Design of a Service and Role-Based Performance Assessment System to Support Employee Performance Assessment

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Article Info	ABSTRACT
	The challenge that is often faced by companies is how to find solutions that can be used to evaluate the performance of their employees. The purpose of this study is to design a service-based performance appraisal system with a ticket system to support employee performance appraisals in a company. By using this service-based assessment system, performance appraisal can be carried out objectively based on what the employees have done, this is possible because the parts and roles in the company have been mapped, where each role has different services to handle. As the employee has finished doing certain services, the employee will get points according to what has been done. At the end of each month, the company can determine the "Best Employee of the Month" based on the total point data obtained in a certain month, then the appropriate reward or punishment can be given based on their performance.

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1. INTRODUCTION

One of the challenges that are often faced by companies is how to find solutions that can be used to assess the performance of their employees, this will greatly determine whether the employee needs to be dismissed because of poor performance or giving rewards because the employee gave his best performance for the company [1]. Sometimes, the general approach that can be taken is to evaluate subordinates by their superiors, but unfortunately this form of assessment is very likely to be biased towards subjectively inclined judgments, which can lead to a halo effect, central tendency, leniency, strictness and recency [2][3].

According to Sastrohadiwiryo [4], performance appraisal is an activity carried out by management / supervisor assessors to assess the performance of the workforce by comparing performance on performance with job descriptions / descriptions within a certain period usually at the end of each year. According to Mathis and Jacson [5], performance appraisal is the process of evaluating how well employees do their jobs when compared to a set of standards, and then

communicating that information to employees. According to Byras and Rue [6], performance appraisal is the process of evaluating and communicating how employees do their jobs and developing development plans to the employees themselves. According to Irianto [7], performance appraisal is a continuous process to report work performance and abilities in a more comprehensive period of time, which can be used to form the basis for considering an action.

The objectives and benefits of performance appraisal are used to improve job performance, compensation adjustments, placement decisions, training needs, career planning and development and fair job opportunities [2].

One alternative that can be done to add parameters in evaluating employees is the approach to the service mapping method that is carried out on certain roles, where each service will be given a weight based on the average duration of work obtained by previous history. With this system, the assessment will be objective in accordance with what is done by employees so that it can reduce bias that can occur in assessing employees.

The purpose of this research is to design a service-based performance appraisal system to support employee performance appraisal in a company.

2. RESEARCH METHOD

The first thing a company can do is map out what divisions or sections are in the company. The next step is to map the roles that exist in each division, it must be clear roles are in a particular division. Everyone will have a certain role which will later be related to what things they can do. Then the main thing that needs to be done is to map what services are contained in each role, this will determine what things can be done by employees with certain roles. After recording the available services, don't forget to record the estimated duration of work required for each service. From the estimated duration of the existing handling, we can score the service. The score will be given to the employee when he has finished completing a task. The above steps can be summarized in Figure 1 following.
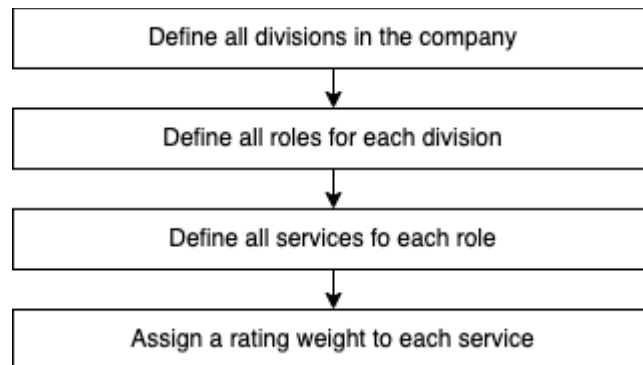

Figure 1. Phase

In system design, there are several tables that are needed, as follows:

2.1. Divisions

The division list table contains data on the list of divisions or sections that exist in a company. The table structure of the division list can be seen in Table 1.

Table 1. Structure Table of Divisions

Field	Data Type	Description
KODE_DIVISI (PK)	CHAR	Division Code
NAMA_DIVISI	VARCHAR	Division Name

2.2. Roles

The role list table contains data on the list of roles or roles that exist in a company. Each role belongs to a certain division. The table structure of the list of roles can be seen in Table 2.

