18	1,25	1,21	0,77	0,00	1,30	0,66	0,42	0,81	0,44	0,81	1,23	0,47	1,16	17,77	0,138606	2,462883	0,04
F3	0,51	0,54	0,54	0,72	1,42	1,21	1,19	1,15	0,61	1,30	0,00	0,75	0,82	1,66	0,89	1,61	1,47	1,20	0,39	17,98	0,252727	4,545027	0,07
F4	0,92	1,07	1,10	0,98	0,99	1,11	1,08	1,06	1,04	0,66	0,75	0,00	0,79	1,03	0,49	1,28	1,19	1,12	0,72	17,39	0,268912	4,675574	0,07
F5	0,72	0,73	0,76	1,37	0,99	1,38	1,30	1,30	0,39	0,42	0,82	0,79	0,00	1,09	0,30	1,00	1,44	0,47	1,00	16,25	0,143232	2,327665	0,04
F6	1,64	1,46	1,61	1,36	0,96	1,20	1,08	1,23	1,11	0,81	1,66	1,03	1,09	0,00	0,87	0,17	0,39	0,69	1,83	20,20	0,245302	4,954996	0,08
F7	1,01	0,75	1,18	1,60	1,22	1,50	1,38	1,44	0,90	0,44	0,89	0,49	0,30	0,87	0,00	1,06	1,30	0,72	0,94	17,97	0,168562	3,029559	0,05
M1	1,61	1,47	1,46	1,15	0,87	1,10	1,04	1,16	0,94	0,81	1,61	1,28	1,00	1,07	1,06	0,00	0,33	0,55	2,00	19,61	0,093603	1,835563	0,03
M2	1,68	1,45	1,54	0,86	1,05	0,89	1,02	1,09	1,43	1,23	1,47	1,19	1,44	0,39	1,30	0,33	0,00	1,36	1,67	21,39	0,128015	2,738689	0,04
M3	0,95	1,05	0,93	1,35	0,78	1,26	1,03	1,09	0,40	0,47	1,20	1,12	0,47	0,69	0,72	0,55	1,36	0,00	1,45	16,88	0,177952	3,003404	0,05
M4	0,39	0,53	0,54	0,85	1,13	0,90	0,96	0,84	1,06	1,19	0,39	0,72	1,00	1,83	0,94	2,00	1,67	1,45	0,00	18,39	0,190558	3,504663	0,05
																						64,4198	1,000

The weighted decision matrix was calculated by multiplying standard matrix criteria by their weight coefficient (W).

Table- 13. Weight Values of Criteria (2009)

Performance Criteria	Weights (W)	
Liquidity Ratios (0,11)	L1	0,03
	L2	0,05
	L3	0,03
Profitability Ratios (0,40)	K1	0,07
	K2	0,06
	K3	0,05
	K4	0,06
	K5	0,06
Financial Ratios (0,32)	F1	0,06
	F2	0,04
	F3	0,07
	F4	0,07
	F5	0,04
	F6	0,08
	F7	0,05
Financial Structure Ratios (0,17)	M1	0,03
	M2	0,04
	M3	0,05
	M4	0,05

Step 4: Creation of Positive and Negative Ideal Solutions;

In the weighted decision matrix, ideal values and negative ideals are selected for ideal solution and negative ideal solution respectively to determine ideal and negative ideal sets of solution.

Table-14. Weighted Normalized Decision Matrix (2009)

