# Application of The Rapid Application Development Method to Develop a Decision Support System for Employee Performance Assessment in a State-Owned Electricity Company

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**Abstract**

This study aims to create a decision support system for employee performance evaluation that will help managers choose qualified applicants for advancement. In this study, observation, interviews, and literature review were employed as data collection techniques. RAD is the system development methodology that the author used in this study. Black box testing is used for testing. The following conclusions were drawn from the research's findings: first, it created a helpful decision support system that helped managers judge employee promotions by giving them more objectivity. This system helps managers make more accurate and equitable promotion decisions by offering rewards for evaluating employee performance. Second, this research contributes to the field by developing a decision support system visually representing employee performance metrics using graphs. Using the MFEP and MPE methods in the system provides a clear and easy-to-understand picture of employee performance. With graphs, managers can quickly and efficiently evaluate employee performance data, facilitating decision-making.

**Keywords:** Decision Support Systems, Employee Performance, Appraisal, Job Promotions.

## 1. Introduction

Human resources (HR) now have an increasingly vital role in achieving the success of an organization. Awareness that the human element in an organization can be a significant differentiator in achieving goals and objectives has increased among various organizations. In this context, improving the role and quality of human resources is the main focus, with measuring employee performance as an important indicator [1]. Organizations or companies need to understand and evaluate the potential of human resources and continue to strive to improve their quality. Employee performance assessment is a relevant and significant method for measuring the extent of individual contribution and performance in achieving organizational goals [2]. Managers carry out this evaluation based on specific criteria that encompass various aspects of performance, including productivity, adaptability, teamwork, and individual target achievement [3]. The process of assessing or evaluating employee performance is not only a formal activity but also a mechanism that provides feedback and correction [4]. In this way, organizations can continue to develop employee potential, identify development areas, and motivate them to achieve better performance [5]. The results of employee performance evaluations and the implementation of necessary corrective actions can measure the quality of decision-making in HR management. With an effective evaluation mechanism, organizations can optimize human resource potential, design human resource policies that are more targeted, and increase productivity and competitiveness in the market [6].

Computational methods optimize decision-making in an organizational context with the rapid development of information technology today. One approach that is currently developing is a decision support system (DSS), which utilizes data and knowledge to increase effectiveness and efficiency in the decision-making process [7]. DSS is a crucial element in assisting decision-making, both for structured and unstructured problems. The SPK framework offers various methods to solve problems [8]. When decision-makers are faced with a number of factors in solving a problem, the multi-factor evaluation process (MFEP) provides a relevant method. Similarly, the exponential comparison approach (MPE), which works well for ranking choice alternatives with several criteria in order of importance [9]. Businesses who are having trouble finding new hires are realizing how important it is to use SPK. With the projection of many employees who will retire in the next few years, managers need to consider more complex criteria, such as age and length of service [10]. The employee

promotion process is becoming increasingly complex, and the presentation of data such as employee profiles, training certificates, and performance assessment results is still done manually [11]. Therefore, integration between managers, assistant managers, and HR on a SPK platform can be an effective solution to increase efficiency and accuracy in decision-making regarding employee promotions [12]. In this way, companies can face the changing dynamics of human resources more adaptively and responsively, ensuring appropriate employee career development and supporting the sustainability of the organization [13].

Decisions are a problem-tracing process that involves a series of steps, starting from understanding the background of the problem, identifying the problem, and forming conclusions or recommendations. The recommendations resulting from this process become the basis for guiding decision-making [14]. The decision-making process involves identifying the problem as the initial step and evaluating the effectiveness of the decision taken at the final stage. Optimal results are reflected in the quality of decisions that have been applied or tested. In the realm of organizational management, decision support systems (DSS) have become very popular applications. DSS combines data and knowledge to increase effectiveness and efficiency in decision-making [15]. The definition of DSS includes application systems that integrate data and knowledge, providing support to organizational management in a more informed and thorough decision-making process. Through the use of technology and information, DSS becomes a very valuable tool for decision-makers to carry out their duties more efficiently. Thus, the use of DSS helps achieve organizational goals by providing fast and accurate access to relevant information. As technology develops, DSS continues to evolve to provide more up-to-date and innovative solutions to support complex managerial decisions [16].

Human resource management is a process that includes planning, organizing, directing, and supervising various activities related to human resources. These activities involve procuring, developing, compensating, integrating, maintaining, and releasing human resources. The aim is so that various individual, organizational, and societal goals can be optimally achieved [16]. The human resources department of an organization has a crucial role in achieving the organization's vision and mission. This department is not only a channel for managing human resources but also a function that makes a major contribution to achieving organizational goals [17]. The HRM model exists as a guide to help management deal with the implications of current human resource practices and trends. Through this model, management can develop programs and guidelines for future human resource planning activities. The main goal of HRM is to increase human resource support to increase organizational effectiveness. By carrying out effective management of human resources, organizations can achieve their goals better. HRM also plays a role in improving individual performance, ensuring a match between organizational and individual needs, and creating a healthy and productive work environment. Thus, HRM has a strategic role in formulating and achieving overall organizational goals [17].

