

FINANCIAL PERFORMANCE APPRAISAL OF MINING AND QUARRYING FIRMS IN BIST

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ABSTRACT

This paper aims to comprehensively evaluate the financial performance of corporations operating within the mining and quarrying sector listed on the BIST exchange during the 2018-2022 period. Employing a meticulous examination of their financial statements, critical financial metrics were computed to gauge their fiscal health. Utilizing the TOPSIS methodology, these companies were systematically ranked based on their aggregated 5-year financial ratios. The analysis delineates a spectrum of performance trends among the corporations, revealing instances of decline, upward trajectories, and steadfast consistency in standings across the evaluated period.

Keywords: Financial Performance, Mining and Quarrying, Rates, TOPSIS.

1. INTRODUCTION

The term "performance" within a business context encapsulates the quality and manner in which operations are conducted. Bayyurt (2011: 578) underscores its efficacy in driving goal achievement. Performance evaluation emerges as a pivotal instrument for comprehending the present status and trajectory of enterprises, encompassing facets such as workforce efficiency, production efficacy, and resource utilization. Decision-makers rely on this assessment to navigate effective strategies for goal attainment (Seçme, 2022: 458). The measurement of business performance assumes paramount significance for stakeholders including partners, managers, and investors, offering insights into profitability fluctuations and the efficacy of cost management processes. Notably, financial performance affords a comprehensive vantage point regarding business operations (Özçelik & Kandemir, 2015: 98). Multifaceted decision-making methodologies commonly underpin the evaluation of financial performance, aiming to achieve optimal outcomes based on specified criteria and weights across diverse decision units (Aytekin and Sakarya, 2013: 31).

Mining activities have become indispensable in sustaining human life, underpinning various aspects of daily existence, from transportation means to dwellings and communication devices. Across history, the mining sector has played an integral role in shaping civilizations. It stands as a linchpin sector, contributing significantly to addressing employment challenges and fostering the economic advancement of nations (Bilim et al., 2018: 425). This pervasive influence across multiple spheres of human existence underscores the paramount importance of the mining sector. This study focuses on examining performance measurements derived from the five-year (2018-2019-2020-2021-2022) data of companies operating within the Mining and Quarrying sector listed in the BIST.

2. LITERATURE REVIEW

An array of scholarly investigations focuses on the assessment of performance through the utilization of multi-criteria decision-making methodologies. These studies engage diverse approaches to evaluate and quantify performance across various sectors and

industries. Some notable research endeavors, decision-making methods to measure and meticulously employing multi-criteria analyze performance, are elucidated below

Table 1. Studies Measuring Performance with Multi-Criteria Decision Making Method

Researcher	Purpose Of The Research	Research Method
Pala (2023)	To measure the financial performance of companies traded in the BIST Technology and Information Sector between 2010-2021.	CRITIC and WASPAS
Taşcı & Akbalk (2022)	To measure the performance of 18 life insurance companies operating in the Turkish insurance industry using data between 2010 and 2020.	CRITIC and TOPSIS
Terzioğlu et al., (2023)	To examine the financial and environmental sustainability performances of 9 Public/Private banks in the banking sector that comply with the Banking Sector Basic Sustainability Principles published by the Turkish Banking Association.	MOORA, OCRA and GİA
Seçme (2022)	To evaluate the performance of selected banks between 2006-2020.	TOPSIS and COPRAS
Topal (2021)	To measure the financial performance of 10 electricity generation companies included in the Forbes 500 list, using data in 2019.	Entropi and CoCoSo
Orhan et al., (2020)	To measure the financial performance of Istanbul Bus Enterprises Trade Joint Stock Company using data between 2011 and 2018.	CRITIC and TOPSIS
Maya & Eren (2018)	To compare the performances of 12 enterprises in the food sector registered in the Istanbul Stock Exchange and among the largest industrial enterprises in ISO 2014, using data between 2011 and 2015.	TOPSIS and VIKOR
Şahin & Karacan (2019)	To rank the financial success of 8 companies registered in the Construction Index operating in BIST, using the financial data of 2017.	GIA and TOPSIS
Karaoğlu & Şahin (2018)	To measure the performance of 24 companies in the BIST Chemistry, Petroleum, Plastic Index (XKMYA).	TOPSIS, VIKOR, GRA and MOORA
Kurt & Kablan (2022)	To examine the effects of the COVID-19 epidemic on the financial performance of airline companies operating in Turkey and included in the BIST Transportation Index (XULAS).	TOPSIS and MABAC
Apan & Öztel (2020)	To determine the performances of 7 GSYO companies traded on BIST between 2012 and 2016.	CRITIC-PROMETHEE
Yetiz & Kılıç (2021)	To evaluate the financial performance of public and private deposit banks serving in Turkey by creating annual financial ratios for the years 2015-2019.	VIKOR

