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Evaluation of Financial Performances of SME's Listed in the Bist Sme Industrial Index by Using TOPSIS Multicriteria Decision Making Method [1]

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In this study, the financial performances of SMEs listed in the BIST SME Industrial Index are evaluated by using TOPSIS multicriteria decision-making method. The data of the study acquired from annual financial statements that were reported between the 2016-2018 period. Financial performance ranks of SMEs are determined for each year and thus comparative financial performances of SMEs are detected.
BIST SME Industrial Index is an index that includes stocks of industrial SMEs traded in BIST Stars, BIST Main, and BIST Emerging Companies markets. SMEs have great importance for the Turkish economy, with their dynamizing roles and with their crucial roles in the regional development and job creation. According to the Turkey Statistical Institute data, Turkish SMEs constitute 99.8 % of all enterprises in Turkey. At the same time, Turkish SMEs provide 72.7% of total employment, 62% of total sales, and 58% of total investments in the Turkish Economy.
The Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) is one of the multicriteria decision-making methods that is commonly used in the evaluation of financial performances of firms. The TOPSIS method is based on two main points: the positive ideal solution and the negative ideal solution. With the help of the TOPSIS method, the distances positive ideal solutions and negative ideal solutions of all options are calculated. Options are ranked according to their proximity to the positive ideal solution and their distance to the negative ideal solution.

Keywords: SME, Financial Performance, TOPSIS, Multicriteria Decision Making, BIST SME Industrial Index.

JEL Codes: *D53*, *G15*, *G17*, *O16*

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1. Introduction

SMEs (Small and Medium-Sized Enterprises) are among the most important elements of economic life with their contributions to employment and their structures that can easily adapt to changes. In all national economies, more than 70% of firms are SMEs and in most countries, more than 90% of firms are SMEs

[1] This study is a revised and recontrolled version of the study presented at the ECONALANYA 2019 congress held on 24-25th October 2019 in Alanya, Turkey.

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(OECD,2017). As awareness of the importance of SMEs in the economy increases, governments and international organizations are increasing their policies to support SMEs. In this context, Borsa İstanbul has decided to establish SME Industry Index and BIST SME Industry index started to be calculated as of December 2013.

Financial performance is a result-oriented type of business performance based on the use of financial indicators of the firm, reflecting the degree of fulfillment of the economic objectives of the firm (Başdar, 2019). Evaluation of the financial performance of SMEs is of great importance for the owners, investors, lenders, and other stakeholders. In this respect, multi-criteria decision-making methods that allow comparative measurement of different alternatives are among the methods used extensively in the measurement of the financial performance of firms.

TOPSIS was developed by Hwang and Yoon in 1980 and is a multi-criteria decision-making method that has been applied in many different areas from firm performance measurement to car selection. In the TOPSIS method, two values called positive ideal solution and negative ideal solution are calculated. The different alternatives are ranked according to their proximity to the positive ideal solution and their distance to the negative ideal solution (Özbek, 2017).

2. Literature Review

Bakırcı, Eslamian Shiraz, and Sattary (2014) have determined the financial performance of 14 companies in the Iron and Steel Industry's main industry sector between the years 2009-2011 by using TOPSIS and DEA (Data Envelopment Analysis) multi-criteria decision-making methods. They used Data Envelopment Analysis super efficiency and TOPSIS methods to determine the performance rankings of the firms that they determined their relative efficiency levels by DEA. Although they attained approximate firm financial performance rankings, the financial performance rankings they determined using TOPSIS and DEA methods are not exactly the same.

Özçelik and Kandemir (2015) have determined the financial performance of 7 tourism companies traded on BIST between 2010 and 2014 by using the financial ratios of the firms as a basis for the TOPSIS method.

Sakarya and Akkuş (2015) analyzed the financial performance of cement companies traded in BIST between the years 2010-2013 using the TOPSIS method, They analyzed firm financial performance firstly by using traditional financial ratios and then by using cash flow ratios. As a result of the study, differences are detected between the results obtained according to traditional financial ratios and the results obtained according to cash flow rates.

Akbulut and Coşkun (2015) determined the financial performances of 32 manufacturing companies traded on BIST between 2010 and 2012 by TOPSIS method and analyzed the correlation between the companies' market value/book value ratios and companies TOPSIS scores. As a result of the study, they found that there is no statistically significant relationship between the stock market performances determined by using market value/book value ratios and the financial performances determined by TOPSIS method.

