

# Business Strategy through Decision Support Systems: A Case Study of Best Employee Selection in Indonesia

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**Abstract:** - This research aims to design a decision support system (DSS) modeling for predicting the best employees in the Company. This research will use the SAW (simple additive weighting) method. This decision support system has helped facilitate the process of assessing and selecting the best employees at the Company. This decision support system can minimize injustice in selecting the best employees. It even saves an HRD manager's time in determining the ranking of the best employees. This research is expected to provide an effective and efficient solution in determining the best employee candidates who deserve rewards. This system is specific to this research case study and is not necessarily suitable for other organizations that may have their own assessment criteria (apart from SMART: Specific, Measurable, Achievable, Relevant, and Timely).

**Key-Words:** - Decision support system, Decision system, Human resources system, Business strategy, Strategic management, Human capital management.

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## 1 Introduction

In a competitive business era today, fast and accurate decision-making is the key to a company's success, [1]. One innovative business strategy is to implement a Management Decision Support System

in selecting the best employees. Management decision support system in choosing the best employee is one of the important things and needs to be done by the company to recognize the strengths and weaknesses of employees, so that

employees can correct their mistakes if there are weaknesses in their work so far, [2]. These systems are not just technological tools, but also strong business strategy pillars that support various operational and managerial aspects of the company.

The system uses intelligent algorithms to evaluate the qualifications, experience, and abilities of prospective employees, thus helping management make more objective and data-driven decisions, [3]. Thus, the system allows companies to identify and recruit the best talent faster than competitors who still use traditional methods. In addition, the Management Decision Support System (MDSS) also helps in retaining quality employees by providing insight into training and development needs, as well as monitoring performance in real time. The use of this system will certainly in the long run also reduce the possibility of human error in evaluation and selection, and ensure that every decision is based on accurate and relevant data, [4]. This not only saves costs; but also increases the productivity of the HR team. The system can also be used to design career development strategies, plan succession, and manage overall employee performance.

Performance is the quantity and quality of work completed by an individual, group, or organization. [5] state that the factors that influence performance consist of the five factors, the first factor is the personal/individual factor which includes the knowledge, skills, abilities, self-confidence, motivation and commitment possessed by each individual. The second factor is leadership which includes the quality of providing encouragement, direction, and support provided by managers and team leaders, [6]. Third, team factors which include quality support and enthusiasm provided by colleagues in a team, trust in fellow team members, cohesiveness and closeness of team members. Fourth, system factors which include work systems, work facilities or infrastructure provided by the organization, organizational processes, and performance culture within the organization. The fifth factor is contextual (situational) factors which include pressure and changes in the external and internal environment.

The effect of implementing performance management will also affect employee performance as a whole, so that the company can achieve the desired goals. Better If performance management is implemented, the higher the employee performance will be [7]. Performance measurement is an activity to assess the achievement of certain targets derived from the organization's strategic goals. After the performance assessment is completed, then reward,

punishment or even promotion will be given to the employee concerned. To support this, a system is needed that is able to provide recommendations for employees with the most potential, [8]. The system must also be able to provide recommendations for the best employees from all employees, in accordance with the performance assessment that has been determined by the company.

There are many methods used for decision making on the selection of the best employees. Among them are Simple Additive Weighting (SAW), Analytical Hierarchy Process (AHP), Profile Matching, Weighted Product (WP), Fuzzy, and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), [9], [10], [11]. This study will use the SAW method. The simple additive weighting method is a weighted sum method used to solve multiple attribute decision-making problems. The simple additive weighting method can help in making decisions on a case with the results of the largest value that will be selected as the best alternative, this method is more efficient because the time required in the calculation is shorter. In addition, the simple additive weighting method is also able to make a more precise assessment, because it is based on the value of the criteria, and the preference weights that have been determined, [12]. Furthermore, for the employee who gets the highest total score, the employee will be the best employee and will be awarded that month.

