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Evaluating Financial Performance in the Indian Food Sector: A TOPSIS Approach to Company Assessment

*** P. Anbuoli, R. Alagesan**

Mannar Thirumalai Naicker College, Pasumalai, Madurai, Tamilnadu, India.

Corresponding author Email: anbuolimtnc@gmail.com

Abstract: *When evaluating financial performance, industry-specific elements that have an influence on the food business are taken into account, including raw material costs, pricing dynamics, the competitive environment, regulatory environment, and consumer trends. When assessing a company's general health and future prospects, it is important to take these elements into account because they have an impact on its financial performance Over the years, India's food business has undergone substantial development and change, driven by factors including shifting customer tastes, urbanisation, and rising disposable income. The industry includes a number of subsectors, including restaurants, processed food, drinks, dairy products, and confectionery. Over the years, India's food business has undergone substantial development and change, driven by factors including shifting customer tastes, urbanisation, and rising disposable income. The industry includes a number of subsectors, including restaurants, processed food, drinks, dairy products, and confectionery. Investment Decisions: Evaluating the financial performance of food sector firms enables investors to make wise investment choices. Risk management: It's crucial to comprehend the financial status of businesses in the food sector. Industry Competitiveness: Analysing financial performance sheds light on the Indian food industry's competitive environment Government agencies and regulatory organisations can use financial performance assessments to develop policies and regulations that support the expansion and sustainability of the food sector. Sector Analysis: Evaluations of financial performance help with a more comprehensive study of the Indian food business. Investment Decisions: Evaluating the financial performance of food sector firms enables investors to make wise investment choices. Risk management: It's crucial to comprehend the financial status of businesses in the food sector. Industry Competitiveness: Analysing financial performance sheds light on the Indian food industry's competitive environment Government agencies and regulatory organisations can use financial performance assessments to develop policies and regulations that support the expansion and sustainability of the food sector. Sector Analysis: Evaluations of financial performance help with a more comprehensive study of the Indian food business. Alternative Parameter taken as Company 1, Company 2, Company 3, Company 4, Company 5, Company 6. Evaluation Parameter Net Profit Margin, Current Ratio, Debt Ratio, Debt to Equity. After doing topsis analysis company 2 has ranked 1 company 2 has ranked 6. TOPSIS method provides a systematic and comprehensive approach for evaluating alternatives based on multiple criteria. It considers both the positive and negative aspects of each alternative and helps decision makers in selecting the most suitable option based on their preferences and objectives.*

Key words: *Net Profit Margin, Current Ratio, Debt Ratio, Debt to Equity, financial performance*

1. INTRODUCTION

Due to ineffective SME operations, the Indian food industry is dealing with a serious issue of wastage of roughly 30% of farm goods. The SMEs in the Indian food industry face a variety of difficulties, including financial difficulties, a lack of technical expertise, a lack of business investment, etc. In this regard, a number of important elements can assist food SMEs in lowering energy consumption and minimising waste of agricultural goods for sustainable growth. In order to support SMEs' sustainable increase in the Indian food sector, this research seeks to identify and examine crucial ICT application variables. For the examination of the variables, the Grey based Decision Making Evaluation Laboratory approach was used. 'Government actions and policies', 'Public-private collaboration', and 'Encouraging ICT' findings The most significant influences are "ICT integrated effective food supply chain," "Coordination between different departments," and "Collaboration and strategic alliances across supply chain." The findings imply that the attempts to improve the food supply chain are centred on "Government policies and initiatives." Since the Indian government controls many parts of food sector policymaking, it is the major consumer of SMEs. To improve the competitiveness of the Indian food sector, the government must act to promoteBusiness environment-related economic policies, private investments, and IT service providers. findings While the aspects that have the most influence are "effective food supply chain," "coordination across multiple departments,"

