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Decision Support System for Determining The Best Employees to Get Incentives Using The Web-Based Multi Factor Evaluation Process (MFEP) Method

Dimas Prananda[1], Ardhini Warih Utami[2]
[1, 2] *Universitas Negeri Surabaya, Surabaya, Indonesia*
dimas.20105@mhs.unesa.ac.id, dimas171201@gmail.com

ABSTRACT

One way for companies to enhance employee performance and motivation is by discovering the most effective methods of providing incentives. However, due to the multitude of factors that must be considered, this process is often complex. Therefore, the objective of this research is to create and develop a web-based Decision Support System that employs the Multi-Factor Evaluation Process (MFEP) method to assist in determining the employees who are most deserving of compensation. This research leverages the Rapid Application Development (RAD) methodology, which encompasses several phases: requirements planning, user design, construction, and cutover. During the construction phase, the system was tested using the Blackbox method to ensure that all functions operated correctly without examining the program code. The research findings indicate that the decision support system can recommend the employees who are most eligible for compensation in accordance with company standards. The MFEP method implemented in this system yields unbiased evaluation results by considering various assessment factors. The rapid system development (RAD) method facilitated a swift and structured development process. The results of the Blackbox testing demonstrate that the system operates effectively in line with the established requirements. With this system, it is anticipated that the process of identifying top-performing employees will become more efficient, objective, and transparent. Additionally, this system can enhance employee motivation to achieve the highest levels of performance.

Keyword: Decision Support System, Multi Factor Evaluation Process, Rapid Application Development, Blackbox, Employee Incentives.

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Corresponding Author
Dimas Prananda
Universitas Negeri Surabaya, Surabaya, Indonesia
dimas17120@gmail.com

1. INTRODUCTION

Employees are the most important asset for the company, and they play a strategic role in the organization as the constituents and managers of its operations to achieve company goals. Employee performance is defined as the amount of work done by an employee when they complete the tasks they have been given. With a high level of employee performance, organizational goals can be achieved. The amount of work, attendance at work, good and

friendly nature, and punctuality of work are some of the factors that can affect employee performance, such as important motivation and work environment. Therefore, from the perspective of occupational and organizational psychology, performance is the result of ability and motivation, and consists of three influences: attitude, motivation, and qualification level. In addition, employee performance is also related to how well employees accomplish the tasks assigned to them [1].

One type of reward related to employee performance appraisal is incentives, which are in the form of money given by organizational leaders to employees to keep them motivated and high performing to achieve organizational goals. Incentives are one of the main things that companies must pay attention to because they motivate employees to continue to improve the quality of their work and increase their enthusiasm for achievement [2].

PT. Swabina Gatra is a company that provides services and products. PT. Swabina Gatra has several departments including cleaning service, security service, maintenance service, supporting production, office administration, receptionist, operator, and driver. PT Swabina Gatra currently determines employees who are entitled to incentives still subjectively. Employees may feel frustrated or doubt the bonus decision if the reason behind the bonus award is unclear or non-transparent. Since subjective assessments are often not based on objectively measurable criteria, the decision-making process can appear non-transparent.

To overcome these challenges, the development of a Decision Support System (DSS) is required. Decision Support Systems are intended to assist managerial decision makers in semi-structured decision situations. However, instead of replacing the judgment of decision makers, Decision Support Systems serve as a tool to improve their ability to make decisions [3].

Decision Support System (SPK) must have a method because it requires an algorithm to process and analyze the data needed in the decision-making process. In this study, the researcher chose the Multi Factor Evaluation Process (MFEP) method as a method to process the data needed in the decision-making process of providing incentives to employees at PT Swabina Gatra. Researchers chose the MFEP method because this method has advantages in the decision-making process and accommodation for quantitative and qualitative features. In addition, this method is able to produce more focused results than other methods. The MFEP decision-making method has an easy-to-understand Communication system. The MFEP method is principled in that important factors are considered intuitively and subjectively for decision-making [4].

By applying the MFEP method, PT Swabina Gatra can develop a Decision Support System that is able to conduct employee appraisals objectively and efficiently. In this system, employee assessment will be done online, the assessment data will be stored digitally, and the results will be processed using the MFEP method. This will make it easier for HR management to make the right decisions in determining employees who are entitled to incentives.

2. METHODS

The multi factor evaluation process is the method used in this research for the process of determining the best employee. Furthermore, the system development method used in this research is the Rapid Application Development (RAD) method which has several development stages, namely the requirements planning, user design, construction, and cutover stages.

2.1 Requirements Planning

A very important first step in the process of creating an information system is the Requirements Plan. In order to create an effective research plan, it is crucial to have a solid understanding of the research objectives, which will be the foundation guiding every process. For the data collected to be of high quality and relevance, proper data collection methods are also essential. The main factor that will shape the design of a system that meets user needs and expectations is a deep understanding of what the system requires. In drawing up a research plan, points such as research objectives, data collection and system requirements should be considered.

2.2 User Design

The system design stage, which aims to meet user needs, includes designing the system process flow and interface. The system process flow is described by creating a use case diagram and activity diagram. Furthermore, the interface is created by designing wireframes based on the system process flow previously described. User design explains using use case diagram in Figure 1.

