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# Investing in Malaysian Consumer Product Companies Using TOPSIS

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**Abstract**

The aim of this study is to evaluate the financial performance of consumer companies in Malaysia using the TOPSIS method, a multi-criteria decision-making approach. Financial data for 13 companies in 2022 were obtained from DataStream. While traditional ratio analysis has been commonly used to assess financial performance over the years, some studies suggest that it may not provide a comprehensive measurement. Therefore, this research employs the TOPSIS method to obtain a more comprehensive result. The TOPSIS approach involves seven steps and utilizes important financial ratios such as Current Ratio, Dividend Yield, Earnings per Share (EPS), Net Profit Margin, Debt Ratio, and Return on Equity (ROE) as criteria for evaluating the financial performance of the companies. The study ranks the 13 consumer companies in Malaysia and provides investment recommendations to investors, aiming to maximize their investment benefits. The findings of this research hold significant value for investors, companies, market participants, and both public and private policymakers, as they can enhance their investment decision-making based on these results.

**Keywords:** Financial Performance, Consumer Products Sector, Decision-Making, TOPSIS Model, Financial Ratios, Multi-Criteria Decision-Making (MCDM)

## Introduction

Researchers have shown significant interest in evaluating performance across various sectors due to its ability to assist decision makers in predicting future financial outcomes. The consumer products sector, which drives economic growth by delivering superior products has garnered particular attention. This sector not only contributes to poverty reduction, as acknowledged by the World Bank, but also plays a pivotal role in boosting gross domestic product (GDP). Consequently, assessing the financial performance of companies operating in this sector holds great importance. Evaluating the financial health of businesses is a reliable indicator of their long-term potential, providing decision makers with a comprehensive overview of their performance. This empowers them to review their strategies and make informed choices. To accurately measure company performance, this study employs six crucial financial ratios: Current Ratio, Dividend Yield, Earnings per Share (EPS), Net Profit Margin, Debt Ratio, and Return on Equity (ROE). The study utilizes the TOPSIS model, a multi-

criteria decision-making (MCDM) tool, to assess the financial performance of companies based on these ratios.

TOPSIS, proposed by Hwang & Yoon (1981), evaluates multiple alternatives based on predefined criteria, assigns weights to each criterion, normalizes the scores of each criterion, calculates geometric distances between alternatives, and identifies the ideal option (Almoghathawi et al., 2017; Behzadian et al., 2012; Chen et al., 2019; Ferreira et al., 2016; Jupri & Sarno, 2019). Financial ratios, as emphasized by Balcı (2017); Fahami et al (2015); Feng & Wang (2000); Hamdan et al (2019); Raed (2020); Wasara & Ganda (2019), play a crucial role in assessing a company's competitive advantage and sustainability within industries. The extensive application of the TOPSIS model in solving various MCDM problems has led to a growing number of subsequent studies. Relevant studies that have utilized TOPSIS as a methodology can be found in the works of (Abd Rahim et al., 2020; Deng et al., 2000; Hoe et al., 2018; Hussain et al., 2020; Mandic et al., 2014; Wanke et al., 2016; Yildiz, 2020). Additionally, studies conducted by Azhar et al (2022); Fahami et al (2019); Hoe et al., (2019; 2020) have also employed financial ratio analysis using TOPSIS to analyze the performance of the service, healthcare and telecommunications industries within the context of Malaysia. The ability of the TOPSIS method to assign weights to each criterion based on its importance while considering the uncertainty, subjectivity, and complexity of the decision-making process enables investors to rank companies from worst to best.

The objective of this study is to propose a conceptual framework that utilizes the TOPSIS model to evaluate the financial performance of consumer products and services companies. The subsequent sections of this paper are organized as follows: Section 2 presents the data and methodology used in the study, Section 3 discusses the results obtained from the model, and the final section concludes the study.