and "collaboration and strategic partnerships throughout supply chain," ICT also integrates these elements. . The results show that the focus of efforts to enhance the food supply chain is on "Government policies and initiatives." The Indian government oversees a large portion of the policymaking in the food industry, making it the main buyer of SMEs. The government must take measures to promote local and foreign investments, IT Economic policies that are relevant to the business climate, service providers, and boosting the competitiveness of the Indian food industry. This project will assist managers in developing profitable and long-lasting ICT solutions for SMEs in diverse food supply chains. financial performance (ROE). Institutional investors may improve corporate governance by enhancing management performance, which lowers capital costs, leverage risk, and total firm capital costs. This improves company performance and economic stability.. The papers in this series emphasise the critical role that WCM plays in boosting business growth and profitability (Gill and Biger, 2013). According to the research, insufficient working capital management, poor planning, and insufficient control have all contributed to the demise of organisations (Kroes and Manikas, 2014). Current research has shown that macroeconomic factors have a substantial impact on the enterprises, notably on WCM (Goel and Sharma, 2015). In the Indian manufacturing industry, many enterprises behave in different ways in terms of commercial and economic WCM efficiency. We appreciate the comments and advice provided by an anonymous referee and editor. This journal's full text archive and current issue are both accessible. The papers in this series emphasise the critical role that WCM plays in boosting business growth and profitability (Gill and Biger, 2013). According to the research, insufficient working capital management, poor planning, and insufficient control have all contributed to the demise of organisations (Kroes and Manikas, 2014). Current research has shown that macroeconomic factors have a substantial impact on the enterprises, notably on WCM (Goel and Sharma, 2015). In the Indian manufacturing industry, many enterprises behave in different ways in terms of commercial and economic WCM efficiency. We appreciate the comments and advice provided by an anonymous referee and editor. This journal's full text archive and current issue are both. Additionally, industrialised nations have been the target of study (Li et al., 2014). Although these research add to the body of knowledge on WCM, their conclusions cannot be applied to emerging nations like IndiaScheffler dishes are used levels in India. Their economic attractiveness is assessed. Institutional kitchens come in three sizes, with capacities ranging from small (for 200 people) to big (for 1000 people). Aperture for collecting solar energy, necessary investment, and a number of small, medium, and large-sized business financial performance indicator values that follow. Developed countries have also been the subject of research (Li et al., 2014). These studies add to the body of information on WCM, however their conclusions do not hold true for emerging nations like India. At the institutional and communal levels, the economic attractiveness of employing Scheffler dishes for solar steam cooking is evaluated in India. There are three sizes available for institutional kitchens: small (for 200 people), medium (for 500 people), and huge (for 1000 people). the solar energy aperture size, the required funding, and the importance of numerous financial success measures forEstimates for small, medium, and large institutional solar steam cooking systems have been made using Scheffler dishes. More than thirty different locations around the country have taken measurements of the annual amount of steam production. Every year, between 583 and 1072 kilogrammes of steam are generated per square. As expected, the economic attractiveness of the Scheffler dish-based solar steam cooking system depends on the region. The anticipated discounted payback times are for small, medium, and large institutional kitchens, accordingly. Large-scale solar steam cooking systems are inherently more financially viable due to economies of scaleEstimates have been established for small, medium, and large institutional solar steam cooking systems. More than thirty different locations around the country (in the capital cities of each state in India) have been used to quantify the annual volume of steam generationIt is expected that the Scheffler dish's aperture will produce between 583 and 1072 kg of steam each year. As expected, the economic attractiveness of the Scheffler dish-based solar steam cooking system depends on the region. The quickest expected discounted payback durations for medium- and large-sized institutional solar steam cooking systems based on Scheffler dishes are 9, 7, and 6 years, respectively. The yearly volume of steam generation has been measured at more than thirty distinct places around the nation (in the capital city of each state in India). The aperture of the dish is predicted to yield between 583 and 1072 kg. of steam every year. The economical attractiveness of dish-based solar steam cooking system is affected by the location, as expected. Large-scale solar steam cooking systems are more financially enticing because of the economies of scale in these systems' capital costs. Using r dishes for solar steam cooking at the institutional and community levels is cost-analyzed in India.two sizesThere are three sizes that have been considered: small (for 200 people), medium (for 500 people), and large (for 1000 people). The aperture area of solar energy collection, the required investment, and consequently the values of various financial performance measures, have all been assessed for small, medium, and large-sized institutional solar steam cooking systems. Over thirty different locations across the country (in the capital cities of each state of India) have assessed the annual amount of steam generation. The annual production of steam per square metre of the dish's aperture is estimated to range between 583 and 1072 kg.. The locations have an impact on how economically viable the is, as expected. The estimated discounted payback times for small, medium, and large institutional kitchens are 9, 7, and 6 years, respectively. Large-scale solar steam cooking systems are more financially enticing because of the economies of scale in these systems' capital costs. There is no evidence that lean and creative strategies have been effectively applied in. This demonstrates the necessity for study into how and to what extent innovation and leanness impact a company's performance. Even though various studies in the literature highlight the simultaneous impact that these two strategies have on both environmental and financial performance, further research is required to analyse this effect. The relationship between leanness, product innovation, process innovation, financial performance, and environmental performance is therefore explored in this article. We use to empirically evaluate the model's assumptions in order to do this. This work builds on structural equation modelling.