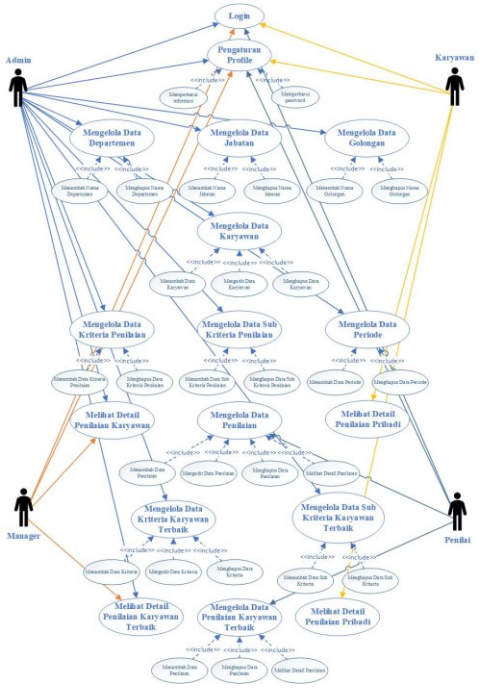

Figure 1. Use Case Diagram

In addition, there is the creation of wireframes based on the use case diagram. This is used to facilitate the application of the use case diagram during the information system development stage.

2.3 Construction

This stage is the realization phase of the previously designed system. System development is carried out with programming or coding to convert designs into applications that can be used. In this research, PHP and Javascript programming languages are used with the Laravel framework. In addition, software and hardware support is needed to run the application.

2.4 Cutover

Applications that have passed the development process will be thoroughly tested to evaluate possible errors, both in appearance (UI/UX) and system (Coding). User design testing is more related to user experience and application functionality, while cutover testing with black box testing is more related to the overall readiness of the system to launch and operate effectively.

2.5 Multi Factor Evaluation Process (MFEP)

The MFEP method is a multifactor decision-making method that considers various criteria, both qualitative and quantitative, objectively. This method is easy to understand and apply.

MFEP calculation stages [5]:

a. Determine factors and weights (total weight = 1).
b. Fill in the objective value (0-1) for each factor from the available data.
c. Calculate the weight evaluation by multiplying the factor weights and evaluation values, then summing up all the results to get the total evaluation value of each alternative.

2.6 Determination of The Best Employee at The Department Level

At this stage, employees will first be selected at the department level. Employees with the highest scores in each department will proceed to the company level ranking process. The department-level assessment follows the system already used by PT Swabina Gatra.

The steps of calculating the score at the department level:

a. Admin fills in the value of each criterion with a range: A (80-85), B (70-79), C (60-69), D (50-59).
b. The scores for each employee are summed up.
c. The total score of all employees in the department is calculated.
d. Each employee's score is divided by the total score of all employees in the department.

$$\frac{\text{total employee score}}{\text{total score of all departement employee}} = \text{Results} \quad (1)$$

2.7 Determination of The Best Employee At The Company Level

Employees who get the highest rank in each department will continue to the company level ranking stage with the best employees from other departments. At this stage, the weighted evaluation calculation process is carried out, namely the calculation of the weight between the factor weight and factor evaluation, then continued with the summation of all weighted evaluation results to obtain the total evaluation value of each employee. This total value is calculated using the following formula [6]:

$$EF = \sum x / \sum x\ max \quad (2)$$

$$BE = BF\ x\ EF \quad (3)$$

$$\sum BE = \sum (\ BF\ x\ EF\ ) \quad (4)$$

Where:

EF = Factor evaluation WE = Weighted Evaluation ∑WE = Total Weighted Evaluation

X = subcriteria value FW = Factor Weight

X max = max x value E = Evaluation

3. RESULTS AND DISCUSSION

3.1 Login Page

Users first enter the system through the login page. Users log into the app through this page, where they have to enter their email and password to confirm their identity. Users can select the “Forgot password?” option to restore it in case of forgetting. Users can log into the system by pressing the Login button after filling in their data. This login page is conveniently designed so that users can immediately access the information and system functions they need. Figure 2 shows the login page.

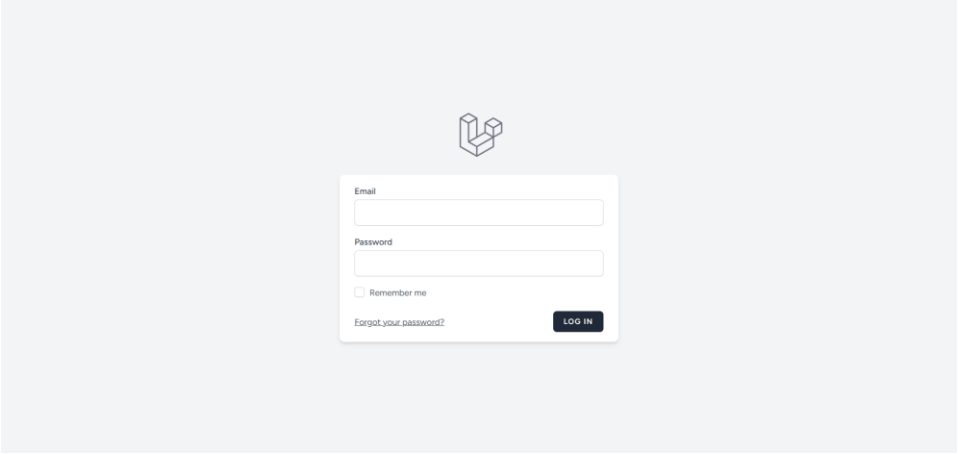

Figure 2. Login Page

3.2 Dashboard Page

The main control center is the dashboard page, which displays the ongoing appraisal period, the best employee table, and the number of employees who have and have not been evaluated. There is a bar chart that shows the average score for each department, giving an overview of their performance. Users can also submit comments with the star rating feature and a comment field to provide feedback. This design makes data management and access easier. This dashboard view is specifically for appraisal users. Dashboard page shown in Figure 3.

