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Employee Performance Assessment System Design Based on 360 Degrees Feedback and Simple Multi-Attribute Rating Technique Method Integration

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Abstract— One of the things that affects the success of an organization in achieving its goals is employee performance. The best performance of employees will be achieved if the organization carries out an assessment. In this modern era, employee performance appraisal is carried out with a computerized system to help make decisions in the assessment process. This system is known as the Decision Support System (DSS) and the method used is the Simple Multi-Attribute Rating Technique (SMART) because the assessment process has many criteria. In addition, to reduce subjectivity, the 360 Degree Feedback method is also used, namely the assessment process that comes from various parties. From the proposed design, it is found how the employee performance appraisal process will be faster, more transparent, and have high credibility with this appraisal system.

Keywords— Decision Support System, SMART, 360 Degree Feedback

I. INTRODUCTION

Human Resources (HR), or in this case more specifically called employees, is a central factor in an agency or organization. One of the successes of an agency in achieving its goals is driven by the performance of its employees. The higher the employee's performance, the better the impact for the agency.

Employee performance will reach its best performance if the agency conducts an assessment [1]. However, not all assessment processes have had the expected impact. This depends on how the assessment process is carried out. The assessment that is carried out must have several criteria, including being carried out transparently and systematically, and must be objective.

In connection with these criteria, there is still a problem in the employee performance appraisal process. Many companies or agencies have not been able to apply these criteria in the process of assessing the performance of their employees. Likewise, what happened at Universitas Sangga Buana. The employee performance appraisal process carried out at Universitas Sangga Buana is still lacking in terms of

transparency. The assessment process that is carried out cannot be known by all parties, even the employees who are the object of the assessment. In addition, Universitas Sangga Buana does not yet have a standardized and structured performance appraisal system and has clear standards in the assessment process.

In today's modern era, with the rapid development of technology, employee performance appraisal should be done using a computerized system that can help superiors make decisions in the assessment process. This system is called the DSS (Decision Support System), which is a part of a computer-based information system that is used to assist in the decision-making process in an agency or organization. One of the DSS methods commonly used is the Simple Multi-Attribute Rating Technique (SMART) method.

There are several studies regarding the application of the SMART Method in the Decision Support System (DSS) Employee Performance Appraisal that have been carried out previously, such as in CV. King Photo Studio Palembang [2], PT. Trans Engineering Sentosa Medan [3] and Metro Plaza Swalayan Pekanbaru [4]. The results of these studies indicate that the DSS for Employee Performance Appraisal using the SMART Method can make the employee performance appraisal process easier, faster and more efficient because the completion steps are quite simple.

However, in some of the cases above, the assessment process is still vulnerable to the subjectivity of superiors in assessing their employees, because the assessment is only carried out by one party, namely the supervisor himself. To overcome this, the assessment process should use the 360 Degree Feedback method. This method is a method of appraising employee performance using various sources of assessors consisting of superiors, co-workers, subordinates and themselves. Therefore, based on the background / discussion of the problems mentioned above, a Decision Support System was designed for employee performance appraisal based on 360 Degree Feedback at Universitas Sangga Buana using the SMART Method.

II. LITERATURE REVIEW

A. Human Resources

Human Resources (HR) is one of the resources of an organization/agency that has the ability to carry out managerial functions, namely moving other resources within the organization, such as: money (money), machines, raw materials (materials), and methods. (method). Without Human Resources (HR), other resources can be useless and will not be able to help achieve the goals of the organization/agency. One of the most important HR parts of an agency or organization is employees, because employees have the potential to be the driving force in the agency or organization [5].

B. Employees

Employees in an agency or organization are usually closely associated with performance. Performance can be used as a measuring tool to measure the quality of these employees in an agency or organization. Performance is the equivalent of the English word: performance, which means the result or work performance. Thus, it can be concluded that performance is a result or level of achievement of the resulting work process in achieving the goals of an agency or organization.

C. Employee Performance Appraisal

Because of the importance of the existence of employees in an agency or organization, it is necessary to control and supervise employee performance. The way to find out or measure the performance of employees in an agency or organization is by conducting an assessment. Employee performance appraisal can encourage employees to carry out their duties and responsibilities as well as possible.

D. 360 Degree Feedback Method

To reduce subjectivity, the assessment process is used with the 360 Degree Feedback method. Assessment using this method is an appraisal process where employees receive assessments from various parties, ranging from superiors, subordinates, colleagues, and even assessments from themselves. This assessment method is considered more objective and can reduce subjectivity because the assessment is not only carried out by one party [6].

E. Decision Support System (DSS)

In this increasingly sophisticated modern era, the employee performance appraisal process will be easier and more effective by using a Decision Support System, compared to having to do an assessment manually. Decision Support Systems are part of an information system that helps decision makers using computer media as a decision making tool [7].