The construct measures are evaluated using confirmatory factor analysis (CFA), and the assumptions of the structural model are tested using route model analysis. The study's results show that innovation and leanness both considerably enhance financial and environmental performance, which supports the hypothesised model. The study's findings demonstrate how important it is to consider both leanness and innovation since both directly and indirectly through innovation, leanness has an impact on both financial and environmental performance. draw the attention of practitioners, scholars, and policy builder to the effects of lean and innovative practises on the financial and environmental performance of particular firms and supply. The study's findings confirm the model's hypotheses and show that innovation and leanness have a significant positive impact on financial performance. The results of this study also show how important it is to consider innovation and leanness simultaneously since leanness has an indirect influence on innovation's ability to achieve innovation's primary goals of improving financial and environmental performance. The consequences of lean and innovative practises on the financial and environmental performance of specific organisations and supply chains may be brought to the attention of practitioners, academics, and policymakers by these results.

2. TOPSIS Method

Multi-criteria decision-making frequently employs the TOPSIS (method for Order of Preference by Similarity to Ideal Solution) method. By considering how closely they resemble the ideal answer, it helps in choosing the greatest alternative from a set of possibilities. The approach offers a thorough examination by considering both the advantages and disadvantages of each choice. The next stage is to identify the pertinent criteria and confirm that they are quantitative and indicative of the decision problem. The decision matrix is first normalised and then scaled up to one. The weight of each criterion is then determined to reflect its relative importance. determining the ideal solutions that are both beneficial and detrimental for each circumstance Finding the favourable and unfavourable ideal solutions for each criterion allows for the determination of the best and worst values. A comparison of each option's distance from the positive and negative ideal solutions is made. Following that, the choices are rated according to which one comes closest to the ideal, affirmative response, with the one with the highest score being the most preferred. The method offers a system and logical approach to decision-making, enabling quick comparisons and assessments across a range of factors. The Technique for Order Preference by Similarity to and the Entropy Method, two frequently used techniques, are given an overview of the normalisation approaches in this article. By determining the positive and negative ideal solutions for each criterion, the best and worst values are determined. The distance between each alternative and the positive and negative ideal solutions is calculated. The options are then scored based on how closely they approach the ideal, favourable outcome, with the highest score being the most preferred choice. The method offers a structured and methodical approach to decision-making, enabling effective comparisons and evaluations across a number of criteria. The entropy approach and the Technique for Order Preference by Similarity to Ideal Solution are two techniques that are frequently coupled. This article offers an overview of the frequently used normalisation procedures for these two techniques. Information entropy (a measure of the diversity of attribute data) is used to assess the effects of normalisation on the entropy-based method. It has been demonstrated that normalisation has an impact on the, which modifies how much each attribute modifies the distance between each choice and the ideal solution as well as the negative ideal solution. The bigger the DAD, the more the attribute influences the decision's result. It has been demonstrated that, in contrast to vector normalisation, which does not alter the respectively, min-max normalisation alters and may result in the appearance of multiple zeros. To evaluate the impact of normalisation on the entropy-based approach, information entropy, a measure of the diversity of attribute data, is utilised. It has been demonstrated that normalisation has an impact on, which influences how much each characteristic contributes to the gap between each alternative and the ideal solution as well as the negative ideal solution. The bigger the, the more the attribute influences the decision's result. It has been demonstrated that min-max normalisation alters the DAD, but vector normalisation and sum normalisation do not. Entropy of information (IE), The impacts of normalisation on the entropy-based method are evaluated using a measure of attribute data variety. It has been demonstrated that normalisation has an effect on the, which in turn affects how much each characteristic contributes to the gap between each choice and the ideal answer. The bigger the DAD, the more the attribute influences the decision's result. It has been demonstrated that neither vector normalisation nor sum normalisation will alter the DAD. The impacts of normalisation on the Information entropy (IE), a gauge of attribute data variety, is used to assess entropy-based approaches. It is discovered that the DAD is vulnerable to normalisation, which in turn influences how much each characteristic contributes to the distance between each option and the desired perfect solution and the ideal answer. The bigger the DAD, the more the attribute influences the decision's result. Information entropy is used as a measure of attribute variation as we examine the implications of normalisation on the entropy-based TOPSIS approach. It has been demonstrated that normalisation has an impact on the DAD, which influences how much each attribute contributes to the distance between each choice and the ideal solution as well as the negative ideal solution. The bigger the DAD, the more the attribute influences the decision's result. It has been shown that although vector normalisation and sum normalisation have no effect on the DAD, min-max normalisation not only changes the DAD but may also cause a number of zero values to emerge. As a result, the calculated. Numerous studies have attempted to extend the TOPSIS approach, but these efforts have been unsuccessful since the decision matrix cannot achieve the optimum answers, which are frequently provided as actual values. The majority of these articles defuzzify the elements of the fuzzy decision matrix, which inevitably results in the loss of crucial information and may even yield