Performance evaluation is a formal process for assessing employee achievements. This achievement evaluation process has several important functions. Achievement evaluation serves as a tool to assess the effectiveness of employee selection carried out by the organization [17]. By evaluating employee performance, organizations can identify the match between employee abilities and job demands. The second function of performance evaluation is as a basis for salary policies, promotions, or required training. Employers often use the results of performance evaluations to determine incentives, salary increases, or promotional opportunities for employees who perform well. Apart from that, achievement evaluations can also be a basis for identifying training and development needs required by employees [18]. The third function of achievement evaluation is to provide feedback to employees. This feedback can be very beneficial in helping employees identify their strengths and areas for development. By knowing the results of the evaluation, employees can plan steps to improve their performance in the future. It is important to note that performance evaluations also play a role in the promotion context [19]. A promotion is a move that increases the responsibility and authority of an employee to a higher position in the organizational hierarchy. Thus, achievement evaluation becomes a determining factor in decision-making regarding promotions, considering that employees who perform well tend to be given priority to get promotions [20] [21] [22].

## 2. Research Methods

In this research, the author used data collection methods that included observation, interviews, and a literature study. The author applied the system development method of Rapid Application Development (RAD). The initial phase of the research involved requirements planning, where the author carried out various activities related to requirements planning in the first phase of RAD. The next step is the design workshop, where this workshop becomes a forum for designing and improving the system. Users provide responses to existing working prototypes, and analyzers make improvements to the modules designed by utilizing several pieces of software based on user responses. The implementation phase, as the final stage in RAD, involves creating a system based on the design resulting from the workshop. The implementation phase involves developing the system using the PHP programming language with the CodeIgniter version 3 framework, MySQL as the database, and Apache as the server. After the implementation is complete, testing is carried out using the black-box testing method. This

approach tests system functions from the outside, ensuring that these functions work as expected and meet user needs well.

## 3. Results and Discussion

We can provide the following summary of the existing operating system based on the findings of the observations and interviews that were conducted: When it comes to employee performance reviews in advance of promotions, the manager gives the HR department instructions. This process begins when the HR staff forwards the order to the HR supervisor. Next, the HR staff section provides a list of employee names to the HR SPV. The HR SPV is responsible for selecting employees who are considered to have the potential for promotion. After the selection is carried out, SPV HR provides a list of names of potential employees to the assistant manager for finance, HR, and administration. The next stage involves the assistant managers for finance, HR, and administration in assessing the employees proposed by the HR SPV. The results of the assessment are then submitted to the manager, who will select employees who are considered the best to be proposed or promoted. After making a decision, the manager gives an order to the HR staff to make a decision on the employee proposal. The final process involves HR staff making a decree on employee proposals, which will later be sent to distribution. Thus, this series of steps forms a system that involves coordination between the manager, HR staff, HR SPV, and various related units to compile and propose potential employee candidates for promotion.

Furthermore, the current system lacks automation in presenting data for employee promotion needs. Direct requests by managers to HR in manual processes create the potential for errors and lost time that could be used for other, more strategic activities. Direct involvement in data collection can also lead to inaccurate information and increase the risk of human error. Furthermore, the complexity of the factors or criteria in the employee assessment process, which results in a long evaluation time, is also a serious challenge. This time-consuming process hampers the speed of making promotional decisions. In an era that prioritizes responsiveness and efficiency, these delays can have a negative impact on employee satisfaction and managerial effectiveness. To overcome this problem, it is necessary to implement system updates that are more automated in presenting data for employee promotions, as well as simplifying the assessment process by considering truly relevant factors. This update is expected to increase efficiency, accuracy, and speed in carrying out the employee promotion process, providing a positive impact on overall organizational performance.

To overcome the identified problems, the author offers a number of solutions in system development. First, by providing login access to admins or HR staff, it allows them to manage users by adding, activating, resetting passwords, and deleting users. In addition, the system stores the user management data in a database to ensure the continuity of information. Apart from that, the implementation of the employee management feature allows admins or HR staff to add, edit, and delete employee data with ease. In order to ensure data integrity and accessibility, the system also stores employee management data in a database. In a similar manner, admin or HR staff can manage employee positions and training certificates, which are also stored in the database. The master criteria and annual criteria management feature is provided to HR SPVs, allowing them to add, view, and manage criteria and criteria weights in each assessment year. SPV HR can also propose potential employees for promotion and view the results of previously proposed employee proposals. Finance, HR, and administration assistant managers have access to log in and carry out employee performance assessments proposed by SPV HR. After logging in, managers can store the assessment results in a database for reference and further analysis. After logging in, managers can view the results of performance appraisals and select employees deserving promotion. The system then stores employee promotion data in a database. By implementing these solutions, it is hoped that a more automated system can increase efficiency, accuracy, and responsiveness in the entire employee promotion process, overcoming the problems of manualist and long-term processes that have been previously identified.

