

# Employee Performance Assessment using Analytical Network Process and Rating Scale

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## ABSTRACT

Employee performance assessment is an essential aspect of a company. This study aims to assess employee performance based on Analytical Network Process (ANP) and rating scale. ANP was employed to determine the importance of the criteria. Meanwhile, the rating scale was used to analyze the results of the employee performance assessment. The results of the study showed the weights of the criteria. The highest to lowest weights in sequence included the skills to carry out tasks, job performance, ability to cooperate, employment relationship, and personality. Based on the assessment of fifty-three employees of HRD and Corporate Secretary and General Counsel Department, one employee showed outstanding performance, four employees exemplified high performance, forty-five employees met the standard performance, and three employees had low performance.



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## 1. Introduction

Employees play an essential role in the success and competitiveness of a company [1]. In an organization, each employee has different areas of expertise and skills [2]. Performance assessment is a process needed to organize human resources. It also has an impact on the development of the organization [3]. The key to the success of the organization is influenced by employee performance [4]. Although the organization is highly dependent on technology, employees remain an essential factor for their success [5]. Performance assessment is imperative to be done in the Human Resource Department (HRD) and the company's management section [6]. Performance assessment is used to measure the company's achievement in completing the specified targets [7]. It is also to measure the efficiency and effectiveness of the employees [8]. Performance assessment provides information to improve the performance of the employees [9]. The assessment results can be used for promotions, salary increments, and rewards and training for the employees [10]. Performance assessment is the responsibility of the manager to evaluate the performance of the employees [11]. The manager's capability to make the appropriate evaluation can support the company to maintain and achieve its vision and mission [12]. Therefore, assessors need high evaluation standards [13] and appropriate methods [14]. Appropriate assessment methods may help the manager provide ratings to their employees [15].



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In general, employees' performance assessment uses an average score. Also, the criteria used do not have any weight. As a result, the most important criteria for evaluating employee performance are usually unknown. Employee performance assessment has to be adjusted to the needs of the company [16]. The appropriate measurement methods are needed so that performance evaluation can be carried out effectively [14]. Several studies on performance assessment have been conducted out in various fields. The popular method used by many researchers is the Analytical Hierarchy Process (AHP) and the Analytic Network Process (ANP). Ilhami and Rimantho [17] proposed the AHP method and rating scale in evaluating employee performance. Arin, et al. [18] made use of the ANP method to assess supplier performance. Sestri [19] employed the AHP method to evaluate lecturer performance. Saefudin et al. [20] also used AHP for the assessment of employee performance assessment. Subiyanto et al. [21] developed an intelligence technique for soybean assessment. Campeol et al. [22] used AHP to assess infrastructure.

According to the previous studies, one of the popular methods used to assess performance is Analytical Network Process (ANP). However, little attention is paid to the problem of employee performance assessment. This study aims to assess employee performance using the ANP method and rating scale. ANP has many advantages. ANP can be employed to determine the weight of the criteria and sub-criteria in performance assessment [23]. ANP can explain the interrelationship between criteria and sub-criteria [24]. Therefore, the selection of decisions can be made appropriately and objectively [25]. Besides, ANP uses pairwise comparison [26] so that the comparison can be made reasonably. In this study, ANP is used to determine the weight of the criteria and sub-criteria.

Furthermore, the weight of criteria is used to assess the employee performance using the rating scale. This study provides essential insights in evaluating employee performance using the ANP method and rating scale. The organization of this paper includes the introduction in section 1, determination of criteria and sub-criteria, proposed method (ANP and rating scale), and data collection in section 2. Section 3 describes the results of the criteria and sub-criteria weight and employee performance assessment. Finally, the last part of this paper presents the conclusion and suggestions for further research.

## 2. Methods

This section presents the criteria and sub-criteria, proposed methods (integration of ANP and rating scale), and data collection procedures to evaluate employee performance. These three subsections are explained as follows.

