The implementation of the ROC weighting method on EDAS for optimizing employee incentive distribution (Case Study of PT. Juishin)

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Article Info	ABSTRACT
Keywords: *Reward*, *ROC*, *EDAS*, *Black Box*, *UML.*	*Rewards can serve as a tool for motivating employees within a company. Typically, companies offer rewards to employees in the form of salary increases, incentives or bonuses, promotions, and other rewards, similar to those implemented by PT. Juishin. PT. Juishin is a company engaged in the production of cement and ceramics. In awarding rewards, PT. Juishin currently employs a direct selection method, which has led to instances of employee dissatisfaction. This research aims to design and develop an application for the selection of employees eligible for rewards by utilizing the ROC and EDAS methods. The application of these methods will facilitate the company's process of selecting reward recipients. The system design employs UML, including use case diagrams, activity diagrams, class diagrams, and sequence diagrams. The outcome of this research is to assist HR in determining the eligibility of reward recipients. The application will display the ranking process of reward recipients, where those with the highest scores will receive the rewards. The system testing is conducted using black box testing to ensure that the application meets the functional requirements. The result of this research will assist the company in assessing employee eligibility for rewards on a daily basis.*
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INTRODUCTION

The development of information and communication technology, particularly computer-based information, which was initially used only by certain groups, has now become widely utilized. Employees are one of the key factors in the operation of a company (Ritonga et al., 2024).

A reward is a special form of recognition given by an individual or a group. It is usually presented as a resource or a gift. In addition to the tasks assigned to an employee, every company, association, or business group will provide support (S. R. Nasution, n.d.).

The provision of rewards to employees aims to motivate them. However, the reward system for employees at PT Jui Shin has not been optimal due to a tendency to focus solely

on performance evaluations, which leads to a lack of objectivity. Additionally, there is no weighting or clear criteria to determine which factors have the most significant impact on employee performance. The reward system at PT. Juishin for employees has several shortcomings, such as rewards being given based solely on an individual's personal analysis, making the evaluation subjective and lacking transparency. Additionally, the system is ineffective and has low accuracy in determining the appropriate rewards.

To resolve this issue, the author designed a decision support system for determining employee rewards using the Ranking Order Centroid (ROC) method for weighting in the Evaluation Based on Distance from Average Solution (EDAS) method. This system enables the generation of reward ranking results for employees and determines who is eligible to receive rewards or promotions (Kurniawan Zega et al., 2022).

The EDAS method functions to accurately implement mathematical formulations according to established principles, resulting in a ranking value. The advantage of the EDAS method is that it provides a high level of evaluation accuracy and a fast calculation process. On the other hand, the Ranking Order Centroid (ROC) method is an approach for analyzing alternative selection, focusing on the context of decision support system (Sari et al., 2024).

The purpose of the ROC method is to assist in decision-making by comparing alternatives based on the number of relevant attributes or criteria, usually with a focus on weighting. The advantage of the ROC method is that it provides distance stability for each weight criterion (Sari et al., 2024).

A Decision Support System (DSS) is an approach (or methodology) designed to support decision-making. This method utilizes mathematical calculations to generate information in the form of an ideal ranking of alternatives. A Decision Support System is a model consisting of a set of procedures for data processing and evaluation to aid in decision-making.. The system development procedure can be outlined into several stages or steps namely analysis, design, development, testing, and maintenance (Maulana et al., 2019).

Theoretical Foundation

A Decision Support System is a specialized information system designed to assist managers in making decisions related to semi-structured data (Handayani et al., 2021). A Computer-based interactive system, known as a "decision support system," addresses unstructured problems by transforming data using various models and providing information that decision administrators can use to make new decisions (Sari et al., 2024).

The determination of weight using the Rank Order Centroid (ROC) approach is a technique that prioritizes criteria . when dealing with criteria 3 and criteria 2, criteria 1 and 2, in this case, represent the highest priority and patriotic value, respectively. The same procedure is then applied until the criterion with the lowest priority is reached (Iskandar, 2022). The Rank Order Centroid (ROC) method is used in research to ensure the accuracy of weights for each criterion (M. B. K. Nasution et al., 2022).

