

## The Decision Support System Design Of Employee Performance Appraisal Using Analytical Hierarchi Process (AHP) Method

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**Abstract** - A performance appraisal is important for every employee and it is also useful for companies to assign the next policy action. In RS Roemani, the performance appraisal process is used for the promotion, the performance evaluation, the hajj subsidy, the outstanding employee and the adjustment of a diploma. While, the criteria used as much as 4 criteria and 13 sub-criteria and their implementation is still done by hand. The method used in this study is the Analytical Hierarchy Process (AHP), because it can make a complex problem be easily simplified, thereby accelerating the decision making process by arranging the hierarchy and providing comparative value of each criteria to determine the appropriate criteria. The criteria used are: (1) the commitment that consists of the honesty, the loyalty, the responsibility and the discipline; (2) The management that consists the leadership, the planning, the organizing and the directing; (3) The co-operation that consists of the communications, the ability for adaptation and the information sharing; (4) The performance both the quality and quantity. The Decision support system of performance appraisal using AHP method can be used for all of the assessment processes while the decision of the criteria and sub criteria can be changed in accordance to the management agreement.

**Keywords:** *The decision support systems, AHP, Performance Appraisal*

### I. INTRODUCTION

The quality of human resources is one of the important factors to improve the productivity of an institution. Therefore, it is necessary to have high competence human resources since it will be able to support the work performance of employees.

The performance appraisals should be conducted to determine the achievements of every employee. By conducting the performance appraisal process, every employee achievements with excellent value, good, fair or less can be identified. The appraisal of achievement is important for every employee and it is also useful for companies to establish further policy action.

Performance appraisal means the subordinates get the attention from the superiors that encourage employee enthusiasm for work, as long as the assessment process conducted honestly and objectively and any follow-up for it.

The follow up of the employee performance appraisal will be possible fir the employee to be promoted, developed and or increased for his remuneration.

The scope of performance appraisal are covered in what, why, where, when, who and how or often referred to 5 W + 1 H. (Sikula, 1980 in Hasibuan, 2009).

The employee performance appraisal process conducted at the Roemani hospital, is used for the promotion, the performance evaluation (PHK), the hajj subsidy, the outstanding employee and the adjustment of a diploma.

Performance appraisal is used to evaluate the work of all employees quantitatively and qualitatively using the criteria such as the honest commitment, the loyalty, the responsibility and the discipline. Meanwhile, the management aspects that assessed are the leadership, the planning, the organizing and the directing. The Co-operation aspects that assessed are the communications, the ability for adaptation and the information sharing. And the works assessed are the quality and quantity.

The number of criteria (*multiple criteria*) used in employee performance appraisal process make the management difficult to score for each criteria. Therefore, it is needed an appropriate method. The method used to solve multiple criteria in RS Roemani is the *Analytical Hierarchy Process (AHP)*. In addition, the management also wants a system that can handle the changes in the number and name of the criteria.

AHP is used because it can solve the complex and unstructured problems into more detailed groups and explain what is meant in the first goal, taking into account the validity up to the limit of tolerance inconsistencies various criteria and alternatives are selected by decision makers. In addition, It also has the ability to solve the multi-objective and multi-criteria problem based on a preference comparison of each element in the hierarchy (Kadarsah, 2002)

### II. DECISION SUPPORT SYSTEMS THEORY

In the early 1970s, Scott-Morton formulate the concept of the first SPK. SPK is a computer-based interactive system that helps to make decisions using data

and models to solve unstructured problems. (Gorry and Scott-Morton, 1971; Efraim, 2007).

The conceptual framework of Decision Support System which consists of data; external and internal, outside the computer system, model management, knowledge managers, dialogue management and the manager (user) can be seen in figure 1. (Efraim, 2007)

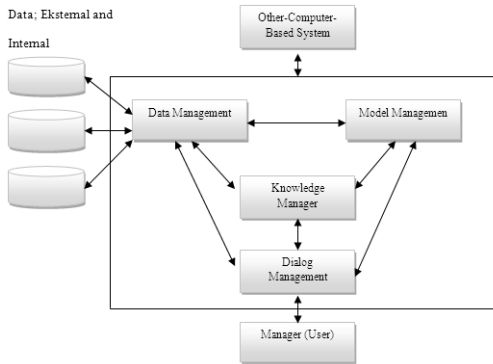


FIGURE 1. THE CONCEPTUAL FRAMEWORK OF DECISION SUPPORT SYSTEM

The Steps taken in the Decision Support System performance appraisal using AHP method can be seen in Figure 2.