Table 1 encapsulates a selection of recent studies employing Multi-Criteria Decision Making (MCDM) methodologies for Performance Measurement. The table delineates the authors of these studies, their research objectives, the methodologies applied, and the resultant findings. The synthesis provides a comprehensive overview of the research landscape elucidating the intricacies of MCDM applications in assessing and measuring performance across diverse domains.

3. APPLICATION

Among the methodologies employed for appraising business performance, the multi-criteria decision-making method stands as the prevailing approach. These techniques offer a

robust framework particularly suited for scenarios involving multiple alternatives and diverse evaluation criteria, notably in the hierarchical ranking of businesses based on their degrees of success.

Within the scope of this study, the performance assessments of companies within the mining and quarrying sector listed on the BIST exchange between 2018 and 2022 were conducted. Key financial ratios derived from the examination of their financial statements constitute the foundational data for this investigation. The TOPSIS method, a prominent multi-criteria decision-making technique, was employed in this analysis. Subsequently, the sequential procedural details of this method, integral to the study's

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evaluation, are meticulously outlined in the tables below. Notably, the tabulated data includes the companies under discussion, presented in an organized, alphabetical manner for clarity and reference.

Table 2. Company Codes

Order	Company Name
1	A
2	B
3	C
4	D
5	E

As depicted in Table 2 above, the study encompasses the utilization of data from five distinct companies denoted by sequential numbers (1 through 5) and corresponding letters (A, B, C, D, E) for reference and clarity. Notably, among the six designated companies within the Mining and Quarrying sector listed on the BIST exchange, the dataset pertaining to CVKMD (Maden İşletmeleri Sanayi ve Ticaret A.Ş.) was regrettably omitted due to inaccessible data.

Table 3. Ratios by Years

Order	Company	Ratios	Data				
			2018	2019	2020	2021	2022
1	A	Gross Profit/Net Sales	0,01	0,77	0,38	0,78	0,12
		Operating Profit/ Net Sales	0,04	0,40	12,44	2,29	0,52
		Net Income/ Net Sales	0,17	0,07	15,45	0,08	1,97
		Net Income/ Total Assets	0,15	0,005	0,29	0,005	0,23
		Net Income/ Equity	1,56	0,01	0,45	0,007	0,26
2	B	Gross Profit/Net Sales	0,606	0,65	0,64	6,33	0,60
		Operating Profit/ Net Sales	0,47	0,56	0,55	0,46	0,41
		Net Income/ Net Sales	0,78	0,64	0,58	0,65	0,60
		Net Income/ Total Assets	0,19	0,15	0,16	0,17	0,20
		Net Income/ Equity	0,22	0,22	0,18	0,20	0,24
3	C	Gross Profit/Net Sales	0,63	0,67	0,68	0,66	0,61
		Operating Profit/ Net Sales	0,53	0,59	0,60	0,47	0,44
		Net Income/ Net Sales	0,88	0,66	0,62	0,65	0,66
		Net Income/ Total Assets	0,23	0,21	0,18	0,17	0,24
		Net Income/ Equity	0,25	0,23	0,20	0,19	0,28
4	D	Gross Profit/Net Sales	0,60	0,65	0,65	0,63	0,60
		Operating Profit/ Net Sales	0,47	0,56	0,55	0,46	0,42
		Net Income/ Net Sales	0,78	0,65	0,58	0,65	0,60
		Net Income/ Total Assets	0,19	0,20	0,16	0,17	0,20
		Net Income/ Equity	0,22	0,22	0,18	0,20	0,24
5	E	Gross Profit/Net Sales	0,55	0,97	0,33	0,46	0,51
		Operating Profit/ Net Sales	3,83	6,08	0,11	0,16	0,28
		Net Income/ Net Sales	212,35	2,33	2,37	1,45	2,32
		Net Income/ Total Assets	0,14	0,01	0,08	0,08	0,22
		Net Income/ Equity	0,15	0,02	0,09	0,09	0,25