	LIQUIDITY RATIOS			PROFITABILITY RATIOS					OPERATING RATIOS							Financial Structure Ratios			
Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
AKFEN	0,01	0,01	0,01	0,02	0,01	0,01	0,00	0,01	0,02	0,01	0,02	0,00	0,01	0,00	0,01	0,01	0,00	0,03	0,01
ALARAK	0,01	0,03	0,01	0,00	0,01	0,01	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00	0,01	0,0,1	0,0,1	0,01	0,02
DOHOL	0,01	0,03	0,01	-0,01	-0,01	0,00	0,00	0,00	0,01	0,01	0,03	0,01	0,02	0,00	0,02	0,01	0,01	0,01	0,02
GLYHO	0,01	0,01	0,01	0,02	0,03	0,03	0,06	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,0,1	0,0,1	0,01	0,02
SAHOL	0,00	0,01	0,00	0,01	0,01	0,03	0,02	0,02	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,00	0,01
DYHOL	0,01	0,01	0,01	-0,02	-0,03	0,01	0,00	-0,01	0,01	0,00	0,02	-0,01	0,01	0,00	0,01	0,0,1	0,0,1	0,01	0,01
ISYHO	0,01	0,00	0,01	0,05	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,00	0,01
ITTFH	0,01	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,01	0,02	0,02	0,07	0,01	0,01	0,03	0,00	0,01	0,01	0,02
KCHOL	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,01	0,01	0,02	-0,01	0,01	0,00	0,01	0,01	0,01	0,01	0,01
MZHLD	0,00	0,00	0,00	-0,03	0,03	0,01	0,01	0,00	0,00	0,02	-0,04	0,00	0,02	0,05	0,02	0,01	0,01	0,03	-0,01
NTHOL	0,01	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02
TAVHL	0,01	0,00	0,01	0,01	0,01	0,01	0,00	0,00	0,05	0,01	0,02	0,00	0,02	0,01	0,01	0,01	0,00	0,02	0,01
TRNSK	0,00	0,00	0,00	0,00	-0,01	0,01	0,00	0,00	0,00	0,00	-0,01	0,00	0,00	0,06	0,01	0,01	0,02	0,01	-0,01
YAZIC	0,01	0,01	0,01	0,01	0,02	0,02	0,01	0,01	0,00	0,01	0,01	0,01	0,01	0,00	0,01	0,01	0,01	0,01	0,01

Table- 15. Ideal Solutions (2009)

	LIQUIDITY RATIOS			PROFITABILITY RATIOS					OPERATING RATIOS							Financial Structure Ratios			
Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
POZIÇS.	0,01	0,03	0,01	0,05	0,01	0,03	0,06	0,05	0,05	0,02	0,03	0,07	0,02	0,06	0,03	0,01	0,02	0,03	0,02
NEGIÇZ.	0,00	0,00	0,00	-0,02	-0,03	0,00	0,00	-0,01	0,00	0,00	-0,04	-0,01	0,00	0,00	0,00	0,00	0,01	0,00	-0,01

Step 5: Calculation of Distance Values;

Positive ideal and negative ideal values are deducted from the values on each factor's column to calculate value of distance from positive ideal and negative ideal solutions.

Table-16. Values of Distance from Positive Ideal Solution (2009)

	LIQUIDITY RATIOS			PROFITABILITY RATIOS					OPERATING RATIOS							Financial Structure Ratios			
Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
AKFEN	0,00	-,02	0,00	-,03	0,00	-,02	-,06	-,04	-,03	-,01	-,01	-,07	-,01	-,06	-,02	0,00	-0,02	0,00	-,01
ALARAK	0,00	0,00	0,00	-,05	0,00	-,02	-,06	-,05	-,05	-,02	-,02	-,07	-,01	-,06	-,02	0,00	-0,01	-0,02	0,00
DOHOL	0,00	0,00	0,00	-,06	-,02	-,03	-,06	-,05	-,04	-,01	0,00	-,06	-,00	-,06	-,01	0,00	-0,01	-0,02	0,00
GLYHO	0,00	-,02	0,00	-,03	0,02	0,00	0,00	0,00	-,05	-,02	-,03	-,07	-,02	-,06	-,03	0,00	-0,01	-0,02	0,00
SAHOL	-0,01	-,02	-,01	-,04	0,00	0,00	-,04	-,03	-,05	-,01	-,03	-,07	-,02	-,06	-,03	0,00	-0,01	-0,03	-,01
DYHOL	0,00	-,02	0,00	-,07	-,04	-,02	-,06	-,06	-,04	-,02	-,01	-,08	-,01	-,06	-,02	0,00	-0,01	-0,02	-,01
ISYHO	0,00	-,03	0,00	0,00	-,01	-,03	-,06	-,05	-,05	-,01	-,03	-,07	-,02	-,06	-,03	0,00	-0,01	-0,03	-,01
ITTFH	0,00	-,02	-,01	-,05	-,01	-,02	-,06	-,05	-,04	0,00	-,01	0,00	-,01	-,05	0,00	-0,01	-0,01	-0,02	0,00
KCHOL	0,00	-,02	0,00	-,04	0,00	-,02	-,06	-,05	-,04	-,01	-,01	-,08	-,01	-,06	-,02	0,00	-0,01	-0,02	-,01
MZHLD	-0,01	-,03	-,01	-,08	0,02	-,02	-,05	-,05	-,05	0,00	-,07	-,07	-,00	-,01	-,01	0,00	-0,01	0,00	-,03
NTHOL	0,00	-,03	-,01	-,05	-,01	-,02	-,06	-,05	-,05	-,01	-,03	-,07	-,02	-,06	-,03	-0,01	-0,02	-0,03	0,00
TAVHL	0,00	-,03	0,00	-,04	0,00	-,02	-,06	-,05	0,00	-,01	-,01	-,07	0,00	-,05	-,02	0,00	-0,02	-0,01	-,01
TRNSK	-0,01	-,03	-,01	-,05	-,02	-,02	-,06	-,05	-,05	-,02	-,04	-,07	-,02	0,00	-,02	0,00	0,00	-0,02	-,03
YAZIC	0,00	-,02	0,00	-,04	0,01	-,01	-,05	-,04	-,05	-,01	-,02	-0,06	-0,01	-0,06	-0,03	0,00	-0,01	-0,03	-0,01