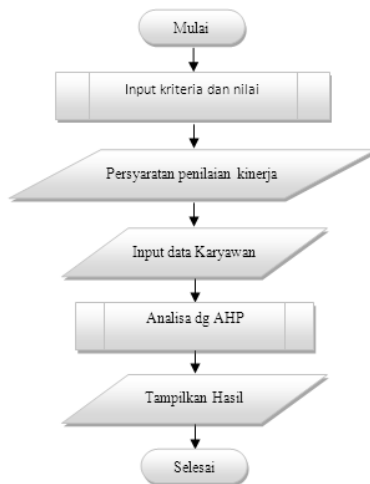


FIGURE 2. THE DSS PERFORMANCE APPRAISAL FLOWCHART AHP METHOD

Input criteria and values are given to make the comparison in order to produce a local priority value or a global priority. The requirements of performance assessment undertaken to provide the terms that are used prior to the performance appraisal process carried out. Input

data of employee using the AHP method then show the results of Employees who pass and delayed.

The Decision Support System is a computer-based information that provides interactive support information for managers and business practitioners during the decision process. (O'Brien, 2005).

The Decision Support System is an interactive information system that provides information, modeling, and manipulation of data. The system was used to assist decision making in situations that semi structured and unstructured situations, where no one know exactly how the decision should be made (Alter, 2002; Kusri, 2007).

### III. PERFORMANCE APPRAISAL THEORY

Performance appraisal is an analysis and interpretation of the success or failure of performance achievement. Assessment should be linked with the resources (inputs) which are under his jurisdiction such as human resources, funding / finance, facilities, work methods and other related things. (Veithzal Rival, 2005) Employee performance appraisal has been undertaken by various organizations since centuries. Although the performance appraisal system has been debated by the public, but overall it can be seen that the performance appraisal is an integral part of organizational life. Longenecker and Fink (1999) cites several reasons that a formal performance appraisal in the organization is required to properly process a raise, promotion, demotion (Rafikul Islam, 2005).

On the other hand the performance appraisal is an important part of organizational culture and is required to assess progress toward the goals of the organization (Daley, 1993 and Farr, 1983). Another definition cites that performance appraisal is a formal procedure carried out in the organization to evaluate employees and give contributions and interest for Employees themselves (Dale Yoder, 1981.; Rafikul Islam, 2005).

Since the performance appraisal is very important, it should be done carefully. The ineffective Performance appraisal system will bring a lot of problems such as low morale, low productivity, low employees' enthusiasm and support for the organization (Somerick, 1993; Rafikul Islam, 2005).

The development of times and issues, encourage experts developed new theories, such as (Vallance, 1999) that describes the performance appraisal methods used in Singapore, Thailand and the Philippines and examines the role of organizational culture in the appraisal process in these countries. Singapore adopts Potential Appraisal System (PAS), the criteria used are 1) 'helicopter quality', is a person's ability to analyze problems or issues in taking all important factors. 2) 'intellectual qualities', is the ability to analyze, imagine, and face reality. 3) 'results orientation'. 4). 'Leadership quality', is the ability to motivate, delegate and communicate.

In Thailand the criteria used is the output of work in terms of quality, quantity and output applications, the ability to manage and perform the work in planning and execution, the ability to direct and make decisions- including an interval period of meeting, take control, coordination efforts with other organizations, solve problems and resolve conflicts and help to achieve organizational goals, improve the work and services, demonstrate new ideas and solutions to identify and address the problems and accomplish the work efficiently and effectively.

In the Philippines the criteria used: labor management, people management, resource management, relationship management, constraint management and innovation.