The EDAS method is an analythical calculation that aligns with the computation of positive alternative distance, negative alternative distance, weighted positive distance table,

negative distance table, normalized positive distance values, and normalized negative distance values (Saragi et al., 2022).

Employees are a crucial resource for every organization to achieve the primay goal of human resource (HR) management, which is to enhance the company's profitability. Therefore, long-term productivity growth requires hiring employees who adhere to the principle of "the right person in the right place" (Kurniawan, 2018).

An empolyees insective is a sum of money that varies depending on their team. The rewards given usually meet specific requirements and expectations. Compensation is influenced by human interaction with the organizational environment, especially when personnel handle intangible assetsor material resources (Handayani et al., 2021).

PHP is a markup language for HTML that enables the development of interactive applications with features for data entry and extraction. All defined syntax is processed on the server, and the content sent to browser is only the output. Secondly, it is a programming language consisting of scripts that are stored and executed on the server (Hermiati et al., 2021).

MySQL is one of the relational database management systems (RDBMS). It supports PHP, a structured programming language, as several of its SQL interfaces have been approved by the ANSI group (Handayani et al., 2021). MySQL is used to modify databases using the SQL language. It is free to use and open-source, alloing anyone to utilize it (Audrilia & Budiman, 2020).

Unified Modelling Language (UML) is a general spesification language used to document, design, and construct complex models. UML can also be defined as a tool for enhancing system development and a technique for creating object-oriented systems (Bangun et al., n.d.)

The Use Case Diagram Model is used to predict how the information system being developed will behave. An example of how one or more actors interact within the system being built using use cases is depicted in the use case diagram. Understanding the functionality of a system and identifying who has access to utilize these functions can help developers gain a better understanding of how the system operates (Novi Arisa & Ihsan Alfani, 2022).

Class Diagram is represents the relationships beetwen clases and provides a detailed explanation of each class within design model of a system. It also illustrates the rule and responsibilites of entities that define system behavior. A class diagram also shows the attributes and operations of a class, as well as the consraints related to the connect objects (Bangun et al., n.d.).

An Activity Diagram describes the workflow or activies of a system or bussines process. The symbol used in an activity diagram include start point, end point, activities, fork, join, decision point, and swimlane (Siagian et al., 2023).

Visual Studio Code is a lightweight yet powerful source code editor that runs on the desktop. It can be used for various programming languages such as JavaScript, HTML, CSS, PHP, Python, C++, and many more. Visual Studio Code works on various operating systems, including Windows, macOS, and Linux. Additionally, Visual Studio Code offers the Live Share feature, which allows multiple developers to work on the same project simultaneously from different locations(Puspita, 2023)

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RESEARCH METHOD

To assist in the preparation of research and the development of this application, clear development stages are required. These stages outline the steps taken according to the application development process. The researcher follows several stages, as outlined below:

1. Requirement Analysis, in the requirement analysis stage, the author collects data for determining employee reward at PT. Juishin.
2. System Design, In this stage, the proposed system for employee reward allocation at PT. Juishin is designed using the ROC weighting method in the EDAS approach. The design includes use case diagrams, class diagrams, activity diagrams, and sequence diagrams.
3. Program Coding, This stage involves translating data or solving software problems using a predefined and designated programming language. During the coding phase, the system is implemented using PHP as the programming language for development.
4. Program Testing, The design procedure of a system includes step-by-step testing for each developed component, as well as analyzing issues in outdated systems and creating new applications to address existing challenges.
5. Program Maintenance, Once the program testing is completed and the system functions as expected, the application will run accordingly. The PHP-based application will be deployed, such as the employee reward determination system at PT. Juishin.

In conducting this research, the researcher used two study methods:

1. Field Study, in the field study method, the researcher carried out several activities, including :
   a. Observation- in this stage, the researcher observed data related to employee reward determination at PT. Juishin.
   b. Interview- in this stage, the researcher collected data by asking questions about employee reward allocation at PT. Juishin to sources relevant to the research problem.
2. Literature Review, the researcher conducted a literature review to obtain data related to the thesis from various sources concering theories on employee reward allocation at PT.Juishin.