The first step that all actors can take in the employee performance appraisal system for promotion is the login activity. Upon opening the system, users are immediately directed to the login page, where they must enter their username (NIP) and password, and then click the "Login" button. The system will then validate the information entered, and if it is invalid, it will display an error message. However, if the information is valid, the system will direct the user to the home page according to the access rights or user level of each actor. All actors can carry out the logout activity, which involves leaving the system after previously logging in. To log out, users only need to select the "Logout" menu available in the system. After that, the system will process the logout request and immediately redirect the display to the login page, completing the user session in the system. User management activities, on the other hand, are the admin's special authority. After logging in as an admin, this actor can select the "Manage Users" menu. In this activity, admins have the ability to manage users by carrying out various actions such as adding new users, resetting passwords, activating, and deleting user data. Thus, the admin has full control over user management in the system, ensuring security and continuity of access according to the role of each user.

In the context of the employee performance assessment system, administrators have the responsibility to carry out user management activities, manage employee training certificates, and manage positions. After logging in as admin, this actor can select the "Manage Employees" menu to manage employee data. In this activity, admins can add, edit, delete, and view detailed employee information, making it easy to manage employee data comprehensively. Furthermore, admins can also carry out activities to manage employee training certificates by selecting the "Manage Training Certificates" menu after logging in. In this activity, the admin has the authority to add, edit, delete, and view employee training certificate details. The admin can efficiently and accurately manage data related to employee training certificates in the system. Admins can also manage positions by logging in and selecting the "Manage Positions" menu. Admins have the ability to manage positions by changing the status of the position and viewing details of who is filling it. This gives administrators complete control over the organizational structure and job titles, ensuring clarity regarding who occupies which positions in the organization. By carrying out these three activities, administrators play a crucial role in maintaining the integrity and order of employee data, training certificates, and position structures in the system, making the employee performance assessment system more organized and manageable.

In carrying out administrative functions, administrators have the responsibility to carry out several key activities in the employee performance appraisal system. One of them is the activity of printing a SK (Decision Letter), which can be done after logging in as an admin and selecting the "Print SK" menu. The admin can select the year based on the decree that will be printed in this activity. This step allows the admin to print and download the issued decree, ensuring the availability of official documents related to employee promotion decisions. Furthermore, message viewing activities have become an important part of system communication management. Admins can view messages sent by users by selecting the message icon after logging in. This activity allows admins to access and review messages related to login problems, inactive user status, and forgotten password problems. This strengthens the communication and problem-solving aspects of the system, increasing responsiveness to any problems that may arise. SPV SDM carries out the task of managing master criteria. After logging in as SPV SDM, this actor can select the "Master Criteria" menu to manage the criteria in the system. HR SPV has the authority to add new criteria, providing flexibility in adapting evaluation criteria to organizational needs. Thus, SPV HR can manage and update assessment criteria according to organizational dynamics.

In managing the employee performance appraisal system, HR SPV has a crucial role in certain activities. HR SPV can access the annual criteria management activity by logging in and selecting the "Annual Criteria" menu. In this activity, SPV SDM can manage annual criteria by selecting the criteria needed each year. SPV HR can determine whether to keep the selected criteria the same as the previous year, reduce them, or add new ones based on the needs and developments of the organization. In addition, SPV SDM participates in employee proposal activities, accessible by logging in as SPV SDM and selecting the "Employee Proposal" menu. In this activity, SPV HR has the ability to nominate employees for certain positions, creating clarity and transparency in the employee promotion or promotion process. This also allows the HR SPV to carefully consider relevant factors in determining potential employees for promotion. Finally, SPV HR can view proposals by logging in and selecting the "Employee Proposals" menu. During this activity, SPV HR can review the submitted employee proposals and assess their outcomes. This step allows SPV HR to monitor and evaluate employee proposals, supporting more accurate and effective decision-making in the promotion process. Thus, through this series of activities, SPV HR plays an important role in carrying out human resource management functions, making a positive contribution to effectiveness and transparency in the employee assessment and promotion process.