**Research Methodology**

Based on the information extracted from DataStream, a dataset containing financial data of 13 consumer companies listed in Malaysia for the year 2022, Table 1 represents the gathered data. The TOPSIS method was employed to analyze these 13 healthcare companies, utilizing six financial ratios as evaluation criteria. The financial ratios considered in this study are Current Ratio, Dividend Yield, Earnings per Share (EPS), Net Profit Margin, Debt Ratio, and Return on Equity (ROE) to assess the financial performance of the companies. Among these ratios, Current Ratio, Dividend Yield, Net Profit Margin, Earnings per Share (EPS), and Return on Equity (ROE) are identified as the ideal alternatives for maximizing the criteria that require maximization. Conversely, Debt Ratio should be minimized.

Table 1
*Consumer Product Companies In Malaysia Stock Market*

| COMPANY | CODE |
|---|---|
| TEO GUAN LEE CORP | C1 |
| NICHE CAPITAL | C2 |
| ENG KAH CORPORAT | C3 |
| NTPM HOLDINGS BHD | C4 |
| CLASSITA H | C5 |
| ESTHETICS INTN'L | C6 |
| CITRA NUSA HOL | C7 |
| PROLEXUS BERHAD | C8 |
| TOMEI CONS BHD | C9 |
| FCW HOLDINGS BERHAD | C10 |
| INFRAHARTA HOLDINGS | C11 |
| OCR GROUP BHD | C12 |
| CARLO RINO | C13 |

The purpose of the TOPSIS method is to assist in making decisions involving multiple criteria. This method considers the geometric distance between the ideal positive and negative solutions. The TOPSIS method consists of seven steps, which were executed using MS Excel.

*Step 1: Decision Matrix* $\left(\left(x_{ij}\right)_{m\times n}\right)$ *Formation.*

To create a decision matrix, m alternatives (companies) and n criteria (financial ratios) are considered. Each alternative is assigned a score for each criterion $x_{ij}$, resulting in the construction of a matrix $\left(x_{ij}\right)_{m\times n}$ denoted as below.

$$(x_{ij})_{m\times n} = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ \cdot & & & \cdot \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix} \quad (1)$$

*Step 2: Decision Matrix Normalization.*

The normalized decision matrix $R = (r_{ij})_{m\times n}$ is constructed by transforming the attribute dimensions into non-dimensional attributes, as illustrated below.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}}, i = 1,2,\dots,m,\ j = 1,2,\dots,n \quad (2)$$

$$R = (r_{ij})_{m\times n} = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix} \quad (3)$$

*Step 3: Weighted Normalized Decision Matrix (***T***) Construction.*

$$\mathrm{T} = (t_{ij})_{m\times n} = (w_j r_{ij})_{m\times n}, i = 1,2,\dots,m \qquad \text{where } w_j = \frac{W_j}{\sum_{j=1}^{n} W_j}, j = 1,2,\dots,n \quad (4)$$

$\sum_{j=1}^{n} w_j = 1$ and $W_j$ is the original weight given to the indicator, $w_j, j = 1,2,\dots,n$

$$\mathrm{T} = \begin{bmatrix} w_1 r_{11} & w_2 r_{12} & \dots & w_n r_{1n} \\ w_1 r_{21} & w_2 r_{22} & \dots & w_n r_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ w_1 r_{m1} & w_2 r_{m2} & \dots & w_n r_{mn} \end{bmatrix} \quad (5)$$

*Step 4: The Positive/Best Ideal ($A_b$) Solution and The Negative/Worst Ideal ($A_w$) Solution Determination.*

$$A_b = \{\langle \min(t_{ij} \mid i = 1,2,\dots,m) \mid j \in J_- \rangle, \\ \langle \max(t_{ij} \mid i = 1,2,\dots,m) \mid j \in J_+ \rangle\} \equiv \{t_{bj} \mid j = 1,2,\dots,n\}, \quad (6)$$

$$A_w = \{\langle \max(t_{ij} \mid i = 1,2,\dots,m) \mid j \in J_- \rangle, \\ \langle \min(t_{ij} \mid i = 1,2,\dots,m) \mid j \in J_+ \rangle\} \equiv \{t_{wj} \mid j = 1,2,\dots,n\}, \quad (7)$$

where,

$J_+ = \{ j = 1,2,\dots,n \mid j$ associates with the criteria having a positive impact, and
$J_- = \{ j = 1,2,\dots,n \mid j$ associates with the criteria having a negative impact.