Table- 17. Values of Distance from Negative Ideal Solution (2009)

	LIQUIDITY RATIOS			PROFITABILITY RATIOS					OPERATING RATIOS							Financial Structure Ratios			
Criteria	L1	L2	L3	K1	K2	K3	K4	K5	F1	F2	F3	F4	F5	F6	F7	M1	M2	M3	M4
AKFEN	0,01	0,01	0,01	0,04	0,04	0,01	0,00	0,02	0,02	0,01	0,06	0,01	0,01	0,00	0,01	0,01	-0,01	0,03	0,02
ALARAK	0,01	0,03	0,01	0,02	0,04	0,01	0,00	0,01	0,00	0,00	0,05	0,01	0,01	0,00	0,01	0,01	0,00	0,01	0,03
DOHOL	0,01	0,03	0,01	0,01	0,02	0,00	0,00	0,01	0,01	0,01	0,07	0,02	0,02	0,00	0,02	0,01	0,00	0,01	0,03
GLYHO	0,01	0,01	0,01	0,04	0,06	0,03	0,06	0,06	0,00	0,00	0,04	0,01	0,00	0,00	0,00	0,01	0,00	0,01	0,03
SAHOL	0,00	0,01	0,00	0,03	0,04	0,03	0,02	0,03	0,00	0,01	0,04	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,02
DYHOL	0,01	0,01	0,01	0,00	0,00	0,01	0,00	0,00	0,01	0,00	0,06	0,00	0,01	0,00	0,01	0,01	0,00	0,01	0,02
ISYHO	0,01	0,00	0,01	0,07	0,03	0,00	0,00	0,01	0,00	0,01	0,04	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,02
ITTFH	0,01	0,01	0,00	0,02	0,03	0,01	0,00	0,01	0,01	0,02	0,06	0,08	0,01	0,01	0,03	0,00	0,00	0,01	0,03
KCHOL	0,01	0,01	0,01	0,03	0,04	0,01	0,00	0,01	0,01	0,01	0,06	0,00	0,01	0,00	0,01	0,01	0,00	0,01	0,02
MZHLD	0,00	0,00	0,00	-0,01	0,06	0,01	0,01	0,01	0,00	0,02	0,00	0,01	0,02	0,05	0,02	0,01	0,00	0,03	0,00
NTHOL	0,01	0,00	0,00	0,02	0,03	0,01	0,00	0,01	0,00	0,01	0,04	0,01	0,00	0,00	0,00	0,00	-0,01	0,00	0,03
TAVHL	0,01	0,00	0,01	0,03	0,04	0,01	0,00	0,01	0,05	0,01	0,06	0,01	0,02	0,01	0,01	0,01	-0,01	0,02	0,02
TRNSK	0,00	0,00	0,00	0,02	0,02	0,01	0,00	0,01	0,00	0,00	0,03	0,01	0,00	0,06	0,01	0,01	0,01	0,01	0,00
YAZIC	0,01	0,01	0,01	0,04	0,04	0,01	0,00	0,02	0,02	0,01	0,06	0,01	0,01	0,00	0,01	0,01	-0,01	0,03	0,02