erroneous findings. We provide a brand-new direct way for the fuzzy extension in this work that does not have the drawbacks of earlier methods. We demonstrate that the variations in the weighted sums of local criteria between the ideal solutions and the alternatives may be seen as modifications. It is well established that in many real-world circumstances, utilising weighted sums to aggregate local criteria is not the best course of action. Due to this, we suggest adding other local criterion aggregation types to the approach in addition to weighted sums and developing a system for the generalisation of various aggregation modes, which will lead to subpar outcomes. The multi-attribute or multi-criteria decision making technique known as approach for Order Performance by Hwang, Yoon, and Lai et al. [10] employed incremental analysis to get over issues with ratio scales that numerous MCDM techniques have. according to Shih et al. [11], The benefits of include the following: weighing the pros and cons of every option; assessing each option's performance according to a variety of criteria. also provides the logic behind human decision-making. has been effectively utilised in recent years in the areas of transportation [14], product design [8], and supply chain management [12]. However, as human judgements can occasionally be inaccurate due to a lack of information, confusing facts might not be adequately stated. Therefore, while evaluating each alternative's performance on the model and the respective weights of the various criteriaIt is common to acquire values or interval values. One instance is Jahanshaloo et al. Included among its benefits are taking into consideration both the best and worst scenarios and comparing the efficacy of every option according to a wide variety of variables. also provides the logic behind human decision-making. In recent years, Yang and Hung utilised to answer a plant layout design issue by outlining the model for interval data and providing a special way for figuring on how well each alternative score. However, there are two main issues with the TOPSIS method. The first downside is the design of the normalised decision matrix, which usually results in a small discrepancy between the conducted measurements and the normalised scale for each criterion. In other words, a system with a narrow gap is awful for ranking and cannot accurately convey the real superiority of options. Another flaw in the strategy is that risk assessment for a decision maker was never taken into account. Depending on their propensity for risk, decision-makers differ in how likely they are to overestimate the likelihood. The benefits of include the following: including both the best and worst case scenarios; assessing each alternative's performance according to a variety of criteria. also provides the logic behind human decision-making. risk-averse, risk-neutral, and risk-seeking behaviours in recent years. It is hard to assess the subjective propensity associated with various decision makers' preferences without taking risk propensity into account. The approach's fundamental tenet is that, in order to solve these two problems, the alternative should be picked if it is farthest from the unfavourable perfect solution and closer to the positive one. are clearly recognised in traditional MCDM approaches. The consequences of lean and innovative practises on the financial and environmental performance of specific organisations and supply chains may be brought to the attention of practitioners, academics, and policymakers by these results.are also displayed as real numbers in the traditional TOPSIS technique. The conventional TOPSIS method has been applied with success in several domains. The TOPSIS method's applications are thoroughly discussed in [4], however since it's not always possible to know for sure what the true values are The benefits of include the following: weighing the pros and cons of every option; assessing each option's performance according to a variety of criteria. also provides the logic behind human decision-making. Although the TOPSIS technique has undergone several fuzzy modifications recently, these extensions aren't comprehensive since the ideal answers are frequently provided as actual values or because they cannot be achieved in the decision matrix. components are a common practise that almost always results in the loss of crucial data and may The best solutions are discovered using the real valued representation of fuzzy values. The procedure utilised to identify the solution is not described at all in [41,69].