*Step 5: The Separation Measures for Each Alternative from the Best Ideal Solution and Negative Ideal Solution Calculation.*

The separation measures for each alternative is and the best/worst calculated as follows:

$$d_{ib} = \sqrt{\sum_{j=1}^{n} (t_{ij} - t_{bj})^2}, i = 1, 2, ..., m \quad (8)$$

$$d_{iw} = \sqrt{\sum_{j=1}^{n} (t_{ij} - t_{wj})^2}, i = 1, 2, ..., m \quad (9)$$

*Step 6: The Relative Closeness to the Ideal Solution for Each Alternative Calculation:*

For each alternative, the relative closeness to the ideal solution $s_{iw}$ is computed as follows.

$$s_{iw} = \frac{d_{iw}}{d_{ib} + d_{iw}}, 0 \le s_{iw} \le 1, i = 1, 2, ..., m \quad (10)$$

$s_{iw} = 0$ if and only if the alternative solution has the worst condition whereas $s_{iw} = 1$ if and only if the alternative solution has the best condition.

*Step 7: Rank the alternatives.*

The alternatives are ranked in descending order according to the relative closeness coefficient, $s_{iw}$ with the highest values $s_{iw}$ representing the best alternative.

**Results and Discussion**

The decision-making matrix shown in Table 2 was utilized to conduct the normalisation of the decision matrix, as well as the weighting of the normalised decision matrix. This process aimed to obtain the positive ideal solution and the negative ideal solution for every decision criterion illustrated in Table 3. By using equations (8) and (9), the distances of all options from the positive ideal solution ( $d_{ib}$ ) and the negative ideal solution ( $d_{iw}$ ) are presented in Table 4.

Table 2
*Multicriteria Decision Making Matrix*

| Company Code | Current Ratio | Dividend Yield | EPS | Net Profit Margin | Return On Equity (ROE) | Total Debt |
|---|---|---|---|---|---|---|
| C1 | 4.43 | 2.7 | 0.07 | 7.39 | 15.81 | 11.51 |
| C2 | 11.51 | 0 | 0 | -31.44 | 4.43 | 15.4 |
| C3 | 15.4 | 3.81 | 0 | -14.24 | 11.51 | -20.24 |
| C4 | -20.24 | 4.95 | 0.03 | 3.73 | 15.4 | 8.31 |
| C5 | 8.31 | 0 | 0 | -24.84 | -20.24 | 2.69 |
| C6 | -5.79 | 2.7 | 0 | -4.92 | 2.69 | 4.27 |
| C7 | 5.63 | 0 | 0 | 1.75 | 0.98 | 0.94 |
| C8 | 35.19 | 0.61 | 0 | -3.34 | 5.63 | 0 |
| C9 | 16.7 | 2.88 | 0.24 | 4.79 | 0.94 | -7.99 |
| C10 | -7.99 | 0 | 0.08 | 75.21 | 35.19 | 2.88 |
| C11 | 2.88 | 0 | 0 | -443.92 | 16.7 | 14 |
| C12 | 12.6 | 0 | 0 | -50.62 | 14 | 8.06 |
| C13 | 8.9 | 2.86 | 0 | 6.9 | 8.06 | 6.14 |

Table 3
*Positive Ideal ( $A_b$ ) and Negative Ideal ( $A_w$ ) Solutions*

| Ideal Solution | Current Ratio | Dividend Yield | EPS | Net Profit Margin | Return On Equity (ROE) | Total Debt |
|---|---|---|---|---|---|---|
| Positive ideal solution ( $A_b$ ) | 0.11163 | 0.09829 | 0.15140 | 0.02753 | 0.10952 | 0.07273 |
| Negative ideal solution ( $A_w$ ) | -0.06420 | 0.00000 | 0.00000 | -0.16251 | -0.06299 | -0.09558 |