Step 6: Calculation of Relative Closeness to Ideal Solution;

The square roots of squares sum of each year's distance values are calculated to find each year's average distance from positive and negative ideal solutions. Lastly, their closeness ratios (c) are calculated by dividing negative average distance of the relevant year to the sum of such year's positive and negative average distances. High closeness mean preference in the order.

$$S+=\sqrt{(0,01-0,01)^2+(0,01-0,03)^2+(0,01-0,01)^2+\ldots.+(0,01-0,02)^2}=0,13$$

$$S-=\sqrt{(0,01-0,00)^2+(0,01-0,00)^2+(0,01-0,00)^2+\ldots.+(0,01-(-0,01)^2}=0,10$$

$$C=\frac{0,10}{0,13+0,10}=0,43$$

Step 7:Ordering of Closeness Values

Order of performance of the years by their convergence ratios is shown in Table 10.

Table- 18. Order of Closeness to the Solution (2009)

CONGLOMERATES	POZ.IDEAL(S+)	NEG.IDEAL(S-)	AFFECTION	PERCENTAGE	AFFINITY ORDER
AKFEN	0,13	0,10	0,43	85,8	4.
ALARAK	0,14	0,09	0,38	75,3	10.
DOHOL	0,14	0,09	0,39	77,4	5.
GLYHO	0,12	0,13	0,50	100,0	1.
SAHOL	0,14	0,08	0,38	76,3	8.
DYHOL	0,17	0,07	0,29	57,8	14.
ISYHO	0,15	0,09	0,39	77,1	6.
ITTFH	0,12	0,12	0,48	95,9	2.
KCHOL	0,14	0,09	0,38	76,1	9.
MZHLD	0,16	0,09	0,35	69,8	12.
NTHOL	0,16	0,07	0,31	61,0	13.
TAVHL	0,13	0,11	0,45	90,4	3.
TRNSK	0,15	0,08	0,36	72,4	11.
YAZIC	0,14	0,09	0,39	76,6	7.

Table- 19. Order of Performance for (2009)

CONGLOMERATES	POZ.IDEAL(S+)	NEG.IDEAL(S-)	AFFECTION	PERCENTAGE	AFFINITY ORDER
GLYHO	0,12	0,13	0,503	100,0	1.
ITTFH	0,12	0,12	0,483	96	2.
TAVHL	0,13	0,11	0,456	90,4	3.
AKFEN	0,13	0,10	0,432	85,8	4.
DOHOL	0,14	0,09	0,389	77,4	5.
ISYHO	0,15	0,09	0,388	77,1	6.
YAZIC	0,14	0,09	0,386	76,6	7.
SAHOL	0,14	0,08	0,384	76,3	8.
KCHOL	0,14	0,09	0,383	76,1	9.
ALARAK	0,14	0,09	0,379	75,3	10.
TRNSK	0,15	0,08	0,364	72,4	11.
MZHLD	0,16	0,09	0,351	69,8	12.
NTHOL	0,16	0,07	0,307	61,0	13.
DYHOL	0,17	0,07	0,291	57,8	14.

2009 financial performance scores of the conglomerates in Table 19 were calculated by means of the Topsis method.According to these results, the company with the best 2009 performance is Global Investment Holding.That conglomerate was followed by İttifak Holding and Tav Airports Holding as 2th and 3rd best performers.The table shows Doğan Yayın Holding as the worst performer.The same method was used to score financial performances of these conglomerates for the years 2010 and 2011 (Tables 20, 21)

Table-20. Order of Performance for (2010)