This research is a case study conducted using the object of one company in Indonesia, in this study we disguise the identity as privacy and use the initials "XX" which are located in two different locations. Thus, this allows for differences in assessment factors/criteria in selecting the best employees in the company. One of the factors is the work environment and work culture built in the two locations. This will provide a uniqueness of this research. It should be noted that the company "XX" has problems with employee loyalty. Thus, there are many factors of employee dissatisfaction in the company. This can certainly reduce company performance. The company "XX" also does not have an employee performance appreciation system, such as the selection of the best employees. Therefore, the purpose of this research is to create a simple decision support system (DSS) for the company "XX" to facilitate the process of selecting the best employees every period. Therefore, this research will focus on identifying the criteria and sub-criteria used to determine who deserves to be the best employee and get a reward, while employees whose performance is still lacking will get punishment. The process of collecting the

necessary data is used to evaluate candidates, and the creation of a DSS model is carried out using the multicriteria analysis method. Meanwhile, the implementation and testing of DSS using real data. The DSS improvement evaluation process is also carried out periodically during the observation period of this research to ensure accurate and reliable results. The contribution of this research is expected to provide an effective and efficient solution in determining the best employee candidates who deserve a reward. Another benefit of making a system at PT XX is also to minimize the occurrence of injustice in the selection of the best employees. Even saves the time of an HRD manager in determining the ranking of the best employees.

## 2 Problem Formulation

### 2.1 Management Decision Support System (DSS)

A system that is able to provide problem-solving capabilities and communication capabilities for problems with semi-structured and unstructured conditions, [13]. DSS You could say it is a computer system that processes data into information in making decisions on specific semi-structured problems. *Decision Support System* (DSS) is intended to support management in carrying out analytical work in less structured situations and with less clear criteria. Decision Support Systems (DSS) are not intended to automate decision-making, but provide interactive tools that enable decision-makers to carry out various analyses using available models, [2]. In simple terms, DSS is a form of application of various decision-making theories that we already know, such as operations research and science management. The difference is, if in the past the formulation of problems and searching for solutions was carried out using manual literacy calculations by determining minimum, maximum, and optimum values, now computer systems are clever at offering solutions to solve problems posed in just a short matter of time.

### 2.2 Method Simple Additive Weighting (SAW)

The simple additive weighting method is a weighted addition method used to solve multiple attribute decision-making problems, [12]. The basic concept of this method is to find the weighted sum of the performance ratings for each alternative from all attributes. The simple additive weighting method

can also help in decision making in a case with the largest value which will be selected as the best alternative. This method is more efficient because the time required for calculations is shorter. The simple additive weighting method recognizes two attribute criteria, namely profit criteria and cost criteria. The fundamental difference between these two criteria is in the selection of criteria when making decisions. The Simple Additive Weighting (SAW) method can help in decision-making in companies because it makes it possible to measure the contribution of each criterion to the final decision. By assigning weights to each criterion, companies can determine the priority of the desired criteria and measure how well each alternative meets these criteria.

Apart from that, the simple additive weighting method also has the advantage of being able to make more precise assessments because it is based on predetermined criteria values and preference weights and can choose the best alternative from a number of existing alternatives. However, calculations using the SAW method also have several shortcomings, such as the assumption that all criteria have equal weight and that the criteria do not influence each other. Therefore, companies must be careful in setting criteria weights and ensure that the SAW method is used correctly in the appropriate case context.

The results of previous research state that the use of Simple Additive Weighting (SAW) can help the work of the superior employee selection team through a multi-criteria weighting and selection process with fast and accurate results, [14].

This research methodology is included in the mixed method (qualitative and quantitative). This qualitative research method focuses on collecting data that cannot be measured numerically, such as interviews, observations and document analysis. The author carried out a qualitative research method, in the form of observation so that the author could collect the data needed for this research. Where the data is the result of observations, made by the author himself. Meanwhile, the quantitative method of this research focuses on collecting data that can be measured numerically, such as surveys, experiments, and statistical analysis. The qualitative aspect is realized by observation, and the quantitative aspect is realized by experiment, where data collection is the result of input and output that enters the application during operation. The things that are of concern in observing and testing this research are 1) The simple additive weighting (SAW) method in the decision support process processes alternative data and also criteria data

where each criterion will have a weight or assessment. All data will be saved into a database and processed according to the SAW method rules. 2) The decision results process using the SAW method consists of several stages where alternative data is formed into a matrix and then matrix normalization is carried out. Then the preference value is calculated for the normalized data, after which a ranking is carried out as the final result of the decision system. The following are the stages used in this research, including:

1. Determine alternatives.
2. Determine the criteria that will be used as a reference for decision-making (Cj).
3. Provides suitability ranking values for alternatives for each criterion.
4. Determine the importance level weight (Wj).
5. Create a table of suitability ranking levels of each alternative for each criterion.
6. To form the results of each alternative and criteria, a decision matrix formula (X) is created from the similarity ranking