Table 4
*Distance of the Alternatives from The Positive Ideal Solution ( $d_{ib}$ ) and Negative Ideal Solution( $d_{iw}$ )*

| Company Code | $d_{ib}$ | $d_{iw}$ |
|---|---|---|
| C1 | 0.166162705 | 0.270768614 |
| C2 | 0.221169378 | 0.259169911 |
| C3 | 0.249416135 | 0.230244357 |
| C4 | 0.2325215 | 0.259533807 |
| C5 | 0.273055314 | 0.208483765 |
| C6 | 0.23594797 | 0.222023322 |
| C7 | 0.241037652 | 0.218447608 |
| C8 | 0.211965933 | 0.26962295 |
| C9 | 0.171341982 | 0.273128475 |
| C10 | 0.205200402 | 0.286103962 |
| C11 | 0.28733498 | 0.211524704 |
| C12 | 0.213054125 | 0.246576374 |
| C13 | 0.203142415 | 0.249569873 |

Equation (10) is used to calculate the relative closeness to the ideal solution, $s_{iw}$ of each alternative. Table 5 displays the relative closeness distances of each decision alternative to the ideal solution, $s_{iw}$. The company's overall financial performance is determined by ranking their relative closeness distances to the ideal solution, $s_{iw}$, in descending order. The highest $s_{iw}$ value corresponds to the best alternative with the best financial results.

Table 5
*Ranking of Consumer Product Companies*

| Company Code | Companies | Relative Closeness to the Ideal Solution, $s_{iw}$ | Rank |
|---|---|---|---|
| C1 | TEO GUAN LEE CORP | 0.619705208 | 1 |
| C9 | TOMEI CONS BHD | 0.614503103 | 2 |
| C10 | FCW HOLDINGS BERHAD | 0.582335478 | 3 |
| C8 | PROLEXUS BERHAD | 0.559861241 | 4 |
| C13 | CARLO RINO | 0.551277002 | 5 |
| C2 | NICHE CAPITAL | 0.539555929 | 6 |
| C12 | OCR GROUP BHD | 0.53646652 | 7 |
| C4 | NTPM HOLDINGS BHD | 0.527448446 | 8 |
| C6 | ESTHETICS INTN'L | 0.484797466 | 9 |
| C3 | ENG KAH CORPORAT | 0.480015263 | 10 |
| C7 | CITRA NUSA HOL | 0.475418098 | 11 |
| C5 | CLASSITA H | 0.432952951 | 12 |
| C11 | INFRAHARTA HOLDINGS | 0.424016434 | 13 |

The result in Table 5 indicates the ranking of the consumer product companies in terms of their financial performances using the TOPSIS approach. TEO GUAN LEE CORP secures the top position, indicating its strong financial performance and closeness to the ideal solution. TOMEI CONS BHD follows closely, also demonstrating favourable financial results.

The rankings highlight the potential investment opportunities within the consumer product sector. Companies like FCW HOLDINGS BERHAD and PROLEXUS BERHAD exhibit promising financial performance, positioning them as attractive options for investors seeking stable returns.

On the other hand, companies ranked lower, such as INFRAHARTA HOLDINGS and CLASSITA H, may require closer examination. Their lower relative closeness values indicate potential areas for improvement in their financial performance.

Overall, Table 5 allows stakeholders to assess and compare the financial standing of different consumer product companies. It provides valuable insights for investors, enabling them to make informed decisions based on the relative closeness to the ideal solution, ultimately identifying companies with strong financial prospects and growth potential.

**Conclusion**

To conclude, the objective of this article was successfully achieved by evaluating 13 Malaysian consumer product companies using the TOPSIS multi-criteria decision-making method. The findings presented in this study can be valuable for investors in making investment decisions in conjunction with other techniques. By employing financial ratios as criteria, this paper effectively assessed the financial performance of the companies and ranked them accordingly. Table 5 displays the rankings of the companies based on their financial performance using the TOPSIS approach. The top five companies identified are TEO GUAN LEE CORP, TOMEI CONS BHD, FCW HOLDINGS BERHAD, PROLEXUS BERHAD, and CARLO RINO. Notably, these companies also hold prominent positions in the consumer industry. Future research is recommended to extend this study to different industries by employing more advanced techniques and methodologies. Additionally, confirming the ranking results using

alternative methodologies in conjunction with the TOPSIS technique would strengthen the reliability of the results.

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