3.3 Profile Page

The profile page allows users to view and update their personal data. The page features a form that enters the email and password, with a "Save" button at the bottom to save the changes that have been made. In addition, there is a "password update" section that lets users change their passwords, including current password, new password, and password confirmation. This page helps users keep their accounts secure and helps them manage their personal information. Profile page illustrated in Figure 4.

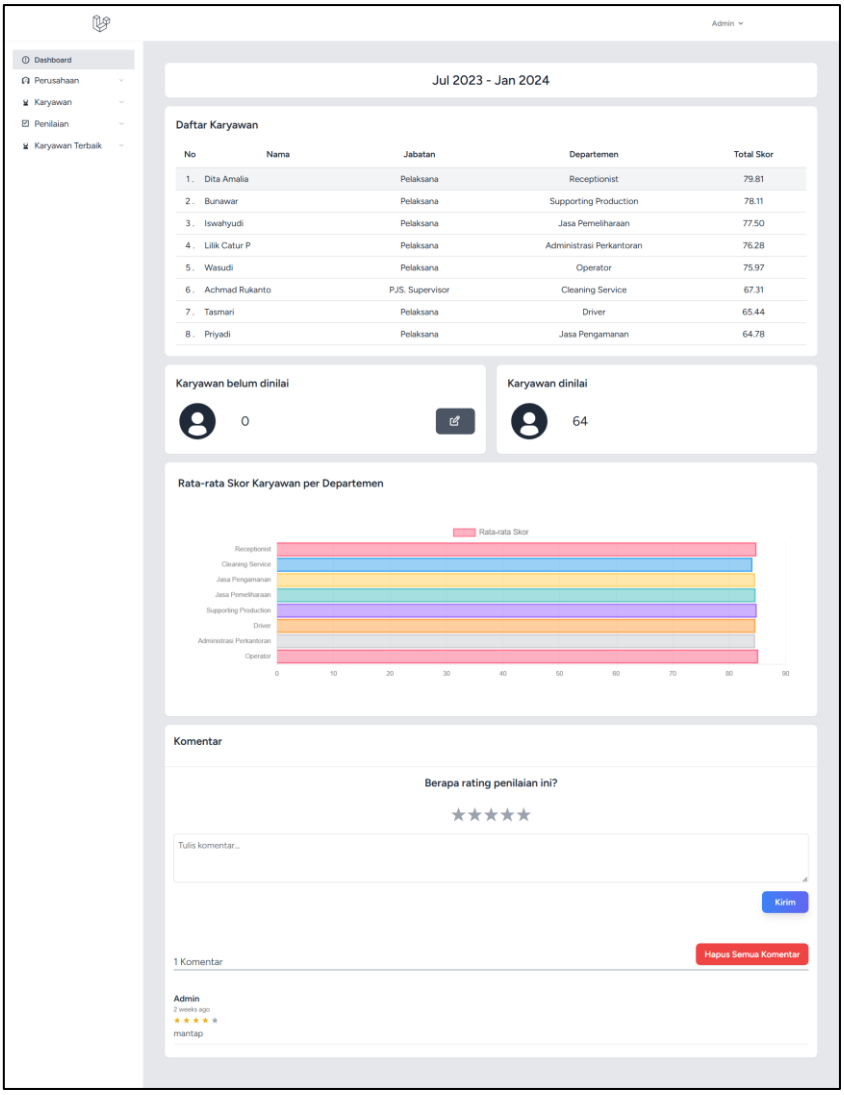

Figure 3. Dashboard Page

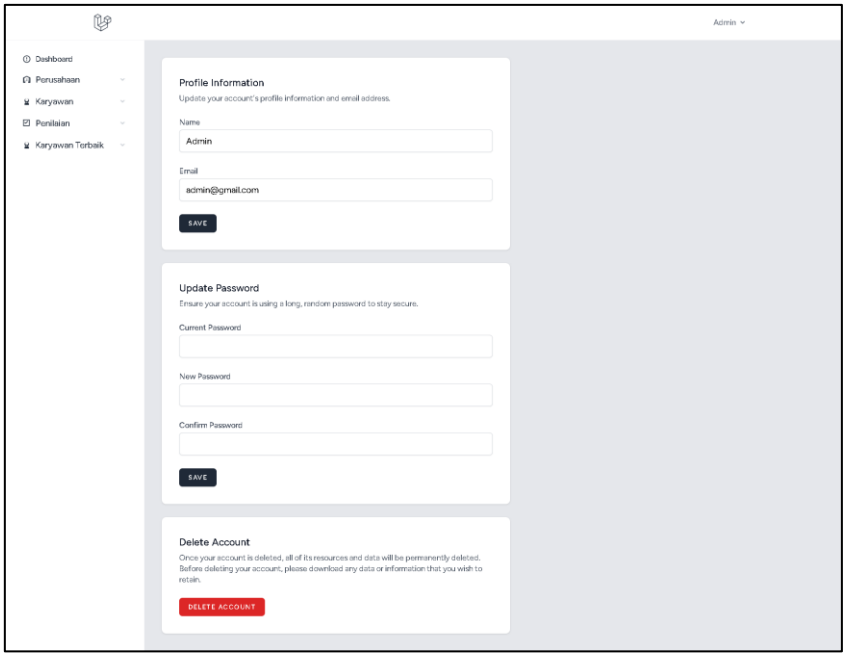

Figure 4. Profile Page

3.4 Assessment Criteria Data Page

The assessment criteria data page is used to manage the criteria used in the employee evaluation process. This page contains the criteria name and details, and users can add new criteria. Below it, the assessment criteria data table displays a list of criteria that have been created, with options to modify or delete data. This page was created to make it easier for users to add, manage, and update assessment criteria in the system. Assessment criteria data page shown in Figure 5.

