

# Model Performance Assessment Research Development Based on Competence using Rating Scales Method, 360 Degree and Algorithm Analytical Network Process at Telimek Lipi

**R Fauzan**

Department of Information System, Computer Indonesia University

rauffauzan@email.unikom.ac.id

**Abstract.** The purpose of this research is to know the indicator, the weight and the method to be used in the assessment of the competence of the researcher, determining the standardization of the person acting as a single appraiser (Assessor) and Generating the design of performance appraisal system. The research method that used in this research is analysis descriptive method While the tool in data processing using ANP Algorithm (Analytical Network Process) and for the assessment process using the method of 360 Degree and Rating Scales The result of the research shows that in general the criteria that must be owned by a researcher is the work attitude (68%) further knowledge (21%) and skill (11%) The results of the assessments that refer to the weight of each of these criteria will be compared with the Employee Performance Target (SKP) score. Where the correlation with the assessment of SKP is the result of the work is the effect of competence. So if the results suitable or not, will be an input for Top Management in recommending a researcher.

## 1. Introduction

TELIMEK (Power and Mechatronics) - LIPI (Indonesian Institute of Sciences) is one of the research institutions under the auspices of LIPI engaged in electricity and Mechatronics research. Human Resources at Telimek is largely a researcher. Researchers are required to have a good competence. Because in the breakdown of telimek lipi's vision and mission itself, researchers are the most important asset and become the brand of lipi itself.

To measure employee performance, currently Telimek LIPI employee division using a scoring system based on job desk of each employee, namely SKP (Employee Work Objectives). Where performance appraisal is determined in Job Description based on Goal & Objectives which refers to the government employees appraisal and has been established by the government.

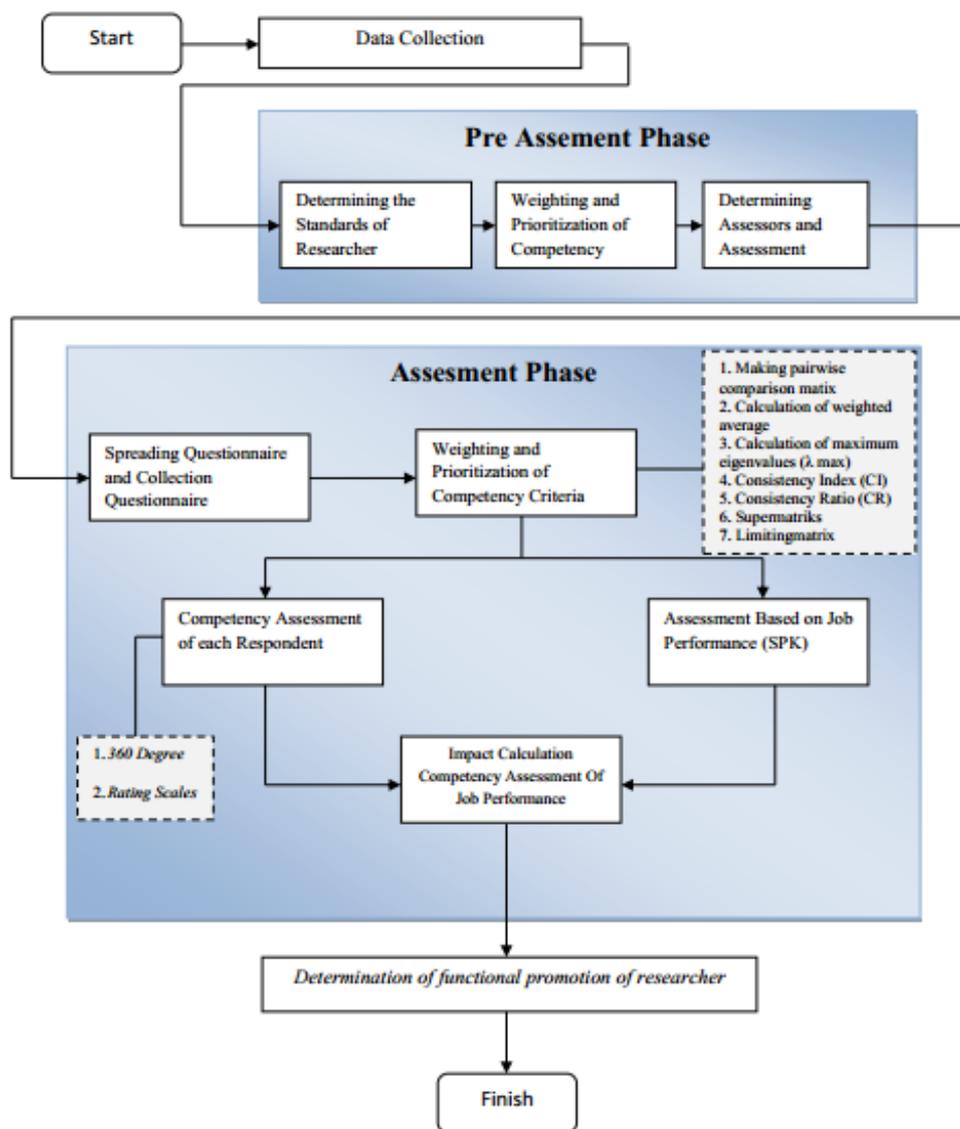
However, in its application, SKP often becomes a problem of the leader during the monitoring and evaluation of employees. Because this system only assesses performance based on the achievement of work alone, without any feedback from the system more precision, especially in view of other employee's ability. Therefore, it needs a system that is able to see in detail the ability of each employee, so that the leader can easily see the competence of the employee. Competence refers to behavioral characteristics that describe the motives, personal characteristics, self-concept, values, knowledge or skills of a person who perform excellently in the workplace. Competence can be defined as the basic characteristics of a person who has a causal relationship with the criteria of effectiveness and / or excellence in a particular job or situation [1-7].