### 2.1 Criteria and sub-criteria

We used five criteria and fifteen sub-criteria to assess employee performance. Details of the criteria and sub-criteria can be seen in Table 1. The criteria for evaluating the employee performance used included job performance (JP) [17], skills to carry out tasks (SCT) [27], ability to cooperate (AC) [17], personality (P) [27], and employment relationship (ER) [27]. These criteria are based on a review of previous research studies.

### 2.2 Proposed Methods

This study proposed the integration of ANP and rating scale to evaluate employee performance. In this study, ANP was employed to determine the criteria weight and sub-

criteria assessment of employee performance. Furthermore, the results of the criteria weight were used to assess employee performance using the rating scale. The framework of the proposed ANP integration method and rating scale is presented in Fig. 1. We identified the criteria and sub-criteria in assessing the employee performance shown in the previous sub-chapter. The network (interdependence) model of the employee performance assessment can be seen in Fig. 2. This study employed the ANP method proposed by Saaty [30]. The ANP measurement scale used a scale of 1 to 9. The scale is described as follows; 1 shows equal importance, 3 shows moderate importance, 5 shows essential importance, 7 shows high importance, and 9 shows extreme importance.

Table 1. Criteria and sub-criteria of job performance in PT X

No	Criteria	Sub criteria
1.	Job performance (JP) [19]	Ability to complete tasks (JP1) [27]
		Accepting responsibility (JP2) [17]
		Task completion speed (JP3) [27]
2.	Skills to carry out tasks (SCT) [27]	Creativity (SCT1) [28]
		Initiative (SCT2) [28]
		Ability to coordinate different types of work (quantity) (SCT3) [29]
3.	Ability to cooperate (AC) [17]	Good team management (AC1) [17]
		Maintaining a good relationship with the team (AC2) [17]
4.	Personality (P) [27]	Honesty (P1) [29]
		Spirit of work (P2) [27]
		Discipline (P3) [17]
		Attendance (P4) [19]
5.	Employment relationship (ER) [27]	Attitude toward superiors (ER1) [27]
		Attitude toward colleagues (ER2) [27]
		Attitude toward subordinates (ER3) [27]

The stage of weighting the criteria and sub-criteria was carried out using Super decision software. Each employee was rated on the rating scale for each criterion that used the rating scale 1-5. This scale is described in Table 2. Furthermore, the results of the rating scale and weighting on ANP were used to assess employee performance. The final score of the employee performance assessment was done by multiplying the criteria weight, subcritical weight, and rating scale score. This study proposed five categories of employee performance, as shown in Table 3 [31].

Table 2. Scale of employee performance assessment

Assessment scale	Explanation
1	Unsatisfactory Performance
2	Improvement Desired
3	Meets Expectation
4	Exceeds Expectation
5	Outstanding Performance

