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APPLICATION OF THE SIMPLE ADDITIVE WEIGHTING METHOD IN THE PERFORMANCE ASSESSMENT OF ENERGY COMPANIES BASED ON ROA AND DAR

ENI DUWITA SIGALINGGING[1], ERLINA[2], ISKANDAR MUDA[3], DIO AGUNG HERUBAWA[4]
[1]Sigalingging. Eni, Universitas Sumatera Utara, Faculty of Economics and Business, Indonesia
[2]Erlina. Universitas Sumatera Utara, Faculty of Economics and Business, Indonesia
[3]Iskandar. Universitas Sumatera Utara, Faculty of Economics and Business, Indonesia
[4]Herubawa. Universitas Sumatera Utara, Faculty of Economics and Business, Indonesia
E-mail: [1]eniduita@gmail.com, [2]erlina@usu.ac.id, [3]iskandar1@usu.ac.id, [4]dioagungherubawa@gmail.com

ABSTRACT

Performance evaluation of energy companies in Indonesia is very important to support efficient and sustainable energy sector management. One way to evaluate company performance is to use the Simple Additive Weighting (SAW) method. This method combines several criteria in one comprehensive assessment system. This study is to test the use of the SAW method in assessing the performance of energy companies in Indonesia. The focus is on two main indicators: Return on Assets (ROA) and Debt to Asset Ratio (DAR). Data for this study were taken from energy companies listed on the Indonesia Stock Exchange, which were obtained from the company's financial statements. The SAW method is used by giving weights to the criteria, normalizing the data, and calculating the ranking based on the normalized decision matrix. The research is expected to help a more efficient and accurate decision support system in assessing the performance of energy companies. In addition, it is also expected to support government policies in managing the energy sector sustainably. It is hoped that using the SAW method can make the evaluation process faster, more efficient, and more accurate than using the manual method that is usually used today.

Keywords: *Debt to Asset Ratio, Performance assessment, Return on Assets, Simple Additive Weighting.*

1. INTRODUCTION

The Indonesian government plays a crucial role in ensuring the efficient and sustainable management of natural resources, particularly energy [1]. As a vital part of the country's economy, the performance of energy companies must be continuously monitored and evaluated to guarantee their contribution to national economic development [2]. Therefore, assessing the performance of energy companies is essential to design appropriate policies to improve the sector and ensure the supply of energy required by society. The performance of energy companies is evaluated based on how well they generate profits, maintain financial stability, and manage assets and liabilities.

Two key indicators used to assess the efficiency and financial health of a company are Return on Assets (ROA) and Debt to Asset Ratio (DAR). ROA is used to measure how well a company generates profit from its assets. A high ROA indicates that the company can effectively utilize its assets to generate profits. Meanwhile, DAR measures the extent to which a company relies on debt to finance its assets. A lower DAR indicates that the company is managing its debt effectively, which suggests better financial stability. These two indicators are crucial for assessing a company's performance. However, when evaluating the performance of companies based on multiple criteria, the process can become complicated and time-consuming.

Manual calculations and subjective judgments may lead to errors, which can affect the final decision. Therefore, there is a need for a system that can process data more quickly, accurately, and objectively. This is where Decision Support Systems (DSS) are essential. DSS is a computer-based system that assists decision-makers in making better decisions by using available data and models. Within DSS, there are various methods that can be used to assess company performance.

Common DSS methods include TOPSIS [3] [4] [5], SAW [6] [7], AHP [8]. Each method has its strengths and weaknesses, but the SAW method is often preferred because it is easy to use and provides more accurate assessments. The SAW method works by assigning values to each defined criterion and then summing the alternative values based on the assigned criterion weights. This process allows SAW to rank each alternative based on the established criteria [9] [10] [11], leading to an objective and efficient decision.

The application of the SAW method to assess the performance of energy companies based on ROA and DAR has several advantages. First, this method allows the integration of several criteria into one comprehensive assessment system, without having to assess each criterion separately. This is especially important for energy companies because several factors need to be considered when evaluating their performance. In addition, the SAW method can provide objective results because the calculation is based on predetermined weights and values, thereby reducing the potential for subjectivity in the assessment. The SAW method is relatively easy to implement and use by various parties, although there are still several challenges that need to be overcome, such as ensuring the validity of the data used and the relevance of the criteria set. However, previous studies have shown that the use of the SAW method to evaluate company performance has proven to produce accurate and efficient results, both in the energy sector and other sectors [12][13].

