ATATÜRK ÜNİVERSİTESİ YAYINLARI
ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi* DOI: 10.16951/trendbusecon.1532523

# Evaluation of Financial Performance of Businesses in Istanbul Stock Market Retail Trade Sector According to Traditional and Cash Flow Ratios with CoCoSo Method

## BIST Perakende Ticaret Sektöründeki İşletmelerin Finansal Performanslarının Geleneksel ve Nakit Akış Rasyolarına Göre CoCoSo Yöntemi ile Değerlendirilmesi

Ayşe SOY TEMÜR[1]
[1]Düzce University, Kaynaşlı Vocational School, Foreign Trade Department, Düzce, Türkiye

Saadet TULUM[2]
[2]Kırklareli University, Vize Vocational School, Finance-Banking and Insurance, Kırklareli, Türkiye

**ABSTRACT**

The purpose of this research is to evaluate the financial performance of companies in the Istanbul Stock Market (BIST) retail trade sector comparatively based on traditional financial rates and cash flow rates. In the study, the financial ratio based on 12 traditional financial ratios and 14 cash flow statements obtained by benefiting from the annual financial statements of the enterprises published in public information platform (PIP) as a criterion in the calculation of financial performance rankings was taken into consideration. Critic method was used in calculating the criteria weights, while CoCoSo and TOPSIS method was used in determining the financial performance rankings. The ranking results obtained were compared and Spearman's test was applied in order to determine whether there was consistency between the findings. In comparisons based on traditional and cash flow ratios, the highest level of similarity was obtained in 2017 and 2018 for the CoCoSo method and in 2017 and 2019 for the TOPSIS method. The lowest similarity was in 2021 and 2022 for CoCoSo and in 2018, 2021 and 2022 for TOPSIS. In the financial performance ranking results obtained from the methods, similar ranking results were achieved in all years except 2018 and 2019 for traditional ratios and 2019 and 2020 for cash flow ratios.

**JEL Codes:** C02, C44, C61

**Keywords:** Istanbul Stock Market Retail Trade, Critic Weight CoCoSo, Financial Performance, Cash Flow Ratios

**ÖZ**

Araştırmanın amacı, BIST perakende ticaret sektöründeki şirketlerin finansal performanslarının geleneksel finansal oranlar ve nakit akış oranlarına göre karşılaştırmalı olarak değerlendirilmesidir. Çalışmada, finansal performans sıralamalarının hesaplanmasında kriter olarak işletmelerin KAP'ta yayımladıkları 2017-2022 dönemine ilişkin yıllık mali tablolarından faydalanılarak 12 geleneksel finansal oran ile 14 nakit akım tablolarından elde edilen finansal oran dikkate alınmıştır. Kriter ağırlıkları hesaplanırken Critic, finansal performans sıralamalarının belirlenmesinde ise, CoCoSo ve TOPSIS yönteminden faydalanılmıştır. Elde edilen sıralama sonuçları karşılaştırılmış ve bulgular arasında tutarlılık olup olmadığının belirlenmesi amacıyla Spearman's testi uygulanmıştır. Geleneksel ve nakit akış oranlarına dayalı karşılaştırmalarda en yüksek benzerlik düzeyi CoCoSo yönteminde 2017 ve 2018, TOPSIS yönteminde 2017 ve 2019 yıllarında elde edilmiştir. En düşük benzerlik ise CoCoSo'ya göre 2021 ve 2022, TOPSIS'e göre ise 2018, 2021 ve 2022 yıllarındadır. Yöntemlerden elde edilen finansal performans sıralama sonuçlarında ise, geleneksel oranlara göre 2018 ve 2019, nakit akış oranlarına göre 2019 ve 2020 haricindeki tüm yıllarda birbirine benzer sıralama sonuçlarına ulaşılmıştır.

**Jel Kodları:** C02, C44, C61

**Anahtar Kelimeler:** Borsa Istanbul Perakende Ticaret, Critic Ağırlıklandırmalı CoCoSo, Finansal Performans, Nakit Akış Oranları

**Geliş Tarihi/Received** 13.08.2024
**Kabul Tarihi/Accepted** 12.06.2025
**Yayın Tarihi/Publication Date** 15.07.2025

**Sorumlu Yazar/Corresponding author:** Ayşe SOY TEMÜR
**E-mail:** aysesoy@duzce.edu.tr

**Cite this article:** Soy Temür A., & Tulum S. (2025). Businesses in Istanbul Stock Market Retail Trade Sector According to Traditional and Cash Flow Ratios with CoCoSo Method. *Trends in Business and Economics*, *39*(3), 359-377.

## Introduction

The retail trade sector, which tends to develop continuously, has become one of the important sectors in the world economy today. Especially after the 2000s, the retail trade sector in Turkey has shown rapid growth, depending on the developments in technology. There are approximately 3.6 million businesses in Turkey, when the manufacturer and suppliers are included, 2.3 million of these businesses operate in connection with the retail sector. Approximately 10.2 million people work in related businesses. The turnover generated by these enterprises is around 12.4 trillion and corresponds to approximately 75% of the total turnover of all sectors (16.6 trillion). The growth performance of the sector contributes significantly to the growth of the country's economy (Ministry of Commerce, 2023).

Financial performance used in measuring the activities of businesses; which is important for investors, managers and other businesses operating in the sector. With the measurement of financial performance based on financial indicators, it is possible to learn about many indicators such as how effectively businesses use their existing resources, profitability levels and liquidity situations. Financial performance measurement can be carried out on a single business basis, as well as many alternatives and many criteria. The methods used in decision problems with multiple alternatives and criteria are expressed as multi-criteria decision making (MCDM). In many studies in the literature, various MCDM techniques have been used to evaluate the financial performance of businesses. TOPSIS method is among the most commonly used methods. Examining the financial performance of businesses in the retail trade sector has also been the subject of numerous research.

In this study, the annual financial performances of enterprises registered in the BIST retail sector for the period 2017-2022 were examined by the Ciritic weighted CoCoSo method according to both traditional financial rates and cash flow rates. Cash flow statements allow businesses to appear more clearly, as they include changes in their cash and similar assets. For this reason, cash flow ratio as well as traditional financial rates were used in the research. The criteria weights were determined using the Critic method, which incorporates both the standard deviations of the criteria and inter-criteria correlations as an objective weighting approach. In the ranking of alternatives, although it was developed in 2019, it has been applied to many decision-making problems and has been proven to be accurate, can be easily applied to different decision problems, however, the CoCoSo method, which was not previously used in a study on the BIST retail industry, was applied. Other reasons for preferring the CoCoSo method are that it is based on a combination of various compromise techniques to reach the final optimum solution, provides a more balanced solution by taking into account various aspects of the criteria, and has advantages such as being flexible and easy to implement (Winardo & Cahyono, 2024). In addition, analyzes were carried out with TOPSIS method, one of the most commonly used MCDM techniques, to compare the ranking results obtained from the CoCoSo method. The ranking results obtained were subjected to consistency analysis both on the basis of the criteria used and according to the methods with the Spearman's test. All findings were evaluated by comparison.

This study makes several contributions to the literature. First, in addition to traditional financial rates, cash flow rates were used in the research, where clearer information about the financial performance of businesses could be obtained. In similar studies in the literature, more traditional financial ratios and financial performance evaluations are carried out. Although studies using cash flow rates are also subject to research, the number of studies using traditional and cash flow rates is quite limited. In this study, both traditional financial ratios and cash flow ratio were used and the ranking results obtained were compared. Secondly, analyzes were carried out in the literature with a very limited number of financial performance analysis and the CoCoSo method, which was never used in the retail trade sector. In addition, with the TOPSIS method, the Spearman's test was performed to determine the consistency between the ranking results by performing the performance ranking of the enterprises. Another contribution of the research to the literature is that the research covers a long period (2017-2022). It also includes financial performance evaluations for the pre-Covid-19, Covid-19 period and post-Covid-19 period, which caused significant effects on businesses in this period.

In the literature, there is no research in which the financial performance of businesses registered in the BIST retail sector is evaluated by the Critic weighting CoCoSo method using traditional financial ratios and cash flow ratio together and the ranking results obtained are compared with the TOPSIS method and the Spearman's test is applied to measure the consistency of the method results. Due to these features, the work performed differs

considerably from the literature. This research provides guiding information for investors considering investing in the retail trade sector. It is thought that it will play an important role in making more efficient investment decisions and will contribute significantly to the literature in terms of studies to be carried out later on similar methods and sectors.

In the first part of the research, the importance of the retail trade sector and the study is mentioned. Then, the recent literature on studies using cash flow ratio in evaluating the financial performance of businesses, research in which financial analysis of businesses in the retail trade sector is carried out, and studies using the CoCoSo and TOPSIS method are summarized. In the third section, information on the businesses included in the analysis and the criteria used is included. In the fourth part of the study, the methods used in determining the criteria weights and sorting alternatives are explained. In the fifth section, the results of the analysis obtained were presented, and in the last section, general evaluations were made on all findings, the ranking results obtained from similar studies in the literature were compared and suggestions were made for future research.

## Literature Review

The literature includes many studies in which both traditional and cash flow rates are used as evaluation criteria in the review of the financial performance of businesses. In this part of the study, recent research in the literature research has been studied in three groups. First, studies based on cash flow ratios were examined. In the second group, studies on financial performance analyzes for the retail trade sector are summarized. Finally, studies in which CoCoSo and TOPSIS methods were used together are included.

Studies on financial performance analysis are often studied by researchers. In similar studies in the literature, research based on traditional proportions shows intensity, but there are also research based on cash flow rates. The first theoretical studies in which cash flow rates were systematically classified were carried out by Carslaw and Mills (1991), Giacomino and Mielke (1993) and Mills and Yamamura (1998). In the studies of Celik et al. (2023), using the cash flow and financial status tables of the Ford, Tofas and Karsan automotive companies traded in BIST, they conducted an analysis of the cash flow performance of the enterprises. As a result of the analysis, comments regarding the cash flows of the enterprises are included.