As depicted in Table 3, the presented data encapsulates the utilized ratios and the financial information pertaining to companies

A, B, C, D, and E over the preceding five years, forming the basis of this study's analysis. The initial phase involved the creation of decision

matrices for each annual dataset. Subsequently, each entry within these matrices underwent a squaring operation. The collective sum of these squared values was

calculated, followed by the extraction of square roots, thereby leading to the generation of decision matrices for each year, respectively in Tables 4 to 8.

Table 4. Decision Matrix for 2018

2018	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0001	0,0016	0,0289	0,0225	2,4336
B	0,3672	0,2209	0,6084	0,0361	0,0484
C	0,3969	0,2809	0,7744	0,0529	0,0625
D	0,3600	0,2209	0,6084	0,0361	0,0484
E	0,3025	14,6689	45092,5200	0,0196	0,0225
Total	1,4267	15,3932	45094,5400	0,1672	2,6154
Square Root of Totals	1,1945	3,9234	212,3548	0,4089	1,6172

Table 5. Decision Matrix for 2019

2019	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,5929	0,1600	0,0049	0,000025	0,0001
B	0,4225	0,3136	0,4096	0,0225	0,0484
C	0,4489	0,3481	0,4356	0,0441	0,0529
D	0,4225	0,3136	0,4225	0,0400	0,0484
E	0,9409	36,9664	5,4289	0,0001	0,0004
Total	2,8277	38,1017	6,7015	0,1067	0,1502
Square Root of Totals	1,6816	6,1727	2,5887	0,3267	0,3876

Table 6. Decision Matrix for 2020

2020	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,1444	154,7536	238,7025	0,0841	0,2025
B	0,4096	0,3025	0,3364	0,0256	0,0324
C	0,4624	0,3600	0,3844	0,0324	0,04
D	0,4225	0,3025	0,3364	0,0256	0,0324
E	0,1089	0,0121	5,6169	0,0064	0,0081
Total	1,5478	155,7307	245,3766	0,1741	0,3154
Square Root of Totals	1,2441	12,4792	15,6645	0,41723	0,5616

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Table 7. Decision Matrix for 2021

2021	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,6084	5,2441	0,0064	0,000025	0,00005
B	40,0689	0,2116	0,4225	0,0289	0,0400
C	0,4356	0,2209	0,4225	0,0289	0,0361
D	0,3969	0,2116	0,4225	0,0289	0,04
E	0,2116	0,0256	2,1025	0,0064	0,0081
Total	41,7214	5,9138	3,3764	0,0931	0,1242
Square Root of Totals	6,4592	2,4318	1,8375	0,3052	0,3525

Table 8. Decision Matrix for 2022

2022	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0144	0,2704	3,8809	0,0529	0,0676
B	0,3600	0,1681	0,3600	0,0400	0,0576
C	0,3721	0,1936	0,4356	0,0576	0,0784
D	0,3600	0,1764	0,3600	0,0400	0,0576
E	0,2601	0,0784	5,3824	0,0484	0,0625
Total	1,3666	0,8869	10,4189	0,2389	0,3237
Square Root of Totals	1,1690	0,9418	3,228	0,4888	0,5689

Tables 9 through 13 delineate the outcome of a systematic process involving the division of each entry within the decision matrices by the respective square roots of the totals. This iterative procedure was conducted for each

year's dataset, culminating in the generation of the following tables, capturing the normalized values for analysis and comparison.