The elements assessed were loyalty, work performance, honesty, discipline, creativity, teamwork, leadership, personality, initiative, skills and responsibilities (Malay Hasibuan SP, 2009).

The criteria used for performance assessment at the Inter Services Maintenance System (ISMS) is the quality / quantity of work, planning / organization, initiative / commitment, teamwork / cooperation, communication and external factors (Rafikul Islam, 2005).

The dimensions of employees' work performance based on work Quantity, Quality of work, job knowledge, Creativeness, Corporation, Dependability, Initiative, Personal Qualities (Gomes, 1995; Rafikul Islam, 2005).

Basically the performance assessment is used to assess the ratio of the real work with the standards of quality and quantity produced of each employee. Setting policy means employees will be promoted, demoted, and or increased his remuneration. (Hasibuan, 2009).

The process of preparing the performance appraisal (Mondy and Noe, 1993; Hasibuan, 2009) is divided into several phases of activities that are shown in figure 3.



FIGURE 3. THE FRAMEWORK OF PERFORMANCE APPRAISAL PREPARATION

#### IV. ANALYTICAL HIERARCHY PROCESS (AHP) THEORY

The AHP method developed by Thomas L. Saaty around 1970, the method is a framework to make decisions effectively on complex problems. Three principles to solve problems with the AHP are: the principle of setting a

hierarchy, the principle of setting priorities, and the principle of measuring the consistency (Kusrini, 2005).

The decision making process is basically selecting an alternative. The main equipment of the AHP is a functional hierarchy with the main input of human perception. Through the hierarchy, a complex and unstructured problem can be solved in groups. Then the groups are arranged in form of hierarchy (Permadi, 1992; Kadarsah, 2002). To solve problems with the AHP, there are several principles that must be followed, they are:

- a. Creating a hierarchy
- b. Assessing Criteria and Alternatives
- c. Determining Priorities
- d. Measuring Consistency

The process contained in the AHP is the input criteria and sub criteria. The process uses predefined input process- *that the input process is in other place*, set the value of comparison, calculate the local priorities and global priorities. The process can be seen in Figure 4.

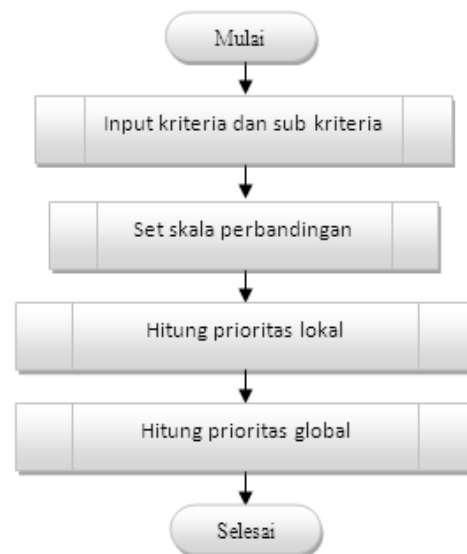


FIGURE 4. THE AHP FLOWCHART

#### V. CASE STUDY

##### A. The framework for Decision Support System of Performance Appraisal.

The decision support system design of performance appraisal using the Analytical Hierarchy Process (AHP) that used for the promotion process can be viewed in figure 5.

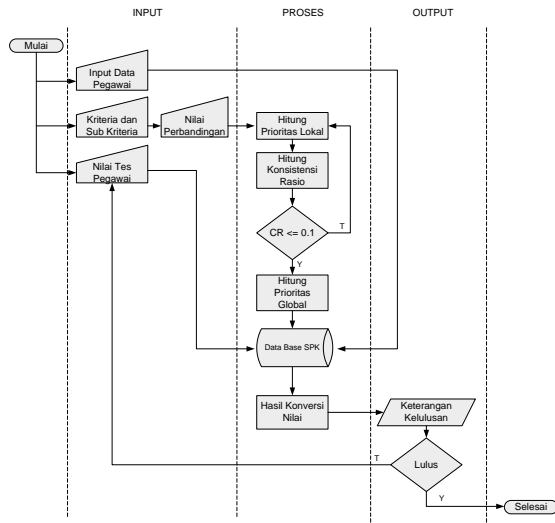


FIGURE 5. DSS PERFORMANCE APPRAISAL FRAMEWORK

The Framework of decision support systems performance appraisal described in Figure 5, contains three functions: input, process and output.