Table 2. Structure Table of Roles

Fields	Data Type	Description
KODE_ROLE (PK)	CHAR	Role Code
KODE_DIVISI (FK)	CHAR	Division Code, Foreign Key to Division List Table
NAMA_ROLE	VARCHAR	Role Name

2.3. Employees

The employee list table contains data on the list of employees in a company. Each employee must have a specific role. The structure of the employee list table can be seen in Table 3.

Table 3. Structure Table of Employees

Field	Data Type	Description
ID_KARYAWAN (PK)	CHAR	Employee ID
KODE_ROLE (FK)	CHAR	Role Code, Foregin Key to table List of Roles
NAMA_KARYAWAN	VARCHAR	Employee Name

2.4. Services

The service list table contains data on the list of services that exist in a company, the services are mapped based on what roles can make requests for a service and who can handle the service. It is necessary to map the duration of the work and the score that will be given when the employee has finished handling the service. The structure of the service list table can be seen in Table 4.

Table 4. Structure Table of Services

Field	Data Type	Description
KODE_LAYANAN (PK)	CHAR	Service Code
ROLE_REQUEST (FK)	CHAR	Role that can make requests for services, foreign keys to Table List of Roles
ROLE_RESPONSE (FK)	CHAR	Role that can respond to services, foreign keys to Table List of Roles
NAMA_LAYANAN	VARCHAR	Service Name
DURATION	INTEGER	Duration of estimated processing time in minutes
UNIT	VARCHAR	Unit of measurement unit
SCORE	INTEGER	The score given when the service is completed

2.5. Tickets

The ticket list table contains transaction data containing the ticket submitted, where there are 4 ticket statuses that can be submitted given, namely OPEN: Ticket created, PROCESS: Ticket is picked up by the executor for processing, FINISH: Ticket has been executed and is ready to be judged by the ticket opener, CLOSE: Ticket has been rated/rated by the ticket opener. For the purposes of evaluating ticket waiting times, it is necessary to store data when tickets are made and when tickets are responded to, and for the purposes of calculating execution time, it is necessary to store data when tickets are responded to and when tickets are executed. The table structure of the ticket transaction list can be seen in Table 5 below.

Table 5. Structure Table of Tickets

Field	Data Type	Description
NOMOR_TIKET (PK)	CHAR	Ticket Number
KODE_LAYANAN (FK)	CHAR	Service type
REQUEST_ID (FK)	CHAR	Who opened the ticket
RESPONSE_ID (FK)	CHAR	Who executed the ticket, foregin key to the Employee List Table
JUDUL_TIKET	VARCHAR	Ticket Title
DESKRIPSI_TIKET	VARCHAR	Ticket description or details, foregin key to Employee List Table
STATUS_TIKET	ENUM	Ticket Status, contains status (OPEN, PROCESS,

		FINISH, CLOSE)
DATE_OPEN	TIMESTAMP	Time when ticket was created
DATE_RESPONSE	TIMESTAMP	Time when ticket
DATE_OPEN	TIMESTAMP	when ticket was completed
RATING	INTEGER	The value given by the requesting ticket to the executing ticket, the rating range is 1 (worst) to 5 (best).