Table 9. Weighted Decision Matrix for 2018

2018	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0083	0,0102	0,0008	0,3668	0,9646
B	0,5073	0,1198	0,0037	0,4647	0,1360
C	0,5274	0,1351	0,0041	0,5625	0,1546
D	0,5023	0,1198	0,0037	0,4647	0,1360
E	0,4604	0,9762	0,9999	0,3424	0,0928

Table 10. Weighted Decision Matrix for 2019

2019	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,4579	0,0648	0,02704	0,0153	0,0258
B	0,3865	0,0907	0,24723	0,4592	0,5677
C	0,3984	0,0956	0,2550	0,6428	0,5935
D	0,3865	0,0907	0,2511	0,6122	0,5677
E	0,5768	0,9850	0,9001	0,0306	0,0516

Table 11. Weighted Decision Matrix for 2020

2020	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,3054	0,9969	0,9863	0,6950	0,8013
B	0,5144	0,0441	0,0370	0,3835	0,3205
C	0,5466	0,0481	0,0396	0,4314	0,3561
D	0,5225	0,0441	0,0370	0,3835	0,3205
E	0,2653	0,0088	0,1513	0,1917	0,1603

Table 12. Weighted Decision Matrix for 2021

2021	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,1208	0,9417	0,0435	0,0164	0,0199
B	0,9800	0,1892	0,3537	0,5571	0,5674
C	0,1022	0,1933	0,3537	0,5571	0,5390
D	0,0975	0,1892	0,3537	0,5571	0,5674
E	0,071	0,0656	0,7891	0,2622	0,2553

Table 13. Weighted Decision Matrix for 2018

2022	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,1027	0,5522	0,6103	0,4706	0,4570
B	0,5133	0,4354	0,1859	0,4092	0,42183
C	0,5218	0,4672	0,2045	0,4910	0,4921
D	0,5133	0,4460	0,1859	0,4092	0,4218
E	0,4362	0,2973	0,7187	0,4501	0,4394

Incorporating expert insights, the relative importance levels of the various ratios were discerned, leading to the formulation of Table 14. This table reflects the weighted significance assigned to individual ratios,

derived from expert evaluations, thereby providing a framework for prioritizing and assessing their impact within the context of this study.

Table 14. Importance Levels of Ratios

Rates	Importance Degrees
Gross Profit/Net Sales	0,0424
Operating Profit/ Net Sales	0,4046
Net Income/ Net Sales	0,1942
Net Income/ Total Assets	0,2596
Net Income/ Equity	0,0992

In accordance with the importance levels assigned to each ratio, weighted decision matrices were formulated through the multiplication of these weights with the standard decision matrices. Subsequently, the minimum and maximum values within these

matrices were computed for each respective year. The outcomes of this process across the studied years are systematically outlined in Tables 15 to 19, delineating the extremities of values within these weighted matrices.

Table 15. Minimum and Maximum Values in 2018

2018	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0004	0,0041	0,0002	0,0952	0,0957
B	0,0215	0,0485	0,0007	0,1206	0,0135
C	0,0224	0,0547	0,0008	0,14604	0,0153
D	0,0213	0,0485	0,0007	0,1206	0,0135
E	0,0195	0,3950	0,1942	0,0889	0,0092
Minimum	0,0004	0,0041	0,0002	0,0889	0,0092
Maximum	0,0224	0,3949	0,1942	0,1460	0,0957

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Table 16. Minimum and Maximum Values in 2019

2019	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0194	0,0262	0,0053	0,0040	0,0026
B	0,0164	0,0367	0,0480	0,1192	0,0563
C	0,0169	0,0387	0,0495	0,1669	0,0589
D	0,0164	0,0367	0,0488	0,1589	0,0563
E	0,0245	0,3985	0,1748	0,0079	0,0051
Minimum	0,0164	0,0262	0,0053	0,0040	0,0026
Maximum	0,0245	0,3985	0,1748	0,1669	0,0589

Table 17. Minimum and Maximum Values in 2020

2020	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0130	0,4033	0,1915	0,1804	0,0795
B	0,0218	0,0178	0,0072	0,0996	0,0318
C	0,0232	0,0195	0,0077	0,1120	0,0353
D	0,0222	0,0178	0,0072	0,0996	0,0318
E	0,0112	0,0036	0,0294	0,0498	0,0159
Minimum	0,0112	0,0036	0,0072	0,0498	0,0159
Maximum	0,0232	0,4033	0,1915	0,1804	0,0795