The employee data input is a data input of all employees conducted by an administrator, an administrator not only input the employee data but also input the criteria and sub criteria into the system, in which automatically processed by the decision support system based on AHP calculations.

The input process of the employees' scores test performed by a user's employees, the score then put and converted through the AHP calculation.

The Managers and The Director have the same report that contains the employees' scores, appraisal standards, and the information of the passed or the postponement employee.

Once the employee data, the criteria and the sub criteria entered by the administrator, the next step is processing them using AHP method, then storing them in a data base of DSS. Furthermore, the users enter the employees' scores then calculated them with the results of AHP calculation, the results and the conversion will be obtained from the process.

The data of the passed and postponement employee obtained after the employee, the criteria, the comparison score and the employees score input.

*B. The Performance Assessment Criteria*

The criteria used in the performance appraisal process consists of four criteria, the four criteria used are the commitment, management, cooperation and performance.

Commitment is the attitude of an employee toward the job, in this case the appraisal includes: the level of honesty while working, the level of employee loyalty to the

institution, the level of employee responsibility in carrying out the duties and the discipline of employees in terms of time worked.

Management criteria are criteria relating to the management and organization. The criteria assessed are the level of leadership, the planning, the organizing and the directing of co-workers or subordinates.

Cooperation is the criterion concerning to the effective or ineffective model of communication, how the employee adapted with the working environment and how employees share information. The performance being assessed is the quality and quantity of work accomplish compared to the standard of an institution. The criteria and sub criteria for performance assessment are described in Figure 6.

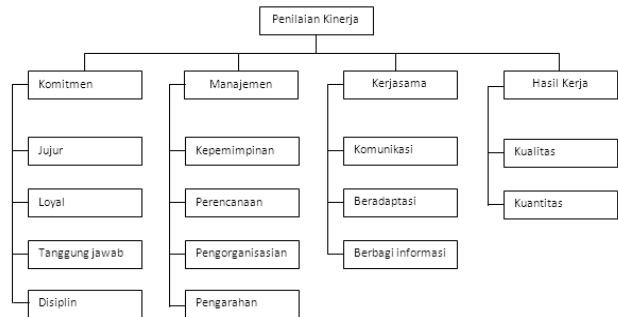


FIGURE 6. CRITERIA AND SUB CRITERIA

The criteria used are described in Table 1.

TABLE 1. THE EXPLANATION OF CRITERIA

No	Criteria	Explanation
1	Comitment	Asses the behavioural commitment to the needs, priorities, and goal of the institution
2	Managemen	Asses how employees can lead, plan, organize, and direct others
3	Co-operation	The cooperatin between emploee and employer, cooperation among co-wokers or sub-ornidate
4	Performanc e	The result obtained form the employee, compare to the organization standard.

*C. Providing Comparison Score*

The DSS performance appraisal used for promotion process and the criteria in this case study are: (1) The

commitment that includes loyalty, honesty, responsibility, discipline; (2)The Management that consists of the leadership, planning, organizing, directing; (3) The Cooperation that consists of communication, information sharing and the ability for adaptation; (4) the work performance both the quality and the quantity.

TABLE 2. THE PAIRED COMPARISON SCORE OF CRITERIA

	Komitmen	Manajemen	Kerjasama	Hasil Kerja
Komitmen	1	7	6	5
Manajemen	0.143	1	2	3
Kerjasama	0.167	0.500	1	2
Hasil Kerja	0.200	0.333	0.500	1
Jumlah	1.510	8.833	9.500	11

TABLE 3. THE PAIRED COMPARISON SCORE OF SUB-COMMITMENT CRITERIA

	Jujur	Loyal	Tanggung jawab	Disiplin
Jujur	1	6	5	4
Loyal	0.167	1	2	2
Tanggung jawab	0.2	0.5	1	2
Disiplin	0.25	0.5	0.5	1
JUMLAH	1.617	8	8.5	9