Akgün and Soy Temür (2016) determined the financial performances of 2 airline companies registered in BIST transportation index between 2010 and 2015 using TOPSIS method.

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İlkuçar and Çifci (2016) evaluated financial performances of 6 electric generation companies for 2015 by using TOPSIS method.

Aytekin and Karamaşa (2017) analyzed financial performances of 6 insurance companies traded in BIST by using 6 financial indicators from 2011 to 2015. They obtained financial performances rankings of 6 insurance firms by using the fuzzy (Shannon's entropy-based) TOPSIS method.

Balcı (2017) examined the financial performances of 27 public hospitals between 2014 and 2015 by using TOPSIS method. As a result of the study, significant differences were observed among the financial performances of public hospitals by year.

Metin, Yaman, and Korkmaz (2017) determined the financial performance of 11 energy companies traded in BIST between 2010 and 2015 by using TOPSIS and MOORA methods and compared the performance rankings obtained in both methods.

Orçun and Eren (2017) financial performance of technology companies traded on BIST between 2010 and 2015 analyzed by using TOPSIS method. Also, financial performance rankings and stock exchange return rankings of the companies for the relevant periods were analyzed and no significant relationship could be determined.

Kayalı and Aktaş (2018) examined the financial performances of firms in the automotive sector traded on BIST between 2010 and 2015 using TOPSIS method. As a result of the study, they were determined that some companies have maintained their place in financial performance rankings and some companies have changed their place in the rankings year to year.

Özçelik and Küçükçakal (2019) analyzed the financial performance of financial leasing and factoring companies traded in BIST between 2009 and 2016 by TOPSIS method. They used the liquidity, activity, and profitability ratios of the companies as criteria in TOPSIS method.

3. Data and Methodology

Financial ratios of 42 firms listed in the BIST SME Industrial Index between 2016-2018 years are used as decision criteria of TOPSIS analysis. Three main financial ratio groups are selected as decision criteria; liquidity ratios, turnover ratios, and profitability ratios. Annual financial reports of 42 firms are obtained from the website of the Public Disclosure Platform (kap.gov.tr) and financial ratios are calculated for each firm and year. The financial ratios used in this study were selected through a literature review. The list of financial ratios are shown in table 1:

Table. 1. Selected Financial Ratios

Group of Financial Ratios	Selected Ratio	Calculation Formula of The Selected Ratio	Abbreviation
Liquidity Ratios	Current Ratio	Current Assets/Current Liabilities	CuR
	Acid-Test Ratio	Current Assets-Inventories / Current Liabilities	AcTR
	Cash Ratio	Cash+ Marketable Securities / Current Liabilities	CaR
Turnover Ratios	Accounts Receivable Turnover Ratio	Net Sales / Average Accounts Receivable	ARTR

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	Inventory Turnover Ratio	Cost of Good Sold/Average Inventory	ITR
	Total Asset Turnover Ratio	Net Sales / Total Assets	TATR
Profitability Ratios	Net Profit Margin	Net Income / Sales	NPM
	Return on Equity	Net Income / Average Shareholder's Equity	ROE
	Operating Profit Margin	Operating Earnings / Revenue	OPM

Liquidity ratios are the ratios that reveal the ability of a firm to pay its current assets and overdue (short-term) debts. Turnover rates are the ratios that show how firms use effectively their assets. Profitability ratios indicate the effectiveness of the firm in terms of profit-making in the operating period(Okka, 2009).

With TOPSIS method, alternatives are sorted according to certain criteria. The TOPSIS method has 6 steps (Özdemir, 2015; Özbek,2017):

Step 1 is the formation of the decision matrix. The decision matrix is a matrix of decision criteria and factors. It can be shown as follows:

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

Step 2 is the creation of a normalized matrix. After squaring each aij value in the decision matrix, the square root of the sum of squares is taken for each criterion. After taking the square root of the sum of the squares of the data based on criteria, each data is divided by the square root of the sum of the squares of the data of the criteria to which it belongs, and the normalization matrix is completed.