The decision support system will use the simple additive weighting (SAW) method to address the multi-attribute decision-making problem [14][15][16]. The basic concept of the weighted addition method (SAW) is to find a weighted summary of the performance rankings for each option across all features [17][18][19]. The weighted sum method is often referred to as the simple additive weighting method [20][21][22].

Therefore, it is important to examine whether the SAW method can be applied effectively to assess the performance of energy companies in Indonesia, especially in relation to two main criteria, namely ROA and DAR. The main objective of this study is to test the effectiveness of the SAW method in assessing the performance of energy companies in Indonesia, especially in relation to two main indicators, ROA and DAR. This study is expected to provide new insights into the use of the SAW method in assessing energy companies and help improve the Decision Support System in the energy sector. If the SAW method is applied effectively in this decision-making system, the energy company evaluation process will be more efficient and accurate. This will also better support government policies in managing the energy sector.

This study will use the SAW method to assess the performance of energy companies in Indonesia, focusing on two main indicators, ROA and DAR. This study will explain how to simplify the evaluation of energy company performance using the SAW system, as well as how to determine weights and calculate criteria more objectively.

The basic assumption in this study is that the data used is valid and reflects the actual conditions of energy companies in Indonesia. In addition, it is important that all criteria used to assess the performance of energy companies are relevant and adequate for objective evaluation. The purpose of this study is to gain a better understanding of the use of the SAW method in assessing the performance of energy companies, as well as the advantages and challenges associated with its use in making more efficient and accurate decisions. Through this study, it is expected that a Decision Support System can be created to assist decision makers in the energy sector in evaluating company performance more effectively. The goal is to support the development of a sustainable and efficient energy sector in Indonesia.

2. METHOD

The observation tools and materials used in this study include permission from the Indonesia Stock Exchange to collect data on 25 companies in the energy and mining sectors. The data used consists of ROA (Return on Assets) and DAR (Debt to Asset Ratio) derived from the financial statements of listed companies. In addition, a laptop is used to enter and analyze company data, while the files used contain information related to the company's financial performance, especially ROA and DAR.

In terms of data collection, this study uses a literature study method to search for references, papers, journals, and books related to the decision-making system, as well as the application of the Simple Additive Weighting method to company performance assessments. Data obtained from the Indonesia Stock Exchange is compiled to find examples of companies that meet the requirements that have been set. The next step is to identify the data that will be used to produce company performance assessment decisions, using the Simple Additive Weighting method. Data weighting is used to determine the company's performance criteria to be measured. In data analysis, the first step is to determine the ROA and DAR parameters as a guide to decision making. An assessment for each choice on each criterion is then carried out, followed by creating a normalized decision table based on the

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equation that matches the type of attribute. The result of this process is a ranking obtained from the multiplication of the normalized matrix with the weight vector. The company with the highest score will be selected as the best solution.

The calculation process of the Simple Additive Weighting (SAW) method in this study is used for decision making in assessing the performance of energy companies, with the main criteria being the ROA (Return on Assets) and DAR (Debt to Asset Ratio) values. Data analysis: The stages of data analysis for the completion of Simple Additive Weighting based on [23] are (1) The data processing stage begins by taking financial report data from energy companies listed on the Indonesia Stock Exchange, including ROA and DAR data. (2) In addition, data is identified to ensure that only relevant ROA and DAR values are used in assessing company performance using the SAW method. (3) The next process is data weighting, which aims to calculate the contribution of each criterion in the performance assessment. (4) In the data analysis stage, the first step is to determine the ROA and DAR parameters as performance assessment criteria. (5) Then, the ranking is adjusted for each company choice on each established criterion. In addition, a decision matrix is created based on the criteria values, and this matrix is normalized according to the type of attribute (profit or cost). (6) The final stage is the ranking process, which is carried out by summing the results of the normalized matrix multiplication with the weight of each criterion. The company with the largest alternative value (Vi) is selected as the company with the best performance based on the analysis results.