F. Simple Multi-Attribute Rating Technique

One of the methods in the Decision Support System (DSS) is the Simple Multi-Attribute Rating Technique (SMART) method. The Simple Multi Attribute Rating Technique (SMART) method in the Decision Support System (DSS) or Decision Support System (DSS) was first introduced by Ward Edwards in 1977. This method is called the SMART method because in this method it emphasizes simplicity and ranking rather than the elicitation method that is more complicated [8].

III. METHOD

A. Software Development Methods

The software development method used is the Web Engineering method. Web Engineering is a method that offers an agile framework but still emphasizes discipline in its development to build an industrial quality system [9]. In reality, when creating a web-based system / application, we must always be ready to face changes, be it changes to the system being built, changes in team members, changes due to new technology, or other changes that can affect system development. This method proposes to respond to these changes agile and in an appropriate manner.

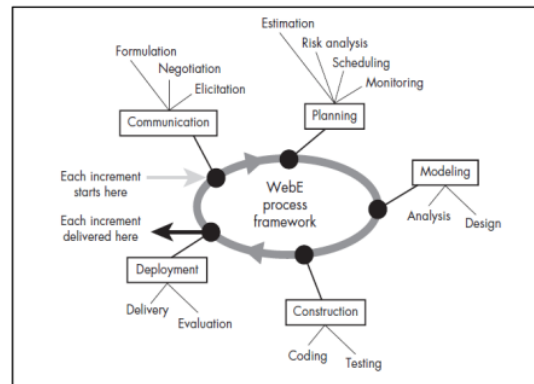


Fig. 1. Web Engineering Framework

The five processes are carried out repeatedly (incremental), according to the results of the evaluation that has been carried out. Each repetition (incremental) process starts from the Communication stage and ends at the Deployment stage. In this article, we will only discuss it until the modeling stage.

B. Systems Development Method

The system development method used is the Simple Multi-Attribute Rating Technique (SMART) method. SMART is a multi-criteria decision-making technique based on the theory that each alternative consists of a number of criteria that have values and each criterion has a weight that describes how important it is compared to other criteria. This weighting is used to assess each alternative in order to obtain the best alternative [10]. The steps for the SMART method [11] can be seen in the following figure:

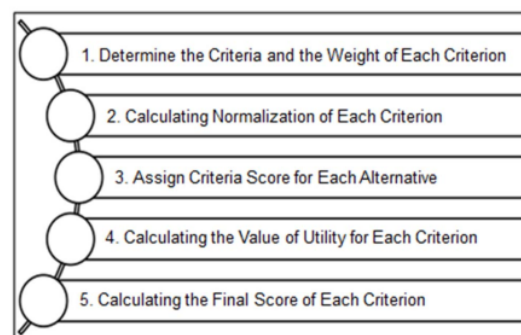


Fig. 2. SMART Method Steps

The weighting of the SMART method is carried out by making a comparison among all the criteria regarding how important a criterion is when compared to other criteria [11]. Weighting is carried out using a scale between 1 - 100. After determining the weight value, then normalizing the weight is carried out, which can be calculated using the following formula:

$$\text{Normalization} = \frac{w_j}{\sum w_j} \quad (1)$$

Explanation :

w_j = Weight of a Criterion

$\sum w_j$ = Total Weight of All Criteria

The next step is to provide a criterion value for each alternative. This criterion value should ideally be quantitative. However, if the data is in qualitative form, a change is made to quantitative data by making the criteria value parameter [12], for example by making a scale of numbers 1 - 5, and each number represents each value of the qualitative data. Then, determine the utility value of each of these criteria. This utility value is based on the nature of the criteria itself. There are criteria that are "cost" and some are "benefit". Cost criteria are criteria that are "preferably a smaller value", while the Benefit criterion is a criterion that is "preferably a larger value" [13]. The utility value can be calculated with the following equation:

$$u_i(a_i) = \frac{(C_{max} - C_{out})}{(C_{max} - C_{min})} \quad (2)$$

$$u_i(a_i) = \frac{(C_{out} - C_{min})}{(C_{max} - C_{min})} \quad (3)$$

Explanation:

$u_i(a_i)$ = utility value of the i^{th} criterion for the i^{th} alternative

C_{max} = maximum criterion value

C_{min} = minimum criterion value

C_{out} = the value of the i^{th} criterion

Equation (2) is used to calculate the utility value of the Cost criterion, while equation (3) is used to calculate the utility value of the Benefit criterion. Next, calculate the final value, which is obtained from the number of times the utility value and the criterion weight normalization value, as can be seen in the following formula:

$$u(a_i) = \sum_{j=1}^m w_j \cdot u_j(a_i) \quad (4)$$

Explanation:

$u(a_i)$ = the final value of the i^{th} alternative

w_j = normalized j^{th} criterion weight value

$u_j(a_i)$ = utility value of the j^{th} criterion for the i^{th} alternative

IV. ANALYSIS AND RESULT

A. Ongoing System Analysis

The employee performance appraisal system in Universitas Sangga Buana is currently considered not good enough and still has problems such as the following:

1. The employee performance appraisal system that has been in Universitas Sangga Buana has not been carried out in a structured and systematic manner. The assessment methods and systems used are not clear and standardized. The assessment process has not been implemented thoroughly and there is no system that specifically regulates this assessment process.
2. The employee performance appraisal system that has been implemented has not been transparent. Employees do not know and are not given information about what criteria are part of the assessment and also the results of the performance appraisals that have been carried out on him.
3. In the provision of rewards, such as the provision of free Umrah, so far, most have only been given to employees who are about to enter retirement, meaning that rewards are only based on the length of service, not depending on the weight of the performance that has been done.

B. Analysis of the Proposed System

Universitas Sangga Buana Employee Performance Appraisal Decision Support System is considered very important. With this system, it is hoped that the assessment of employee performance at the Universitas Sangga Buana can be carried out in a more structured and transparent manner. The performance appraisal method implemented in this system is the 360 degree feedback method, where the assessment is carried out from various parties, be it superiors, colleagues, subordinates, and also an assessment of himself. This system is made web-based, so it can be accessed by anyone using the internet, but is limited by the access rights of each user.

In addition, with the implementation of the Universitas Sangga Buana Employee Performance Assessment DSS, the performance appraisal process can become more transparent, because the whole process, from determining the assessment criteria to the recap of the results obtained from the assessment process, can be known, either by himself or his superiors. A transparent appraisal system like this will certainly provide more encouragement and motivation so that employees can further develop and improve their performance.

Users of this system consist of admins, HR Directors, superiors (structural officials), subordinates (security guards and CS), as well as employees at Universitas Sangga Buana. Each user has access rights and their respective roles. Admin is a user whose task is to manage core data on the system. The HR director is the user who determines the assessment criteria and manages decisions. Bosses and subordinates are users who assess employees. Meanwhile, employees are the central users of this system. In this system, employees assess their fellow employees and also assess themselves. Employees can also view reports on the results of their assessment of themselves. In addition, this system can also assist the Director of HR in making decisions in giving rewards and punishments to employees.

C. System Design

After knowing the specifications needed through the system analysis process, then proceed to design stage of the Universitas Sangga Buana Employee Performance Assessment Decision Support System

1) Use Case Diagram

In the Use Case Diagram of the Universitas Sangga Buana Employee Performance Assessment Decision Support System there are 5 actors and 9 main use cases. The actors in the use case diagram consist of: Admin, Employee, Direct Leader/Supervisor, HR Director, and Supporting Team (CS/Security). Meanwhile, the use case consists of: Login, Manage User Access Rights, Manage Divisions, Employee Assessment, Peer Assessment, Input Daily Activity Report (DAR), See the Recap of the Assessment Result, Manage Employee Performance Appraisals, View Employee Assessment Reports.

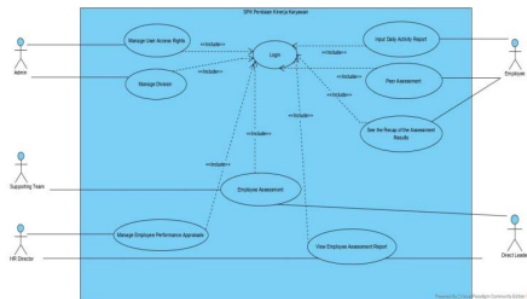


Fig. 3. Use Case Diagram

2) Flowchart

To find out in more detail about the process flow of the Universitas Sangga Buana Employee Performance Assessment Decision Support System, it can be seen in the flowchart image as follows:

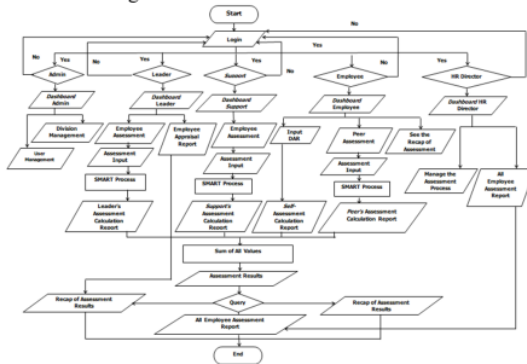


Fig. 4. Flowchart

V. CONCLUSION

This research has resulted in a design for developing an employee performance assessment system by using the 360

Degree Feedback method and the Simple Multi-Attribute Rating Technique method from DSS, so that the employee performance appraisal process at Universitas Sangga Buana becomes more credible, because with this system, the assessment process becomes more systematic, structured, and transparent.

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