In the studies of Onder and Gurbuz (2023), they examined the cash flow activity activity of 78 companies that were offered to the public in the Istanbul Stock Market in the period 2005-2018. In the research, the activity ratio of cash flows from activities related to sales, assets, equity and total debts were used as performance criteria. In another study using cash flow rates, the financial performance of businesses operating in the BIST it industry was evaluated by the Critic-based TOPSIS method (Sakarya & Ilkdogan, 2022). Especially with the introduction of the TMS 7 Cash Flow Statement Standard, the number of studies based on cash flow rates has increased. Research in which Promethee (Sakarya & Eryaman, 2022), Entropi-Edas (Apan & Oztel, 2020), TOPSIS (Acikgoz, 2021), (Sakarya & Girgin, 2022) and CoCoSo (Ciftci et al., 2021); (Soy Temur & Tulum, 2022) methods are used to determine the financial performance of companies traded on BIST based on cash flow rates can be given as examples.

In the literature, the TOPSIS method is frequently used in studies carried out to examine the financial performances of businesses registered in the BIST retail trade sector. Studies conducted by Soy Temür et al. (2017), Deste and Halifeoglu (2019), Satir et al. (2020), Itik and Sel (2021), Yildirim (2021), Askin and Erdem (2022), Budak and Sakarya (2022) and Ertas and Yetim (2022) can be cited as an example of research using the TOPSIS method in the analysis of the financial performance of businesses operating in the BIST retail trade industry. On the other hand, a large number of studies have been conducted using different CCTPLE methods. Ceyhan and Karapolat (2022) measure the financial performance of retail trade enterprises by Copras method; The financial performance impact of the Covid-19 outbreak process on chain markets operating under the BIST Retail Trade sector (Iyibildiren, 2022); Sariay and Bagci (2020), the impact of asset consumption on the financial performance of businesses; Ulker and Aslan (2020), With the financial ratio analysis of the financial performance of 3 market chains traded in the BIST-Retail Trade Sector; Demirkol and Ikvan (2019), BIST wholesale and retail trade, financial rates of businesses in the hotel and restaurant sector by Aras method; Ozbek (2016) evaluated the financial performance of the Bim stores chain for the period 2008-2016 by the Electre III method. Balci (2024) evaluated the financial performance of companies in the BIST wholesale and retail trade sector using the SECA method using post-Covid-19 pandemic data. In a similar study, Keskin (2024) used Entropy weighting and Multimoora methods in evaluating the financial performance of companies in the retail trade sector.

In the last part of the literature review, research using the CoCoSo method in financial performance analysis was examined. Although the CoCoSo method is a new method developed in 2019', it has been used frequently by researchers. Some of these studies for financial performance analysis can be summarized as follows.

Ghosh and Bhattacharya (2022) examined the impact of Covid-19' on the financial performance of accommodation and tourism companies in their work, which they used the MEREC method in determining the criteria weights. In the studies of Akbulut and Hepsen (2021), Entropi-based CoCoSo method in the analysis of the relationship between financial performance and stock returns; Peng and Huang (2020) used the Critic weighted CoCoSo method for financial risk assessment. Pala (2021) used the CoCoSo method in the evaluation of the financial performances of the companies in the BIST construction index; Gulcemal et al. (2023) and Bektas (2022) insurance companies; Calis and Sakarya (2022) automotive sector; Akgul (2021), Cilek (2022) and Ciftaslan and Rencber (2022) banks; Ciftci et al. (2021) energy companies; Topal (2021) electricity generation companies; Soy Temur and Tulum (2022) technology companies; Bozkurt and Simsek (2024) BIST energy companies. Ozekenci (2024) analyzed the financial performance of the companies in the BIST sustainability 25 index with LBWA and MEREC based CRADIS methods in his study and used various MCDM techniques together with the CoCoSo method to test the robustness and validity of the results. Similarly, a study was conducted by Kaya et al. (2024) for the financial performance analysis of 22 companies registered in the sustainability index, including the determination of criteria weights with Fucom and performance ranking with CoCoSo, GRA, MABAC, MAIRCA, MOOSRA, OCRA, TOPSIS, TODIM and VIKOR. As a result of the study, the results were consolidated using the Copeland method and Borda rule, since each method gave different ranking results. Then, a weight simulation was used to test the robustness of Copeland's results.

In the literature, no research has been found examining the financial performance of businesses in the BIST retail trade sector using the CoCoSo method. In addition, in this study, financial ratios based on cash flow statements were used along with traditional financial ratios obtained from the financial statements of businesses. The research conducted in this respect is an original study. This study aims to provide guiding information to investors considering investing in the retail trade sector and to contribute to the literature.

## Data

In this section, information about the businesses included in the analysis is first included. Then, data regarding the criteria used in the analyzes were mentioned.

### Information on Businesses

In the study, data on companies whose financial statements can be reached were used in evaluating the financial performance of enterprises registered in the BIST retail sector for the period 2017-2022. Data on financial statements used in the analyzes were obtained from Public Disclosure Platform (Public Disclosure Platform, 2023).

Information on businesses registered in the BIST retail sector is included in Table 1.

**Table 1.**

*Businesses Registered to the BIST Retail Trade Sector*

| *Row* | *Code* | *Activity Area* |
|---|---|---|
| *1* | *BIMAS* | *Retail trade of a wide variety of goods, where food products, beverages or tobacco products are not weighted* |
| *2* | *BIZIM* | *Fast consumer products marketing* |
| *3* | *CRFSA* | *Wholesale and retail trade / department stores* |
| *4* | *CASA* | *Production of fish oil and fish flour* |
| *5* | *KIMMR* | *Wholesale and retail purchase and sale, import and export of all kinds of food and necessities* |
| *6* | *GMTAS* | *Wholesale and retail trade* |
| *7* | *MAVI* | *Design, manufacture, import, export and marketing of ready-to-wear garments and textile products made of all kinds of natural and sun'i fabrics…* |
| *8* | *MEPET* | *Petroleum, petroleum product, petroleum derivatives, gasoline, diesel fuel, kerosene, fuel oil, solvent, jet fuel* |
| *9* | *MGROS* | *To make wholesale sales of all kinds of food and consumer goods for retail and retail consumption* |
| *10* | *MIPAZ* | *Wholesale and retail trade, hotels and restaurants, vehicles, agricultural and machine tools, construction and other* |
| *11* | *SUWEN* | *Production and design in the underwear and pajamas industry* |
| *12* | *SOKM* | *Retailing* |
| *13* | *TKNSA* | *Consumer electronics, information technology, telecom products and white goods retailing* |
| *14* | *VAKKO* | *To produce and sell ready-made clothing items* |

**Source:** https://www.kap.org.tr/tr/Industries

As seen in the table, there are 14 companies registered in the BIST retail trade sector. While the subject of activity of some of these enterprises is food, some of them carry out textile production and sales. SUWEN was not included in the analyzes because its financial statements before 2021 could not be reached. KIMMR was included in the analyzes in 2018 and after, GMTAS 2020 and beyond.

***Data on Evaluation Criteria***

In this research, which aims to measure the financial performance of companies traded in the BIST retail trade sector for 2017-2021, the financial statements published by the enterprises in PIP were used. In this context, in addition to traditional financial rates, cash flow-based financial ratios are also included in the analyzes and are intended to achieve more valid and comparable results. For this purpose, when selecting the ratios used in the analyses as an indicator of financial performance, attention has been paid to the comparability of cash flow ratios with traditional ratios. The financial ratios used in the study are presented in Tables 2 and 3.

**Table 2.**

*Traditional Financial Rates*

| Code | Feature | Financial Rations | Calculation Method |
|---|---|---|---|
| A. Liquidity Ratios | | | |
| LR1 | Max | Current Rate | Current Assets/Short-Term Liabilities |
| LR2 | Max | Acid-Test Rate | (Current Assets-Inventories) / Short-Term Liabilities |
| LR3 | Max | Cash Rate | (Ready Values+Free Securities) / Short-Term Liabilities |
| B. Activity Rates | | | |
| A1 | Max | Active Speed of Rotation | Net Sales/Total Assets |
| A2 | Max | Inventory Turnover Rate | Cost of Goods Sold/Average Inventories |
| A3 | Max | Net Working Capital Turnover Rate | Net Sales/Net Working Capital |
| C. Ratios Related to Financial (Financial) Structure | | | |
| F1 | Max | Financing Rate | Equity/Total Liabilities |
| F2 | Min | Borrowing Ratio | Total Foreign Assets/Total Liabilities |
| D. Profitability Ratios | | | |
| P1 | Max | Return on Equity | Net Profit/Equity |
| P2 | Max | Assets Profitability | Net Profit/Total Assets |
| P3 | Max | Net Profit Margin | Net Profit/Net Sales |
| P4 | Max | Earnings Per Share | Net Profit/Total Number of Shares |

As indicated in Table 2, the 12 most frequently used ratios in the literature, which are among the traditional financial ratios grouped as liquidity ratios, activity ratios, financial (financial) structure ratios and profitability ratios, were used.

**Table 3.**

*Financial Ratios Based on Cash Flow Statements*

| | | | |
|---|---|---|---|
| A. Liquidity/Debt Payment Ratios | | | |
| L1 | Max | Operating Cash Flow Ratio | Cash Flows from Operating Activities / Short Term Debts |
| L2 | Max | Cash Ratio | Available Cash /Short Term Debts |
| L3 | Max | Cash Debt Coverage Ratio | Cash Flows from Operating Activities / Total Payables |
| L4 | Max | Cash Interest Coverage Ratio | (Cash Flows from Operating Activities + Interest Expenses)/ Interest Expenses |
| B. Activity/Activity Rates | | | |
| AR1 | Max | Cash Return on Assets | Cash Flows from Operating Activities / Total Assets |

| | | | |
|---|---|---|---|
| AR2 | Max | Cash Return on Fixed Assets | Cash Flows from Operating Activities / Total Non-current Assets |
| AR3 | Max | Cash Transfer Rate | Cost of Sales (Excluding Depreciation Expenses)/Cash Available |
| C. Financial Structure Ratios | | | |
| FS1 | Min | Financial Leverage Ratio | Total Foreign Assets/Total Liabilities |
| FS2 | Max | Cash Flow-Continuous Capital Ratio | Cash Flows from Operating Activities / Permanent Capital |
| D. Profitability Ratios | | | |
| PR1 | Max | Cash-to-Sales Ratio | Cash Flows from Operating Activities / Net Sales |
| PR2 | Max | Cash-Asset Ratio | Cash Flows from Operating Activities / Total Assets |
| PR3 | Max | Cash Rate of Return of Partners | Cash Flows from Operating Activities / Equities |
| PR4 | Max | Profit Quality Rate | Cash Flows from Operating Activities / Period Profit/(Loss) |
| PR5 | Max | Cash Flow Per Share | Cash Flows from Operating Activities / Number of Shares in Circulation |

Financial ratios based on cash flow statements; It is classified in four groups as liquidity/debt payment, efficiency/activity, financial structure and profitability ratios. Of these ratios, 14 financial ratios, which are frequently used in the literature to evaluate the financial performance of businesses, are used as evaluation criteria.

