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Evaluating Financial Performance of Food Service Companies: A TOPSIS-based Approach

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Abstract

The food service industry has a significant impact on society and plays a crucial role in expanding economic opportunities. Performance evaluation is essential for this industry in a highly competitive environment to enhance organizational decision-making. This study aims to propose a conceptual framework using the TOPSIS model to evaluate and rank the financial performance of food companies in Malaysia. Key financial ratios such as current ratio, return on equity, profit margin, debt to equity ratio, earnings per share, dividend yield, and price earnings ratio are employed. The study holds significance as it provides a means to assess the financial performance of the food service industry in Malaysia using the proposed conceptual framework and TOPSIS model. The findings of this research highlight that NESTLE emerges as the top-performing company among the studied companies, being the closest to the ideal solution. This paper emphasizes the importance of evaluating, comparing, and ranking the financial statuses of food service companies in Malaysia utilizing the TOPSIS model. The significance of this study lies in its ability to assess the financial performance of the food service industry in Malaysia through the proposed conceptual framework using the TOPSIS model.

Keywords: Financial Performance, Food Service Industry, Decision-Making, TOPSIS Model, Financial Ratios, Multi-Criteria Decision-Making (MCDM)

Introduction

The food service industry may seem insignificant, but it actually contributes to a country's GDP, income, employment, and foreign exchange earnings. (Rodmanee & Chi Huang, 2013). In today's dynamic business environment, food and beverage companies face significant challenges in maintaining a competitive edge. Therefore, evaluating performance is crucial for these companies to defend their market position and improve over time. This evaluation system allows organizations to realign their business strategies and outpace competitors, leading to improved efficiency (Erdoğan et al., 2016). It also provides management teams with valuable insights to make informed decisions in the future. Moreover, the evaluation system benefits not only the company itself but also other companies in the same sector.

Items in the balance sheet and income statement typically reflect the financial performance of these companies. The importance of financial statements lies in their ability to provide insights into the strengths and weaknesses of companies in relation to their liquidity, solvency, growth, and profitability (Yalcin et al., 2012). Therefore, in the context of financial analysis, financial ratios are used as the indicators for comparing performance (Chen & Shimerda, 1981). The TOPSIS model, a multi-criteria decision-making (MCDM) tool, is used in the study to assess the financial performance of companies based on financial ratios.

The TOPSIS method proposed by Hwang & Yoon (1981), is a widely used technique in the field of multi-criteria decision-making (MCDM). It is specifically designed to handle situations where there are multiple criteria involved in the process of ranking alternatives and determining the most favorable option. This is achieved by employing distance measures to assess the relative performance of each alternative (Almoghathawi et al., 2017; Balcı, 2017; Behzadian et al., 2012; Chen et al., 2019; Fahami et al., 2015; Feng & Wang, 2000; Ferreira et al., 2016; Hamdan et al., 2019; Jupri & Sarno, 2019; Raed, 2020; Wasara & Ganda, 2019). The TOPSIS model is employed in this study to rank firms in the food sector and is recognized as a robust MCDM approach that yields reliable results with high computational efficiency (Hoe et al., 2020; Lukić et al., 2020). Consequently, numerous studies in the literature have shown considerable interest in utilizing the TOPSIS model to rank alternatives and identify optimal decision alternatives (Abd Rahim et al., 2020; Azhar et al., 2022; Deng et al., 2000; Fahami et al., 2019; Hoe et al., 2018, 2019; Hussain et al., 2020; Mandic et al., 2014; Wanke et al., 2016; Yildiz, 2020). Accurate performance measurement using TOPSIS is advantageous for decision makers as it equips them with valuable information to make well-informed choices.

The goal of this research is to propose a conceptual framework for evaluating the financial performance of food service companies using the TOPSIS model. This paper's subsequent sections are organized as follows: Section 2 presents the data and methodology used in the study, Section 3 discusses the model's results, and Section 4 concludes the study.

Research Methodology

Table 1 presents the financial data of 10 food service companies listed in Malaysia for the year 2022, extracted from DataStream. The TOPSIS method was used to analyze these companies, using seven financial ratios as evaluation criteria. The study considered ratios such as Current Ratio, Dividend Yield, Earnings per Share (EPS), Net Profit Margin, Debt Ratio, Return on Equity (ROE) and Price to Earnings Ratio (PER). Among these ratios, Current Ratio, Dividend Yield, Net Profit Margin, EPS, ROE, and PER were identified as ideal for maximizing certain criteria, while the Debt Ratio should be minimized

Table 1
Food Service Companies In Malaysia Stock Market

COMPANY	CODE
HUP SENG INDUSTRIES	C1
QL RESOURCES BHD	C2
KAWAN FOOD BERHAD	C3
TH PLANTATIONS BHD	C4
NESTLE (MALAYSIA)	C5
KLUANG RUBBER CO	C6
DUTCH LADY MILK	C7
FGV HOLDINGS BHD	C8
INNOPRISE PLANTATION	C9
MALAYAN FLOUR MILLS	C10

The TOPSIS method consists of seven steps, which were executed using MS Excel. The TOPSIS method is utilized in financial investment to support decision-making that involves multiple criteria. It calculates the distance between ideal positive and negative solutions. This method involves seven steps that can be implemented through 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.