CONGLOMERATES	POZ.IDEAL (S+)	NEG.IDEAL(S-)	AFFECTION	PERCENTAGE	AFFINITY ORDER
TAVHL	0,14	4,00	0,97	100,0	1.
GLYHO	0,11	0,13	0,54	55,7	2.
ITTFH	0,12	0,12	0,49	51	3.
ISYHO	0,14	0,10	0,42	43,8	4.
AKFEN	0,13	0,10	0,42	43,5	5.
NTHOL	0,13	0,09	0,42	43,3	6.
KCHOL	0,14	0,10	0,41	42,4	7.
DOHOL	0,14	0,09	0,40	41,7	8.
ALARAK	0,14	0,09	0,39	40,5	9.
SAHOL	0,14	0,09	0,39	40,2	10.
YAZIC	0,13	0,08	0,38	39,7	11.
MZHLD	0,17	0,09	0,36	36,9	12.
DYHOL	0,16	0,07	0,32	32,9	13.
TRNSK	0,15	0,06	0,29	29,7	14.

Table-21. Order of Performance for 2011

CONGLOMERATES	POZ.IDEAL(S+)	NEG.IDEAL(S-)	AFFECTION	PERCENTAGE	AFFINITY ORDER
ITTFH	0,11	0,12	0,529	100	1.
TAVHL	0,11	0,12	0,510	96,3	2.
SAHOL	0,13	0,12	0,475	89,8	3.
ALARAK	0,12	0,11	0,470	88,8	4.
AKFEN	0,12	0,11	0,467	88,2	5.
TRNSK	0,13	0,11	0,455	86,0	6.
KCHOL	0,13	0,10	0,436	82,4	7.
YAZIC	0,13	0,09	0,431	81,5	8.
ISYHO	0,13	0,10	0,423	79,9	9.
DOHOL	0,16	0,09	0,372	70,3	10.
MZHLD	0,15	0,08	0,364	68,,9	11.
NTHOL	0,14	0,08	0,355	67,2	12.
GLYHO	0,15	0,06	0,288	54,5	13.
DYHOL	0,17	0,07	0,287	54,3	14.

5. DISCUSSION AND CONCLUSION

The study analyzed 2009-2011 financial performances of 14 ISE-listed conglomerates and employed TOPSIS, a multi-criteria decision making method, as its method of analysis. The first stage of the analysis involved calculation of each holding's financial ratios to identify their financial performance, and then the TOPSIS method was used to these calculated financial ratios

into a single score which shows overall financial performance of the conglomerate. The scores calculated were used for order of performance of these conglomerates.

Table-22. Order of Performance for 2009, 2010 and 2011

CONGLOMERATES	POZ.IDEAL(S+)	NEG.IDEAL(S-)	AFFECTION	PERCENTAGE
AKFEN	4.	5.	5.	72.5
ALARAK	10.	9.	4.	68.2
DOHOL	5.	8.	10.	63.1
GLYHO	1.	2.	13.	70.1
SAHOL	8.	10.	3.	68.8
DYHOL	14.	13.	14.	48.3
ISYHO	6.	4.	9.	67.0
ITTFH	2.	3.	1.	82.3
KCHOL	9.	7.	7.	67.0
MZHLD	12.	12.	11.	58.5
NTHOL	13.	6.	12.	57.1
TAVHL	3.	1.	2.	95.6
TRNSK	11.	14.	6.	62.7
YAZIC	7.	11.	8.	65.9

The financial performance scoring conducted for 14 ISE-listed conglomerates shows that the best performance belongs to TAV Airports Holding with an average percentage of 95.6 for the years 2009-2011. The second and third best performances belong to ITTFH and AKFEN with average percentages of 82.3 and 72.5 respectively. GLYHO, which attained good performance in 2009 and 2010 but performed poorly in 2011 with an average percentage of 70.1, comes as the fourth best performer. It is understood that the worst performance belongs to DYHOL, with average percentage of 48.3. A review of the TOPSIS results points to ITTFH as the best performer of the period covering the years 2009-2011. It appears that DYHOL is the worst performing conglomerate. What has been inferred and concluded from the evaluation is that some holdings have been steadfast with their ranking in the group and this kind of stability is what is sought by certain parties, in particular risk-averse investors, and that some holdings have improved their ranking and some of them performed poorly due to their instable performances. In such conglomerates, the criteria used may vary according to the characteristics of conglomerates. Conglomerates should review the policies that failed. They should explore the conditions leading to the destabilization of. What they should to do be successful, must be analyzed.

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