## Methods

In this research, the financial performances of businesses registered in the BIST retail trade sector were evaluated with the Critic-weighted CoCoSo method. The Critic (CRiteria Importance Through Intercriteria Correlation) method, which is one of the objective valuation methods, was used to determine the criterion weights, and the CoCoSo method was used to rank the alternatives. The reason why the CoCoSo method is preferred is that it is a method developed recently and it has not been used in the literature to examine the financial performances of businesses in the retail trade sector before.

### Critic Method

This method was described by Diakoulaki et al. It was brought to the literature with a study carried out in 1995 by This method is based on the analytical examination of the evaluation matrix to extract all the information contained in the evaluation criteria and consists of five stages (Diakoulaki et al., 1995). These stages are;

- Creation of the decision matrix,

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

$i = 1,2,\dots,n.$

- Normalizing the decision matrix,

benefit criteria;

$$r_{ij} = \frac{x_{ij} - x_j^{min}}{x_j^{max} - x_j^{min}} \quad (2)$$

used for cost-oriented criteria;

$$r_{ij} = \frac{x_j^{max} - x_{ij}}{x_j^{max} - x_j^{min}} \quad (3)$$

$x_j^{max}$ = j. the maximum value among the alternatives of the criterion,

$x_j^{min}$ = j. the minimum value among the alternatives of the criterion,

i=1,2,3,…,m alternatives,

j=1,2,3,...,n represents the criteria.

• Determining the degree of relationship between criteria,

$$P_{jk} = \frac{\sum_{i=1}^{m}(r_{ij} - \bar{r}_j).(r_{ik} - \bar{r}_k)}{\sqrt{\sum_{i=1}^{m}(r_{ij} - \bar{r}_j)^2 . \sum_{i=1}^{m}(r_{ik} - \bar{r}_k)^2}} \quad (4)$$

(j, k=1,2,3,…,n)

- Calculation of standard deviations (σj) and Cj values,

$$\boldsymbol{\sigma_j} = \sqrt{\frac{\sum_{i=1}^{m}(r_{ij}-\bar{r}_j)^2}{\boldsymbol{m-1}}} \quad (5)$$

$$\boldsymbol{C_j} = \boldsymbol{\sigma_j}.\sum_{k=1}^{n}(\mathbf{1}-\boldsymbol{p_{jk}}) \quad (6)$$

j=1,2,3,…,n

- It consists of the stages of calculation of criterion weights ($w_j$).

$$\boldsymbol{w_j} = \frac{\boldsymbol{c_j}}{\sum_{k=1}^{n}\boldsymbol{c_j}} \quad (7)$$

**CoCoSo Method**

CoCoSo method, Yazdani et al. Developed by in 2019. This method consists of a combination of Simple Additive Weighting (SAW) and Exponically Weighted Product (EWP) methods and consists of five stages. These stages are;

- Creating the decision matrix,
- Normalizing the decision matrix,
- It is in the form of calculating the performance scores of decision alternatives. Equations (1) and (2) given in the Critic method are used in the first two stages.
- After calculating the normalized values, in the third step, the total weighted comparability ($S_i$) values according to the gray relational generation approach and the total power weighted comparability ($P_i$) values according to the WASPAS multiplicative method are calculated.

$$S_i = \sum_{j=1}^{n}\left(w_j r_{ij}\right) \quad (8)$$

$$P_i = \sum_{j=1}^{n}(r_{ij})^{w_j} \quad (9)$$

- In the fourth step of the CoCoSo method, the relative weights of the alternatives are calculated.

$$k_{ia} = \frac{P_i+S_i}{\sum_{i=1}^{m}(P_i+S_i)} \quad (10)$$

$$k_{ib} = \frac{S_i}{minS_i} + \frac{P_i}{minP_i} \quad (11)$$

$$k_{ic} = \frac{\lambda(S_i)+(1-\lambda)(P_i)}{(\lambda maxS_i+(1-\lambda)maxP_i)}; 0 \le \lambda \le 1 \quad (12)$$

$k_{ia}$ the weighted sum method (WPM) is the arithmetic mean of the total scores of the weighted product method (WSM), $k_{ib}$ is the sum of the total scores of WSM and WPM compared to the best decision alternative, and $k_{ic}$ is represents the balanced scores of the WSM and WPM model scores. While calculating the $k_{ic}$ values, the coefficient, which is the indicator of how much $S_i$ and $P_i$ values are represented in the $k_{ic}$ values, is used with its value (0.5), which is generally accepted in the literature.

- In the last stage, the order of decision alternatives ($k^i$) is made.

$$k_i = (k_{ia}k_{ib}k_{ic})^{\frac{1}{3}} + \frac{1}{3}(k_{ia}+k_{ib}+k_{ic}) \quad (13)$$

The performance rankings of the alternatives are performed according to the obtained $k_i$ values. The highest ki value is expressed as the best financial performance (Yazdani et al. 2019), (Yazdani and Zarate, 2019).

**TOPSIS Method**

TOPSIS is a method developed by Yoon and Hwang in 1980 and is based on the principle of proximity of decision points to the ideal solution. Since it is an effective decision-making tool, it is frequently used, particularly in financial performance measurement. It can be easily applied to different sectors and allows the comparison of variables in different sectors according to their optimum, minimum and maximum values (Yurdakul and İc, 2003); (Yue, 2011). The TOPSIS method generally consists of six stages.

In the first stage, the decision matrix is created using the formula Equality 1.

During the evaluation, different dimensions found between different indexes cannot be compared with each other. Therefore, standardization is required in index data. For this purpose, the normalization process is performed in the second stage of the TOPSIS method for all data in the created decision matrix. Here, calculations are made in two ways according to the benefit and cost criteria. If the maximum of the criterion performance values is considered better, the normalized values are calculated using Equation 14.

$$x_{ij} = \frac{(X_{ij}-\bar{X}_i)}{S_i} \quad (14)$$

If it is considered better that the criteria performance values are minimum, the normalization process is carried out in two steps. First, the performance values are converted into a benefit status using the performance values, and then the normalized values are calculated.

$$x_{ij}^{*} = \frac{1}{x_{ij}^{*}} \quad (15)$$

$$\bar{x}_{ij} = \frac{x_{ij}^{*}}{\sum_{i=0}^{m} x_{ij}^{*}} \quad (16)$$

In the third step, the values in the normalized decision matrix are multiplied by the weight values to create a weighted decision matrix (Equation 17 and 18).

$$0 < w_j < 1, \qquad \sum_{j=1}^{n} w_j = 1 \quad (17)$$

$$\hat{x}_{ij} = \bar{x}_{ij} \,.\, w_j, \qquad i = \overline{0, m} \quad (18)$$

In the fourth stage of the TOPSIS method, positive ($A^+$) and negative ideal ($A^-$) solution values are created. The largest values in each column in the weighted normalized decision matrix constitute the $A^+$ data set, and the smallest values constitute the $A^-$ data set (Equations 19 and 20).

$$A^{+} = \left\{ (max v_{ij} | j \in J), \left(min v_{ij} | j \in J'\right) \right\} \quad (i = 1,2,\dots,m) \quad (19)$$

$$A^{+} = \{ v_1^{+}, v_2^{+}, \dots, v_n^{+} \}$$

$$A^{-} = \left\{ (min v_{ij} | j \in J), \left(max v_{ij} | j \in J'\right) \right\} \quad (i = 1,2,\dots,m) \quad (20)$$

$$A^{-} = \{ v_1^{-}, v_2^{-}, \dots, v_n^{-} \}$$

In the fifth stage, the distances of the evaluation factor values for each decision point from Euclidean are calculated to create the distance values ($S^+$ and $S^-$) to the positive and negative ideal solution. Equations 21 and 22 are used in performing these calculations.

$$S_i^{+} = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^{+})^2} \quad (21)$$

$$S_i^{-} = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^{-})^2} \quad (22)$$

Finally, the relative closeness (C) to the ideal solution is calculated. The relative closeness value to the ideal solution is symbolized by $C_i^+$ (Equation 23) and takes a value in the range of $0 \leq C_i^+ \leq 1$. While $C_i^+ = 1$ indicates the absolute closeness of the relevant decision point to the ideal solution, $C_i^+ = 0$ indicates the absolute closeness of the relevant decision point to the negative ideal solution (Sakarya & Aksu, 2020).

$$C_i^{+} = \frac{S_i^{-}}{S_i^{-} + S_i^{+}} \quad (23)$$

## Results

In this part of the study, firstly, the results tables obtained from the Critic method used in determining the criteria weights, then the findings of the CoCoSo method used in performance evaluation and finally the ranking results obtained from the TOPSIS method applied to compare the findings are given.

### Critic Method Findings

At this stage, the tables containing the weight ($w_j$) values of the criteria based on traditional and cash flow rates calculated in line with the information obtained from the financial statements of BIST technology enterprises published on the Public Disclosure Platform are presented below.