3. MATERIALS AND METHODS

An approach for the ranking alternatives based on many criteria is called approach for Order of Preference by Ideal Solution The technique offers an organised and thorough strategy for assessing alternatives based on several criteria. It helps decision-makers choose the best course of action by taking into account both the advantages and disadvantages of each possibility. Criteria Identification: Identify the criteria that are relevant and important for the evaluation. These criteria should be measurable and representative of the decision problem.

1. Normalization: Normalise the decision matrix, which shows how each choice performs against each criterion. To guarantee that the results are on the same scale and to get rid of the impacts of using multiple measuring units, normalisation is done.
2. The following advantages of include: accounting for both the best and worst possibilities; evaluating the effectiveness of all alternatives across a wide range of criteria. Additionally, offers the reasoning underlying human choice. In recent years, 2.: List the desirable (negative ideal) and ideal (positive ideal) solutions for each condition. The positive solution represents the highest feasible value for each criterion, whereas the negative solution represents the lowest possible value.
3. The following advantages of include: accounting for both the best and worst possibilities; evaluating the effectiveness of all alternatives across a wide range of criteria. Additionally, offers the reasoning underlying human choice. In recent years, 3. Calculating Similarity: Determine how closely each alternative resembles both. Typically, a distance metric like the Manhattan distance or Euclidean distance is used for this. The similarity values represent the performance of each alternative in comparison to the ideal solutions.

4. The following advantages of include: accounting for both the best and worst possibilities; evaluating the effectiveness of all alternatives across a wide range of criteria. Additionally, offers the reasoning underlying human choice. In recent years, 4. Calculate the Relative: Determine how close each option is to the positive solution by taking into consideration the distances between the positive. Each alternative's total performance is represented by the relative closeness value.
5. Ranking: Order the options according to how near they are to each other. The alternative deemed to be most desired or the finest option is that with the highest relative proximity.

4. RESULTS AND DISCUSSION

TABLE 1. Data Set

Company	Net Profit Margin	Total Assets Turnover	Current Ratio	Debt Ratio	Debt to Equity
Company 1	41.306329	1.140624	1.530169	2100.113929	0.887364
Company 2	0.276676	3.080025	0.777924	7304.608089	150.185025
Company 3	171.924544	0.693889	0.725904	3890.0169	3.200521
Company 4	163.916809	1.399489	7.584516	2344.012225	0.976144
Company 5	2.070721	3.940225	0.731025	7139.743009	37.970244
Company 6	19.079424	7.295401	1.602756	4230.721936	4.418404

TABLE 2. Normalized Data

	NORMALIZED DATA				
	Net Profit Margin	Total Assets Turnover	Current Ratio	Debt Ratio	Debt to Equity
Company 1	0.321924139	0.053495407	0.061960504	2.295443836	0.047184151
Company 2	0.026346989	0.087906778	0.044178791	4.280984972	0.613844769
Company 3	0.656771326	0.041724414	0.042676111	3.124071662	0.089609816
Company 4	0.641293723	0.05925568	0.137946021	2.425075028	0.04948826
Company 5	0.072078549	0.099427325	0.042826379	4.23239832	0.308650466
Company 6	0.218790204	0.135291287	0.063413095	3.258010537	0.105287777

TABLE 3. Weight

	WEIGHT				
	Net Profit Margin	Total Assets Turnover	Current Ratio	Debt Ratio	Debt to Equity
Company 1	0.25	0.25	0.25	0.25	0.25
Company 2	0.25	0.25	0.25	0.25	0.25
Company 3	0.25	0.25	0.25	0.25	0.25
Company 4	0.25	0.25	0.25	0.25	0.25
Company 5	0.25	0.25	0.25	0.25	0.25
Company 6	0.25	0.25	0.25	0.25	0.25