Table 18. Minimum and Maximum Values in 2021

2021	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0051	0,3810	0,0085	0,0043	0,0020
B	0,0416	0,0765	0,0687	0,1446	0,0563
C	0,0043	0,0782	0,0687	0,1446	0,0535
D	0,0041	0,0765	0,0687	0,1446	0,0563
E	0,0030	0,0266	0,1532	0,0681	0,0253
Minimum	0,0030	0,0266	0,0085	0,0043	0,0020
Maximum	0,0416	0,3810	0,1532	0,1446	0,0563

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Table 19. Minimum and Maximum Values in 2022

2022	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity
A	0,0044	0,2234	0,1185	0,1222	0,0454
B	0,0218	0,1761	0,0361	0,1062	0,0419
C	0,0221	0,1890	0,0397	0,1275	0,0488
D	0,0218	0,1804	0,0361	0,1062	0,0419
E	0,0185	0,1203	0,1396	0,1169	0,0436
Minimum	0,0044	0,1203	0,0361	0,1062	0,0419
Maximum	0,0221	0,2234	0,1396	0,1275	0,0488

In a subsequent step, every individual value within the matrices underwent subtraction from its respective maximum value, followed by squaring. Subsequently, row-wise summations were computed, and the square roots of these totals were derived. This

meticulous process was conducted for each year's dataset, and the resulting computations are systematically exhibited in the ensuing Tables 20 to 24 for comprehensive review and analysis.

Table 20. Ideal (Maximum) Discrimination Criteria in 2018

2018	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity	Total	Square Root of Total
A	0,0005	0,1527	0,0376	0,0026	0,0000	0,1934	0,4398
B	0,0000	0,1200	0,0374	0,0006	0,0068	0,1649	0,4060
C	0,0000	0,1158	0,0374	0,0000	0,0065	0,1596	0,3995
D	0,0000	0,1200	0,0374	0,0006	0,0068	0,1649	0,4060
E	0,0000	0,0000	0,0000	0,0033	0,0075	0,0108	0,1037

Table 21. Ideal (Maximum) Discrimination Criteria in 2019

2019	Gross Profit/Net Sales	Operating Profit/ Net Sales	Net Income/ Net Sales	Net Income/ Total Assets	Net Income/ Equity	Total	Square Root of Total
A	0,0000	0,1386	0,0287	0,0265	0,0032	0,1971	0,4439
B	0,0001	0,1309	0,0161	0,0023	0,0000	0,1493	0,3864
C	0,0001	0,1295	0,0157	0,0000	0,0000	0,1452	0,3811
D	0,0001	0,1309	0,0159	0,0001	0,0000	0,1469	0,3833
E	0,0000	0,0000	0,0000	0,0253	0,0029	0,0282	0,1678

Table 22. Ideal (Maximum) Discrimination Criteria in 2020

2020	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0001	0,0000	0,0000	0,0000	0,0000	0,0001	0,0102
B	0,0000	0,1486	0,0340	0,0065	0,0023	0,1914	0,4375
C	0,0000	0,1473	0,0338	0,0047	0,0020	0,1878	0,4333
D	0,0000	0,1486	0,0340	0,0065	0,0023	0,1914	0,4375
E	0,0001	0,1598	0,0263	0,0171	0,0040	0,2073	0,4553

Table 23. Ideal (Maximum) Discrimination Criteria in 2021

2021	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0013	0,0000	0,0210	0,0197	0,0030	0,0449	0,2120
B	0,0000	0,0927	0,0071	0,0000	0,0000	0,0998	0,3160
C	0,0014	0,0917	0,0071	0,0000	0,0000	0,1002	0,3166
D	0,0014	0,0927	0,0071	0,0000	0,0000	0,1012	0,3182
E	0,0015	0,1256	0,0000	0,0059	0,0010	0,1339	0,3659

Table 24. Ideal (Maximum) Discrimination Criteria in 2022

2022	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0003	0,0000	0,0004	0,0000	0,0000	0,0008	0,0283
B	0,0000	0,0022	0,0107	0,0005	0,0000	0,0134	0,1159
C	0,0000	0,0012	0,0100	0,0000	0,0000	0,0112	0,1056
D	0,0000	0,0018	0,0107	0,0005	0,0000	0,0131	0,1142
E	0,0000	0,0106	0,0000	0,0001	0,0000	0,0108	0,1038

For each year's dataset, a sequential process was undertaken wherein every value within the matrices underwent subtraction from the respective minimum values, followed by squaring. Subsequently, row-wise summations were computed, and the square

roots of these totals were derived. This meticulous computational procedure was diligently executed across the datasets for each year, culminating in the tabulated results outlined in Tables 25 to 29 for comprehensive scrutiny and assessment.