**Table 4.**
*Critic Method Weight Values According to Traditional Ratios*

| | Criterion | LR1 | LR2 | LR3 | A1 | A2 | A3 | F1 | F2 | P1 | P2 | P3 | P4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | $C_j$ | 2,730 | 2,788 | 3,633 | 4,147 | 3,151 | 2,904 | 3,071 | 2,443 | 2,753 | 2,291 | 3,575 | 2,456 |
| | $w_j$ | 0,076 | 0,078 | 0,101 | 0,115 | 0,088 | 0,081 | 0,085 | 0,068 | 0,077 | 0,064 | 0,099 | 0,068 |
| 2018 | $C_j$ | 3,078 | 3,060 | 3,585 | 3,973 | 3,286 | 3,850 | 3,199 | 3,084 | 2,510 | 2,910 | 3,232 | 2,756 |
| | $w_j$ | 0,080 | 0,079 | 0,093 | 0,103 | 0,085 | 0,100 | 0,083 | 0,080 | 0,065 | 0,076 | 0,084 | 0,072 |
| 2019 | $C_j$ | 2,053 | 1,950 | 2,126 | 4,251 | 3,307 | 3,051 | 1,949 | 2,128 | 3,148 | 2,001 | 3,071 | 3,611 |
| | $w_j$ | 0,063 | 0,060 | 0,065 | 0,130 | 0,101 | 0,093 | 0,060 | 0,065 | 0,096 | 0,061 | 0,094 | 0,111 |
| 2020 | $C_j$ | 1,924 | 1,929 | 2,051 | 3,992 | 3,231 | 3,165 | 2,501 | 2,344 | 2,656 | 2,197 | 2,717 | 2,775 |
| | $w_j$ | 0,061 | 0,061 | 0,065 | 0,127 | 0,103 | 0,101 | 0,079 | 0,074 | 0,084 | 0,070 | 0,086 | 0,088 |
| 2021 | $C_j$ | 2,969 | 2,571 | 2,781 | 2,868 | 3,152 | 2,745 | 2,994 | 2,761 | 4,068 | 2,460 | 2,939 | 3,377 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2022 | $w_j$ | 0,083 | 0,072 | 0,078 | 0,080 | 0,088 | 0,077 | 0,084 | 0,077 | 0,114 | 0,069 | 0,082 | 0,095 |
| | $C_j$ | 2,361 | 1,601 | 1,653 | 4,421 | 3,329 | 2,351 | 1,673 | 2,384 | 3,356 | 1,556 | 1,688 | 2,715 |
| | $w_j$ | 0,081 | 0,055 | 0,057 | 0,152 | 0,114 | 0,081 | 0,058 | 0,082 | 0,115 | 0,053 | 0,058 | 0,093 |

According to the findings obtained from the Critic method, weight values vary every year. According to this; The highest $w_j$ was calculated in the A1 criterion in all years except 2021, and in the P1 criterion in 2021.

**Table 5.**

*Critic Method Weight Values According to Cash Flow Ratios*

| | Criterion | L1 | L2 | L3 | L4 | AR1 | AR2 | AR3 | FS1 | FS2 | PR1 | PR2 | PR3 | PR4 | PR5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | Cj | 1,744 | 3,914 | 1,462 | 1,638 | 1,673 | 1,657 | 1,653 | 3,316 | 2,021 | 2,258 | 1,673 | 2,965 | 2,856 | 2,127 |
| | wj | 0,056 | 0,126 | 0,047 | 0,053 | 0,054 | 0,054 | 0,053 | 0,107 | 0,065 | 0,073 | 0,054 | 0,096 | 0,092 | 0,069 |
| 2018 | Cj | 1,696 | 3,171 | 1,702 | 3,009 | 1,987 | 2,624 | 3,290 | 4,360 | 2,344 | 2,341 | 1,987 | 3,343 | 3,262 | 2,443 |
| | wj | 0,045 | 0,084 | 0,045 | 0,080 | 0,053 | 0,070 | 0,088 | 0,116 | 0,062 | 0,062 | 0,053 | 0,089 | 0,087 | 0,065 |
| 2019 | Cj | 2,608 | 4,278 | 2,290 | 2,653 | 2,472 | 3,201 | 3,649 | 3,544 | 3,659 | 2,654 | 2,472 | 3,226 | 3,212 | 3,484 |
| | wj | 0,060 | 0,099 | 0,053 | 0,061 | 0,057 | 0,074 | 0,084 | 0,082 | 0,084 | 0,061 | 0,057 | 0,074 | 0,074 | 0,080 |
| 2020 | Cj | 2,274 | 3,717 | 2,829 | 3,520 | 3,003 | 2,793 | 4,362 | 5,909 | 3,324 | 2,696 | 3,003 | 3,710 | 2,859 | 4,015 |
| | wj | 0,047 | 0,077 | 0,059 | 0,073 | 0,063 | 0,058 | 0,091 | 0,123 | 0,069 | 0,056 | 0,063 | 0,077 | 0,060 | 0,084 |
| 2021 | Cj | 1,813 | 3,345 | 2,218 | 2,396 | 2,718 | 2,447 | 4,063 | 5,706 | 2,547 | 2,254 | 2,718 | 2,884 | 2,913 | 2,835 |
| | wj | 0,044 | 0,082 | 0,054 | 0,059 | 0,067 | 0,060 | 0,099 | 0,140 | 0,062 | 0,055 | 0,067 | 0,071 | 0,071 | 0,069 |
| 2022 | Cj | 2,087 | 4,677 | 1,987 | 2,131 | 2,929 | 2,010 | 2,941 | 5,510 | 3,345 | 2,465 | 2,929 | 2,589 | 2,874 | 3,624 |
| | wj | 0,050 | 0,111 | 0,047 | 0,051 | 0,070 | 0,048 | 0,070 | 0,131 | 0,079 | 0,059 | 0,070 | 0,061 | 0,068 | 0,086 |

It is seen that the Critic weight values calculated according to the ratios based on the cash flow statements also vary on a yearly basis. According to the results obtained; L2 with 0.126 and 0.099 values in 2017 and 2019, respectively, and the highest weight values in 2018 (0.116), 2020 (0.123), 2021 (0.140) and 2022 (0.131) were calculated in FS1 criterion.

### *CoCoSo Method Findings*

In this section, the analysis results obtained from the CoCoSo method are given. In order to set an example from the tables obtained, only the tables for all the implementation steps for the year 2022 are included, and the findings for the other years are shown in the comparison table containing only the ranking results. At this stage, the tables regarding the results are presented separately as the results of the analysis using the criteria related to traditional ratios and the analysis results obtained from the cash flow ratios. Finally, a comparison table containing the ranking results of the enterprises was created.

### Critic Weighted CoCoSo Analysis Results According to Traditional Financial Ratios

In the first stage of the CoCoSo method, a decision matrix table in 13x12 format, which includes alternatives and criteria, was created using Equation (1). The decision matrix created is given in Table 6.

**Table 6.**

*Decision Matrix by Traditional Fnancial Ratios*

| Criteria | max | max | max | max | max | max | max | min | max | max | max | max |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direction | | | | | | | | | | | | |
| Business | LR1 | LR2 | LR3 | A1 | A2 | A3 | F1 | F2 | P1 | P2 | P3 | P4 |
| BIMAS | 0,975 | 0,467 | 0,076 | 2,284 | 8,266 | -206,63 | 0,647 | 0,607 | 0,321 | 0,126 | 0,055 | 0,013 |
| BIZIM | 0,926 | 0,406 | 0,198 | 3,499 | 7,221 | -58,781 | 0,139 | 0,878 | 0,568 | 0,069 | 0,020 | 4,639 |
| CRRFSA | 0,676 | 0,268 | 0,171 | 2,495 | 5,063 | -8,512 | -0,092 | 1,101 | 0,240 | -0,024 | -0,010 | -0,015 |
| CASA | 16,818 | 2,623 | 0,000 | 2,000 | -2,873 | 2,888 | 2,774 | 0,265 | 0,159 | 0,117 | 0,058 | 11,878 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KIMMR | 1,380 | 0,714 | 0,423 | 1,603 | 4,480 | 10,375 | 0,740 | 0,575 | 0,081 | 0,034 | 0,021 | 0,220 |
| GMTAS | 4,001 | 1,012 | 0,676 | 0,669 | -3,262 | 4,131 | 5,802 | 0,147 | 0,201 | 0,171 | 0,256 | 1,259 |
| MAVI | 1,246 | 0,822 | 0,011 | 1,226 | 2,162 | 7,898 | 0,462 | 0,684 | 0,534 | 0,169 | 0,138 | 0,015 |
| MEPET | 0,292 | 0,279 | 0,013 | 2,056 | 550,76 | -10,874 | 1,750 | 0,364 | 0,045 | 0,029 | 0,014 | 0,340 |
| MGROS | 0,774 | 0,354 | 0,295 | 2,045 | 5,200 | -12,655 | 0,126 | 0,888 | 0,631 | 0,071 | 0,035 | 0,142 |
| MIPAZ | 17,084 | 17,084 | 4,969 | 0,005 | 0,000 | 0,006 | 15,554 | 0,060 | 0,727 | 0,683 | 131,71 | 4,705 |
| SOKM | 0,817 | 0,127 | 0,067 | 3,158 | 5,119 | -25,344 | 0,180 | 0,847 | 0,831 | 0,127 | 0,040 | 4,011 |
| TKNSA | 1,045 | 0,418 | 0,308 | 2,769 | 4,452 | 74,375 | 0,137 | 0,879 | 0,690 | 0,083 | 0,030 | 0,000 |
| VAKKO | 1,685 | 0,740 | 0,523 | 1,086 | 1,023 | 4,103 | 0,933 | 0,517 | 0,574 | 0,277 | 0,255 | 6,758 |

In the second stage of the CoCoSo method; The normalized decision matrix created using Equation (2) for benefit-oriented criteria and Equation (3) for cost-oriented criteria is given in Table 7.