This study aims to determine the indicators, weightings and methods that will be used in the assessment of the performance of researchers competence, Determine the standardization of people who act as a single rater (Assessor) and Produce the design of the assessment system performance of competent researchers at the Research Center Lipi Telimek A competency-based performance appraisal system is expected to provide more detailed and quantitative measurement results with increased objectivity. This will assist in measuring the comparison of results between SKP and the competency of the researcher and recommendation of promotion or other development.

**2. Methodology**

The research method used in this research is descriptive method of analysis. While the tool in data processing using ANP Algorithm (Analytical Network Process) and for the assessment process using 360 Degree and Rating Scales. Here's a picture of the research that I use as a reference in doing this (Figure 1) research:



**Figure 1.** Research stages.

### 2.1. Data collection phase

Data collection was obtained from the questionnaire of each researcher. The questionnaire is a comparison between each competency.

### 2.2. Pre-assessment phase

This stage is the preparation stage, where there are several designs to collect and process data.

**2.2.1. Competency setting.** Since 2009, Lipi has issued a regulation of standardization of competence that must be owned by researchers. The regulation was written in letter no 04 / E / 2009 on the standard of functional competence [8].

- Knowledge  
(P1) Mastering literature search techniques; (P2) Mastering data collection techniques; (P3) Mastering data processing techniques; (P4) Mastering scientific writing techniques; (P5) Mastering presentation techniques; (P6) Mastering group lead techniques; (P7) Mastering Research planning techniques; (P8) Following teaching and mentoring techniques; (P9) Mastering the technique of writing a book
- Skills  
(K1) Able to communicate well; (K2) Able to operate supporting research equipment; (K3) Able to process and analyze data; (K4) Able to write in good and correct Indonesian; (K5) Ability to write abstract in English well and correctly; (K6) Ability to operate presentation and visual aids; (K7) Able to motivate both yourself and others; (K8) Able to write in English well and correctly
- Attitude  
(SK1) Honest; (SK2) Responsible; (SK3) Discipline; (SK4) Can work together; (SK5) Critical; (SK6) Creative; (SK7) Motivate; (SK8) Innovative; (SK9) Self-control; (SK10) Adaptive. [8] (Table 1).