System Design Planning

Use Case Diagram, The Use Case Diagram for the optimizing employee incentive distribution system in this study can be seen in the following image :
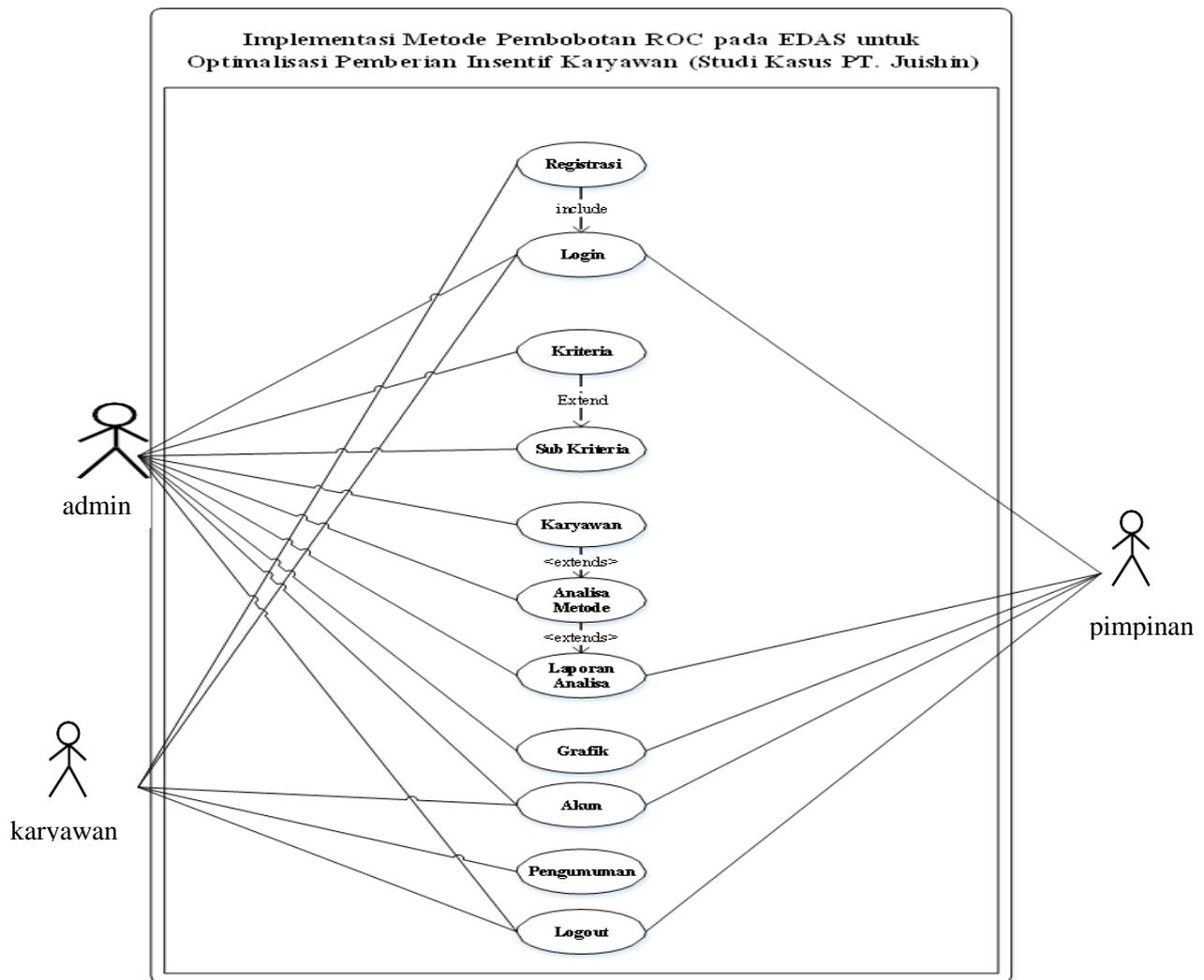
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Figure 1. Use Case Diagram

RESULTS AND DISCUSSION

Result, the purpose of this research is to develop an application for optimizing employee incentive allocation at PT. Juishin by implementing the ROC weighting method in EDAS. This application is develop using several supporting software tools, including XAMPP, HTML (HyperText MarkUp Language), MySQL, PHP (HyperText Preprocessor), and Visual Studio Code.