**Table 7.**

*Decision Matrix Normalized to Traditional Financial Ratios*

| **Business** | LR1 | LR2 | LR3 | A1 | A2 | A3 | F1 | F2 | P1 | P2 | P3 | P4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BIMAS | 0,041 | 0,020 | 0,015 | 0,652 | 0,021 | 0,000 | 0,047 | 0,475 | 0,351 | 0,213 | 0,000 | 0,002 |
| BIZIM | 0,038 | 0,016 | 0,040 | 1,000 | 0,019 | 0,526 | 0,015 | 0,215 | 0,665 | 0,132 | 0,000 | 0,391 |
| CRRFSA | 0,023 | 0,008 | 0,034 | 0,713 | 0,015 | 0,705 | 0,000 | 0,000 | 0,247 | 0,000 | 0,000 | 0,000 |
| CASA | 0,984 | 0,147 | 0,000 | 0,571 | 0,001 | 0,746 | 0,183 | 0,803 | 0,145 | 0,200 | 0,001 | 1,000 |
| KIMMR | 0,065 | 0,035 | 0,085 | 0,457 | 0,014 | 0,772 | 0,053 | 0,506 | 0,045 | 0,083 | 0,000 | 0,020 |
| GMTAS | 0,221 | 0,052 | 0,136 | 0,190 | 0,000 | 0,750 | 0,377 | 0,917 | 0,198 | 0,276 | 0,002 | 0,107 |
| MAVI | 0,057 | 0,041 | 0,002 | 0,349 | 0,010 | 0,763 | 0,035 | 0,401 | 0,622 | 0,273 | 0,001 | 0,002 |
| MEPET | 0,000 | 0,009 | 0,003 | 0,587 | 1,000 | 0,697 | 0,118 | 0,709 | 0,000 | 0,075 | 0,000 | 0,030 |
| MGROS | 0,029 | 0,013 | 0,059 | 0,584 | 0,015 | 0,690 | 0,014 | 0,205 | 0,746 | 0,134 | 0,000 | 0,013 |
| MIPAZ | 1,000 | 1,000 | 1,000 | 0,000 | 0,006 | 0,735 | 1,000 | 1,000 | 0,869 | 1,000 | 1,000 | 0,397 |
| SOKM | 0,031 | 0,000 | 0,013 | 0,902 | 0,015 | 0,645 | 0,017 | 0,244 | 1,000 | 0,213 | 0,000 | 0,339 |
| TKNSA | 0,045 | 0,017 | 0,062 | 0,791 | 0,014 | 1,000 | 0,015 | 0,214 | 0,820 | 0,152 | 0,000 | 0,001 |
| VAKKO | 0,083 | 0,036 | 0,105 | 0,309 | 0,008 | 0,750 | 0,065 | 0,561 | 0,673 | 0,426 | 0,002 | 0,569 |
| wj | 0,083 | 0,072 | 0,078 | 0,080 | 0,088 | 0,077 | 0,084 | 0,077 | 0,114 | 0,069 | 0,082 | 0,095 |

After the normalized decision matrix values are calculated, the $S_i$ and $P_i$ values are calculated. Then the relative weights of the alternatives and, in the last step, the final ranking of the decision alternatives (which) are calculated. Accordingly, the results obtained using Equation (8-13) are presented in Table 8.

**Table 8.**

*Performance Ranking of Firms by Traditional Financial Ratios*

| **Business** | $S_i$ | $P_i$ | $k_{ia}$ | $k_{ib}$ | $k_{ic}$ | strength[3] | Total/3 | $k_i$ | Order |
|---|---|---|---|---|---|---|---|---|---|
| BIMAS | 0,156 | 6,930 | 0,071 | 2,564 | 1,413 | 0,635 | 1,349 | 1,984 | 12 |
| BIZIM | 0,270 | 7,945 | 0,082 | 3,563 | 1,638 | 0,782 | 1,761 | 2,543 | 4 |
| CRRFSA | 0,146 | 4,627 | 0,048 | 2,000 | 0,951 | 0,449 | 1,000 | 1,449 | 13 |
| CASA | 0,398 | 7,659 | 0,080 | 4,379 | 1,606 | 0,827 | 2,022 | 2,849 | 2 |
| KIMMR | 0,168 | 7,721 | 0,079 | 2,820 | 1,573 | 0,704 | 1,490 | 2,194 | 11 |
| GMTAS | 0,260 | 7,714 | 0,080 | 3,447 | 1,590 | 0,758 | 1,705 | 2,463 | 7 |
| MAVI | 0,220 | 7,691 | 0,079 | 3,164 | 1,577 | 0,733 | 1,607 | 2,340 | 9 |
| MEPET | 0,263 | 6,638 | 0,069 | 3,232 | 1,376 | 0,674 | 1,559 | 2,232 | 10 |
| MGROS | 0,222 | 7,732 | 0,079 | 3,189 | 1,586 | 0,737 | 1,618 | 2,356 | 8 |
| MIPAZ | 0,739 | 8,554 | 0,093 | 6,906 | 1,853 | 1,058 | 2,950 | 4,009 | 1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SOKM | 0,308 | 7,346 | 0,076 | 3,696 | 1,526 | 0,755 | 1,766 | 2,521 | 5 |
| TKNSA | 0,273 | 7,714 | 0,080 | 3,538 | 1,592 | 0,766 | 1,737 | 2,502 | 6 |
| VAKKO | 0,310 | 8,279 | 0,086 | 3,909 | 1,712 | 0,831 | 1,902 | 2,733 | 3 |

The performance ranking of the enterprises is carried out according to the $k_i$ values obtained at the last stage of the steps applied according to the CoCoSo method. According to the Critic-weighted CoCoSo method, in which traditional financial ratios are used, MIPAZ is the retail business with the highest financial performance value in 2022. The company with the second highest performance value is CASA, while the third is VAKKO. Other businesses can be listed as BIZIM, SOKM, TKNSA, GMTAS, MGROS, MAVI, MEPET, KIMMR, CRRFSA, respectively.

**Critic Weighted CoCoSo Analysis Results by Cash Flow Ratios**

In the first stage of the CoCoSo method, in which cash flow rates are used, the decision matrix table in 13x14 format created using Equation (1) is presented below.

**Table 9.**

*Decision Matrix by Cash Flow Ratios*

| Business | L1 | L2 | L3 | L4 | AR1 | AR2 | AR3 | FS1 | FS2 | PR1 | PR2 | PR3 | PR4 | PR5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BIMAS | 0,355 | 0,076 | 0,260 | 8,676 | 0,158 | 0,279 | 54,245 | 0,607 | 0,285 | 0,069 | 0,158 | 0,402 | 1,253 | 0,017 |
| BIZIM | 0,168 | 0,198 | 0,153 | 3,440 | 0,134 | 0,515 | 18,741 | 0,878 | 0,667 | 0,038 | 0,134 | 1,097 | 1,932 | 8,966 |
| CRRFSA | 0,224 | 0,171 | 0,184 | 3,389 | 0,203 | 0,525 | 11,947 | 1,101 | 2,156 | 0,081 | 0,203 | -2,004 | -8,368 | 0,122 |
| CASA | -0,073 | 0,000 | -0,012 | 0,000 | -0,003 | -0,012 | -83806,037 | 0,265 | -0,003 | -0,002 | -0,003 | -0,004 | -0,027 | -0,324 |
| KIMMR | 0,115 | 0,423 | 0,082 | 3,076 | 0,047 | 0,107 | 6,948 | 0,575 | 0,079 | 0,029 | 0,047 | 0,110 | 1,365 | 0,300 |
| GMTAS | 0,359 | 0,676 | 0,132 | 4,943 | 0,019 | 0,025 | -14,575 | 0,147 | 0,020 | 0,029 | 0,019 | 0,023 | 0,113 | 0,142 |
| MAVI | 0,427 | 0,011 | 0,393 | 4,643 | 0,269 | 1,251 | 77,159 | 0,684 | 0,727 | 0,219 | 0,269 | 0,851 | 1,593 | 0,023 |
| MEPET | 0,139 | 0,013 | 0,102 | 2,445 | 0,037 | 0,040 | 557,218 | 0,364 | 0,051 | 0,018 | 0,037 | 0,058 | 1,279 | 0,435 |
| MGROS | 0,309 | 0,295 | 0,249 | 6,077 | 0,221 | 0,493 | 7,231 | 0,888 | 0,772 | 0,108 | 0,221 | 1,966 | 3,116 | 0,444 |
| MIPAZ | -0,135 | 4,969 | -0,130 | -10,379 | -0,008 | -2,408 | 0,010 | 0,060 | -0,008 | -1,519 | -0,008 | -0,008 | -0,012 | -0,054 |
| SOKM | 0,223 | 0,067 | 0,180 | 3,364 | 0,152 | 0,344 | 51,273 | 0,847 | 0,478 | 0,048 | 0,152 | 0,998 | 1,201 | 4,819 |
| TKNSA | 0,276 | 0,308 | 0,259 | 3,695 | 0,228 | 1,670 | 8,938 | 0,879 | 1,312 | 0,082 | 0,228 | 1,885 | 2,734 | 0,000 |
| VAKKO | 0,646 | 0,523 | 0,482 | 6,039 | 0,249 | 0,714 | 1,584 | 0,517 | 0,406 | 0,230 | 0,249 | 0,517 | 0,900 | 6,083 |

FS1 of the criteria in the table is cost-oriented and all other criteria are benefit-oriented. Considering this situation, the normalized decision matrix table obtained with the help of Equation (2) and (3) in the second step is given in Table 10. After calculating the normalized values, the values obtained by using Equation (8-13) in the third, fourth and fifth stages of the CoCoSo method are given in Table 11.