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

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.

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

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

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

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

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

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

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

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

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

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

Table 2 was used to normalize and assign weights to the decision matrix, which is shown in the decision-making matrix. The goal was to identify the best positive and worst negative solutions for each financial criterion mentioned in Table 3. Equations (8) and (9) were applied to measure the distances of all options from both the positive ideal solution (d_{ib}) and the negative ideal solution (d_{iw}), and the results 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	PER
C1	2.05	2.96	0.03	10.22	18.62	0.35	24.9
C2	1.4	0.68	0.09	5.87	9.08	61.99	47.4
C3	4.36	1.69	0.09	9.83	10.06	1.61	20.1
C4	3.86	0	0.09	20.69	8.85	176.57	13
C5	0.71	1.82	2.56	13.55	102.62	149.19	52.1
C6	34.25	0.77	0.17	41.01	1.4	0.4	23.6
C7	1.12	1.47	3.94	3.87	11.87	2.16	8.8
C8	1.17	3.94	0.43	8.41	22.81	54.4	6.3
C9	1.38	8.49	0.22	40.36	26.45	0.7	11.8
C10	1.33	3.08	0.17	3.95	11.78	93.72	3.8

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	PER
Positive ideal solution (A_b)	0.139463	0.112983	0.118422	0.089858	0.130226	0.096963	0.088996
Negative ideal solution (A_w)	0.002891	0.000000	0.000902	0.008480	0.001777	0.000192	0.006491

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	0.252697401	0.059595409
C2	0.257152938	0.083064642
C3	0.258990464	0.042390966
C4	0.249142053	0.105957376
C5	0.17915798	0.191848634
C6	0.227207048	0.162914276
C7	0.247901261	0.120195545
C8	0.242737686	0.06807068
C9	0.232006879	0.142812202
C10	0.254463344	0.067131624

Equation (10) is utilized to determine the relative closeness to the ideal solution, s_{iw} of each alternative. The relative closeness distances of each decision alternative to the ideal solution, s_{iw}. are presented in Table 5. The ranking of these distances, arranged in descending order, determines the overall financial performance of the company. The alternative with the highest value corresponds to the best alternative, which the best financial outcomes.

Table 5
Ranking of Food Service Companies

Company Code	Companies	Relative Closeness to the Ideal Solution, s_{iw}	Rank
C5	NESTLE (MALAYSIA)	0.517103	1
C6	KLUANG RUBBER CO	0.417599	2
C9	INNOPRISE PLANTATION	0.38101636	3
C7	DUTCH LADY MILK	0.32653243	4
C4	TH PLANTATIONS BHD	0.29838791	5
C2	QL RESOURCES BHD	0.24415153	6
C8	FGV HOLDINGS BHD	0.21901174	7
C10	MALAYAN FLOUR MILLS	0.20874588	8
C1	HUP SENG INDUSTRIES	0.19083183	9
C3	KAWAN FOOD BERHAD	0.14065553	10

Table 5 provides valuable insights for financial investors regarding the ranking of food service companies based on their relative closeness to the ideal solution. These rankings can help investors make informed decisions about potential investments in these companies.

In the ranking of consumer product companies based on financial investor perspective, NESTLE (MALAYSIA) secures the top position with the highest relative closeness value of 0.517103. This indicates a strong financial performance and makes it an attractive investment option. KLUANG RUBBER CO. follows closely in the second position with a relative closeness value of 0.417599, also demonstrating a favorable financial performance.

The remaining companies, including INNOPRISE PLANTATION, DUTCH LADY MILK, and TH PLANTATIONS BHD, hold positions 3 to 5, indicating relatively good financial performance but slightly lower than the top contenders. QL RESOURCES BHD, FGV HOLDINGS BHD, MALAYAN FLOUR MILLS, HUP SENG INDUSTRIES, and KAWAN FOOD BERHAD rank from 6 to 10, showing comparatively weaker financial performances.

By considering this ranking information, financial investors can gain insights into the relative financial strength and performance of these consumer product companies, enabling them to make more informed decisions about potential investment opportunities.

Conclusion

Measuring company performance is crucial for continuous improvement. This study presents a conceptual framework that utilizes the TOPSIS model to assess the financial performance of listed Malaysian food service companies. The findings indicate that NESTLE is the top performing company among the studied companies, followed by KLUANG RUBBER CO, INNOPRISE PLANTATION, DUTCH LADY MILK, TH PLANTATIONS BHD, QL RESOURCES BHD, FGV HOLDINGS BHD, MALAYAN FLOUR MILLS, HUP SENG INDUSTRIES and KAWAN FOOD BERHAD. This research holds significance as it provides a means to evaluate the performance of consumer products and services companies in Malaysia through the proposed conceptual framework and the TOPSIS model.

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