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

Step 3 is the creation of a weighted decision matrix. The weights of the evaluation criteria (w_i) are determined. The sum of all weights must be equal to 1. The weighted decision matrix is generated by multiplying the data of the criteria by the weights of the criteria.

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

Step 4 is to obtain ideal and negative ideal solution values. After obtaining the weighted decision matrix, maximum values of positive criteria, and minimum values of negative criteria are determined and ideal solution values are found. Negative ideal solution values are obtained by determining minimum values of positive criteria and maximum values of negative criteria. Ideal and Negative Ideal solutions are expressed in the following formulas:

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

Step 5 is to obtain the distance from ideal and negative ideal points. In the TOPSIS method, the Euclidean distance is used to calculate the distance to ideal and non-ideal points. Euclidean distance is calculated by the following formulas:

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

Step 6 is the calculation of the proximity to the ideal solution. The ideal and negative ideal discrimination measures are used to calculate the proximity of each decision point to the ideal solution. and shows the absolute closeness of the respective decision point to the ideal solution, and the absolute proximity of the relevant decision point to the negative ideal solution. The relative proximity to the ideal solution is calculated by the following formula:

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^*}$$

4. Results and Discussion

Firstly, the selected financial ratios of 42 firms included in the BIST SME industry index between 2016-2018 were calculated. As an example of the calculated financial ratios, the financial ratios for 2018 are given in table 2.

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Table. 2. Financial Ratios for 2018 of 42 SME Listed in BIST SME Industry Index

	BNTAS.E	BRKSN.E	BRMEN.E	BURCE.E	BURVA.E	CMBTN.E	DAGI.E	DENCM.E	DIRIT.E	DITAS.E	DOBUR.E
CuR	4,58	1,09	0,40	0,92	1,73	1,17	1,90	1,03	0,46	1,54	2,52
AcTR	3,11	0,80	0,40	0,47	1,00	1,13	1,01	0,64	0,14	0,89	2,43
CaR	1,32	0,15	0,37	0,04	0,16	0,14	0,26	0,00	0,03	0,08	1,16
ARTR	3,23	6,28	19,90	1,42	2,81	87,43	1,70	4,52	3,07	3,85	30,03
ITR	3,09	4,55	0,89	2,54	5,66	3,77	4,36	3,30	18,66	4,74	3,91
TATR	0,40	1,20	0,02	0,30	1,21	2,16	0,77	0,86	0,23	1,38	1,66
NPM	0,13	0,01	-4,23	-0,07	0,00	0,04	-0,06	0,00	-1,23	0,07	0,03
ROE	0,07	0,02	-0,22	-0,05	0,02	0,20	-0,08	-0,01	-0,86	0,26	0,10
OPM	0,14	0,05	-0,02	0,04	0,12	-0,03	0,08	0,05	-0,88	0,15	0,04

	DOGUB.E	EMKEL.E	ERSU.E	FMIZP.E	FORMT.E	GEDZA.E	IZFAS.E	IZTAR.E	KRSTL.E	LUKSK.E	MAKTK.E
CuR	0,32	1,26	4,41	5,50	1,06	4,86	2,21	0,63	2,56	1,61	1,52
AcTR	0,10	0,70	1,59	5,09	0,96	3,84	1,27	0,49	2,18	0,91	1,27
CaR	0,01	0,05	0,01	0,06	0,07	1,67	0,42	0,04	0,14	0,08	0,35
ARTR	1,83	1,41	0,78	18,62	5,61	6,13	1,10	7,20	9,94	1,61	2,36
ITR	5,24	3,17	9,58	9,05	1,22	4,68	1,72	10,12	2,99	2,53	1,04
TATR	0,20	0,47	0,17	1,30	0,63	0,84	0,56	0,41	1,13	0,21	0,41
NPM	-0,51	0,04	0,01	0,27	0,09	0,17	0,03	-0,01	0,03	0,50	-0,17
ROE	-0,25	0,05	0,00	0,42	0,37	0,18	0,03	-0,01	0,05	0,18	-0,15
OPM	-0,38	0,04	0,00	0,27	0,22	0,26	0,07	0,04	0,04	-0,03	0,23