**Table 10.**

*Normalized Decision Matrix by Cash Flow Ratios*

| Business | L1 | L2 | L3 | L4 | AR1 | AR2 | AR3 | FS1 | FS2 | PR1 | PR2 | PR3 | PR4 | PR5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BIMAS | 0,627 | 0,015 | 0,638 | 1,000 | 0,599 | 0,659 | 0,994 | 0,475 | 0,136 | 0,908 | 0,599 | 0,606 | 0,838 | 0,037 |
| BIZIM | 0,388 | 0,040 | 0,463 | 0,725 | 0,513 | 0,717 | 0,994 | 0,215 | 0,312 | 0,891 | 0,513 | 0,781 | 0,897 | 1,000 |
| CRRFSA | 0,460 | 0,034 | 0,514 | 0,723 | 0,762 | 0,719 | 0,994 | 0,000 | 1,000 | 0,915 | 0,762 | 0,000 | 0,000 | 0,048 |
| CASA | 0,080 | 0,000 | 0,193 | 0,545 | 0,017 | 0,587 | 0,000 | 0,803 | 0,002 | 0,868 | 0,017 | 0,504 | 0,726 | 0,000 |
| KIMMR | 0,321 | 0,085 | 0,346 | 0,706 | 0,198 | 0,617 | 0,993 | 0,506 | 0,040 | 0,885 | 0,198 | 0,533 | 0,847 | 0,067 |
| GMTAS | 0,633 | 0,136 | 0,428 | 0,804 | 0,098 | 0,596 | 0,993 | 0,917 | 0,013 | 0,885 | 0,098 | 0,511 | 0,738 | 0,050 |
| MAVI | 0,720 | 0,002 | 0,855 | 0,788 | 1,000 | 0,897 | 0,994 | 0,401 | 0,340 | 0,994 | 1,000 | 0,719 | 0,867 | 0,037 |
| MEPET | 0,351 | 0,003 | 0,379 | 0,673 | 0,162 | 0,600 | 1,000 | 0,709 | 0,027 | 0,879 | 0,162 | 0,519 | 0,840 | 0,082 |
| MGROS | 0,569 | 0,059 | 0,619 | 0,864 | 0,826 | 0,711 | 0,993 | 0,205 | 0,361 | 0,930 | 0,826 | 1,000 | 1,000 | 0,083 |
| MIPAZ | 0,000 | 1,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,993 | 1,000 | 0,000 | 0,000 | 0,000 | 0,503 | 0,728 | 0,029 |
| SOKM | 0,459 | 0,013 | 0,507 | 0,721 | 0,578 | 0,675 | 0,994 | 0,244 | 0,225 | 0,896 | 0,578 | 0,756 | 0,833 | 0,554 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TKNSA | 0,526 | 0,062 | 0,636 | 0,739 | 0,851 | 1,000 | 0,994 | 0,214 | 0,610 | 0,916 | 0,851 | 0,980 | 0,967 | 0,035 |
| VAKKO | 1,000 | 0,105 | 1,000 | 0,862 | 0,929 | 0,765 | 0,993 | 0,561 | 0,192 | 1,000 | 0,929 | 0,635 | 0,807 | 0,690 |

**Table 11.**

*Performance Ranking of Enterprises by Cash Flow Ratios*

| Year | **Business** | $S_i$ | $P_i$ | $k_{ia}$ | $k_{ib}$ | $k_{ic}$ | strenght[3] | Total/3 | $k_i$ | Order |
|---|---|---|---|---|---|---|---|---|---|---|
| | BIMAS | 0,521 | 10,806 | 0,083 | 4,044 | 1,798 | 0,845 | 1,975 | 2,820 | 7 |
| | BIZIM | 0,558 | 10,997 | 0,085 | 4,203 | 1,834 | 0,867 | 2,040 | 2,907 | 5 |
| | CRRFSA | 0,434 | 8,648 | 0,067 | 3,292 | 1,441 | 0,681 | 1,600 | 2,281 | 11 |
| | CASA | 0,308 | 8,201 | 0,062 | 2,783 | 1,350 | 0,616 | 1,399 | 2,015 | 12 |
| | KIMMR | 0,421 | 10,689 | 0,081 | 3,694 | 1,763 | 0,809 | 1,846 | 2,655 | 9 |
| | GMTAS | 0,478 | 10,668 | 0,082 | 3,873 | 1,769 | 0,824 | 1,908 | 2,732 | 8 |
| 2022 | MAVI | 0,612 | 10,840 | 0,084 | 4,345 | 1,817 | 0,872 | 2,082 | 2,954 | 3 |
| | MEPET | 0,433 | 10,500 | 0,080 | 3,692 | 1,735 | 0,800 | 1,836 | 2,636 | 10 |
| | MGROS | 0,573 | 10,979 | 0,085 | 4,249 | 1,833 | 0,870 | 2,056 | 2,926 | 4 |
| | MIPAZ | 0,394 | 4,599 | 0,037 | 2,282 | 0,792 | 0,404 | 1,037 | 1,441 | 13 |
| | SOKM | 0,520 | 10,901 | 0,084 | 4,060 | 1,813 | 0,851 | 1,986 | 2,836 | 6 |
| | TKNSA | 0,595 | 10,975 | 0,085 | 4,321 | 1,836 | 0,876 | 2,081 | 2,957 | 2 |
| | VAKKO | 0,688 | 11,226 | 0,087 | 4,676 | 1,891 | 0,917 | 2,218 | 3,135 | 1 |

According to the Critic-weighted CoCoSo method, in which the criteria obtained from the cash flow statements are used, the retail trade company with the highest financial performance value in 2022 was found to be VAKKO. The second highest value belongs to TKNSA. MAVI, MGROS, BIZIM, SOKM, BIMAS, GMTAS, KIMMR, MEPET, CRRFSA, CASA and MIPAZ enterprises follow respectively.

**Comparison of CoCoSo Method Results**

Table 12 was formed by collecting the ranking results obtained from the Critic-weighted CoCoSo method in a single table.

**Table 12.**

*Performance Rank Comparison Chart*

| Year/ Business | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Traditional Ratio | Cash Ratio | Traditional Ratio | Cash Ratio | Traditional Ratio | Cash Ratio | Traditional Ratio | Cash Ratio | Traditional Ratio | Cash Ratio | Traditional Ratio | Cash Ratio |
| BIMAS | 4 | 3 | 2 | 3 | 2 | 4 | 2 | 1 | 3 | 8 | 12 | 7 |
| BIZIM | 3 | 2 | 6 | 2 | 3 | 3 | 4 | 4 | 7 | 7 | 4 | 5 |
| CRRFSA | 8 | 6 | 8 | 9 | 11 | 9 | 13 | 7 | 13 | 12 | 13 | 11 |
| CASA | 10 | 11 | 12 | 10 | 4 | 1 | 7 | 12 | 2 | 9 | 2 | 12 |
| KIMMR | - | - | 7 | 8 | 6 | 6 | 6 | 6 | 11 | 11 | 11 | 9 |
| GMTAS | - | - | - | - | - | - | 1 | 9 | 1 | 6 | 7 | 8 |
| MAVI | 1 | 4 | 1 | 1 | 9 | 2 | 5 | 2 | 8 | 1 | 9 | 3 |
| MEPET | 2 | 1 | 4 | 4 | 5 | 12 | 10 | 10 | 6 | 10 | 10 | 10 |
| MGROS | 6 | 7 | 9 | 7 | 10 | 8 | 12 | 5 | 10 | 5 | 8 | 4 |
| MIPAZ | 9 | 8 | 10 | 12 | 1 | 10 | 3 | 13 | 4 | 13 | 1 | 13 |
| SOKM | 11 | 10 | 5 | 5 | 8 | 11 | 8 | 3 | 9 | 4 | 5 | 6 |
| TKNSA | 7 | 9 | 11 | 11 | 12 | 7 | 11 | 8 | 12 | 3 | 6 | 2 |
| VAKKO | 5 | 5 | 3 | 6 | 7 | 5 | 9 | 11 | 5 | 2 | 3 | 1 |

According to Table 12, it is seen that the financial performance rankings of the enterprises vary on a yearly basis, but different ranking results are obtained according to the financial ratios used. Years and businesses in which the same ranking results were obtained; VAKKO-2017, MAVI-2018, MEPET,2018, SOKM-2018, TKNSA-2018,

BIZIM-2019, KIMMR-2019, BIZIM-2020, KIMMR-2020, MEPET-2020, BIZIM-2021, KIMMR-2021, MEPET- It can be specified as 2022.

In order to measure the consistency between the results obtained, Spearman's Brown Rank Correlation Coefficient (Spearman's r) ($r_s$) test was applied. This test is used when both variables are at the ordering level of measurement, and it takes values ranging from -1 to +1. If the value is close to zero, it is interpreted as there is no relationship between the variable, and if it is close to 1 as an absolute value, there is a strong relationship. A positive value indicates the same relationship between the variables, and a negative value indicates an inverse relationship (Altas, Kaspar ve Ergut, 2012).

$$d^k = x^k - y^k \qquad (24)$$

*k=1, 2, 3 ,..., k*

$$r_s = 1 - \frac{6\sum_{j=1}^{K}(d_i)^2}{K(K^2-1)} \qquad (25)$$

$d_i = x_i - y_i$, i element represents the difference between the sequence numbers $x_i$ and $y_i$, and n represents the number of alternatives.

The results of Spearman's rank relation test, obtained by applying Equation (24-25) in order to measure the consistency between the ranking results obtained from traditional and cash flow statement based financial ratios, are given in Table 13.

**Table 13.**

*Spearman's r Test Results*

| Period | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| $r_s$ | 0,891 | 0,860 | 0,168 | 0,115 | -0,060 | 0,033 |

According to the $r_s$ values in Table 13, it is seen that the degree of consistency of the ranking results obtained from traditional rates and cash rates in 2017 and 2018 is high. The ranking results in Table 12 also support that the closest ranking results were obtained in 2017 and 2018. In other years, $r_s$ values are close to zero. This situation indicates that there is no relationship between the ranking results obtained from the analyzes using different ratios in the years 2019-2022.

In order to compare the findings obtained from the CoCoSo method, the TOPSIS method, which is one of the most used MCDM techniques, was also applied. The data obtained are included in section 5.4.

**Topsis Method Findings**

Since the TOPSIS method was applied to compare the ranking results obtained from the CoCoSo method, the resulting results are shown in a single table.