TABLE 4. Positive Matrix

Positive Matrix					
	Net Profit Margin	Total Assets Turnover	Current Ratio	Debt Ratio	Debt to Equity
Company 1	0.16	0.03	0.03	1.07	0.15
Company 2	0.16	0.03	0.03	1.07	0.15
Company 3	0.16	0.03	0.03	1.07	0.15
Company 4	0.16	0.03	0.03	1.07	0.15
Company 5	0.16	0.03	0.03	1.07	0.15
Company 6	0.16	0.03	0.03	1.07	0.15

TABLE 5. Negative matrix

	Negative matrix				
	Net Profit Margin	Total Assets Turnover	Current Ratio	Debt Ratio	Debt to Equity
Company 1	0.006587	0.010431103	0.010669028	0.573860959	0.011796038
Company 2	0.006587	0.010431103	0.010669028	0.573860959	0.011796038
Company 3	0.006587	0.010431103	0.010669028	0.573860959	0.011796038
Company 4	0.006587	0.010431103	0.010669028	0.573860959	0.011796038
Company 5	0.006587	0.010431103	0.010669028	0.573860959	0.011796038
Company 6	0.006587	0.010431103	0.010669028	0.573860959	0.011796038

TABLE 6. SI plus

	SI Plus
Company 1	0.548954
Company 2	0.922208
Company 3	0.675142
Company 4	0.541475
Company 5	0.919056
Company 6	0.713019

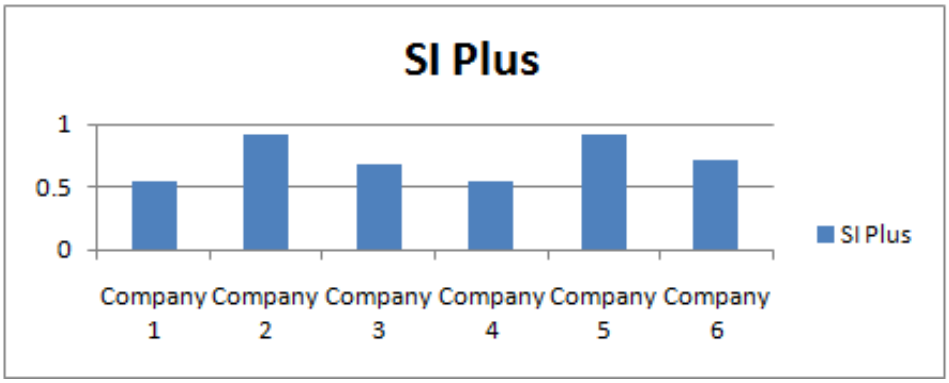

FIGURE 1. Si plus values

TABLE 7. Si negative

	Si Negative
Company 1	0.074109841
Company 2	0.516334008
Company 3	0.260511379
Company 4	0.158971841
Company 5	0.488977142
Company 6	0.246998211

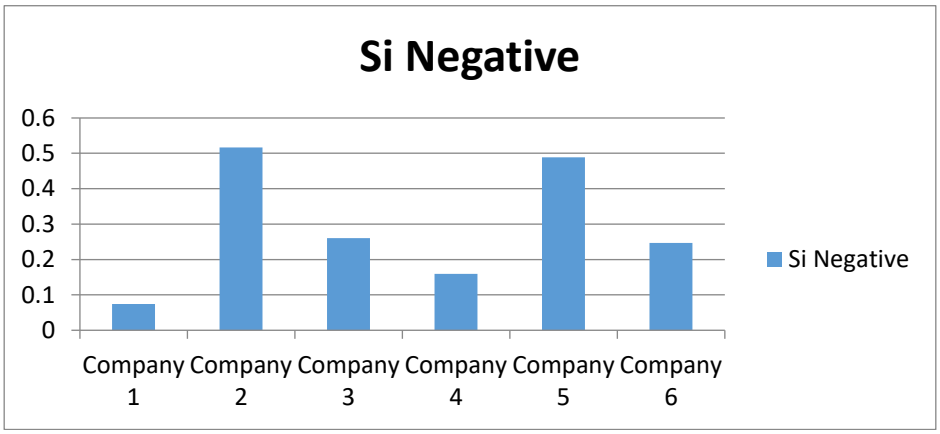

FIGURE 2. Si negative

TABLE 8. CI values

	CI
Company 1	0.118944
Company 2	0.358929
Company 3	0.278427
Company 4	0.226958
Company 5	0.347277
Company 6	0.257285