	MEGAP.E	MERKO.E	NIBAS.E	OYLUM.E	OZRDN.E	POLTK.E	PRZMA.E	RODRG.E	RTALB.E	SAFKR.E	SAMAT.E
CuR	9,73	1,13	0,78	0,66	1,52	3,71	5,09	1,59	3,79	2,03	1,33
AcTR	8,22	0,33	0,64	0,54	0,85	3,04	2,98	0,83	3,35	1,38	0,12
CaR	0,58	0,01	0,11	0,01	0,06	0,56	0,08	0,20	0,71	0,28	0,00
ARTR	4,52	1,28	7,90	11,29	3,14	3,27	0,95	1,08	4,54	3,65	1,39
ITR	5,79	6,26	4,85	2,83	4,79	1,53	0,92	2,72	2,45	3,45	23,92
TATR	0,86	0,77	0,46	0,63	1,09	0,64	0,21	0,65	0,31	1,02	1,01
NPM	0,02	-0,08	-0,12	-0,04	0,10	0,08	0,04	0,07	-0,02	0,14	0,00
ROE	0,02	-0,22	-0,09	-0,06	0,23	0,06	0,01	0,11	-0,01	0,22	-0,02
OPM	0,06	-0,02	-0,03	-0,05	0,15	0,10	0,09	0,02	-0,59	0,04	0,09

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	SANFM.E	SAYAS.E	SEYKM.E	SNPAM.E	TACTR.E	TKURU.E	TMPOL.E	VANGD.E	YAPRK.E
CuR	0,88	1,34	5,69	2,29	0,29	1,47	1,07	5,34	1,08
AcTR	0,59	0,74	3,64	1,71	0,24	0,81	0,87	5,15	0,76
CaR	0,01	0,05	0,31	0,47	0,00	0,27	0,03	0,18	0,07
ARTR	5,15	2,12	3,25	3,62	6,24	1,80	6,23	4,15	6,25
ITR	3,70	8,91	4,67	3,44	7,17	4,15	1,71	27,19	10,47
TATR	1,09	0,72	0,91	0,36	0,15	0,65	0,87	0,07	0,59
NPM	0,01	-0,43	0,11	0,16	-0,45	-0,32	-0,02	0,15	0,11
ROE	0,05	-0,91	0,12	0,09	-0,16	-1,33	-0,05	0,01	0,10
OPM	0,10	0,03	0,13	0,31	-0,37	-0,31	0,10	-0,38	0,30

Selected financial ratios are used as a decision matrix. In step 2, the normalized matrix is formed by dividing each of the proportions in the decision matrix by the square root of the sum of the squares of the proportions. The weighted normalized matrix was obtained by weighting the normalized matrix. Equal weight was given to each decision criterion (financial ratio) while the weighting process was made and the weight given to each ratio was 1/9. After weighting, the maximum and minimum values for each decision criterion (financial ratio) were determined as ideal solution points and negative ideal solution points.

After obtaining the ideal and negative ideal solution points, the distance to ideal and non-ideal points was obtained by using $S_i^* = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_j^*)^2}$ and $S_i^- = \sqrt{\sum_{j=1}^{n}(v_{ij} - v_j^-)^2}$ formulas. Finally, the proximity to the ideal solution was calculated by using $C_i^* = \frac{S_i^-}{S_i^- + S_i^*}$ formula.

Table. 3. BIST SME Industry Index Year 2016 TOPSIS Ranking

BIST SME Industry Index Year 2016 TOPSIS Ranking			
Rank	**Company Name**	**TOPSIS Score**	**Sector**
1	Sönmez Cotton	0,607	Textile, Clothing, Leather
2	Federal-Mogul İzmit Piston and Pin	0,571	Metal Goods, Machinery and Equipment Making
3	Gediz Packaging	0,542	Chemical, Petroleum Rubber, Plastic
4	Çimbeton Cement	0,514	Stone Soil Based
5	Politeknik Metal	0,508	Chemical, Petroleum Rubber, Plastic
6	Mega Polyethylene Foam	0,505	Chemical, Petroleum Rubber, Plastic
7	RTA Laboratories	0,481	Chemical, Petroleum Rubber, Plastic
8	Seyitler Chemistry	0,478	Chemical, Petroleum Rubber, Plastic
9	Doğan Burda Magazine	0,473	Paper and Paper Products Printing
10	Bandırma Packaging Materials	0,461	Metal Goods, Machinery and Equipment Making
11	Formet Steel Door	0,460	Metal Goods, Machinery and Equipment Making
12	Lüks Velvet	0,455	Textile, Clothing, Leather
13	Yaprak Farm	0,455	Agriculture, Forestry and Fisheries
14	Özerden Plastic Products	0,442	Chemical, Petroleum Rubber, Plastic
15	Prizma Press Typography	0,441	Paper and Paper Products Printing
16	Safkar Ege Cooling	0,437	Metal Goods, Machinery and Equipment Making