**Table 14.**

*TOPSIS Comparison Chart*

| Year/ Business | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tradi-tional Ratio | Cash Ratio | Tradi-tional Ratio | Cash Ratio | Tradi-tional Ratio | Cash Ratio | Tradi-tional Ratio | Cash Ratio | Tradi-tional Ratio | Cash Ratio | Tradi-tional Ratio | Cash Ratio |
| BIMAS | 3 | 2 | 3 | 1 | 5 | 7 | 2 | 4 | 4 | 9 | 13 | 8 |
| BIZIM | 7 | 3 | 7 | 2 | 6 | 5 | 6 | 8 | 8 | 8 | 7 | 3 |
| CRRFSA | 11 | 4 | 9 | 9 | 9 | 11 | 13 | 9 | 7 | 12 | 11 | 12 |
| CASA | 10 | 11 | 12 | 8 | 1 | 1 | 8 | 7 | 1 | 2 | 3 | 13 |
| KIMMR | - | - | 1 | 10 | 12 | 10 | 10 | 10 | 12 | 11 | 12 | 10 |
| GMTAS | - | - | - | - | - | - | 1 | 5 | 2 | 4 | 8 | 9 |
| MAVI | 1 | 6 | 2 | 3 | 4 | 2 | 4 | 1 | 10 | 1 | 10 | 5 |
| MEPET | 2 | 1 | 11 | 4 | 10 | 3 | 5 | 11 | 5 | 10 | 2 | 11 |
| MGROS | 5 | 7 | 6 | 6 | 2 | 9 | 12 | 3 | 11 | 6 | 9 | 4 |
| MIPAZ | 8 | 8 | 5 | 12 | 3 | 6 | 3 | 13 | 3 | 13 | 1 | 7 |
| SOKM | 9 | 9 | 8 | 5 | 8 | 12 | 7 | 6 | 9 | 7 | 5 | 6 |
| TKNSA | 6 | 10 | 4 | 11 | 7 | 4 | 9 | 2 | 13 | 3 | 4 | 2 |
| VAKKO | 4 | 5 | 10 | 7 | 11 | 8 | 11 | 12 | 6 | 5 | 6 | 1 |

When Table 14 is examined, it is seen that there are similarities and differences in the performance rankings in which traditional and cash flow rates are used according to the TOPSIS method, as in the CoCoSo method. Business and year information with the same ranking results; MIPAZ-2017, SOKM-2017, CRRFSA-2018, MGROS-2018, CASA-2019, KIMMR-2020, BIZIM-2021. Spearman's test was applied to measure the degree of consistency between the obtained ranking results. Obtained $r_s$ values are given in the table below.

low. The highest values are close to 0.5 in 2017 and 2019, and the $r_s$ values in other years are very close to zero.

**Table 15.**

*Spearman's Test Results (TOPSIS)*

| Period | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| $r_s$ | 0,482 | -0,021 | 0,448 | 0,126 | -0,077 | 0,055 |

According to the $r_s$ values obtained from the ranking results obtained from the TOPSIS method, it can be stated that the level of consistency between the ranking results is

**Comparison of CoCoSo- TOPSIS Methods**

In this part of the research, all results obtained from criteria using both conventional and cash flow ratios are displayed and compared in a single table. In addition, Spearman's test was applied to the CoCoSo and TOPSIS ranking results and the level of consistency between the methods was tried to be measured.

**Table 16.**

*CoCoSo- TOPSIS Comparison Chart to Traditional Ratios*

| Year/ | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Business | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS |
| BIMAS | 4 | 3 | 2 | 3 | 2 | 5 | 2 | 2 | 3 | 4 | 12 | 13 |
| BIZIM | 3 | 7 | 6 | 7 | 3 | 6 | 4 | 6 | 7 | 8 | 4 | 7 |
| CRRFSA | 8 | 11 | 8 | 9 | 11 | 9 | 13 | 13 | 13 | 7 | 13 | 11 |
| CASA | 10 | 10 | 12 | 12 | 4 | 1 | 7 | 8 | 2 | 1 | 2 | 3 |
| KIMMR | - | - | 7 | 1 | 6 | 12 | 6 | 10 | 11 | 12 | 11 | 12 |
| GMTAS | - | - | - | - | - | - | 1 | 1 | 1 | 2 | 7 | 8 |
| MAVI | 1 | 1 | 1 | 2 | 9 | 4 | 5 | 4 | 8 | 10 | 9 | 10 |
| MEPET | 2 | 2 | 4 | 11 | 5 | 10 | 10 | 5 | 6 | 5 | 10 | 2 |
| MGROS | 6 | 5 | 9 | 6 | 10 | 2 | 12 | 12 | 10 | 11 | 8 | 9 |
| MIPAZ | 9 | 8 | 10 | 5 | 1 | 3 | 3 | 3 | 4 | 3 | 1 | 1 |
| SOKM | 11 | 9 | 5 | 8 | 8 | 8 | 8 | 7 | 9 | 9 | 5 | 5 |
| TKNSA | 7 | 6 | 11 | 4 | 12 | 7 | 11 | 9 | 12 | 13 | 6 | 4 |
| VAKKO | 5 | 4 | 3 | 10 | 7 | 11 | 9 | 11 | 5 | 6 | 3 | 6 |

When Table 16 is examined, it is seen that the ranking values obtained from the CoCoSo and TOPSIS methods are highly similar to each other. The ranking results with the highest differences emerged, especially in 2018 and 2019.

**Table 17.**

*CoCoSo- TOPSIS Comparison Chart by Cash Flow Ratios*

| Year/ | 2017 | | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Business | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS | CoCoSo | TOPSIS |
| BIMAS | 3 | 2 | 3 | 1 | 4 | 7 | 1 | 4 | 8 | 9 | 7 | 8 |
| BIZIM | 2 | 3 | 2 | 2 | 3 | 5 | 4 | 8 | 7 | 8 | 5 | 3 |
| CRRFSA | 6 | 4 | 9 | 9 | 9 | 11 | 7 | 9 | 12 | 12 | 11 | 12 |
| CASA | 11 | 11 | 10 | 8 | 1 | 1 | 12 | 7 | 9 | 2 | 12 | 13 |
| KIMMR | - | - | 8 | 10 | 6 | 10 | 6 | 10 | 11 | 11 | 9 | 10 |
| GMTAS | - | - | - | - | - | - | 9 | 5 | 6 | 4 | 8 | 9 |
| MAVI | 4 | 6 | 1 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 5 |
| MEPET | 1 | 1 | 4 | 4 | 12 | 3 | 10 | 11 | 10 | 10 | 10 | 11 |
| MGROS | 7 | 7 | 7 | 6 | 8 | 9 | 5 | 3 | 5 | 6 | 4 | 4 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MIPAZ | 8 | 8 | 12 | 12 | 10 | 6 | 13 | 13 | 13 | 13 | 13 | 7 |
| SOKM | 10 | 9 | 5 | 5 | 11 | 12 | 3 | 6 | 4 | 7 | 6 | 6 |
| TKNSA | 9 | 10 | 11 | 11 | 7 | 4 | 8 | 2 | 3 | 3 | 2 | 2 |
| VAKKO | 5 | 5 | 6 | 7 | 5 | 8 | 11 | 12 | 2 | 5 | 1 | 1 |

Looking at the financial performance ranking results using the ratios obtained from the cash flow statements, it is possible to say that the results obtained from the CoCoSo and TOPSIS methods are quite close to each other.

**Table 18.**

*CoCoSo- TOPSIS Spearman's Test Results*

| Year | | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|
| $r_s$ | Traditional Ratio | 0,845 | 0,196 | 0,210 | 0,846 | 0,989 | 0,995 |
| | Cash Flow Ratio | 0,945 | 0,937 | 0,476 | 0,621 | 0,797 | 0,863 |
| $r^2$ | Traditional Ratio | 0,715 | 0,038 | 0,044 | 0,716 | 0,979 | 0,990 |
| | Cash Flow Ratio | 0,894 | 0,878 | 0,226 | 0,385 | 0,635 | 0,744 |

From the Spearman's test, which was applied to examine whether there is consistency between the ranking results obtained according to the methods, $r_s$ values very close to absolute value 1 were obtained in all years except 2018 and 2019, when traditional ratios were used, and 2019, where cash flow ratios were used. This accounts for the high level of similarity in the ranking results obtained from the CoCoSo and TOPSIS methods.

**Conclusion and Recommendations**

In the study, the financial performance rankings of the companies registered in the BIST retail trade sector for the period of 2017-2022 were examined comparatively according to the CoCoSo method, using both traditional ratios and the ratios obtained from the cash flow statements. In the literature, there are many studies in which financial performance rankings are carried out on the basis of many different sectors or businesses using various MCDM techniques. Many of these studies used traditional ratios. The number of studies using cash flow ratios is less than studies using traditional ratios. Among the studies in the literature, there are also studies on the retail trade sector. However, this study differs from the studies in the literature both in terms of the financial ratios used and the method used.

In the research, besides traditional financial ratios, financial ratios obtained from cash flow statements, which allow to see clearly from which sources the cash is generated and how it is used, are also used. The Critic method was used to calculate the weight values of the criteria, and the CoCoSo method was used to perform the financial performance rankings. Separate analyzes were performed according to traditional and cash flow rates, and the results of the ranking were compared. In addition, analysis regarding the financial performance ranking was carried out according to the TOPSIS method. Spearman's test was applied to measure the level of consistency between all the results obtained.

According to the analysis results of the CoCoSo method, the highest level of similarity between the ranking results obtained using traditional ratios and the ranking results obtained according to cash flow ratios was obtained in 2017 and 2018. The lowest similarity is for 2021 and 2022. This is also supported by the results of the Spearman's test applied (Table 13). According to the TOPSIS method, the highest similarities between the financial performance rankings of the enterprises are in 2017 and 2019, while the lowest similarities are in 2018, 2021 and 2022. The difference in financial ratios used can be stated as the reason for obtaining different ranking results.

When the financial performance ranking results obtained from CoCoSo and TOPSIS methods are examined, it has been found that the ranking results are highly similar. This is seen both from the tables on the comparison of the ranking results of CoCoSo- TOPSIS methods and from the results of the $r_s$ test applied to measure the consistency between these methods. In Table 18, the coefficient of determination, that is, the explained variance ($r^2 = rs^2$) values, has been calculated in order to express this result more clearly. When the $r^2$ values in this table are examined, it can be seen that values close to 1 are obtained in all years except 2018 and 2019, in which traditional financial ratios are used, and 2019 and 2020, where cash flow rates are taken as the criteria. The $r^2$ values being close to 1 is interpreted as a good accuracy result. The highest level of similarity was calculated in 2021

and 2022 in the results of the analysis using traditional financial ratios. According to the analyzes using the criteria of cash flow rates, the level of consistency between the ranking results in 2017 and 2018 is much higher than in other years.