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

7. Create a normalization calculation formula (rij) from decision matrices (X).

$$r_{ij} = \begin{cases} \frac{X_{ij}}{\max_i X_{ij}} \\ \frac{\min_i X_{ij}}{X_{ij}} \end{cases} \quad (2)$$

8. Generates Values (R) or normalized matrices from normalized counts (rij)

$$R = \begin{bmatrix} R_{11} & R_{12} & R_{1j} \\ R_{21} & R_{22} & R_{2j} \\ \dots & \dots & \dots \\ R_{i1} & R_{i2} & R_{ij} \end{bmatrix} \quad (3)$$

9. The final result of the preference value (Vi) is obtained from the sum of the multiplication of the normalized matrix row elements (R) with the preference weights (W) corresponding to the matrix column elements (W).
10. Producing the Vi value indicates that the Ai value is the correct criterion.

$$V_i = \sum_{j=1}^n w_j r_{ij} \quad (4)$$

In creating this decision support system, the criteria required in the process of calculating employee performance scores will be used. The criteria to be used are determined by 5 main criteria, namely SMART (Specific, Measurable, Achievable, Relevant, and Timely).

**Specific**, Employees must have goals or targets that are planned and to be achieved, so they need to make specific and clear goals. What are the goals to be achieved; Who will be involved in achieving these goals; Why the goal is to be achieved; Where to reach it; when do you want the goal to be achieved? **Measurable**, when determining project goals, employees must ensure that these goals can be measured. This aims to monitor and track each progress. **Achievable**, indicates that the goals made by employees must be realistic, so that they can be achieved. So, pay close attention to all aspects related to achieving that target. **Relevant**, namely ensuring that the goals to be achieved are relevant or in line with the company's mission. The objectives should also reflect one or more of the company's core values. Lastly, namely **Time-bound goals (Timely)**, employees need to have a clear work time range to be able to achieve the goal. Without this, an employee will have difficulty knowing when and where to start. It is also necessary to create realistic and definite time frames, at each stage of the project. It also aims to avoid never-ending marathon projects.

### 3 Problem Solution

The Simple Additive Weighting (SAW) method in this research is used to determine the best employees based on the highest ranking. The following are the implementation steps:

1. Determining Criteria

There are 5 criteria or weights used in assessing the best employees at Company "XX". These main criteria are SMART (Specific, Measurable, Achievable, Relevant, and Timely). The function of this weighting is to form a total score for all employees at Company "XX" from two different locations (Location A and Location B). The weighting carried out by the company leadership is explained for each criterion as follows (Table 1).

Table 1. Employee Criteria

Criterion Name	Criterion Type	Criteria value weight	Grand Total Value
(C1) Specific	Benefits	25	100
(C2) Measurable	Benefits	30	
(C3) Achievable	Benefits	10	
(C4) Relevant	Benefits	20	
(C5) Timely	Benefits	15	

Next, research sample data was entered, namely by inputting assessment data from 30 respondents

(employees of Company “XX”) obtained from two different locations, namely location A and location B. This sample data will later be used as input data in calculating the scores for each respondent (employees). In conducting scoring, researchers also use value preferences as a standard in carrying out this assessment, especially in Company “XX”. In addition, this preference data shows that each value score has a description (Table 2). The following is the explanation.

Table 2. Preference Value Data at Company XX

Information	Value Score
Very bad	2
Bad	4
Pretty good	6
Good	8
Very good	10

Table 3. Research sample data  
(employee initials at PT XX)

Location	Employee	(C1) Specific	(C2) Measurable	(C3) Achievable	(C4) Relevant	(C5) Timely
<b>A</b>						
	Nur	6	8	4	6	6
	Retno	2	4	4	6	8
	Anida	10	8	7	6	10
	Piyan	2	6	4	4	4
	Supri	4	2	4	4	4
	Anjar	8	6	6	8	6
	Joko	10	8	8	8	6
	Aan	8	8	8	8	8
	Hasan	4	2	6	2	2
	Nunung	3	4	4	8	4
	Niken	4	6	4	4	8
	Ika	2	10	8	2	2
	Heru	8	10	8	6	8
	Ita	4	2	2	10	2
	Vera	6	4	8	4	6
	Samsul	4	6	4	8	4
	Wawan	4	2	6	2	8
	Fajri	4	8	4	8	6
	Dewa	4	6	2	8	2
	Dwi	4	2	6	4	8
<b>B</b>						
	Budi	10	6	6	6	6
	Eddie	8	10	8	8	8
	Anthony	4	4	4	4	4
	Didi	4	6	4	8	4
	Tri	2	4	6	4	4
	Wanti	6	6	6	6	6
	Parman	8	8	8	8	8
	Mardi	2	4	6	4	8
	Tiny	4	4	4	4	4
	Yanti	6	6	6	6	6