The development of this application is expected to assist PT. Juishin in determining employee incentive for those who are eligible based on various weighting criteria. The application is designed and built as a web-based platform, with black-box testing used for system evaluation.

Discussions, the following is a discussion of the implementation related to the pages of the application for optimizing employee incentive that has been developed. The implementation is as follows :

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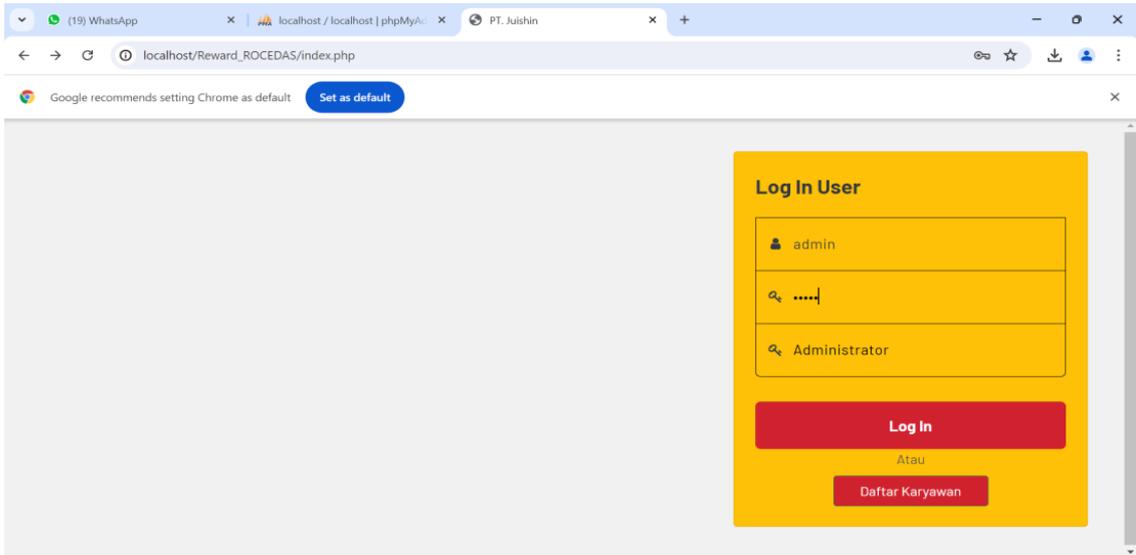Page **128** of 11

1. Operator Login Interface

Figure 2. Login Form

The operator login interface serves as the initial page for operators, including administrators, managers, and employees, to log in by selecting their role admin, manager, or employee followed by entering their registered password. Upon successful login, they can access various menus tailored to their tasks, and roles associated with their accounts.

2. Admin Access Pages, After the admin logs into application, a page will appear consisting of several menus and available access rights, such as the criteria menu, sub-criteria, employees, analysis,. As explained in the image below:
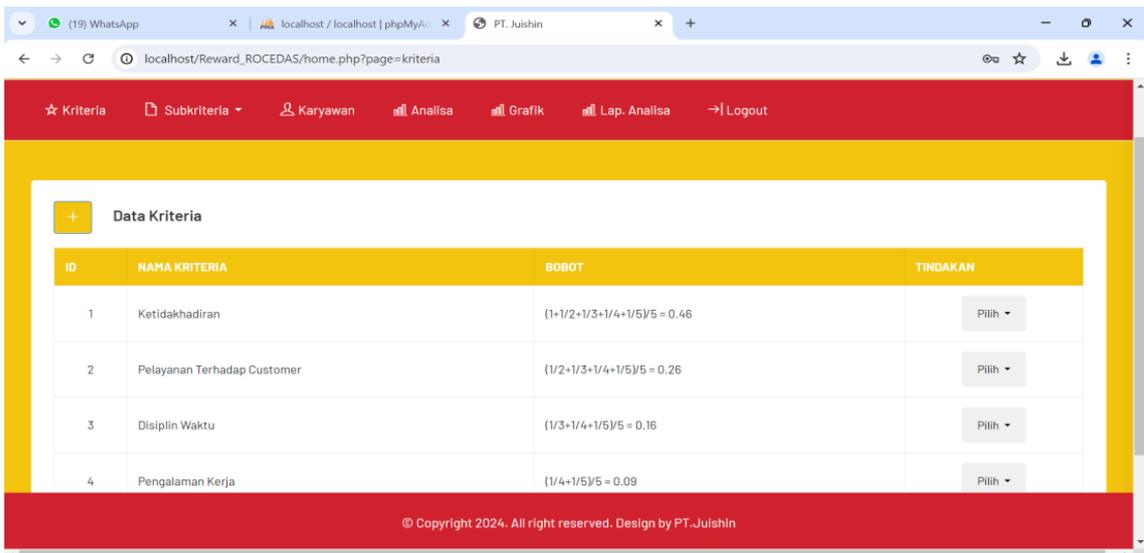