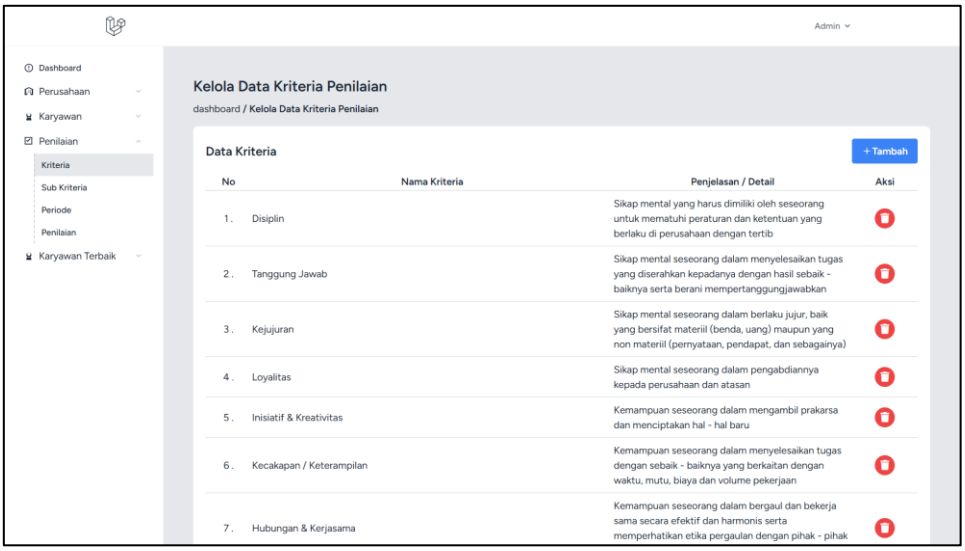

Figure 5. Assessment Criteria Data Page

3.5 Assessment Sub Criteria Data Page

The assessment sub criteria data page is used to manage sub criteria that detail assessment criteria. This page contains the sub criteria name code, sub criteria details, and criteria dropdown to select the relevant criteria; below it, there is a sub criteria data table that displays a list of sub criteria that have been created. This table is equipped with criteria filter and search features to make it easier for users to find and filter sub criteria. This page was created to make it easier for users to manage and update assessment sub criteria. Assessment sub criteria data page shown in Figure 6.

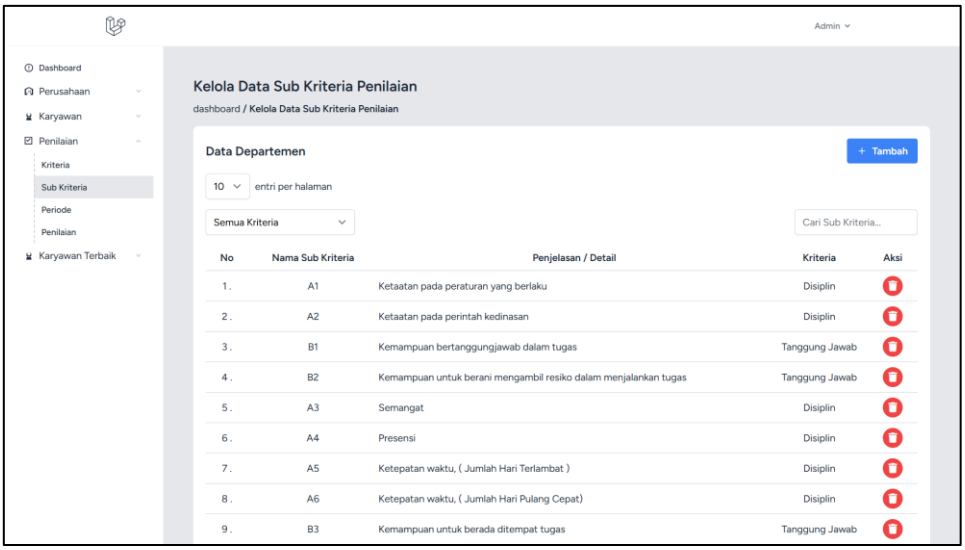

Figure 6. Assessment Sub Criteria Data Page

3.6 Period Select Page

The select period page allows users to select an assessment period before starting the assessment. The page has a period input dropdown that displays a list of available assessment periods, and users can simply select the appropriate period to proceed to the assessment process. This page is designed to ease the selection of the relevant period and ensure that the assessment is conducted based on the right period. This page shown in Figure 7.

Figure 7. Period Select Page

3.7 Assessment page

The assessment page is used to assess employees based on predetermined criteria. This page has a table that shows employee data that can be assessed, with each row displaying the name, position, department, total score, and assessment status (already or not yet assessed). the total score is obtained from calculations using formula (1). This page also has per-page entry features, such as department dropdown and search to make it easier to find employees. Users can perform an assessment with the score button, which will change to a detail, edit, or delete button after the assessment is complete. This page was created to facilitate the employee assessment process. Figure 8 explains the assessment page.