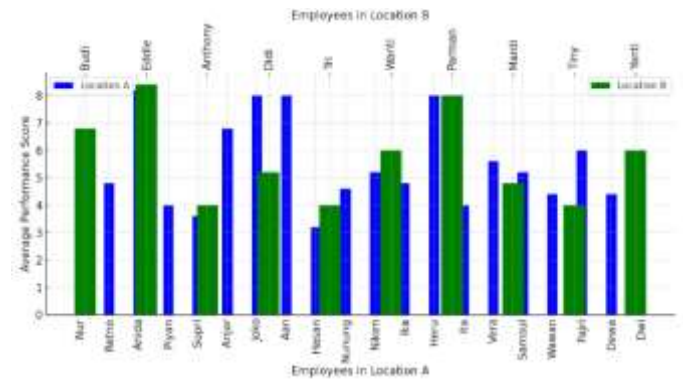


Fig. 1: Average employee performance comparison between location A and location B

The data that has been input in Table 3 and Figure 1 shows that the assessment elements of each employee at Company “XX” in two different locations have different performance abilities. This happens because of the different characters of each person while they work at Company “XX”. Apart from character, differences in demographics (gender and educational background) and culture can also be used as indicators that differentiate a person's performance assessment at Company “XX”. All these differences show that each person has their own performance abilities which cannot be equalized in an organization.

Figure 1 shows a comparison of the average performance of employees in two different locations (Location A and Location B) in the company “XX.” In Location A, there is significant variation in employee performance. Employees such as Anida, Joko, and Heru showed high average scores, while Piyan, Supri, and Hasan had lower scores. This reflects the diverse ability differences between individuals in terms of performance achievement. Whereas in Location B, the average performance tends to be more evenly distributed. Employees like Eddie and Parman stand out with high scores, while Anthony and Mardi have lower scores. This difference may be due to character, demographic, and cultural factors that influence performance assessment. In general, Figure 1 also confirms that each employee has unique performance capabilities in both locations. There is no uniform pattern between the two locations, emphasizing that a more individualized performance appraisal approach is needed to reflect the diverse capabilities of employees at company “XX.”

## 2. Normalization Calculations

The next test stage, after alternative criteria values are determined, namely carrying out normalization calculations R. Normalization is a technique for changing the scale of data that has different

dimensions into a uniform scale, namely between 0 – 1. The purpose of normalization is to change the numerical column values in a data set to use a common scale, without distorting differences in value ranges or losing information. This calculation is carried out to find the ratio value of the overall performance of each employee at Company “XX”, later this value will be used as a ranking of respondents. The calculation results are explained as follows (Table 4).

Table 4. Normalization calculations

Employee	Criteria					Total Value Weight (C1+C2+C3+C4+C5)	Ranking
	C1 (Min-Score)/(Max-Min)	C2 (Min-Score)/(Max-Min)	C3 (Min-Score)/(Max-Min)	C4 (Min-Score)/(Max-Min)	C5 (Min-Score)/(Max-Min)		
<b>Location A</b>							
Nur	0.5	0.75	0.25	0.5	0.5	55	-
Retno	0	0.25	0.25	0.5	0.75	31.25	-
Anida	1	0.75	0.625	0.5	1	78.75	1
Piyan	0	0.5	0.25	0.25	0.25	26.25	-
Supri	0	0	0.25	0.25	0.25	17.5	-
Anjar	0.75	0.5	0.5	0.75	0.5	61.25	-
Joko	1	0.75	0.75	0.75	0.5	77.5	2
Aan	0.75	0.75	0.75	0.75	0.75	75	3
Hasan	0.25	0	0.5	0	0	11.25	-
Nunung	0.125	0.25	0.25	0.75	0.25	31,875	-
Niken	0.25	0.5	0.25	0.25	0.75	40	-
Ika	0	1	0.75	0	0	37.5	-
Heru	0.75	1	0.75	0.5	0.75	77.5	2
Ita	0.25	0	0	1	0	26.25	-
Vera	0.5	0.25	0.75	0.25	0.5	40	-
Samsul	0.25	0.5	0.25	0.75	0.25	42.5	-
Wawan	0.25	0	0.5	0	0.75	22.5	-
Fajri	0.25	0.75	0.25	0.75	0.5	53.75	-
Dewa	0.25	0.5	0	0.75	0	36.25	-
Dwi	0.25	0	0.5	0.25	0.75	27.5	-
<b>Location B</b>							
Budi	1	0.5	0.5	0.5	0.5	62.5	3
Eddie	0.75	1	0.75	0.75	0.75	82.5	1
Anthony	0.25	0.25	0.25	0.25	0.25	25	-
Didi	0.25	0.5	0.25	0.75	0.25	42.5	-
Tri	0	0.25	0.5	0.25	0.25	21.25	-
Wanti	0.5	0.5	0.5	0.5	0.5	50	-
Parman	0.75	0.75	0.75	0.75	0.75	75	2
Mardi	0	0.25	0.5	0.25	0.75	28.75	-
Tiny	0.25	0.25	0.25	0.25	0.25	25	-
Yanti	0.5	0.5	0.5	0.5	0.5	50	-