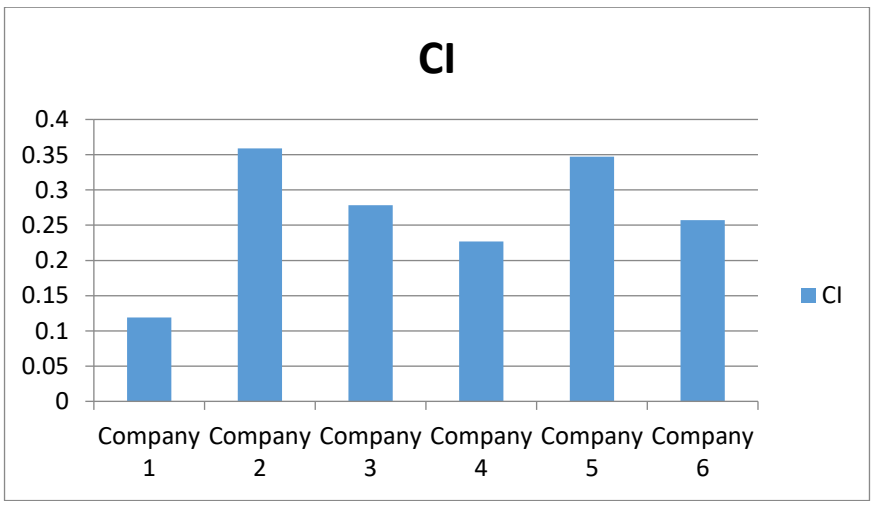

FIGURE 3. CI values

TABLE 9. Ranking

	RANK
Company 1	6
Company 2	1
Company 3	3
Company 4	5
Company 5	2
Company 6	4

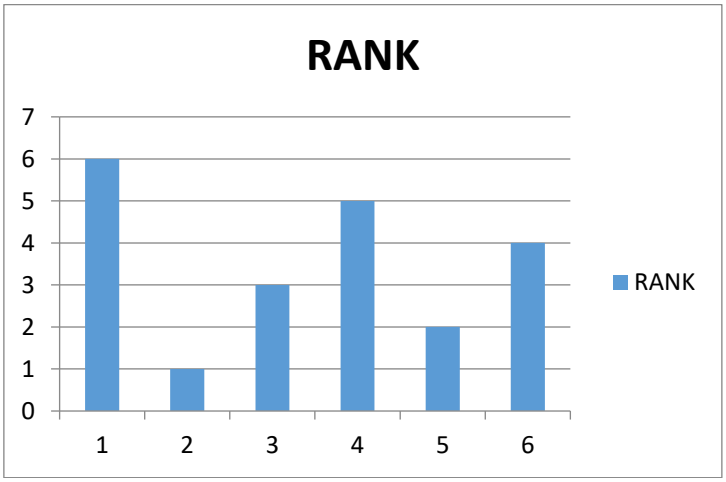

FIGURE 4. Ranking

5. CONCLUSION

When evaluating financial performance, industry-specific elements that have an influence on the food business are taken into account, including raw material costs, pricing dynamics, the competitive environment, regulatory environment, and consumer trends. When assessing a company's overall health and potential for the future, several variables that affect its financial performance must be taken into account. In multi-criteria decision-making, method is frequently utilised. By taking into account how closely they resemble the ideal answer, it helps choose the greatest choice from a group of alternatives. The approach offers a thorough examination by considering both the advantages and disadvantages of each possibility. The next step is to determine the pertinent criteria, making sure they are quantifiable and indicative of the decision problem. The TOPSIS technique provides an organised and systematic approach to decision-making, enabling efficient comparisons and assessments across several criteria. In this study, the entropy method (EM)'s most popular normalisation techniques are: andthe TOPSIS method for order preference by similarity to the ideal solution 8 companies than any other firm, 2 has the most CI. Compared to other companies, business 2 has the most si negatives. Every company's profit margin, turnover, assets, and other factors differ just slightly. By taking into account the distances between the positive ideal solutions, determine how near each choice is to the positive ideal solutionThe relative closeness value represents each alternative's overall performance.The TOPSIS technique offers a thorough and methodical strategy for assessing alternatives based on a variety of factors. It helps decision-makers choose the best option based on their preferences and goals by taking into account both the positive and negative elements of each possibility.

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