Various actors carry out several important activities in the employee performance appraisal system to ensure the smoothness and continuity of the evaluation process. Performance appraisal activities are the main steps carried out by the assistant manager for finance, HR, and administration. The assistant manager for finance, HR, and administration can assess employees by logging in, selecting the "Performance Appraisal" menu, and choosing the year and employee to be assessed. In this process, the assistant managers for finance, HR, and administration assign value weights according to predetermined criteria. The system provides a notification, "Employee has been assessed," if the employee has gone through the assessment process for the year in question. All actors can view the performance assessment results. After logging in and selecting the "Performance Assessment Results" menu and selecting the performance assessment year, the actor or user can see the employee performance assessment results. This step allows transparency and accessibility of information regarding employee performance in general. Finally, the activity of selecting employees for promotion is a special task for managers. After logging in and selecting the "Performance Evaluation Results" menu, the manager must select employees who are deemed eligible for promotion based on the performance assessment year. This activity shows the role of managers in making strategic decisions regarding employee promotions, which are based on the results of performance assessments that are available in the system. Thus, this series of activities forms a structured and integrated process in the employee performance appraisal system, contributing to efficiency and clarity in the management of human resources in the organization.

The mentioned mapping class diagram describes changes to the class structure and representation in the RDBMS table. Some of the striking changes include the removal of the user class as the parent class and replacing it with the employee class, as well as the addition of the position class. In addition, the employee values class and the criterion class were combined, adding the value details class as a result. These modifications represent modifications to entities and class connections inside the framework of an RDBMS. The employee class can take the place of the user class, simplifying the structure to meet more common user needs. Concurrently, the incorporation of the position class offers a more precise depiction of staff roles within the company. Combining employee values and criteria resulted in the establishment of the value details class, which was another modification. This demonstrates a better coordinated method of keeping track of specific employee performance ratings. Value data may be accessed more effectively and systematically thanks to this class. When adding a value details class to an RDBMS, the database schema must be modified to make room for the new structure. When the class model changes, new columns pertaining to grade data must be added as appropriate, and table relationships must be adjusted. Making sure that any modifications to RDBMS tables and class diagrams align with the system's requirements and development objectives is crucial. Care must be taken during the development and customization phases to guarantee the accuracy and consistency of the data in the system.

At the implementation stage, there are two main stages, namely coding and system testing using black box testing. In the coding phase, the author utilizes the PHP (Personal Home Page) programming language using the CodeIgniter (CI) framework to simplify the development process. The system utilizes MySQL as a database management system to store and manage the required data. By using the PHP language, system development becomes more efficient and structured, and it takes advantage of the features provided by the CodeIgniter framework to speed up the application development process. CodeIgniter provides a clean and easy-to-understand framework, making it easy to manage program logic and database structure. In addition, using MySQL as a database provides speed and efficiency in storing and retrieving data. MySQL also supports reliable and secure transaction management, making it a popular choice for web application and system development. After the coding stage is complete, it continues with system testing using the black box testing method. Black box testing is used to test system functions from an external perspective without paying attention to the internal structure of the code. This makes it possible to identify errors or deficiencies in system functionality without having to know its internal implementation. System development using PHP, CodeIgniter, and MySQL, as well as testing using black box testing, is overall a comprehensive approach to ensure that the system being developed can not only run well but can also overcome various scenarios and situations that may arise in real use.

## 4. Conclusion

Based on the presented description, we can draw several important conclusions regarding this research. First, this research succeeded in developing an effective decision support system, providing support to managers in making decisions regarding employee promotions with a more objective approach. This system provides benefits for assessing employee performance as a whole and assists managers in making more precise and fair promotion decisions. Second, this research provides a contribution in the form of a decision support system that is able to present the results of employee performance values visually via graphs. The use of the and MPE methods in the system provides a clear and easy-to-understand picture of employee performance. With graphs, managers can quickly and efficiently evaluate employee performance data, facilitating the decision-making process. Overall, this research provides innovative and effective solutions in the context of human resource management. The resulting decision support system is able to increase objectivity and transparency in the employee promotion process, creating a fairer and more performance-oriented work environment. Thus, this research makes a positive contribution to the development of performance evaluation and decision-making methodologies in human resource management.

Although the decision support system developed in this research has made a positive contribution, there are still areas for improvement in further research. First, this system can be further developed to include employee demotion, mutation, and transfer processes. The addition of these features will provide completeness in employee career management, expand system functionality, and increase the sustainability of the resulting solution. Second, even though this system uses two decision-making methods, namely MFEP and MPE, in further research, researchers can explore and add other methods that can enrich the analysis and evaluation of employee performance. In this way, the system can become more robust and able to handle various contexts and scenarios that may arise in human resource management. By identifying these limitations, further research can produce decision support systems that are more comprehensive, responsive, and effective in supporting human resource management. These improvements will enhance the value and excellence in managing employee careers and the decision-making process related to overall human resource management.

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