### 3. Ranking Calculation

From the results of the normalization calculations, ranking calculations are then carried out in order to produce who is the best employee (rank 1, rank 2, and rank 3). This final result is obtained from the ranking process, namely the addition and multiplication of the normalized matrix R with the weight vector, so that the largest value is obtained

which is chosen as the best alternative (Ai) as a solution.

Table 5. Calculation of the ranking of the best employees from locations A and B

Employee (Initials)	Criteria value weight					Total Value Weight (C1+C2+C3+C4+C5)	Ranking
	C1 (Normalized score * Value weight)	C2 (Normalized score * Value weight)	C3 (Normalized score * Value weight)	C4 (Normalized score * Value weight)	C5 (Normalized score * Value weight)		
<b>Location A</b>							
Nur	25	30	10	20	15	55	-
Retno	12.5	22.5	2.5	10	7.5	31.25	-
Anida	0	7.5	2.5	10	11.25	78.75	1
Piyan	25	22.5	6.25	10	15	26.25	-
Supri	0	15	2.5	5	3.75	17.5	-
Anjar	6.25	0	2.5	5	3.75	61.25	-
Joko	18.75	15	5	15	7.5	77.5	2
Aan	25	22.5	7.5	15	7.5	75	3
Hasan	18.75	22.5	7.5	15	11.25	11.25	-
Nunung	6.25	0	5	0	0	31,875	-
Niken	3,125	7.5	2.5	15	3.75	40	-
Ika	6.25	15	2.5	5	11.25	37.5	-
Heru	0	30	7.5	0	0	77.5	2
Ita	18.75	30	7.5	10	11.25	26.25	-
Vera	6.25	0	0	20	0	40	-
Samsul	12.5	7.5	7.5	5	7.5	42.5	-
Wawan	6.25	15	2.5	15	3.75	22.5	-
Fajri	6.25	0	5	0	11.25	53.75	-
Dewa	6.25	22.5	2.5	15	7.5	36.25	-
Dwi	6.25	15	0	15	0	27.5	-
<b>Location B</b>							
Budi	25	15	5	10	7.5	62.5	3
Eddie	18.75	30	7.5	15	11.25	82.5	1
Anthony	6.25	7.5	2.5	5	3.75	25	-
Didi	6.25	15	2.5	15	3.75	42.5	-
Tri	0	7.5	5	5	3.75	21.25	-
Wanti	12.5	15	5	10	7.5	50	-
Parman	18.75	22.5	7.5	15	11.25	75	2
Mardi	0	7.5	5	5	11.25	28.75	-
Tiny	6.25	7.5	2.5	5	3.75	25	-
Yanti	12.5	15	5	10	7.5	50	-

Based on the results of the ranking data obtained and displayed in Table 5, it shows that at

Company "XX" in location A, the employees who have the best ranking values are Anida (rank 1), Joko (rank 2), Heru (rank 2) and Aan (rank 2). rank 3). Meanwhile, Company "XX" located in B is known to have the best employees, namely Edi (rank 1), Parman (rank 2), and Budi (rank 3).

## 4 Discussions

In a continuously evolving and increasingly competitive business landscape, the ability to make informed and quick decisions has become critical. Management Decision Support System (MDSS) is emerging as an innovative and effective business strategy, providing many significant benefits for the future sustainability of the company. MDSS is a technology-based system designed to assist management in the decision-making process. By integrating data from multiple sources, analyzing information in depth, and presenting comprehensive reports, MDSS provides invaluable insights. The system enables companies to identify trends, anticipate challenges, and respond to opportunities quickly and appropriately.