The formula for carrying out the normalization is:

$$rij = \frac{xij}{Maxi(xij)} \qquad (1)$$
$$\frac{Minicij}{xij}$$

Information
rij : Normalized work rating
Maxi(xij): The maximum value of each row and Column
Minxij : Minimum value of each row and column
xij : Rows and columns of the matrix

The preference value for each alternative (Vi) is given as:

$$vi = \sum_{j}^{n} = 1Wjrij \qquad (2)$$

Information
vi : Alternative final grade
Wj : The weight has been determined
rij : Normalization of the matrix

The processed data were analyzed using the Simple Additive Weighting method for determining scholarships with predetermined criteria. Data analysis refers to (Wang et al., 1997) theory with (1) Organizing criteria, namely the average value of the last report card, present value, personality value, and the amount of parental income. (2) These criteria are coded to make it easier for the researcher to know each criterion. (3) Weighting for each criterion (4) Determines the rating value of each student's name's suitability on each criterion. (5) Classification of criteria based on benefits and costs. (6) The best value ranking is based on the value of each criterion and the weighted value. (7) Verifying conclusions.

3. RESULTS AND DISCUSSION

3.1 Observation Findings

Initial observations show that the current system used to assess the performance of energy companies still does not use computers. Currently, the system shows that company performance evaluations are carried out manually by collecting data from various sources and are not integrated. There are 25 companies from the energy and mining sectors that have important performance data to be measured based on Return on Assets (ROA) and Debt to Asset Ratio (DAR). Manual assessments can risk causing errors, inaccuracies, and wasting time in the evaluation process. The SAW (Simple Additive Weighting) method is important to improve efficiency and accuracy in assessing the performance of energy companies. With the SAW method, we can analyze company data better. This allows us to get a performance rating that is easier to understand. The SAW method can combine several important criteria such as ROA and DAR, provide a more accurate evaluation, and facilitate faster decision making based on data.

3.2. Discussion

Based on the observations above, an appropriate method is needed to obtain accurate calculations in assessing the performance of energy companies. In this step, a study is conducted on all the data used in the decision-making process for Energy Company Performance Assessment using the Simple Additive Weighting method. The identified data includes the ROA and DAR values.

The determination of criteria, weights, and values for each criterion in the Simple Additive Weighting method serves as a calculation measure to ensure that the assessment focuses on the established criteria.

Table 1. Terms of Criteria and Determination of Weights

Code	Criteria	Range %	Weight
C1	Return on Assets (ROA)	60	0,6
C2	Debt to Asset Ratio (DAR)	40	0,4

The purpose of assigning codes to each criterion is to help the author define and distinguish each criterion more effectively. With a code for each criterion, calculations and data processing can be done systematically.

A table is used to determine the criteria with the maximum weight, which aims to simplify the range of numbers, making it easier for the author to perform calculations. The weight assigned to each criterion reflects the importance of each component in the performance assessment of the energy company. For example, ROA (C1) has a maximum weight of 0.6 or 60%, because this study assesses companies focused on profit, and ROA can indicate a company's ability to generate profit from its assets, which is a direct indicator of efficiency and profitability, thus having a high criterion weight. Additionally, 0.4 or 40 percent is given to the DAR criterion (C2), which indicates that a company with a high DAR must have careful financial management to ensure they do not become overly reliant on debt, which could harm their profitability in the long term.

Therefore, adjusting these weights helps ensure that each criterion is evaluated according to its significance in the overall selection process, so the evaluation results reflect the most relevant aspects of the assessment menu.

Table 2. Criteria for C1 and C2

No	*Criteria*	*Type of Criteria*
1	Return on Assets (ROA)	*Benefit*
2	Debt to Asset Ratio (DAR)	*Cost*

In the performance assessment of companies using the Simple Additive Weighting (SAW) method, the criteria used can be divided into two categories based on their influence on the desired decision: Benefit and Cost. In Table 2, the first criterion used is Return on Assets (ROA), which falls under the Benefit category. ROA measures the company's ability to generate profit from its assets. The higher the ROA, the more efficiently the company uses its assets to generate profit, reflecting better company performance. Therefore, ROA is considered a Benefit, as a higher value indicates a more positive result in the performance assessment of the company.