TABLE 4. THE PAIRED COMPARISON SCORE OF THE SUB-MANAGEMENT CRITERIA

	kepemimpinan	perencanaan	pengorganisasian	pengarahan
Kepemimpinan	1	2	2	3
Perencanaan	0.5	1	2	2
Pengorganisasian	0.5	0.5	1	2
Pengarahan	0.333	0.5	0.5	1
Jumlah	2.333	4	5.5	8

TABLE 5. THE PAIRED COMPARISON SCORE OF THE SUB-COOPERATION CRITERIA

	Komunikasi	Beradaptasi	Berbagi informasi
Komunikasi	1	5	4
Beradaptasi	0.200	1	2
Berbagi informasi	1.250	0.500	1
Jumlah	1.450	6.500	7

TABLE 6. THE PAIRED COMPARISON SCORE OF THE SUB-PERFORMANCE CRITERIA

	Kualitas	Kuantitas
Kualitas	1	1
Kuantitas	1	1
Jumlah	2	2

TABLE 7. THE PAIRED COMPARISON SCORE OF THE SUB-APPRAISAL CRITERIA

	BS	B	C	K
BS	1	2	5	6
B	0.500	1	3	5
C	0.200	0.333	1	3
K	0.167	0.200	0.333	1
Jumlah	1.867	3.533	9.333	15

TABLE 8. THE GLOBAL PRIORITIES FOR THE COMMITMENT CRITERIA

Peringkat	Komitmen			
	Jujur	Loyal	Tanggung Jawab	Disiplin
BS	0.194	0.056	0.043	0.031
B	0.115	0.033	0.025	0.019
C	0.048	0.014	0.011	0.008
K	0.024	0.007	0.005	0.004

TABLE 9. THE GLOBAL PRIORITIES FOR THE MANAGEMENT CRITERIA

Peringkat	Manajemen			
	Kepemimpinan	Perencanaan	Pengorganisasian	pengarahan
BS	0.037	0.024	0.017	0.011
B	0.022	0.014	0.010	0.006
C	0.009	0.006	0.004	0.003
K	0.005	0.003	0.002	0.001

TABLE 10. THE GLOBAL PRIORITIES FOR THE COOPERATION CRITERIA

Peringkat	Kerjasama		
	Komunikasi	Beradaptasi	Berbagi Informasi
BS	0.039	0.011	0.008
B	0.023	0.007	0.004
C	0.010	0.003	0.002
K	0.005	0.001	0.001

TABLE 11. THE GLOBAL PRIORITIES FOR THE PERFORMANCE CRITERIA

Peringkat	Hasil Kerja	
	Kualitas	Kuantitas
BS	0.020	0.020
B	0.012	0.012
C	0.005	0.005
K	0.002	0.002

D. The input score for the 20 employees

The number of Employees which are processed in the performance appraisal using AHP method are 20 employees. The obtained scores of each employee can be shown in Table 12.