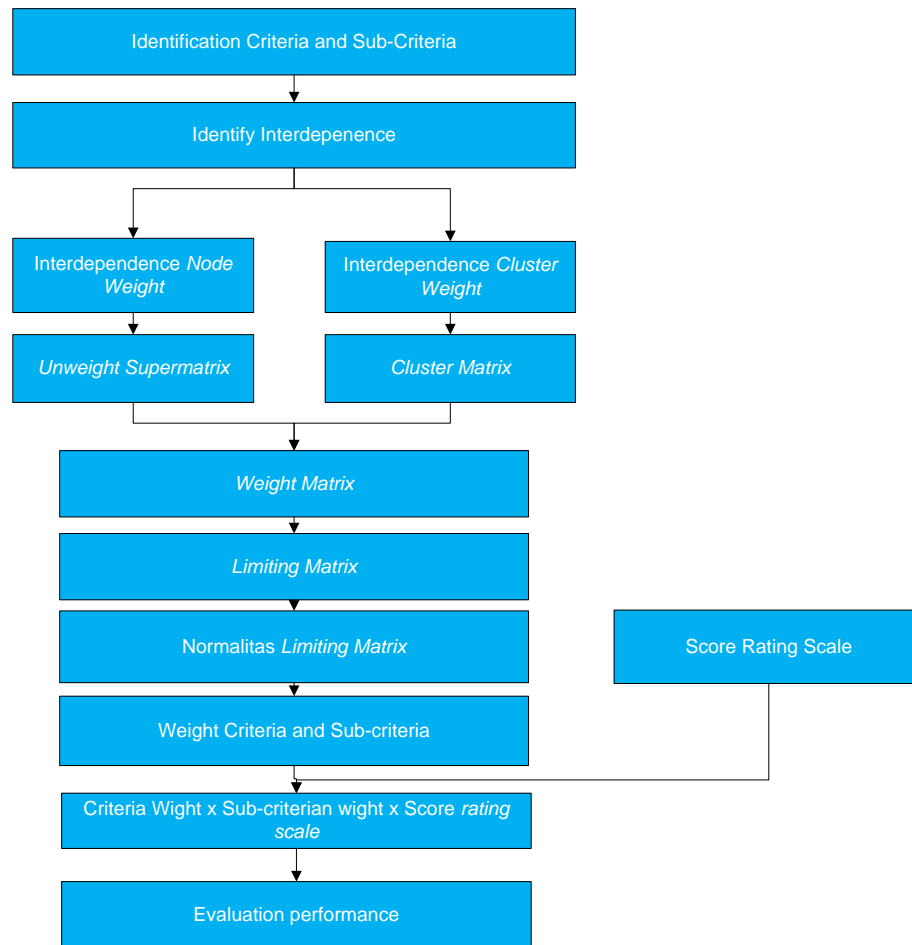


Fig. 1. The framework of employee performance with ANP and rating scale

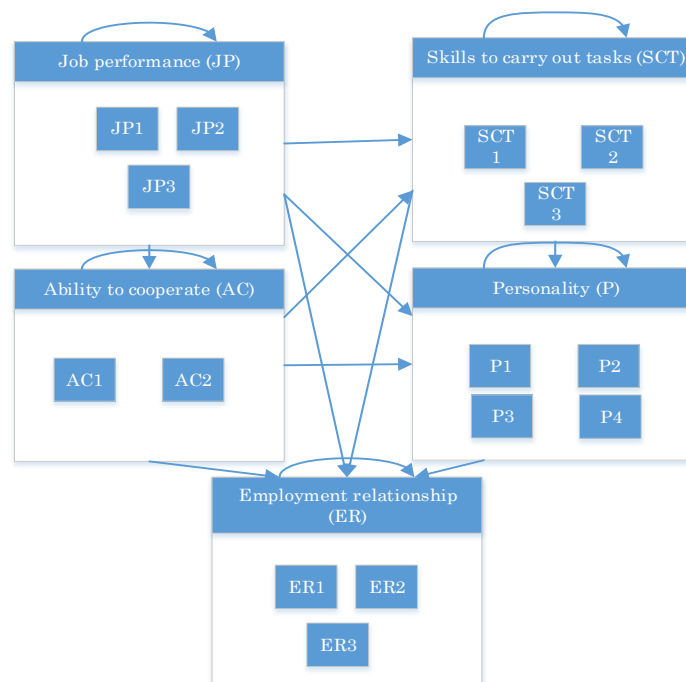


Fig. 2. Model of the network (interdependence) of employee performance assessment

Table 3. Category of employee performance assessment

No	Value Scale	Category	Value Interval
1.	A	Outstanding performance	4.20<n<5.00
2.	B	Exceed expectation	3.40<n<4.20
3.	C	Meets expectation	2.60<n<3.40
4.	D	Improvement desired	1.80<n<2.60
5.	E	Unsatisfactory performance	1<n<1.80

### 2.3 Data Collection

This study was carried out in palm oil, rubber, tea, and coffee companies in Indonesia. The data collection process was done by filling out the questionnaire by respondents. Two surveys were used for weighting the criteria, sub-criteria, and rating scale assessment. The respondent of this study was one head of the Human Resources Department (HRD) and one head of the employee sub-department. The respondents surveyed the criteria weight. Respondents also had a Focus Group Discussion (FGD) to determine the importance of both criteria and sub-criteria.