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Table 25. Ideal (Minimum) Discrimination Criteria in 2018

2018	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0000	0,0000	0,0000	0,0000	0,0075	0,0075	0,0868
B	0,0004	0,0020	0,0000	0,0010	0,0000	0,0034	0,0587
C	0,0005	0,0026	0,0000	0,0033	0,0000	0,0063	0,0796
D	0,0004	0,0020	0,0000	0,0010	0,0000	0,0034	0,0586
E	0,0004	0,1527	0,0376	0,0000	0,0000	0,1907	0,4367

Table 26. Ideal (Minimum) Discrimination Criteria in 2019

2019	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0030
B	0,0000	0,0001	0,0018	0,0133	0,0029	0,0181	0,1346
C	0,0000	0,0002	0,0020	0,0265	0,0032	0,0318	0,1784
D	0,0000	0,0001	0,0019	0,0240	0,0029	0,0289	0,1700
E	0,0001	0,1386	0,0287	0,0000	0,0000	0,1674	0,4092

Table 27. Ideal (Minimum) Discrimination Criteria in 2020

2020	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0000	0,1598	0,0340	0,0171	0,0040	0,2149	0,4635
B	0,0001	0,0002	0,0000	0,0025	0,0003	0,0030	0,0552
C	0,0001	0,0003	0,0000	0,0039	0,0004	0,0046	0,0682
D	0,0001	0,0002	0,0000	0,0025	0,0003	0,0031	0,0553
E	0,0000	0,0000	0,0005	0,0000	0,0000	0,0005	0,0222

Table 28. Ideal (Minimum) Discrimination Criteria in 2021

2021	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0000	0,1256	0,0000	0,0000	0,0000	0,1256	0,3543
B	0,0015	0,0025	0,0036	0,0197	0,0030	0,0303	0,1740
C	0,0000	0,0027	0,0036	0,0197	0,0027	0,0287	0,1693
D	0,0000	0,0025	0,0036	0,0197	0,0030	0,0288	0,1696
E	0,0000	0,0000	0,0210	0,0041	0,0005	0,0256	0,1599

Table 29. Ideal (Minimum) Discrimination Criteria in 2022

2022	Gross Profit/Net Sales	Operating Profit/Net Sales	Net Income/Net Sales	Net Income/Total Assets	Net Income/Equity	Total	Square Root of Total
A	0,0000	0,0106	0,0068	0,0003	0,0000	0,0177	0,1330
B	0,0003	0,0031	0,0000	0,0000	0,0000	0,0034	0,0585
C	0,0003	0,0047	0,0000	0,0005	0,0000	0,0056	0,0745
D	0,0003	0,0036	0,0000	0,0000	0,0000	0,0039	0,0626
E	0,0002	0,0000	0,0107	0,0001	0,0000	0,0110	0,1050

In a systematic progression, ideal solutions were derived by dividing the negative distances by the summation of negative and positive distances for each respective year. This methodical procedure was diligently executed across the datasets for each year, resulting in the tabulated outcomes meticulously presented in Tables 30 to 34 for comprehensive analysis and reference.

Table 30. Performance Scores of Companies in 2018

2018	Results
A	0,1648
B	0,1262
C	0,1662
D	0,1261
E	0,8081

Table 31. Performance Scores of Companies in 2019

2019	Results
A	0,0068
B	0,2583
C	0,3189
D	0,3073
E	0,7092

Table 32. Performance Scores of Companies in 2020

2020	Results
A	0,9784
B	0,1120
C	0,1359
D	0,1121
E	0,04647

Table 33. Performance Scores of Companies in 2021

2021	Results
A	0,6257
B	0,3551
C	0,3484
D	0,3478
E	0,3042

Table 34. Performance Scores of Companies in 2022

2022	Results
A	0,8247
B	0,3354
C	0,4137
D	0,3540
E	0,5027

The ideal solutions, reflecting the performances of the companies across each year, have been enumerated. Additionally, a performance ranking of these companies was established by computing the average of the five-year ideal solution data. This

comprehensive assessment provides a nuanced understanding of the companies' performances over the studied period, enabling a holistic ranking based on their collective five-year ideal solution averages.