In the literature search, a study was found using the Entropy-based Topsis method, using the cash flow rates of five companies operating in the BIST retail trade sector (BIMAS, BIZIM, CRFSA, MGROS and SOKM) for the period 2017-2020. In the study; From 2017 to 2020, the most successful companies in terms of financial performance are MIGROS, SOKM, MIGROS, MIGROS; It was concluded that the most unsuccessful companies were CRFSA, CRFSA, SOKM and CRFSA, respectively (Sakarya & Budak, 2022). In this study, the Critic method was used to calculate criterion weights. Looking at the ranking results of only these five companies in terms of comparison; According to the CoCoSo method in the 2017-2020 periods, the most successful companies are BIZIM, BIZIM, BIZIM, BIMAS, and the most unsuccessful companies are SOKM, CRFSA, SOKM, CRFSA. According to the results of the Critic-based TOPSIS method, while BIMAS, BIMAS, BIZIM, MGROS were the most successful companies over the years, SOKM, CRFSA, SOKM, CRFSA were found to be the most unsuccessful companies. When the results obtained are compared with the research in the literature, it has been found that there is no similarity for the most successful businesses according to the CoCoSo method. However, according to the TOPSIS method, it is seen that the most successful companies in 2020 are the same in both Entropy and Critic weighted methods. In terms of the most unsuccessful enterprises, it has been concluded that the same enterprises have the most unsuccessful financial performance in both CoCoSo and TOPSIS method in all years except 2017. This shows that even though different methods are used to determine the criteria weights, similar results are achieved in similar financial ratios and that the CoCoSo method and TOPSIS methods give similar ranking values.

**Peer-review**: Externally peer-reviewed.
**Author Contributions:** Concept-A.S.T.-S.T.; Design-A.S.T.; Supervision-S.T.; Resources-A.S.T.-S.T.; Data Collection and/or Processing-A.S.T.; Analysis and/or Interpretation-A.S.T.-S.T.; Literature Search-A.S.T.-S.T.; Writing Manuscript-A.S.T.-S.T.; Critical Review-A.S.T.-S.T.
**Conflict of Interest:** The authors have no conflicts of interest to declare.
**Financial Disclosure:** The authors declared that this study has received no financial support.
**Hakem Değerlendirmesi:** Dış bağımsız.
**Yazar Katkıları:** Fikir-A.S.T.-S.T.; Tasarım-A.S.T.; Denetleme-S.T.; Kaynaklar- A.S.T.-S.T.; Veri Toplanması ve/veya İşlemesi-A.S.T.; Analiz ve/veya Yorum- A.S.T.-S.T.; Literatür Taraması-A.S.T.-S.T.; Yazıyı Yazan-A.S.T.-S.T.; Eleştirel İnceleme-A.S.T.-S.T.
**Çıkar Çatışması:** Yazarlar, çıkar çatışması olmadığını beyan etmiştir.
**Finansal Destek:** Yazarlar, bu çalışma için finansal destek almadığını beyan etmiştir.

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## Genişletilmiş Özet

Perakende ticaret sektörü, günümüzde dünya ekonomisindeki en önemli sektörlerden biridir. Türkiye'de perakende ticaret sektörü, özellikle 2000'li yıllardan sonra teknolojide yaşanan gelişmelere de bağlı olarak hızlı bir büyüme göstermiştir. Türkiye'de yaklaşık 3,6 milyon işletme bulunmakta olup, üretici ve tedarikçiler de dahil edildiğinde bu işletmelerden 2,3 milyonu perakende sektörüyle bağlantılı olarak faaliyet göstermektedir. İlgili işletmelerde yaklaşık 10,2 milyon kişi çalışmaktadır. Bu işletmelerin oluşturduğu ciro ise, 12,4 trilyon civarında olup, tüm sektörlerin toplam cirosunun (16,6 trilyon) yaklaşık %75'ine tekabül etmektedir. Sektörün büyüme performansı ülke ekonomisinin büyümesine önemli ölçüde katkı sağlamaktadır (Ticaret Bakanlığı, 2023).

İşletmelerin faaliyetlerinin ölçülmesinde kullanılan finansal performans; yatırımcılar, yöneticiler ve sektörde faaliyet gösteren diğer işletmeler açısından önem arz etmektedir. Mali göstergelere bağlı olarak gerçekleştirilen finansal performansın ölçümüyle işletmelerin mevcut kaynaklarını ne denli etkin kullandığı, karlılık düzeyleri, likidite durumları gibi birçok gösterge hakkında bilgi sahibi olunabilmektedir. Finansal performans ölçümü, tek bir işletme bazında gerçekleştirilebileceği gibi çok sayıda alternatif ve çok sayıda kritere göre de gerçekleştirilebilir. Birden fazla alternatif ve kriterin yer aldığı karar problemlerinde kullanılan yöntemler çok kriterli karar verme (ÇKKV) olarak ifade edilmektedir. Literatürde birçok araştırmada, işletmelerin finansal performanslarının değerlendirilmesi için çeşitli ÇKKV teknikleri kullanılmıştır.

Araştırmanın amacı, Borsa İstanbul (BIST) perakende ticaret sektörüne kayıtlı şirketlerin 2017-2022 dönemine ilişkin finansal performanslarının hem geleneksel finansal oranlara hem de nakit akış oranlarına göre karşılaştırmalı olarak değerlendirilmesidir. Nakit akım tabloları, nakit ve benzeri varlıklarındaki değişimleri de içermesinden dolayı işletmelerin likidite durumlarının daha net bir şekilde görünmesine imkân sağlamaktadırlar. Bu sebeple araştırmada, geleneksel finansal oranların yanı sıra nakit akış rasyoları da kullanılmıştır.

Çalışmada, finansal performans sıralamalarının hesaplanmasında kriter olarak işletmelerin Kamuyu Aydınlatma Platformu'nda (KAP) yayımladıkları 2017-2022 dönemine ilişkin yıllık mali tablolarından faydalanılmıştır. Kriterlerin belirlenmesinde, benzer çalışmalarda en sık kullanılan 12 geleneksel finansal oran ile 14 nakit akış tablolarına dayalı finansal oran dikkate alınmıştır. Kriter ağırlıklarının hesaplanmasında Critic yöntemi kullanılmıştır. İşletmelerin finansal performans sıralamalarının belirlenmesinde ise, çok kriterli karar verme teknikleri (ÇKKV) içerisinde yer alan ve yakın dönemde geliştirilmiş olan Birleştirilmiş Uzlaşık Çözüm (Combined Compromise Solution-CoCoSo) yönteminden yararlanılmıştır.

Literatürde, BIST perakende ticaret sektörüne kayıtlı işletmelerin finansal performanslarının geleneksel finansal oranlar ile nakit akış rasyolarının birlikte kullanılarak Critic ağırlıklandırmalı CoCoSo yöntemi ile değerlendirildiği, elde edilen sıralama sonuçlarının TOPSIS yöntemi ile karşılaştırıldığı ve yöntem sonuçlarına ilişkin tutarlılığın ölçülmesi amacıyla Spearman's testinin uygulandığı bir araştırmaya rastlanmamıştır. Bu özelliklerinden ötürü, gerçekleştirilen çalışma literatürden oldukça farklılık göstermektedir. Bu araştırmanın perakende ticaret sektörüne yatırım yapmayı düşünen yatırımcılar açısından yol gösterici bilgiler sunması, daha verimli yatırım kararlarının verilmesinde önemli rol oynaması ve daha sonra benzer yöntem ve sektörlere ilişkin gerçekleştirilecek çalışmalar açısından literatüre önemli ölçüde katkı sağlayacağı düşünülmektedir.

Geleneksel finansal oranlar ile nakit akış tablolarına dayalı finansal rasyolara ayrı ayrı uygulanan CoCoSo yönteminden elde edilen sıralama sonuçları karşılaştırılmıştır. CoCoSo yöntemi analiz sonuçlarına göre, geleneksel oranlar kullanılarak elde edilen sıralama sonuçları ile nakit akış oranlarına göre ulaşılan sıralama sonuçları arasında en yüksek benzerlik düzeyi 2017 ve 2018 yıllarında elde edilmiştir. En düşük benzerlik ise, 2021 ve 2022 yıllarına ilişkindir. Bu durum, uygulanan Spearman's testi sonuçları ile de desteklenmektedir. Ayrıca, TOPSIS yöntemi de aynı kriterlere uygulanarak CoCoSo yönteminden elde edilen bulgularla karşılaştırılarak değerlendirilmiştir. TOPSIS yöntemine göre, işletmelerin finansal performans sıralamaları arasında en yüksek benzerlikler 2017 ve 2019 yıllarında iken, en düşük benzerlikler 2018, 2021 ve 2022 yıllarına ilişkin olduğu sonucuna varılmıştır. Farklı sıralama sonuçlarının elde edilmesinin sebebi olarak kullanılan finansal oranların farklılığı belirtilebilir.

Çalışmada, yöntem bazında sıralama sonuçları karşılaştırıldığında; CoCoSo ve TOPSIS yöntemlerinden elde edile sıralama sonuçlarının yüksek oranda benzerlik gösterdiği bulgusuna ulaşılmıştır. Sıralama sonuçları arasındaki tutarlılığın ölçülmesi amacıyla uygulanan $r_s$ testi sonuçları da bu bulguyu desteklemektedir. Geleneksel finansal oranların kullanıldığı analizlerde 2018 ve 2019 yılları ile nakit akış oranlarının kriter olarak baz alındığı 2019 ve 2020 haricindeki tüm yıllarda 1'e yakın değerler elde edildiği görülebilir. $r^2$ değerlerinin 1'e yakın olması, iyi bir doğruluk sonucu olarak yorumlanmaktadır. Geleneksel finansal oranlar kullanılarak gerçekleştirilen analiz sonuçlarında en yüksek benzerlik düzeyi 2021 ve 2022 yıllarında hesaplanmıştır. Nakit akış oranlarına ilişkin kriterlerin kullanıldığı analizlere göre ise 2017 ve 2018 yıllarındaki sıralama sonuçları arasındaki tutarlılık düzeyi diğer yıllara kıyasla çok daha fazladır.