TABLE 12. THE SCORES OF 20 EMPLOYEES

No	Nama	Hasil kerja				Komitmen				Manajemen				Kerjasama		
		Kualitas	Kuantitas	Jujur	Loyal	Tanggung jawab	Disiplin	Kepemimpinan	Perencanaan	Pengorganisasian	Pengarahan	Komunikasi	Beradaptasi	Berbagi informasi		
1	Lilik traktor	BS	B	BS	B	B	C	B	B	C	C	BS	B	B		
2	Lungga Setiawan	BS	BS	B	B	C	B	B	BS	C	B	BS	B	BS		
3	Edah Yuliah	BS	BS	K	C	BS	BS	BS	C	K	K	C	BS	B		
4	Munandar	BS	BS	B	B	C	B	B	C	B	B	C	B	C		
5	Karna	BS	B	B	BS	B	C	B	B	C	C	BS	B	B		
6	Purnama	BS	B	B	C	C	B	B	B	C	B	BS	B	B		
7	Martani	BS	BS	BS	B	BS	B	BS	C	B	BS	C	BS	BS		
8	Ali Sukrisa	B	B	BS	B	BS	B	B	C	B	BS	B	B	B		
9	Am Galipano	BS	BS	BS	B	B	BS	C	BS	BS	BS	B	C	C		
10	Ann Setyaningrum	BS	B	BS	B	B	C	B	C	B	B	BS	BS	B		
11	Siti Susanto	BS	B	BS	B	B	B	C	C	B	B	BS	B	B		
12	Masnamah	BS	B	B	B	C	C	B	C	C	B	B	B	BS		
13	Anammarah	BS	B	BS	C	B	C	B	B	C	BS	B	C	C		
14	Jumadi	BS	B	B	B	B	C	C	C	B	B	B	B	C		
15	Hikmah	B	B	B	B	B	BS	C	B	B	C	B	C	B		
16	Nur Syahid	BS	BS	BS	B	C	B	B	BS	BS	C	BS	B	B		
17	Zaidah	B	B	BS	BS	B	B	B	B	C	C	BS	B	C		
18	Latimatul Sumrah	B	BS	B	B	B	B	BS	B	C	B	B	C	C		
19	Tatmadharan	BS	B	B	B	C	C	B	B	C	B	B	B	B		
20	Ida Sari Susanti	BS	B	B	B	C	B	B	C	B	B	BS	B	B		

The scores gained above then will be put into the decision support system performance appraisal. Langgeng Setiawan will perform tests for promotion while his score listed as in Table 12. The score then can be put into the DSS performance appraisal. The process of score input for the commitment criteria, management, communication and the performance is described in Figure 7-10.

FIGURE 7 INPUT SCORE OF EMPLOYEE COMMITMENT CRITERIA

FIGURE 8 INPUT SCORE OF EMPLOYEE MANAGEMENT CRITERIA

FIGURE 9 INPUT SCORE OF EMPLOYEE COLLABORATION CRITERIA

FIGURE 10 INPUT SCORE OF EMPLOYEE PERFORMANCE CRITERIA

As the employee's scores put into the system, soon they will be processed by the DSS Performance Appraisal. The result obtained by the 20 employees can be seen in figure 11.

Data Peserta kenaikan pangkat

Halaman ini akan membantu anda melakukan Pengelolaan Pegawai sebagai pendukung dalam proses Penilaian Kinerja Pegawai.

No.	NIP	Nama Pegawai	Gol.	Penilaian	Nilai Standard	Nilai Peserta	Kelulusan	Aksi
1	978	Ari Cahyono	2B	Sudah Dimilai	0.023186923076923	0.036065949152542	LULUS	View Delete
2	624	Langgeng Setiawan	3D	Sudah Dimilai	0.023186923076923	0.035987976190476	LULUS	View Delete
3	844	Martini	1C	Sudah Dimilai	0.023186923076923	0.033847118644068	LULUS	View Delete
4	223	Nur Syahid	3A	Sudah Dimilai	0.023186923076923	0.031956101694915	LULUS	View Delete
5	18	Zaidah	3A	Sudah Dimilai	0.023186923076923	0.031806101694915	LULUS	View Delete
6	972	Ali Sukron	2B	Sudah Dimilai	0.023186923076923	0.031573728813559	LULUS	View Delete
7	849	Aris Setiawan	2A	Sudah Dimilai	0.023186923076923	0.029913728813559	LULUS	View Delete
8	KTS82	Lilik Wahyudi	2A	Sudah Dimilai	0.023186923076923	0.029684745762712	LULUS	View Delete
9	37	Sri Suyono	2C	Sudah Dimilai	0.023186923076923	0.028854745762712	LULUS	View Delete
10	981	Aminarsih	2B	Sudah Dimilai	0.023186923076923	0.028241355932203	LULUS	View Delete
11	835	Kattah	1D	Sudah Dimilai	0.023186923076923	0.026234915254237	LULUS	View Delete
12	769	Istianatus Sunnah	2C	Sudah Dimilai	0.023186923076923	0.026065084745763	LULUS	View Delete

FIGURE 11. THE RESULTS OF EMPLOYEE VALUE

The data of 20 employees who participated in the promotion test results as in figure 11. These results automatically sort the scores obtained by the employee from the biggest score to the smallest one.

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