Table 35. Five-Year Performance Rankings of Companies

Order	2018	2019	2020	2021	2022	Average of 5 Years
1.	C	D	E	E	A	E
2.	E	E	D	D	B	D
3.	D	B	B	B	E	B
4.	A	A	A	A	D	A
5.	B	C	C	C	C	C

Table 35 delineates distinct performance rankings for each year across the five-year span. It reveals noteworthy fluctuations among the companies' standings over time. For instance, Company C, initially ranked first in 2018, exhibited a considerable decline in

subsequent years, securing the last position. Conversely, Company E displayed an overall improvement in performance, despite a slight decline in 2022. Company A consistently maintained a routine performance, attaining the top rank solely in 2022. On the other hand,

Companies B and D showcased fluctuating performances, witnessing periods of both ascent and descent.

Evidently, Companies A, B, and D demonstrated varying performance trajectories throughout the studied years, experiencing fluctuations in their standings. Consequently, among the five entities, Company C emerged with the least favorable performance, while the assessment determined Company E as the top performer based on the comprehensive analysis of their performances across the five-year duration.

4. CONCLUSION

The concept of 'performance' stands as a fundamental facet within the realm of business operations, serving as an effective tool to steer endeavors toward achieving predefined objectives. Performance evaluation emerges as a pivotal mechanism, enabling companies to gain insight into their present status while forecasting their trajectory. This evaluative process not only identifies areas necessitating improvement but also furnishes operators with indispensable information crucial for informed decision-making.

The integration of performance evaluations into decision-making processes augments a company's capacity for self-enhancement, facilitating a continual pursuit of heightened performance levels. Such evaluative practices afford a holistic perspective when appraising financial performance and overall business efficacy. Notably, within this study, the TOPSIS method, renowned for its efficacy within multi-criteria decision-making, was employed.

Given the ubiquitous presence of the mining sector in contemporary life, this study delved into the meticulous examination of the five-year (2018-2019-2020-2021-2022) financial statements of mining and quarrying companies listed within the sectors section of BIST. Pertinent financial ratios were meticulously computed, considering their significance within these financial statements.

In this study, a structured methodology was employed involving sequential stages to evaluate the financial performances of the companies utilizing the TOPSIS method. The process commenced with the creation of decision matrices for each year, followed by squaring each data point within these matrices. The summation of the squared values and the subsequent derivation of square roots facilitated the generation of annual tables.

Subsequently, these tables underwent normalization, achieved by dividing each data point by the square roots of the respective totals. Importance levels of ratios were determined through expert opinions, enabling the formulation of weighted standard decision matrices by multiplying these importance levels with the standard decision matrices. Calculation of minimum and maximum values within the matrices ensued, followed by a process where each value was subtracted from the maximum values and squared. Similar operations were conducted using the minimum values, resulting in the computation of row totals and their respective square roots.

Further analysis involved deriving ideal solutions by normalizing negative distances for each year against the sum of negative and positive distances. The culmination of this multi-stage process led to the presentation of ideal solutions and the annual performances of the companies. Notably, a comprehensive assessment was conducted through the calculation of performance rankings based on the 5-year average ideal solution data. Observations from these rankings highlighted fluctuations in company performances across the studied years, showcasing instances of decline, improvement, and consistent performance maintenance among the considered companies.

REFERENCES

Apan, M. & Öztel, A. (2020). Girişim Sermayesi Yatırım Ortaklıklarının CRITIC-PROMETHEE Bütünleşik Karar Verme Yöntemi ile Finansal Performans Değerlendirmesi: Borsa İstanbul'da Bir