Figure 3. Criteria Data Page

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The criteria menu page is a page for creating, modifying, or deleting criteria data in the selection process for reward recipients, including attendance, customer service, time discipline, work experience, and employee tenure at PT. Juishin.
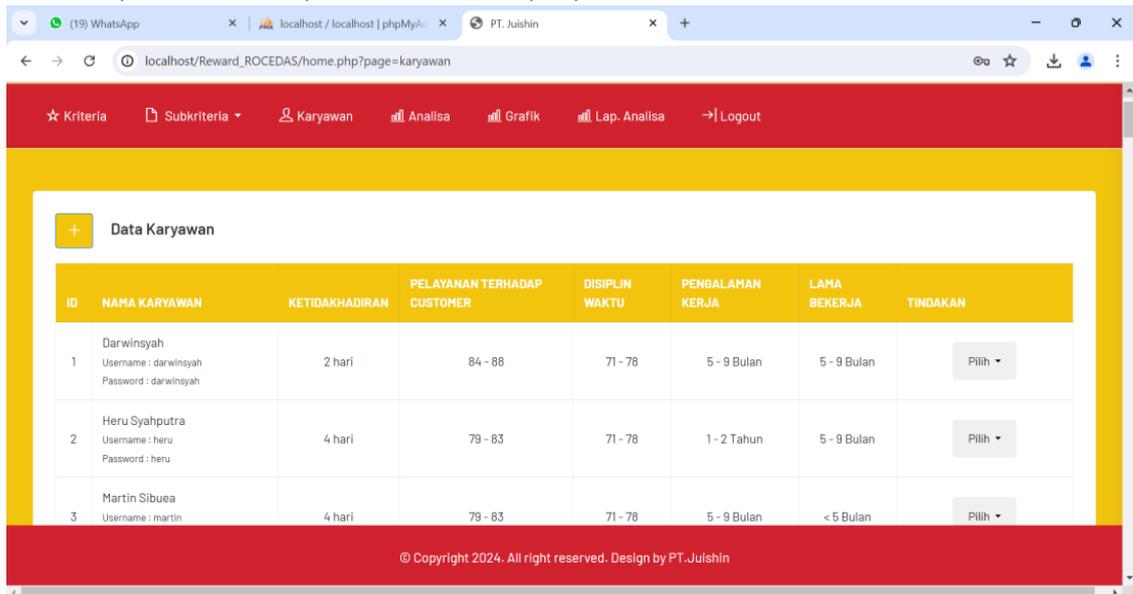

Figure 4. Employee Data Page

The employee menu page is a page for creating, modifying, or deleting employee data for the reward selection process. Employees are selected based on attendance, customer service, time discipline, work experience, and tenure at PT. Juishin.