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17	Kristal Cola Beverages	0,430	Food, Beverages & Tobacco
18	Taze Dry Food	0,415	Manufacturing Industry / Food, Beverages & Tobacco
19	İzmir Brush	0,412	Chemical, Petroleum Rubber, Plastic
20	Ersu Fruit and Food	0,411	Food, Beverages & Tobacco
21	Saray Printing	0,411	Metal Goods, Machinery and Equipment Making
22	Berkosan	0,409	Chemical, Petroleum Rubber, Plastic
23	Dagi Clothing	0,405	Textile, Clothing, Leather
24	Iz Livestock and Food	0,403	Agriculture, Forestry and Fisheries
25	Te-mapol Polymer Plastic	0,399	Chemical, Petroleum Rubber, Plastic
26	Rodrigo Textile	0,398	Textile, Clothing, Leather
27	Say Advertising Building Decoration	0,396	Metal Goods, Machinery and Equipment Making
28	Burçelik Valve	0,388	Metal Main Industry
29	Burçelik Stell Casting	0,388	Metal Main Industry
30	Ditaş Doğan Spare Parts Manufacturing	0,381	Metal Goods, Machinery and Equipment Making
31	Makine Tool Industry	0,379	Metal Goods, Machinery and Equipment Making
32	Oylum Industrial Investments	0,373	Food, Beverages & Tobacco
33	Niğde Concrete	0,363	Stone Soil Based
34	Merko Food Industry Trade	0,348	Food, Beverages & Tobacco
35	Denizli Glass Industry	0,333	Stone Soil Based
36	Doğusan	0,273	Stone Soil Based
37	Birlik Textile	0,260	Textile, Clothing, Leather
38	Taç Agricultural Products	0,244	Agriculture, Forestry and Fisheries
39	Diriliş Textile	0,162	Textile, Clothing, Leather
40	Vanet Food Industry	0,147	Food, Beverages & Tobacco
41	Emek Electrical Industry	0,001	Metal Goods, Machinery and Equipment Making
42	Sanifoam Sponge	0,001	Chemical, Petroleum Rubber, Plastic

According to the results in Table 3, the top five companies with the highest financial performances in 2016 are; Sönmez Cotton, Federal-Mogul İzmit Piston, and Pin, Gediz Packaging, Çimbeton Cement, and Polytechnic Metal. Additionally, Taç Agricultural Products, Diriliş Textile, Vanet Food Industry, Emek Electrical Industry, and Sanifoam Sponge, are then ranked at the bottom of the 2016 financial performance ranking with the lowest financial performances.

Table. 4. BIST SME Industry Index Year 2017 TOPSIS Ranking and Changes in Ranking Compared to Last Year's Ranking

BIST SME Industry Index Year 2017 TOPSIS Ranking				
Rank	**Company Name**	**TOPSIS Score**	**Sector**	**Difference in Ranking**
1	Federal-Mogul İzmit Piston and Pin	0,768	Metal Goods, Machinery and Equipment Making	+1
2	Mega Polyethylene Foam	0,597	Chemical, Petroleum Rubber, Plastic	+4
3	Gediz Packaging	0,586	Chemical, Petroleum Rubber, Plastic	0
4	Politeknik Metal	0,582	Chemical, Petroleum Rubber, Plastic	+1
5	RTA Laboratories	0,580	Chemical, Petroleum Rubber, Plastic	+2
6	Burçelik Valve	0,563	Metal Main Industry	+22
7	Sönmez Textile	0,561	Textile, Clothing, Leather	-7