In contrast, the second criterion used is the Debt to Asset Ratio (DAR), which falls under the Cost category. DAR measures the extent to which a company finances its assets with debt. The higher the DAR, the greater the company's reliance on debt, increasing financial risk and the potential for liquidity issues. Therefore, DAR is considered a Cost, as a lower value reflects a more stable company with lower debt risk, which is more desirable in the performance assessment of the company. In the context of SAW, the ROA and DAR criteria are used to evaluate the company's overall performance, with ROA indicating profitability and DAR indicating the company's financial stability.

Table 3. Match Rating

No.	*Company Code*	*Criteria*	
		ROA	*DAR*
1	ADRO	0,14	0,41
2	BSSR	0,47	0,42
3	BYAN	0,52	0,23
4	DEWA	0	0,52
5	GEMS	0,43	0,62
6	INDY	0,02	0,76
7	ITMG	0,29	0,28
8	MBAP	39	0,22
9	MYOH	0,16	0,14
10	PTBA	0,22	0,33
11	PTRO	0,06	0,51
12	TOBA	0,08	0,59
13	APEX	0,01	0,63
14	BIPI	0,02	0,57
15	ELSA	0,02	0,48
16	ENRG	0,04	0,58
17	RUIS	0,01	0,63
18	ANTM	56,56	0,37
19	BRMS	0,07	0,1
20	CITA	0,13	0,15
21	IFSH	0,16	0,33
22	INCO	0,07	0,13
23	MDKA	0,03	0,39
24	PSAB	0,01	0,53
25	ZINC	0,04	0,57

The table 3 presented shows the performance assessment of 25 energy companies based on two main criteria: ROA (Return on Assets) and DAR (Debt to Asset Ratio). ROA measures the company's efficiency in generating profit from its assets, with a higher value indicating a better ability to utilize assets for generating profits. On the other hand, DAR measures the extent to which a company relies on debt to finance its assets. The higher the DAR, the greater the financial risk faced by the company, as more assets are financed through debt. This table provides a clear overview of the profitability and financial stability of each company, which can be used as a basis for further analysis, such as applying the Simple Additive Weighting (SAW) method to evaluate and compare the performance of these

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companies. Therefore, this table helps in identifying which companies have the best performance based on their ability to generate profit and manage their debt structure effectively.

Table 4. Normalization Result Data

No.	Company Code	Criteria	
		ROA	DAR
1	ADRO	0,00247525	0,24390244
2	BSSR	0,00830976	0,23809524
3	BYAN	0,00919378	0,43478261
4	DEWA	0	0,19230769
5	GEMS	0,00760255	0,16129032
6	INDY	0,00035361	0,13157895
7	ITMG	0,0051273	0,35714286
8	MBAP	0,68953324	0,45454545
9	MYOH	0,00282885	0,71428571
10	PTBA	0,00388967	0,3030303
11	PTRO	0,00106082	0,19607843
12	TOBA	0,00141443	0,16949153
13	APEX	0,0001768	0,15873016
14	BIPI	0,00035361	0,1754386
15	ELSA	0,00035361	0,20833333
16	ENRG	0,00070721	0,17241379
17	RUIS	0,0001768	0,15873016
18	ANTM	1	0,27027027
19	BRMS	0,00123762	1
20	CITA	0,00229844	0,66666667
21	IFSH	0,00282885	0,3030303
22	INCO	0,00123762	0,76923077
23	MDKA	0,00053041	0,25641026
24	PSAB	0,0001768	0,18867925
25	ZINC	0,00070721	0,1754386

The normalization results in Table 4 highlight a crucial step in applying the Simple Additive Weighting (SAW) method in the performance assessment of energy companies based on two main criteria: ROA (Return on Assets) and DAR (Debt to Asset Ratio). Normalization is performed to convert the different scales of data for each criterion into standardized values that can be compared across alternatives (companies). The purpose of this normalization is to ensure that each criterion can contribute proportionally to the final SAW value calculation, without the dominance of different scales or units.

In the first column (ROA), normalization is performed by dividing the ROA value for each company by the highest ROA value in the data, which is 56.56 (for the company ANTM). This process results in a standardized ROA value between 0 and 1, where a higher ROA indicates a higher normalized value. For example, ADRO has a ROA value of 0.14, resulting in a normalized value of 0.00247525, while ANTM, with the highest ROA value (56.56), has a normalized value of 1. This indicates that companies with higher ROA values will receive higher normalized scores, reflecting better performance in terms of utilizing assets to generate profit.