The Simple Additive Weighting (SAW) method in management decision support systems (MDSS) is very effective due to its simplicity and transparency in evaluating multiple criteria. In comparing SAW with other methods. The SAW method is very easy to use and only requires normalization of criteria and weighting. This simplicity makes it easy for companies to implement it without the need for complicated calculations or systems. Every step in SAW is transparent. Decision makers can easily understand how the final score is calculated, which is very important in a management context.

The SAW method is also able to handle multiple criteria well through weighted sum calculations, making it useful for identifying trends or evaluating alternatives based on multiple factors. The system is also adaptable to different industries and scenarios, allowing for quick adjustments when trends or challenges arise.

In fact, one of the key benefits of MDSS is increased operational efficiency. By automating various data analysis processes, MDSS reduces manual workload and reduces the risk of human error. This not only saves time, but also significant costs. Companies can allocate greater resources to other strategic activities, such as product innovation and market development. MDSS enables more accurate and data-driven decision-making. By utilizing smart algorithms and advanced analytical techniques, the system filters relevant data and presents it in an easy-to-understand format.

Management can make more informed and objective decisions, which in turn improves the overall performance of the company.

In the dynamic business environment, flexibility and adaptability are the keys to success. MDSS gives companies the ability to adapt quickly to changing market and economic conditions. The system enables real-time strategy adjustments based on the latest data, allowing companies to remain competitive and relevant. MDSS also contributes to improving the quality of management. By providing timely and relevant information, the system assists management in planning, directing, and controlling various aspects of operations. In addition, MDSS supports the development of sustainable long-term strategies that positively impact the company's growth.

Utilizing MDSS, companies not only strengthen their current position, but also prepare for the future. The system enables companies to conduct better strategic planning, identify new opportunities, and address challenges more effectively. As a result, companies can achieve sustainable growth and maintain business continuity in the long term. Thus, the Management Decision Support System is an innovative and highly beneficial business strategy for the future sustainability of the company. By integrating advanced technology and data analytics, MDSS helps companies make more accurate, efficient, and adaptive decisions. In the ever-changing business world, MDSS has become an invaluable tool for achieving sustainable success and growth.

## 5 Conclusion

From this research, it can be concluded that the decision support management system that has been designed provides many benefits for the company "XX", especially in helping to simplify the process of assessing and selecting the best employees in the company. The company is also optimistic, will start to improve the employee management system better. The decision support management system designed using the SAW method is appropriate and suitable for implementation in the "XX" company which has different cultural demographics in several company locations. However, the researcher highlighted the need for innovation in the input process of preparing this system. The proposed Management Decision Support System should have a criteria input process of 5 criteria, namely SMART (**Specific, Measurable, Achievable, Relevant, and Timely**). These criteria are a novelty of the implementation of the SAW system in this

modern era, which is in accordance with the condition of the company "XX". Thus, all processes and stages in performance appraisal and selection of the best employees in the calculation process can be accounted for and adjusted to current conditions through normalized calculation data.

From the calculation results at Company "XX", the results obtained were that for location A, the best employees were Anida (rank 1), Joko (rank 2), Heru (rank 2) and Aan (rank 3). Meanwhile, at Company "XX" in location B, the best employee data was obtained, namely Edi (rank 1), Parman (rank 2), and Budi (rank 3).

After the design of the decision support system for performance appraisal and selection of the best employees is completed, it is hoped that this system can be implemented in several branch offices of Company "XX" in several regions in Indonesia, and is useful for decision makers at Company "XX" in determining the best employees in each period and per region. However, it should be noted that the system may not necessarily give the same results as companies in other developing countries. Thus, it is necessary to adjust the character assessment for the employees to be assessed. Another thing that makes the difference is the terms of assessment from the company's managerial, which will certainly distinguish the results that will be obtained. However, in general, the mathematical formula used is still the same. This certainly provides an opportunity for new research that wants to test it in other developing countries.

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#### **Declaration of Generative AI and AI-assisted Technologies in the Writing Process**

During the preparation of this work, the author used Chat GPT to correct grammar properly. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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### **Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)**

- Hening Nakuloadi, Nur Wening, and Rianto Rianto carried out the simulation and the optimization.
- Fajar Aribowo and Evada Rustina has implemented the Algorithm 1.1 and 1.2 in C++.
- Aditya Hera Nurmoko and Teguh Widodo has organized and executed the experiments of Section 4.
- I Made Laut Mertha Jaya was responsible for the Statistics.

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The authors have no conflicts of interest to declare.

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