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8	Formet Steel Door	0,555	Metal Goods, Machinery and Equipment Making	+3
9	Seyitler Chemistry	0,552	Chemical, Petroleum Rubber, Plastic	-1
10	Çimbeton	0,552	Stone Soil Based	-6
11	Doğan Burda Magazine	0,547	Paper and Paper Products Printing	-2
12	Yaprak Farm	0,546	Agriculture, Forestry and Fisheries	+1
13	Ditaş Doğan Spare Parts Manufacturing	0,531	Metal Goods, Machinery and Equipment Making	+17
14	Saray Typography	0,525	Metal Goods, Machinery and Equipment Making	+7
15	Özerden Plastic	0,524	Chemical, Petroleum Rubber, Plastic	-1
16	Dagi Clothing	0,523	Textile, Clothing, Leather	+7
17	Makine Tool Industry	0,521	Metal Goods, Machinery and Equipment Making	+14
18	Kristal Cola	0,520	Food, Beverages & Tobacco	-1
19	Berkosan	0,519	Chemical, Petroleum Rubber, Plastic	+3
20	Ersu Fruit and Food	0,519	Food, Beverages & Tobacco	0
21	Taze Dry Food	0,519	Food, Beverages & Tobacco	-3
22	Taç Agricultural Products	0,513	Agriculture, Forestry and Fisheries	+16
23	Prizma Press Typography	0,510	Paper and Paper Products Printing	-8
24	Bandırma Packaging Materials	0,508	Metal Goods, Machinery and Equipment Making	-14
25	Safkar Ege Cooling	0,503	Metal Goods, Machinery and Equipment Making	-9
26	Say Advertising Building Decoration	0,493	Metal Goods, Machinery and Equipment Making	+1
27	İzmir Brush	0,492	Chemical, Petroleum Rubber, Plastic	-8
28	Te-mapol Polymer Plastic	0,491	Chemical, Petroleum Rubber, Plastic	-3
29	Lüks Velvet	0,491	Textile, Clothing, Leather	-17
30	Rodrigo Textile	0,484	Textile, Clothing, Leather	-4
31	Denizli Glass Industry	0,477	Stone Soil Based	-4
32	Oylum Industrial Investments	0,476	Food, Beverages & Tobacco	0
33	Burçelik Stell Casting	0,474	Metal Main Industry	-4
34	İz Livestock and Food	0,473	Agriculture, Forestry and Fisheries	-10
35	Diriliş Textile	0,462	Textile, Clothing, Leather	-5
36	Niğde Concrete	0,446	Stone Soil Based	-3
37	Birlik Textile	0,432	Textile, Clothing, Leather	0
38	Doğusan	0,391	Stone Soil Based	-2
39	Merko Food Industry Trade	0,350	Food, Beverages & Tobacco	-5
40	Vanet Food Industry	0,285	Food, Beverages & Tobacco	0
41	Sanifoam Foam	0,001	Chemical, Petroleum Rubber, Plastic	+1
42	Emek Electric Industry	0,001	Metal Goods, Machinery and Equipment Making	-1

According to the results in Table 4, the top five companies with the highest financial performances in 2016 are; Federal-Mogul İzmit Piston and Pin, Mega Polyethylene Foam, Gediz Packaging, Politeknik Metal, and RTA Laboratories.

Doğusan, Merko Food Industry Trade, Vanet Food Industry, Sanifoam Foam, Emek Electric Industry are ranked at the bottom of the 2017 financial performance ranking with the lowest financial performances.

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Table. 5. BIST SME Industry Index Year 2018 TOPSIS Ranking and Changes in Ranking Compared to Last Year's Ranking