3. Manager Access Pages, After the manager logs into the application, a page will appear consisting of several menus and available access rights, such as viewing charts, decision analysis reports, and user data. As explained in the image below:
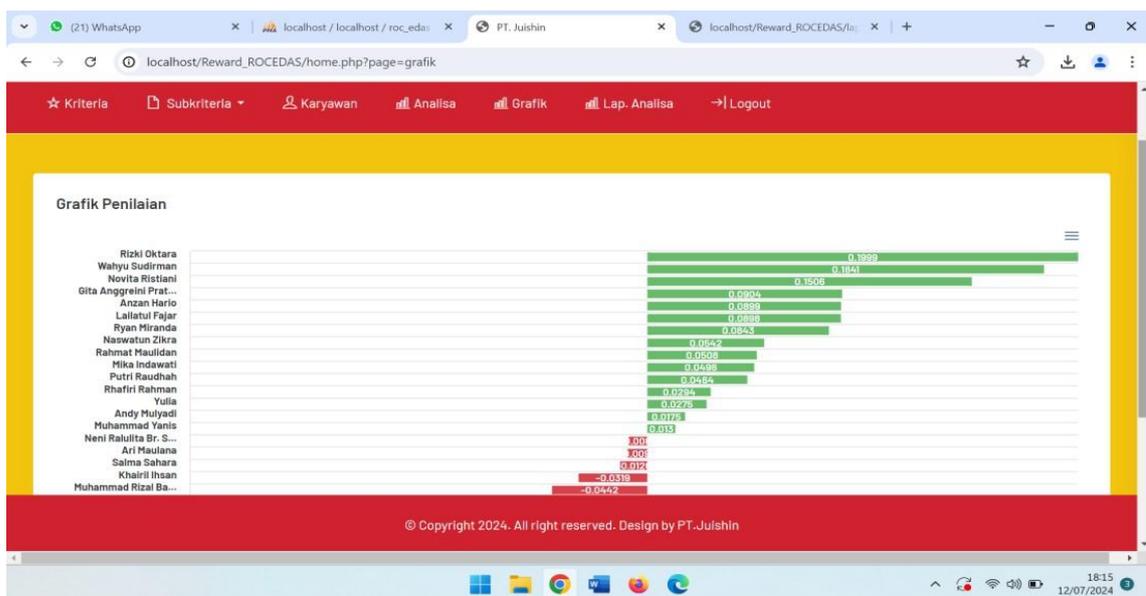

Figure 5. Chart Menu Page

The chart menu page displays information on reward recipient scores using graphical representations, making it easier for the admin to make reward allocation decisions.

Figure 6. Print Analysis Report Page

The print analysis report menu page is a page for printing the analysis results of the ROC and EDAS methods in the employee reward selection process.

4. Employee Access Pages

Figure 7. Employee Menu Page

The registration menu page is the account registration interface for employee access rights. Employees must first register an account before using the system and viewing the announcement of the reward recipient selection results.

In designing the application for optimizing employee incentive distribution, supporting methods such as the ROC method, the EDAS method, and BlackBox testing were used. The implementation and system results include the user interface display, the features available within the application, and a reevaluation of the application's performance.

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After the implementation and testing phases were completed, feedback was collected from potential users of the employee incentive optimization application. BlackBox testing is an approach used to verify whether each function within the application operates correctly, although there may still be some bugs or aspects of the system that are not entirely error-free. The following processes were carried out during this testing phase :

1. Testing each feature to ensure that every function operates correctly, including input, processing, and output for each command executed within the application. If any feature does not function as expected, identification will be conducted, and necessary corrections will be made.
2. Identifying interface errors that may affect the user experience when using the application. These issues may include design deficiencies, navigation difficulties, or unclear elements that hinder ease of use.
3. Identifying errors in data structure or database access. This includes issues such as data retrieval errors, data corruption, or failures in properly connecting the application to the database, which may impact the application's functionality.

CONCLUSION

Conclusion, Based on the results of the research and testing that have been conducted and discussed, several conclusions can be drawn as follows. The employee incentive optimization application developed can assist PT. Juishin in decision-making regarding determining employees eligible to receive incentives at PT. Juishin. The weighting criteria are based on data related to absenteeism, customer service, time discipline, work experience, and length of employment. Therefore, the employees who receive rewards are those with the highest scores based on these criteria.

Suggestion, Based on the research results of the employee incentive optimization application, the following are some suggestions or recommendations. It is recommended that future application development transition from a web-based platform to an Android-based platform with artificial intelligence integration. Additionally, future development is expected to incorporate other software development methods such as WASPAS, MOORA, COPRAS, and other approaches.

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