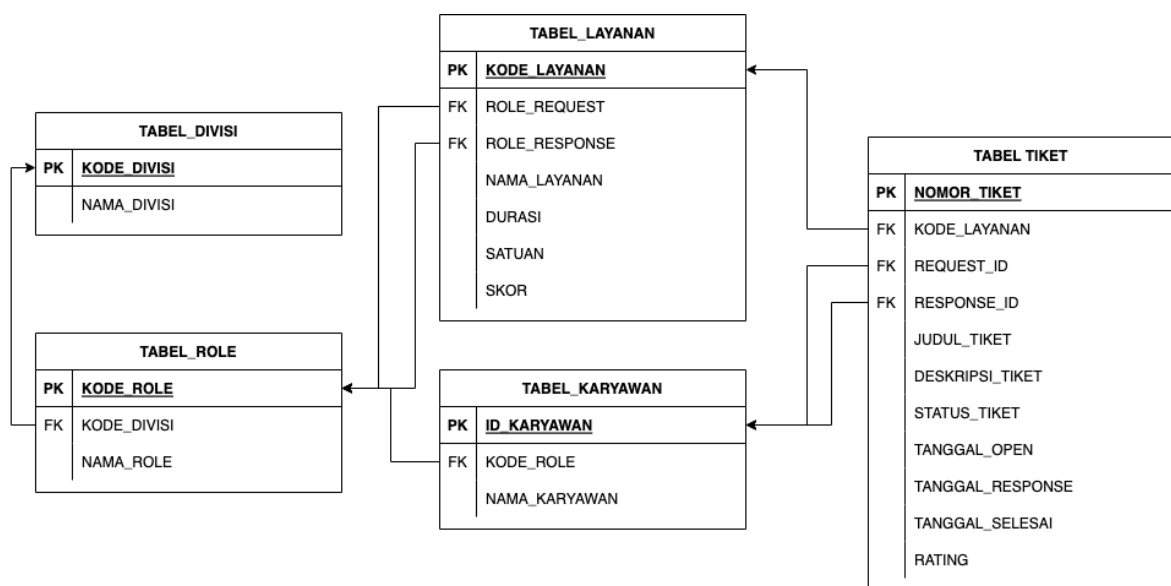The relationship between existing tables can be seen in the ERD in Figure 2.

Figure 2. Entity Relation Diagram

3. RESULTS AND ANALYSIS

The research used a sample of data from a company engaged in the IT sector which consists of 3 divisions:

1. Infrastructure Division
2. Service and Improvement Division
3. Development Division.

From these 3 divisions, there are several roles in each division, examples can be seen in Table 6 below.

Table 6. List of Roles

Division	Names Role Names
Infrastructure Division	Server Engineer
Infrastructure Division	Network Engineer
Infrastructure Division	Database Engineer

Service and Improvement Division	Customer Support
Development Division	System Analyst
Development Division	UI/UX Engineer
Development Division	Backend Engineer
Development Division	Frontend Engineer

Following example the list of services available at the company, the data can be seen in Table 7.

Table 7. List of Services

Service	Roles that can request services	Roles that can handle
Network Troubleshoot	USER	Network Engineer
Cable Pulling	USER	Network Engineer
Questions	USER	Customer Support
Computer Repair	USER	Customer Support
System Development	USER	System Analyst
Creating Tables	System Analyst	Database Engineer
API Design	System Analyst	Backend Engineer
Add Web feature	System Analyst	Backend Engineer
Update Web feature	System Analyst	Backend Engineer
Delete Web feature	System Analyst	Backend Engineer

Each service is also given information on the estimated duration of handling and the score that can be given when the employee finishes working on the service, the estimated duration and score can be seen in the following Table 8.

Table 8. List of Services and estimation duration and score

Service	Duration Estimated	Score
Network Troubleshoot	1 hour / case	60 points
Cable Pulling	3 hours / point	180 points
Assistance Questions	20 minutes / problem	20 points
Computer Repair	1 hour / device	60 points

System Building	1 hour / feature	60 points
Table creation	15 minute / table	15 point
API design	1 hour / endpoint	60 points
Add Web feature	3 hours / feature	180 points
Update Web feature	1 hour / update	60 points
Delete Web feature	30 minutes / feature	30 points

In Ticket Table, the following is an example of what data the employee has done in February 2022 along with the scores for each service request as shown in Table 9.

Table 9. List of Tickets in February 2022

No	Service	Executor	Quantity	Unit	Execution Time	Score
1	Network Troubleshoot	Si M	1	case	30 minutes	120 points
2	Network Troubleshoot	Si E	1	case	60 minutes	60 points
3	Network Troubleshoot	Si L	1	case	120 minutes	30 points
4	Network Troubleshoot	Si D	1	case	240 minutes	15 points
5	Network Troubleshoot	Si A	1	case	15 minutes	240 points
6	Cable Pulling	Si M	1	point	180 minutes	180 points
7	Cable Pulling	Si E	1	point	360 minutes	90 points
8	Cable Pulling	Si L	1	point	90 minutes	360 points
9	Cable Pulling	Si D	1	point	180 minutes	180 points
10	Cable Pulling	Si A	1	point	90 minutes	360 points
11	…	…	…		…	…