**Table 1.** Competency standard.

Functional	P	K	SK
Pen. Pertama	P1-P4	K1-K4	SK1-SK4
Pen. Muda	P1-P6	K1-K6	SK1-SK6
Pen. Madya	P1-P8	K1-K7	SK1-SK8
Pen. Utama	ALL	ALL	ALL

The table above explains that, for example; for the first researcher the knowledge competence that must be possessed is P1 to P4 so also so on.

### 2.3. Assessment phase

This stage is done after the authors determine several methods that will be used in determining the criteria of competence to be measured, the determination of competency priorities and the determination of appraisers and concepts of assessment. Stages:

- Distribution of Questionnaire and Questionnaire Collection
- Priority Weighting and Priority Criteria Competence
- Competency Assessment of each Respondent
- Job Based Performance Rating (SPK)
- Computation Assessment Impact Assessment of Job Performance

### 2.4. Results comparison of SKP and competency assessment

This stage is a comparison between the assessment of SKP and competency assessment. (Table 2)

**Table 2.** SKP assessment of competency and SKP.

Competency Assessment	Assessment of SKP
Competency Assessment is still subjective, but to reduce the value of subjectivity, competency assessment is done by several assessors.	Assessment is done by 1 person appraiser, that is direct supervisor.
The criteria assessed are Knowledge and its 9 sub-criteria, Skills and its 8 sub-criteria and work attitude along with its 10 sub-criteria.	The criteria assessed is the achievement of work compared to the target work.

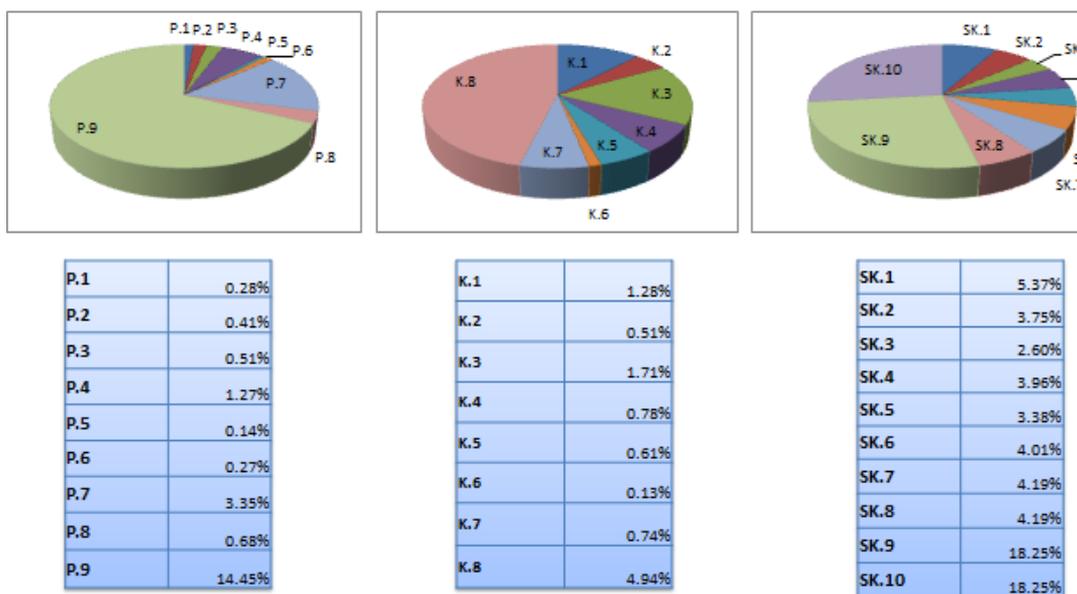
Thus, the output resulting from the assessment of competence is a reference, in which the correlation with the SKP assessment is the result of the resulting work is the effect of the competence. So if the results are appropriate / not, will be an input for Top Management in recommending a researcher.