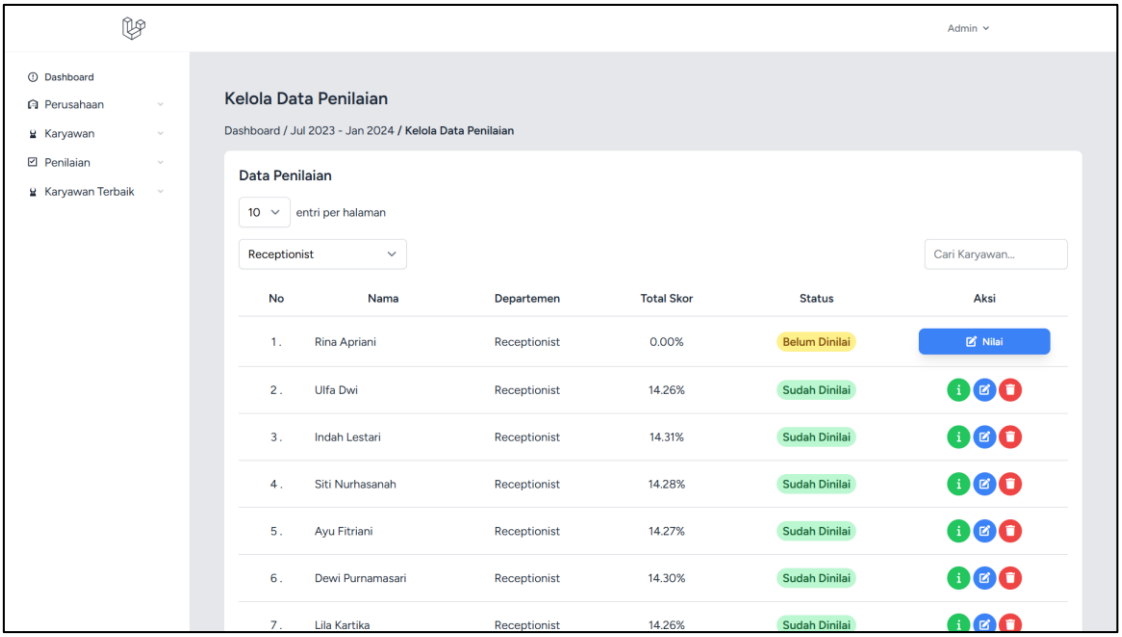

Figure 8. Assessment page

3.8 Assessment form page

To rate employees based on predefined criteria, the appraisal form page is used. This page displays the name of the criteria and sub criteria, as well as the value for each sub criteria. After entering the value, one can press the reset button to delete the input and the save button to save the value that has been entered. This page was created to help appraisers give scores according to the criteria and ensure the appraisal process runs well and accurately. Assessment form page illustrated in Figure 9.

Figure 9. Assessment form page

3.9 Assessment details page

The appraisal details page displays the appraisal results of an employee in detail. The top of the page displays information about the employee, such as name, number, job title, and department, to provide context for the appraisal; below that, the appraisal details table lists the criteria, sub-criteria, score assigned, and predicate received. This page is designed to provide a complete picture of the employee's assessment results in a clear and detailed manner, making it easy to understand. Figure 10 shows the assessment details page.

Figure 10. Assessment details page

3.10 Best Employee Criteria Data Page

The best employee criteria data page is used to manage the criteria used to select the best employee. This page contains the criteria name, maximum value to limit the value entered, and intensity to determine how heavy or weighty the criteria are in the assessment. Below the input form, the best employee criteria data table displays a list of predefined criteria, complete with options to edit or reduce their values. This page was created to make it easier to use the assessment standards to identify the best employees objectively and effectively. This page shown in Figure 11.

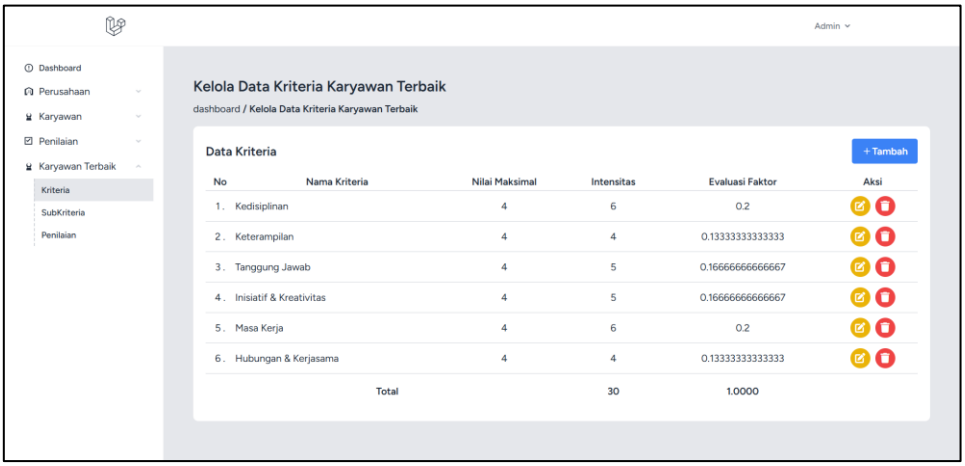

Figure 11. Best Employee Criteria Data Page

3.11 Best Employee Sub Criteria Data Page

The best employee sub criteria data page is used to manage the detailed sub criteria used to select the best employee. This page contains the sub criteria name, sub criteria details, and a criteria dropdown to select the relevant criteria. Below the input form, there is a best employee sub criteria data table that displays a list of sub criteria that have been created, which is equipped with filter and search features to make it easier for users to find the criteria they need. Figure 12 shows best employee sub criteria data page.