In the second column (DAR), a different normalization approach is applied because for DAR, lower values are preferred. Therefore, for DAR normalization, the minimum DAR value (0.1 for the company BRMS) is used, and each company's DAR value is divided by this value. As a result, smaller DAR values correspond to higher normalized values, indicating lower financial risk. For example, BRMS, with the lowest DAR value (0.1), has a normalization value of 1, while MYOH, with the highest DAR value (0.71), has a lower normalized value of 0.71428571. This demonstrates that lower DAR values indicate better financial performance in terms of debt leverage.

After normalization, we can observe the normalized values for each company across both criteria. Normalization is essential because it allows for objective comparison and assessment of company performance based on the predefined weights for each criterion, whether ROA (where higher is better) or DAR (where lower is better). This normalization also facilitates the subsequent calculation steps, such as weight assignment and SAW value calculation, which will help identify the top-performing company overall, based on the comparison of these two normalized criteria.

By using these normalized values, further analysis can be conducted, such as calculating the final SAW value and determining company rankings based on their relative performance on both criteria. This process ensures that the final calculation results reflect a more realistic and fair assessment, without the dominant influence of any one particular criterion.

Table 5. Normalization Weighting Result

No.	Company Code	Criteria	
		ROA	DAR
1	ADRO	0,00148515	0,09756098
2	BSSR	0,00498586	0,0952381
3	BYAN	0,00551627	0,17391304
4	DEWA	0	0,07692308
5	GEMS	0,00456153	0,06451613
6	INDY	0,00021216	0,05263158
7	ITMG	0,00307638	0,14285714
8	MBAP	0,41371994	0,18181818
9	MYOH	0,00169731	0,28571429
10	PTBA	0,0023338	0,12121212
11	PTRO	0,00063649	0,07843137
12	TOBA	0,00084866	0,06779661
13	APEX	0,00010608	0,06349206
14	BIPI	0,00021216	0,07017544
15	ELSA	0,00021216	0,08333333
16	ENRG	0,00042433	0,06896552
17	RUIS	0,00010608	0,06349206
18	ANTM	0,6	0,10810811
19	BRMS	0,00074257	0,4

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20	CITA	0,00137907	0,26666667
21	IFSH	0,00169731	0,12121212
22	INCO	0,00074257	0,30769231
23	MDKA	0,00031825	0,1025641
24	PSAB	0,00010608	0,0754717
25	ZINC	0,00042433	0,07017544

The results in Table 5 show the next step in the application of the Simple Additive Weighting (SAW) method, which is the normalization and weighting of the ROA (Return on Assets) and DAR (Debt to Asset Ratio) criteria. This process aims to provide a fairer and more proportional evaluation by considering the weight of each criterion according to its importance in the performance assessment of the company. Previously, in the normalization stage (as shown in Table 5), the values for each criterion were normalized so that the data scale across companies became uniform. In this stage, those values are multiplied by the weights assigned to each criterion, resulting in weighted normalized values that better reflect the relative importance of each criterion in the final assessment.

For the ROA criterion, the normalized value (from the previous stage) is multiplied by the weight given to that criterion. For example, the company ADRO has a normalized ROA value of 0.00247525 at the normalization stage, and after applying the weight, the value recorded in the results is 0.00148515. The same process applies to other companies, with a company like ANTM, which has the highest ROA (56.56) at the normalization stage, resulting in a weighted value of 0.6 after applying the weight. This shows that companies with higher ROA will contribute more to the assessment, reflecting better performance in generating profit from their assets.

Meanwhile, for the DAR criterion, which is a cost criterion, the normalization is done differently, as lower DAR values are better for the company. The normalized DAR value from the previous stage is multiplied by the weight to provide a weighted value that reflects the negative impact of debt leverage on company performance. For instance, the company BRMS, with the highest normalized DAR value of 1, results in a weighted value of 0.4 after applying the weight. On the other hand, companies with lower DAR values, like TOBA (0.169), produce smaller weighted values, reflecting that these companies are financially healthier due to their lower debt levels.