BIST SME Industry Index Year 2018 TOPSIS Ranking				
Rank	**Company Name**	**TOPSIS Score**	**Sector**	**Difference in Ranking**
1	Çimbeton	0,621	Stone Soil Based	+9
2	Federal-Mogul İzmit Piston and Pin	0,613	Metal Goods, Machinery and Equipment Making	-1
3	Gediz Packaging	0,606	Chemical, Petroleum Rubber, Plastic	0
4	Doğan Burda Magazine	0,601	Paper and Paper Products Printing	-7
5	Mega Polietilen Foam	0,588	Chemical, Petroleum Rubber, Plastic	-3
6	Bandırma Packaging	0,564	Metal Goods, Machinery and Equipment Making	+18
7	Seyitler Chemistry	0,551	Chemical, Petroleum Rubber, Plastic	+2
8	Sönmez Textile	0,536	Textile, Clothing, Leather	-1
9	Vanet Food Industry	0,534	Food, Beverages & Tobacco	+31
10	Politeknik Metal	0,534	Chemical, Petroleum Rubber, Plastic	-6
11	Yaprak Dairy Farm	0,529	Agriculture, Forestry and Fisheries	+1
12	Ditaş Doğan Spare Part Manufacturing	0,525	Metal Goods, Machinery and Equipment Making	+1
13	Formet Stell Door	0,524	Metal Goods, Machinery and Equipment Making	-5
14	Safkar Ege Cooling	0,523	Metal Goods, Machinery and Equipment Making	+9
15	Kristal Cola	0,521	Food, Beverages & Tobacco	+3
16	Özerden Plastic	0,520	Chemical, Petroleum Rubber, Plastic	-1
17	Saray Typography	0,516	Metal Goods, Machinery and Equipment Making	-3
18	Burçelik Valve	0,510	Metal Main Industry	-12
19	Prizma Press Typography	0,509	Paper and Paper Products Printing	+4
20	Lüks Velvet	0,504	Textile, Clothing, Leather	+9
21	İzmir Brush	0,504	Chemical, Petroleum Rubber, Plastic	+6
22	Berkosan	0,504	Chemical, Petroleum Rubber, Plastic	-3
23	Ersu Fruit and Food	0,501	Food, Beverages & Tobacco	-3
24	Rodrigo Textile	0,497	Textile, Clothing, Leather	+6
25	İz Livestock and Food	0,495	Agriculture, Forestry and Fisheries	+9
26	Dagi Clothing	0,494	Textile, Clothing, Leather	-10
27	Machine Tool Industry	0,493	Metal Goods, Machinery and Equipment Making	-10
28	Te-mapol Polymer Plastic	0,492	Chemical, Petroleum Rubber, Plastic	0
29	Denizli Glass Industry	0,489	Stone Soil Based	+2
30	Oylum Industrial Investments	0,480	Food, Beverages & Tobacco	+2
31	Niğde Concrete	0,478	Stone Soil Based	+5
32	RTA Laboratories	0,476	Chemical, Petroleum Rubber, Plastic	-27
33	Burçelik Steel Casting	0,474	Metal Main Industry	0
34	Merko Food Industry	0,467	Food, Beverages & Tobacco	+5
35	Taç Agricultural Products	0,423	Agriculture, Forestry and Fisheries	-13
36	Say Advertising.	0,421	Metal Goods, Machinery and Equipment Making	-10
37	Doğusan	0,406	Stone Soil Based	+1
38	Taze Dry Food	0,372	Food, Beverages & Tobacco	-17
39	Birlik Textile	0,328	Textile, Clothing, Leather	-2
40	Diriliş Textile	0,315	Textile, Clothing, Leather	-5
41	Sanifoam Foam	0,001	Chemical, Petroleum Rubber, Plastic	0
42	Emek Electric Industry	0,001	Metal Goods, Machinery and Equipment Making	0

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According to the results in Table 5, the top five companies with the highest financial performances in 2018 are; Çimbeton, Federal-Mogul İzmit Piston and Pin, Gediz Packaging, Doğan Burda Magazine, Mega Polietilen Foam.

Taze Dry Food, Birlik Textile, Diriliş Textile, Sanifoam Foam, and Emek Electric Industry are ranked at the bottom of the 2018 financial performance ranking with the lowest financial performances.

Federal-Mogul Izmit Piston and Pin company was ranked in the first two ranks every year between 2016-2018. Based on this information, it can be said that Federal-Mogul İzmit Piston and Pin company consistently showed a high financial performance between 2016-2018.

Sanifoam Foam and Emek Electric Industry are the last two companies in all years between 2016-2018.

5. Conclusion

TOPSIS, which is one of the Multi-Criteria Decision Making methods, is used in the evaluation of the past performance of companies or organizations as well as many decision-making problems. In this study, financial performance rankings of 42 firms included in BIST SME Industry index were determined separately for each year between 2016-2018 by using TOPSIS method. The liquidity ratios used in financial performance measurement are the ratios that show the financial performance of the firms in terms of their ability to pay their due debts, their activity ratios to show their effective use of their assets, and their profitability ratios in terms of revealing the returns they generate as a result of their activities. Therefore, the liquidity, efficiency, and profitability of the companies were evaluated together in the financial performance measurement made with TOPSIS method. Different methods or different financial ratios may be used in subsequent studies. Also, the results can be compared with the stock market performances of the firms.