From the sample data in Table 9, an assessment can be made by looking at the execution time. For example, the type of Network Troubleshoot service, where the service has an estimated processing time of 1 hour per case, and for employees who do the task within 1 hour, they will get 60 points. When there are employees who work faster than the standard time, the points earned are greater, for example, when the execution time is twice as fast, the points given can be 2 times greater. To give a score based on execution time, it really depends on the strategy to formulate the score value

given and there are no absolute provisions, it can be returned to the company's strategy to determine the assessment.

Based on what data each employee has done in a certain month, the next thing to do is to calculate the work score for that month, then it can be sorted by the highest so that we can see the performance made by each employee and can determine the name of the employee who has maximum performance with the highest score, and the name of the employee who has the least performance with the lowest score. Sample data to determine "Best Employee of the Month" can be seen in Table 10 below.

Table 10. Example of "Best Employee of the Month" February 2022 based on the highest score

Rank	Employee Name	Total Score February 2022
1	Si F	3600
2	Si A	2400
3	Si D	1800
4	Si H	1500
5	Si I	1500
6	Si L	1200
7	…	…
…	…	…

Indirectly with this system we also make general calculations to calculate the Key Performance Index (KPI) value for each employee. If we determine in general, the KPI of each person is to get a certain number of points, for example, 2000 points for a certain month, then employees with points below that mean they have not achieved their KPIs and those who pass them deserve an award because the KPI target is achieved.

4.   CONCLUSION

By using this service and role-based assessment system, performance appraisal can be carried out objectively based on what the employees have done, this is possible because it has mapped out what parts and roles are in a company, where each role has different services. to be handled, when the employee has finished doing certain services, the employee will get points according to what has been done. At the end of each month, the company can determine the "Best Employee of the month" based on the total point data obtained in a certain month, then the appropriate reward can be given based on their performance.

REFERENCES

[1]   Dessler, Gary. 2015. Human Resource Management. Jakarta: Salemba Empat.
[2]   Mangkuprawira, S. 2002. Human Resource Management. Jakarta: Ghalia Indonesia.
[3]   Sani, Achmad and Masyhuri, M. 2010. Research Methodology for Human Resource Management. Malang: UIN-Maliki Press.
[4]   Sastrohadiwiryo, Siswanto. 2002. Management of Indonesian Manpower, Administrative and Operational Approaches. Jakarta: Earth Literacy.

[5]   Mathis, RL & Jackson, JH 2006. Human Resource Management: Human Resource Management. Jakarta: Salemba Empat.
[6]   Byars, LL and Rue, LW 2006. Human Resource Management. New York. MCGraw Hill.
[7]   Irianto, J. 2001. Human Resource Management. Surabaya: Insan Scholar.
[8]   Welbourne TM, Johnson DE, Erez A. The role-based performance scale: Validity analysis of a theory-based measure. Academy of management journal. 1998 Oct 1;41(5):540-55.
[9]   Yang SJ, Lai PC, Lin J. Design role-based multi-tenancy access control scheme for cloud services. In2013 International Symposium on Biometrics and Security Technologies 2013 Jul 2 (pp. 273-279). IEEE.
[10]   Xu B, Yang X, Shen Y, Li S, Ma A. A role-based SOA architecture for community support systems. In2008 International Symposium on Collaborative Technologies and Systems 2008 May 19 (pp. 408-415). IEEE.
[11]   Wang W, Han J, Song M, Wang X. The design of a trust and role based access control model in cloud computing. In2011 6th International conference on pervasive computing and applications 2011 Oct 26 (pp. 330-334). Ieee.
[12]   Feng X, Guoyan L, Hao H, Li X. Role-based access control system for web services. InThe Fourth International Conference onComputer and Information Technology, 2004. CIT'04. 2004 Sep 16 (pp. 357-362). IEEE.
[13]   Colman A, Han J. Using role-based coordination to achieve software adaptability. Science of Computer Programming. 2007 Jan 15;64(2):223-45.