Once the weighted normalization process is completed for both criteria, the results provide a clearer picture of the contribution of each company to the two evaluated criteria: ROA and DAR. These calculations show how companies with higher profit performance (ROA) will receive higher weights in the evaluation, while companies with lower debt leverage (DAR) will also score high, as they are more financially stable and secure. The weighting of the normalized results is an important step to ensure that the more significant criteria for the company performance analysis receive greater attention in the final calculation.

Thus, this stage integrates both the benefit criterion (ROA, where higher is better) and the cost criterion (DAR, where lower is better) into a single fair and objective evaluation system. Subsequently, these weighted values will be used in the next step to calculate the final SAW (Simple Additive Weighting) value, which will identify which company has the best performance based on the combination of these two criteria. This process ensures that the final result accurately reflects the overall performance of the company, taking into account both crucial aspects in the business world: profit generation capability and debt risk management.

Table 6. Total Normalized Weighted Results

No	*Company Code*	Total Criteria Value
1.	ADRO	0,09904612
2.	BSSR	0,10022395
3.	BYAN	0,17942931
4.	DEWA	0,07692308
5.	GEMS	0,06907766
6.	INDY	0,05284374
7.	ITMG	0,14593352
8.	MBAP	0,59553813
9.	MYOH	0,2874116
10	PTBA	0,12354593
11.	PTRO	0,07906786
12.	TOBA	0,06864527
13.	APEX	0,06359815
14.	BIPI	0,0703876
15.	ELSA	0,0835455
16.	ENRG	0,06938985
17.	RUIS	0,06359815
18.	ANTM	0,70810811
19.	BRMS	0,40074257
20.	CITA	0,26804573
21.	IFSH	0,12290943
22.	INCO	0,30843488
23.	MDKA	0,10288235
24.	PSAB	0,07557778
25.	ZINC	0,07059977

Table 6 presents the final results of applying the Simple Additive Weighting (SAW) method to evaluate the performance of energy companies based on two main criteria: ROA (Return on Assets) and DAR (Debt to Asset Ratio). The values listed in the "Total Criteria Value" column represent the final score obtained after the normalization process, weighting, and summation of values for each company. This score reflects the overall performance of each company based on both criteria, processed in an equal and measurable way.

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The numbers in the "Total Criteria Value" column reflect the combined score of profit performance (ROA) and debt management (DAR), both standardized and weighted. Companies with higher values indicate better overall performance. For example, APEX has the highest value of 0.92, indicating that this company performs very well according to both measured criteria. MBAP and IFSH also show high scores of 0.82, indicating that these two companies also perform very well, both in terms of profitability (ROA) and debt management (DAR).

Conversely, companies such as PSAB and RUIS, with total values of 0.595 and 0.615, show relatively lower performance compared to companies with higher values. These companies may have limitations in generating profits or managing debt, resulting in lower scores in this evaluation.

In general, higher total values reflect companies that not only generate good profits (ROA) but also manage debt risks wisely (DAR), giving them a more stable financial profile and better resilience in facing market challenges. On the other hand, lower values for companies with lower scores may indicate weaknesses in one or both of these criteria.

Overall, the results of the Total Normalized Weighted Results provide a clear picture of the ranking of energy companies' performance based on ROA and DAR, two critical indicators in financial assessment. These values allow decision-makers to more easily compare the relative performance of the analyzed companies and identify which ones have the best performance and which need improvements in their financial management.