Furthermore, the head of the HRD and the head of the employee sub-department assessed eleven employees in the HRD. Respondents assessed eleven employees in the HRD and forty-two employees of the Corporate Secretary and General Counsel Department. The employee performance was assessed in one year (2018).

## 3. Results and Discussion

### 3.1 Criteria weight with Analytical Network Process (ANP)

The weight of the criteria and sub-criteria using the ANP method can be seen in Table 4. The results indicate that there was a link among several criteria. The sub-criteria of accepting responsibility affected the ability to complete tasks. Furthermore, the ability to complete tasks affected the ability to coordinate different types of work.

The skills to carry out tasks ranked the first of the five criteria. It yielded a weight of 0.372. The highest sub-criterion weight value in the criteria of skills to carry out tasks was initiative (SCT2). The lowest sub-criterion value in this criterion was creativity (SCT2). These results contradicted the study conducted by Lakoy [32]. However, creativity is still needed to improve employee performance [32]. Job performance criteria weighted 0.359. This criterion was considered necessary for the respondents after the skills to carry out tasks. The highest weight of this sub-criterion was accepting responsibility (JP2). The lowest weight was the ability to complete tasks (JP3). However, this criterion is also deemed necessary as it can determine the level of employee contribution.

The ability to work together was ranked number three of all criteria. The weight of this criterion was 0.131. The highest sub-criterion weight in this criterion was good team management (AC1). This result is by Samsuni [33]. Employees who can work synergistically can accelerate the achievement of the organization. Good teamwork is effective in getting the job done quickly [34]. The employment relationship was ranked the fourth of all criteria with a weight value of 0.105. Attitude toward subordinates had the highest weight. Meanwhile, attitude toward superiors was considered not very important, although it could not be ignored entirely. This result is by Ali, et al [35]. A positive atmosphere in the work environment is essential for improving employee performance [35]. A positive atmosphere in the work environment is vital for improving performance [35]. Personality was ranked the last of all criteria with a weight value of 0.033. Discipline was the highest sub-criteria. Meanwhile, honesty had the lowest weight. Discipline is one

of the factors that can affect the achievement of company goals. Furthermore, honesty is considered as an attitude that must be possessed by all employees [36].

Table 4. Hasil Bobot Kriteria dan sub kriteria Kinerja Karyawan

No	Criteria	Weight	Sub Criteria	Weight
1.	Job performance (JP)	0.359	Ability to complete tasks (JP1)	0.083
			Accepting responsibility (JP2)	0.146
			Task completion speed (JP3)	0.130
2.	Skills to carry out tasks (SCT)	0.372	Creativity (SCT1)	0.099
			Initiative (SCT2)	0.145
			Ability to coordinate different types of work (quantity) (SCT3)	0.128
3.	Ability to cooperate (AC)	0.131	Good team management (AC1)	0.076
			Maintaining a good relationship with the team (AC2)	0.055
4.	Personality (P)	0.033	Honesty (P1)	0.006
			Spirit of work (P2)	0.009
			Discipline (P3)	0.011
			Attendance (P4)	0.007
5.	Employment relationship (ER)	0.105	Attitude toward superiors (ER1)	0.022
			Attitude toward colleagues (ER2)	0.034
			Attitude toward subordinates (ER3)	0.049

### 3.2 Employee Performance Assessment

The result of the employee performance assessment of HRD can be seen in [Table 5](#). Meanwhile, the result of the employee performance assessment of the Corporate Secretary and General Counsel Department can be seen in [Table 6](#). Based on [Table 5](#), only one employee showed exceptional performance; four other employees exemplified high performance. Six employees performed according to the standards. No employee exemplified poor performance. One factor that can affect employee performance is age. At the age of more than forty years old, work productivity begins to decrease by up to 60%-80% as compared to the productive age [37].