- Uygulama. *Dumlupınar University Journal of Social Sciences*, 63, 54-73.
- Aytekin, S. & Sakarya, Ş. (2013). BIST’de İşlem Gören Gıda İşletmelerinin TOPSIS Yöntemi ile Finansal Performanslarının Değerlendirilmesi. *Yönetim ve Ekonomi Araştırmaları Dergisi*, 11(21), 30-47.
- Bayyurt, N. (2007). İşletmelerde Performans Değerlendirmenin Önemi ve Performans Göstergeleri Arasındaki İlişkiler. *Journal of Social Policy Conferences*, (53), 577-592.
- Bilim, N., DüNDAR, S. & Bilim, A. (2018). Ülkemizdeki Maden Sektöründe Meydana Gelen İş Kazası ve Meslek Hastalıklarının Analizi. *BEÜ Fen Bilimleri Dergisi*, 7(2), 423-432.
- Karaođlan, S. & Şahin, S. (2018). BİST XKMYA İşletmelerinin Performanslarının Çok Kriterli Karar Verme Yöntemleri ile Ölçümü ve Yöntemlerinin Karşılaştırılması. *Ege Akademik Bakış Dergisi*, 18(1), 63-80.
- Kurt, G. & Kablan, A. (2022). COVID-19’un BIST Ulaştırma Endeksinde Faaliyet Gösteren Havayolu İşletmelerinin Finansal Performansı Üzerindeki Etkilerinin, Çok Kriterli Karar Verme Yöntemleri ile Analizi. *İşletme Akademisi Dergisi*, 3(1), 16-33.
- Mama, R. & Eren, T. (2018). Türk Gıda Sektörünün Finansal Performans Analizinin Çok Kriterli Karar Verme Yöntemleri ile Yapılması. *Verimlilik Dergisi*, 21(39), 31-60.
- Orhan, M., Altun, H. & Aytekin, M. (2020). Çok Kriterli Karar Verme Yöntemleriyle Finansal Performans Değerlendirme: Ulaştırma Alanında Bir Uygulama. *Turkish Studies-Economics, Finance, Politics*, 5(1), 395-410.
- Özçelik, H. & Kandemir, B. (2015). BIST’de İşlem Gören Turizm İşletmelerinin TOPSIS Yöntemi ile Finansal Performanslarının Değerlendirilmesi. *Balıkesir University The of Social Sciences Institute*, 18(33), 97-114.
- Pala, F. (2023). BİST Teknoloji ve Bilişim Sektöründe İşlem Gören Şirketlerin Finansal Performanslarının Çok Kriterli Karar Verme Yöntemleri ile Ölçülmesi ve Yöntemlerin Karşılaştırılması. *Finans Ekonomi ve Sosyal Araştırmalar Dergisi*, 8(1), 121-155.
- Seçme, G. (2022). Firma Performans Değerlendirilmesine Çok Kriterli Yaklaşım: Bankacılık Sektörü Üzerine Bir Uygulama. *Ekonomi, Politika & Finans Araştırmaları Dergisi*, 7(2), 457-480.
- Şahin, İ.E. & Karacan, K.B. (2019). BIST’de İşlem Gören İnşaat İşletmelerinin Çok Kriterli Karar Verme Yöntemleri ile Finansal Performans Ölçümü. *International Journal of Multidisciplinary Studies and Innovative Technologies*, 3(2), 162-172.
- Taşçı, M.Z. & Akbalık, M. (2022). Performance Analysis of Insurance Companies Operating in the Turkish Insurance Sector’s Life and Retirement Branches Using Multiple-Criteria Decision-Making Methods. *Journal of Economics and Administrative Sciences*, 23(3), 726-735.
- Terziođlu, M.K., Temelli, S., Yaşar, A. & Özdemir, Ö. (2023). Bankacılık Sektöründe Finansal Performansların Çok Kriterli Karar Verme Yöntemleri ile Karşılaştırılması. *Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstitüsü Sosyal Bilimler Dergisi*, 13(25), 21-45.
- Topal, A. (2021). Çok Kriterli Karar Verme Analizi ile Elektrik Üretim Şirketlerinin Finansal Performans Analizi: Entropi Tabanlı CoCoSo Yöntemi. *Business & Management Studies: An International Journal*, 9(2), 532-546.
- Yetiz, F. & Kılıç, Y. (2021). Bankaların Finansal Performansının VIKOR Yöntemi ile Değerlendirilmesi: Türkiye Örneđi. *Akademik Araştırmalar ve Çalışmalar Dergisi*, 13(24), 151-164.