References

[1] Akbulut, R., & Coşkun, A. (2015). A Research on Financial Performance of Manufacturing Businesses That are Traded on BIST. Journal of Accounting & Finance.

[2] Akgün, M. ve Soy Temür, A. (2016). Evaluation of Financial Performance with TOPSIS Method of Companies Which Are Listed In Transportation Index In The Istanbul Stock Exchange. Int. Journal of Management Economics and Business, ICAFR 16 Special Issue, 173-186.

[3] Aytekin, A., & Karamaşa, Ç. (2017). Analyzing Financial Performance Of Insurance Companies Traded In BIST via Fuzzy Shannon's Entropy Based Fuzzy TOPSIS Methodology. Alphanumeric Journal, 5(1), 71-84.

[4] Bakırcı, F., Shiraz, S. E., & Sattary, A. (2014). Financial Performance Analysis of Iron, Steel Metal Industry Sector Companies in The Borsa Istanbul: DEA Super Efficiency and TOPSIS Methods. Ege Akademik Bakis, 14(1), 9.

[5] Balcı, N. (2017). Financial Performance Analysis With TOPSIS Technique: A Case Study Of Public University Hospitals in Turkey. Yönetim ve Ekonomi Araştırmaları Dergisi, 15(Özel Sayı 1), 155-176.

[6] Başdar, C. (2019). Financial Performance Multicriteria Decision Making Methods. Bursa: Ekin Publishing, 11.

[7] İlkuçar, M., & Çifci, A. (2016). Performance evaluation of electricity generation companies traded on BIST

(online) = ISSN 2285 – 3642
ISSN-L = 2285 – 3642
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URL: http://jedep.spiruharet.ro
e-mail: office_jedep@spiruharet.ro

according to the financial parameters through the application of TOPSIS method. International Journal of Social Sciences and Education Research, 2(3), 1010-1021.

[8] Kayalı,C., A. & Aktas, İ. (2018) Performance Evaluation and Analysis through the TOPSIS Method of Firms in the Automotive Sector Trading in BIST. Karabuk University Journal of Social Sciences Institute. 8(1), 44-59.

[9] Metin, S., Yaman, S., & Korkmaz, T. (2017). Determination of Financial Performance by TOPSIS and MOORA Methods: A Comparative Application on BIST Energy Firms. Kahramanmaras Sutcu Imam University Journal of Social Sciences, 14 (2), 371-394.

[10] OECD. (2017). Enhancing the Contributions of SMEs in a Global and Digitalised Economy.

[11] Okka, O. (2009). Analytical Financial Management Theory and Problems. Ankara: Nobel Publishing, p 104-114.

[12] Orçun, Ç., & Eren, B. S. (2017). Financial Performance Evaluation with TOPSIS Method: An Application on XUTEK. Journal of Accounting & Finance, (75).

[13] Özbek, A. (2017) Multicriteria Decision Making Methods and Problem Solutions with Excel Concept Theory Application. Ankara: Seçkin Publishing, p. 202-203.

[14] Özçelik, H., & Kandemir, B. (2015). The Evaulation of the Financial Performances of the Tourism Enterprises Traded on BIST with TOPSIS Method. Balikesir University Journal of Social Sciences Institute, 18(33).

[15] Özçelik, H., & Küçükçakal, Z. (2019). Analysis of Financial Performance of Financial Leasing and Factoring Companies Traded on BIST by TOPSIS Method. Journal of Accounting and Finance, (81).

[16] Özdemir, M. (2015). Multi Criteria Decision Making Methods for Solving Operational, Managerial and Strategic Problems for Operators, Engineers and Managers. B. F. Yıldırım and E. Önder (Ed.). TOPSIS (135). Bursa: Dora Publishing House.

[17] Sakarya, Ş., & Akkuş, H. T. (2015). Comperative Analysis of Traditional Ratios with Cash Flow Ratios on Measuring Financial Performance: A Practice on BIST Cement Companies With TOPSIS Method. Afyon Kocatepe University Economics and Administrative Sciences Journal, 17(1), 109-123.