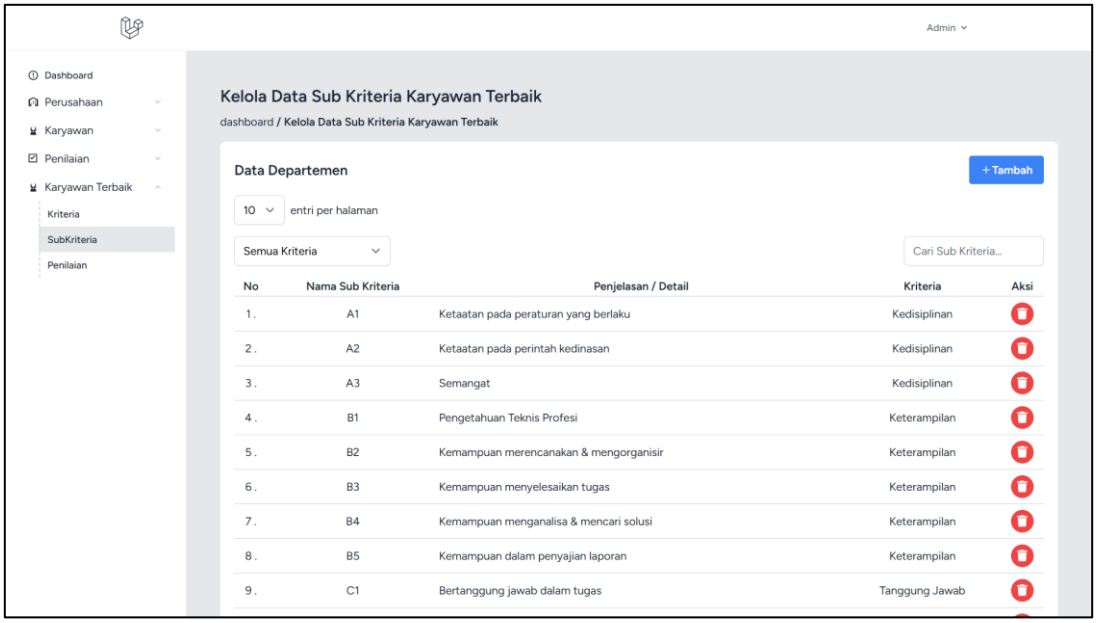

Figure 12. Best Employee Sub Criteria Data Page

3.12 Best Employee Period Select page

The Select Best Employee Period page allows users to select the assessment period used to determine the best employee. This page has a period input dropdown that displays a list of available periods, so users can select the period that matches the assessment they want to do. This page is designed to make it easier for users to choose the right period for the best employee evaluation process, ensuring that the assessment is carried out on time. Figure 13 shows best employee period select page.

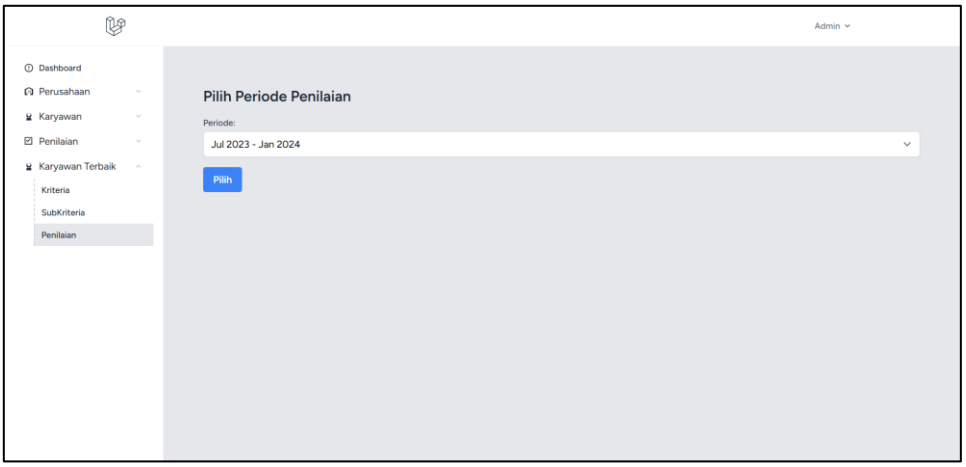

Figure 13. Best Employee Period Select page

3.13 Best Employee Data Page

The best employee data page displays a list of the best employees based on the assessment results. On this page, there is a recommendation table for the best employee per department, which shows the employee's name, total assessment score, and a score button to start or view further assessment. Below the recommendation table, there is a data table for the best employee, which shows the name, department, total score, and a detail button to view more information. the total score is obtained from calculations using formulas (2), (3), (4). Users can view and manage the best employee data on this page. Best employee data page illustrated in Figure 14.