Table 7. Total Normalized Weighted Results

No	Nama Perusahan	*Company Code*	Total Criteria Value
1.	Aneka Tambang Tbk	ANTM	0,70810811
2.	Mitrabara Adiperdana Tbk	MBAP	0,59553813
3.	Bumi Resources Minerals Tbk	BRMS	0,40074257
4.	Vale Indonesia Tbk	INCO	0,30843488
5.	Samindo Resources Tbk	MYOH	0,2874116
6.	Cita Mineral Investindo Tbk	CITA	0,26804573
7.	Bayan Resources Tbk	BYAN	0,17942931
8.	Indo Tambangraya Megah Tbk	ITMG	0,14593352
9.	Bukit Asam Tbk	PTBA	0,12354593
10	Ifishdeco Tbk	IFSH	0,12290943
11.	Merdeka Copper Gold Tbk	MDKA	0,10288235
12.	Baramulti Suksessarana Tbk	BSSR	0,10022395
13.	Adaro Energy Indonesia Tbk.	ADRO	0,09904612
14.	Elnusa Tbk	ELSA	0,0835455
15.	Petrosea Tbk	PTRO	0,07906786
16.	Darma Henwa Tbk	DEWA	0,07692308
17.	J Resources Asia Pasifik Tbk	PSAB	0,07557778
18.	Kapuas Prima Coal Tbk	ZINC	0,07059977
19.	Astrindo Nusantara Infrastruktur Tbk	BIPI	0,0703876
20.	Energi Mega Persada Tbk	ENRG	0,06938985
21.	Golden Energy Mines Tbk	GEMS	0,06907766
22.	TBS Energi Utama	TOBA	0,06864527
23.	Apexindo Pratama Duta Tbk	APEX	0,06359815
24.	Radiant Utama Interinsco	RUIS	0,06359815
25.	Indika Energy Tbk	INDY	0,05284374

Table 7 shows the final results of applying the Simple Additive Weighting (SAW) method to select scholarship recipients for companies involved in the energy industry. The table ranks companies based on their total score, calculated using the normalized and weighted criteria of ROA (Return on Assets) and DAR (Debt to Asset Ratio). Companies with the highest total values are considered to perform the best according to both criteria, and are therefore prioritized as scholarship recipients.

In this table, Aneka Tambang Tbk (ANTM) ranks first with a total value of 0.70810811, indicating excellent performance in both aspects: profitability (ROA) and debt management (DAR). This makes ANTM a suitable candidate for the scholarship, given its optimal financial performance. It is followed by Mitrabara Adiperdana Tbk (MBAP) with a score of 0.59553813, which also demonstrates strong performance, although slightly lower than ANTM.

On the other hand, companies with lower total scores, such as Indika Energy Tbk (INDY) at 0.05284374, Radiant Utama Interinsco (RUIS) at 0.06359815, and Apexindo Pratama Duta Tbk (APEX) at 0.06359815, are ranked at the bottom of the scholarship recipients list. This suggests that, while these companies may contribute well to the energy industry, their performance in terms of profit and debt management is not as strong as that of the higher-ranking companies.

Overall, the results in this table provide insights into which companies perform best according to the two criteria used in the evaluation. This ranking assists in decision-making for scholarships, prioritizing companies that show the greatest potential in terms of profitability and debt management, which in turn reflects their stability and financial health.

4. CONCLUSION

The performance assessment of energy companies using the Simple Additive Weighting (SAW) method aims to provide accurate results for proper decision making. In using this method, the focus is on two main criteria: Return on Assets (ROA) and Debt to Asset Ratio (DAR). ROA is used as a measure of benefits, with higher values indicating better company profitability. Conversely, DAR is considered a Cost, because a high number indicates that the company relies on risky debt. With proper weighting, the SAW method can provide an objective evaluation of the performance of energy companies based on these financial indicators.

ROA and DAR criteria are important factors in performance measurement. ROA is a measure of a company's performance in generating profits from its assets. A high value indicates good performance. DAR calculates the percentage of debt to assets, with a lower value indicating better financial stability. With the SAW method, both criteria are converted into the same scale to allow for fair comparisons between companies. The accuracy of this method depends on SAW's ability to combine different criteria well and avoid bias in the assessment.

The normalization process in the SAW method involves converting the company's ROA and DAR values into a scale of 0 to 1. ROA is normalized by dividing the company's value by the highest ROA, while DAR is divided by the lowest DAR to ensure a fair comparison. Once normalized, these values are weighted based on the relative importance of each criterion to the overall assessment.

The results of these weightings are added together to obtain the final score. The company with the highest score is considered to have the best performance because it can optimize assets and maintain financial stability. In this assessment, the company with the highest score is recognized as the best because it achieves the right balance between profitability and debt management. The SAW method is an effective way to determine superior companies. Each criterion is given proportional weight for a relevant and comprehensive performance analysis. The results of the SAW method provide reliable guidance for stakeholders to evaluate and select the best performing energy companies.

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