Based on the result shown in [Table 6](#), there were thirty-nine employees whose performance met the standards. Meanwhile, three other employees showed low performance. Work experience of fewer than two years has a significant influence on employee performance. This result is in line with [Taurisa and Ratnawati \[38\]](#). Employees with longer tenure tend to have better job mastery [38]. Therefore, it will improve employee performance. Based on the study results, the ANP method and rating scale are



effective and relatively easy to use in assessing employee performance. Besides, the employee performance assessment with this method is proven to be more comprehensive.

Table 5. Employee Performance Assessment of HRD Employees

Ranking	ID. Name	Grade	Category	Ranking	ID. Name	Grade	Category
1	ST	4.29	Outstanding performance	7	IK	3.20	Meets expectation
2	NR	3.62	Exceed expectation	8	SD	3.17	Meets expectation
3	EE	3.57	Exceed expectation	9	WS	2.86	Meets expectation
4	SA	3.56	Exceed expectation	10	AM	2.83	Meets expectation
5	SU	3.52	Exceed expectation	11	FH	2.83	Meets expectation
6	IF	3.26	Meets expectation				

Table 6. Employee Performance Assessment of the Secretary Corporate and General Counsel Department

Ranking	ID. Name	Grade	Category	Ranking	ID. Name	Grade	Category
1	FZ	3.12	Meets expectation	22	MI	2.88	Meets expectation
2	MB	3.09	Meets expectation	23	AO	2.87	Meets expectation
3	BY	3.07	Meets expectation	24	SN	2.87	Meets expectation
4	JR	3.04	Meets expectation	25	AF	2.87	Meets expectation
5	JO	3.03	Meets expectation	26	MT	2.86	Meets expectation
6	AK	3.01	Meets expectation	27	SY	2.85	Meets expectation
7	GP	3.01	Meets expectation	28	EW	2.85	Meets expectation
8	MJ	3.00	Meets expectation	29	HW	2.80	Meets expectation
9	MD	3.00	Meets expectation	30	EV	2.80	Meets expectation
10	SR	2.99	Meets expectation	31	DM	2.78	Meets expectation
11	SE	2.99	Meets expectation	32	SI	2.78	Meets expectation
12	DN	2.99	Meets expectation	33	MH	2.74	Meets expectation
13	MU	2.97	Meets expectation	34	MM	2.72	Meets expectation
14	SO	2.96	Meets expectation	35	HL	2.68	Meets expectation
15	HE	2.94	Meets expectation	36	LM	2.68	Meets expectation
16	ZA	2.93	Meets expectation	37	HS	2.67	Meets expectation
17	AA	2.92	Meets expectation	38	HK	2.62	Meets expectation
18	KA	2.91	Meets expectation	39	SL	2.61	Meets expectation
19	RL	2.90	Meets expectation	40	AS	2.59	Improvement desired
20	IA	2.89	Meets expectation	41	NG	2.59	Improvement desired
21	WM	2.88	Meets expectation	42	NR	2.53	Improvement desired

#### 4. Conclusion

The purpose of this study is to assess employee performance using the ANP method and rating scale. ANP was used to determine the weight of the criteria and sub-criteria. Then, the results of the criteria weight were used to assess employee performance with the assistance of the rating scale. This case study assessed fifty-three employees of the HRD and Corporate Secretary and General Counsel Department. The result from HRD indicated that one employee showed outstanding performance, four employees had high performance, and six others performed according to the standard. Meanwhile, the result

from the Corporate Secretary and General Counsel department showed that thirty-nine employees met the standard of performance, and three employees showed poor performance. In general, the ANP method and rating scale are effective. Besides, it is relatively easy to use in assessing employee performance. For further research, more criteria and sub-criteria can be added, and more expert respondents can improve the comprehensiveness of the study.

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