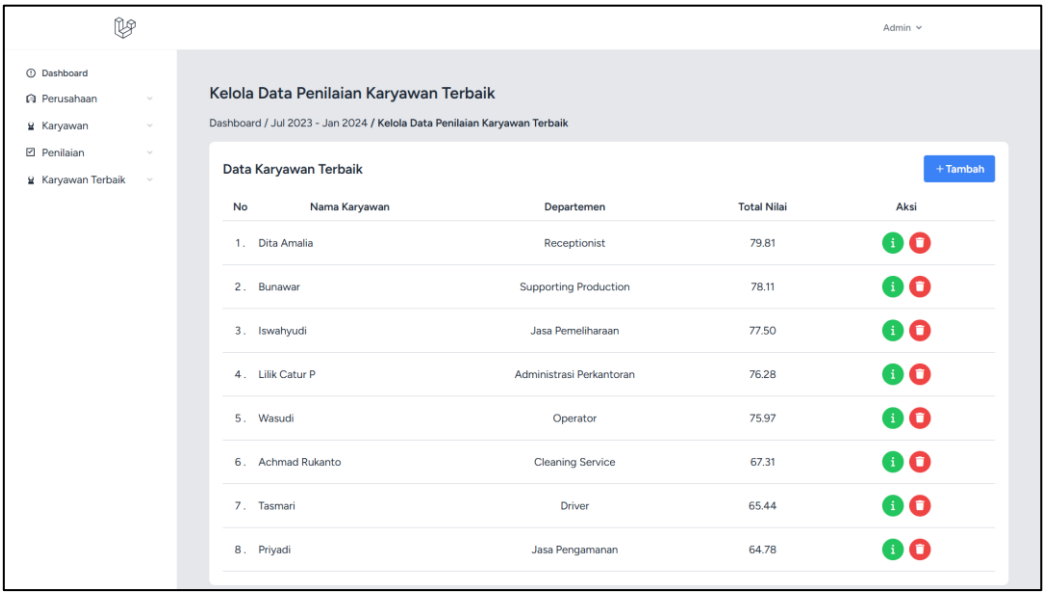

Figure 14. Best Employee Data Page

3.14 Best Employee Assessment Form Page

To determine the best employee, the best employee assessment form page is used to assess employees based on predetermined criteria. This page displays the name of the criteria, sub criteria and maximum value, and the value that must be entered cannot exceed the maximum value that has been determined for each sub criteria. After filling in the value, the user can select the reset button to delete the input or save to save the assessment that has been filled in. This page was created to make the best employee assessment process easy and effective in accordance with the standards. Best employee assessment form page shown in Figure 15.

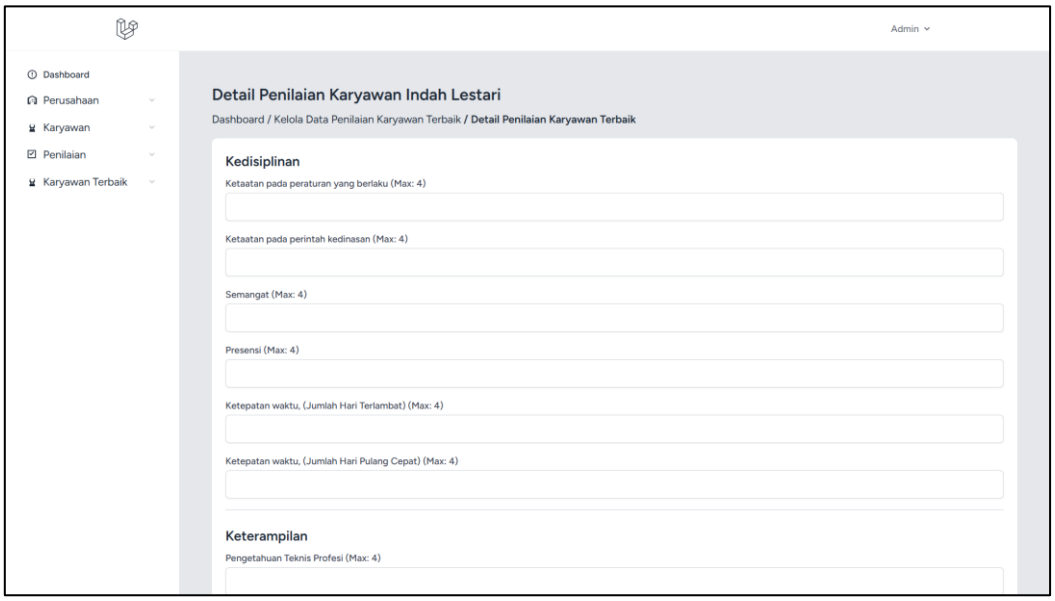

Figure 15. Best Employee Assessment Form Page

3.15 Best Employee Detail Page

The best employee details page has complete information about all the employees selected for good employment. The top of the page displays information about the employee, such as name, number, job title, and department, and below that are the assessment details, which consist of a table showing the criteria, sub criteria, score, and predicate received by the employee. The last part of the page displays the criteria evaluation details, which explains how the total score obtained by the Page presents complete and in-depth information. Figure 16 shows the best employee detail page.

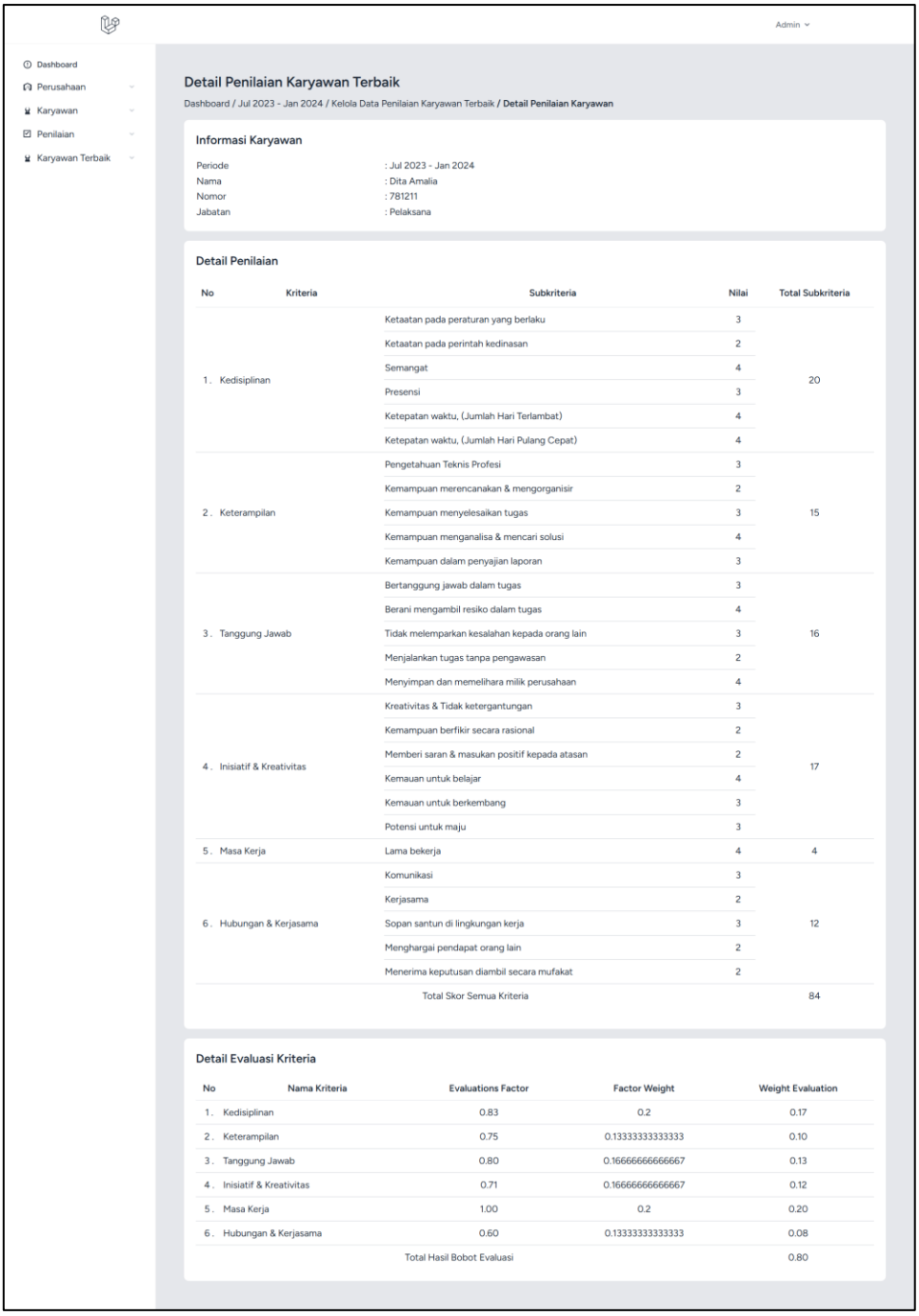

Figure 16. Best Employee Detail Page

CONCLUSION

The research discussed in the previous chapter led to the following conclusions. The Rapid Application Development (RAD) method is used to create a Decision Support System for Determining the Best Employee MFEP Method (Multiple Factor Assessment Process). This development process consists of several stages: Requirement Planning, User Design, Construction, and Cutover. In the Requirement Planning stage, data is collected through interviews and literature studies. Then, the user design stage is divided into three smaller stages: prototype, test, and refine. At this point, the workflow, features, and database schema of the application are designed using the standard design language UML. The application is built in the development stage using the PHP programming language with the Laravel

framework and SQLite database. To ensure that the application functions as expected, the last stage, Cutover, involves testing the application using the BlackBox Testing method.

In this study, manual calculations were first performed to apply the MFEP method. The results of the manual calculation show the same results as the results of the calculation using the program, which indicates that the implementation of the MFEP method works well.

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REFERENCES

[1] F. A. Febriani and A. H. Ramli, 'Pengaruh Budaya Organisasi Terhadap Kinerja Karyawan Melalui Keterikatan Karyawan', *Jurnal Ilmiah Manajemen Kesatuan*, vol. 11, no. 2, Sep. 2023, doi: 10.37641/jimkes.v11i2.1999.

[2] M. Meilisa Amalia *et al.*, 'The Impact Of Providing Motivation And Incentives On Employee Performance In Start-Up Companies: Literature Review Dampak Pemberian Motivasi Dan Insentif Terhadap Kinerja Pegawai Pada Perusahaan Rintisan: Literature Review', 2023. [Online]. Available: http://journal.yrpipku.com/index.php/msej

[3] G. Lestari and A. Savitri Puspaningrum, 'SISTEM PENDUKUNG KEPUTUSAN PEMBERIAN TUNJANGAN KARYAWAN MENGGUNAKAN METODE ANALYTICAL HIERARCHY PROCESS (AHP) STUDI KASUS: PT MUTIARA FERINDO INTERNUSA', *Jurnal Teknologi dan Sistem Informasi (JTSI)*, vol. 2, no. 3, pp. 38–48, 2021, [Online]. Available: http://jim.teknokrat.ac.id/index.php/JTSI

[4] J. Eska, 'SISTEM PENDUKUNG KEPUTUSAN SELEKSI CALON POLRI BARU DI POLRES ASAHAN MENGGUNAKAN METODE MULTIFACTOR EVALUATION PROCESS (MFEP)', 2022. [Online]. Available: http://jurnal.goretanpena.com/index.php/JSSR

[5] N. Susanti, 'Implementation of the Multi Factor Evaluation Process (MFEP) Method in Making Decisions on Providing Assistance to Underprivileged Students', *The IJICS (International Journal of Informatics and Computer Science)*, vol. 5, no. 3, p. 336, Nov. 2021, doi: 10.30865/ijics.v5i3.3453.

[6] I. Afrianty and R. Umbara, 'Sistem Pendukung Keputusan (SPK) Menentukan Kelayakan Calon Penerima Zakat Menerapkan Multi-Factor Evaluation Process (MFEP)', *Seminar Nasional Teknologi Informasi, Komunikasi dan Industri (SNTIKI)*, vol. 8, 2016.