**3. Result and discussion**

The method that will be used by the writer in doing data processing is ANP (Analytical Network Process) method where the steps to be done include making matrix pairwise comparison, weighted average calculation, calculation of maximum Eigen value ( $\lambda$  max), calculation of Consistency Index (CI) and Consistency Ratio (CR) and the last making Supermatriks and Limiting matrix to determine the priority of competency criteria that will be used as an assessment indicator.

*3.1. Assessment of matched comparison matrices competency criteria*

Processing the results of the competency criteria assessment questionnaire were calculated using ANP with the stages as described. Then the results obtained, for each criterion and sub criteria of competence. Here are the statistics (Figure 2):



**Figure 2.** The weight of each competency.

It can be seen that the work attitude criterion element (68%) appears to be more important than the other criteria.

### 3.2. Assessment of pairwise comparison matrices of assessment weights

With the same method as calculating the priority of competency criterion, it is also calculated for each weight of the appraiser. Here are the results (Table 3):

**Table 3.** Assessor scoring.

Assessor	Weight
1. Direct Supervisor	0.665
2. Tops from different work units	0.051
3. Peer associates of the unit work the same	0.189
4. Peer associates of the unit different work	0.035
5. Direct subordinate	0.068
TOTAL	1.000

After obtaining the weight of the competency priority and the weight of the appraiser, a direct assessment of each researcher by the five assessors is done. With Format as follows (Table 4):

**Table 4.** Assessment format.

Assessment Factors	Criteria x Local x Value	Score
Competence Criteria:		
P.1	0.0247 x 0.0028 x 4	0.0003

From the format each evaluator (*penilai*) will be calculated the weight of the assessment and will be calculated on average in whole so as to produce valid assessment results.

### 3.3. Result

Here is an example of a scoring result for a researcher;

(Direct supervisor):  $70 \times 0.656 = 45,88$  - (another boss):  $80 \times 0.051 = 4,08$  - (1st fellow):  $76 \times 0.189 = 14.39$  - (Other field associates):  $64 \times 0.037 = 2.34$  - TOTAL =  $66.70 / 0.933 = 71, 50$

So the competence value of Researcher x is 71, 50. (Figure 3).

From the value of the writer will try to compare with the results SKP assessment of researchers. Here's his assessment:

**Capaian Sasaran Kerja PNS**

SKP untuk bulan Februari tahun 2013

I. Pejabat Penilai		II. Pegawai yang Dinilai	
No		No	
1	Nama	1	Nama
2	NIP	2	NIP
3	Pangkat/Gol	3	Pangkat/Gol
4	Jabatan	4	Jabatan
5	Unit Kerja	5	Unit Kerja

No	III. Kegiatan Tugas Pokok Jabatan	AK	TARGET				PENCAPAIAN				
			Kuantitas	Kualitas	Waktu	Biaya	Kuantitas	Kualitas	Waktu	Biaya	
1	Membuat karya tulis ilmiah terbit dalam jurnal ilmiah nasional (3 Penulis, sebagai penulis pertama 50%) Rincian Tugas : Membuat KTI tentang lengan tembak -Menyempurnakan pendahuluan -mulai membuat dasar teori -studi literatur tambahan	12.5	1 dokumen	15 %	10 hari	0	1 dokumen	15 %	5 hari	0	100
2	Membuat karya tulis ilmiah terbit dalam proceeding pertemuan ilmiah nasional (2 Penulis, sebagai penulis pertama 60%) Rincian Tugas : Membuat KTI tentang respon dinamik -Menyempurnakan pendahuluan -mulai membuat dasar teori -studi literatur tambahan	6	1 dokumen	20 %	10 hari	0	1 dokumen	20 %	10 hari	0	92

Rincian tugas tambahan dan kreativitas:

No	Rincian tugas	Jenis tugas	Kuantitas	Hasil	Kuantitas	Penghitungan
1	Memimpin kelompok peneliti dan terlibat langsung dalam penelitian	Tambahan	1	1	1	1
2	membuat desain review lengan tembak	Tambahan	1	1	1	1
3	membuat validasi DED	Tambahan	1	1	1	1

**NILAI CAPAIAN SKP: 104**  
Predikat: Sangat Baik

**Figure 3.** Assessment of SKP.

These values if converted into index values that exist within the SKP system are:

91 - up: very good

76 - 90: good

61 - 75: enough

51-60: less

50 down: bad

So got the conclusion:

Competency Value: 71, 50 (Simply)

Value from SKP: 104 (Very Good)

There is a gap between the value of competence with the value of SKP is 33. This is due to the assumption that has been described in table 2.2

**4. Conclusion**

The category of a researcher in Telimek Lipi is divided into 4 namely; first Researcher, Young Researcher, Senior Researcher and Principal Researcher. The assessment indicators used in measuring a researcher's competence consist of: Knowledge and its 9 sub-criteria, Skills and its 8 sub-criteria and work attitude and its 10 sub-criteria.

For the method of appraisal, a 360 degree method is used where the competency assessment is performed by; Direct supervisors, boss of different work units, peers, colleagues from different work units and subordinates. And for the rating scale, using Rating Scales i.e.; scale 1 to 5. Where the assessment refers to the formula that is; Weight Criteria x Weight sub-criteria x Scale Rating Scales. The results of the study, resulting in an assessment design. Where first generated the weight of each criteria and sub-criteria that is;

- Pen. Pertama
  - Knowledge (0,0247) : P1(0,0028), P2(0,0041), P3(0,0051), P4(0,0127).
  - Skills (0,0427) : K1(0,0128), K2(0,0051), K3(0,0171), K4(0,0078).
  - Attitude (0,1568) : SK1(0,0537), SK2(0,0375), SK3(0,0260), SK4(0,0396).
- Pen. Muda

- Knowledge (0,0228) : P1(0,0028), P2(0,0041), P3(0,0051), P4(0,0127), P5(0,0014), P6(0,0027).
- Skills (0,0427) : K1(0,0128), K2(0,0051), K3(0,0171), K4(0,0078), K5(0,0061), K6(0,0013).
- Attitude (0,1568) : SK1(0,0537), SK2(0,0375), SK3(0,0260), SK4(0,0396), SK5(0,0338), SK6(0,0401).
- Pen. Madya
  - Knowledge (0,0228) : P1(0,0028), P2(0,0041), P3(0,0051), P4(0,0127), P5(0,0014), P6(0,0027), P7(0,0335), P8(0,0068)
  - Skills (0,0427) : K1(0,0128), K2(0,0051), K3(0,0171), K4(0,0078), K5(0,0061), K6(0,0013), K7(0,0074).
  - Attitude (0,1568) : SK1(0,0537), SK2(0,0375), SK3(0,0260), SK4(0,0396), SK5(0,0338), SK6(0,0401), SK7(0,0419), SK8(0,0419).
- Pen. Utama
  - Knowledge (0,0228) :P1(0,0028),P2(0,0041),P3(0,0051), P4(0,0127),P5(0,0014), P6(0,0027), P7(0,0335), P8(0,0068), P9(0,1445).
  - Skills (0,0427) : K1(0,0128),K2(0,0051), K3(0,0171), K4(0,0078), K5(0,0061), K6(0,0013), K7(0,0074), K8(0,0074).
  - Attitude (0,1568) : SK1(0,0537), SK2(0,0375), SK3(0,0260), SK4(0,0396), SK5(0,0338), SK6(0,0401), SK7(0,0419), SK8(0,0419), SK9(0,1825), SK10(0,1825).

## References

- [1] Antonini D 1996 “Designing an effective 360-degree appraisal feedback process,” *Autumn* **89** 24-38.
- [2] Desseler G 1997 *Manajemen Sumber Daya Manusia Edisi ke-7, Alih Bahasa, jilid 1 & jilid 2* (Prenhallindo, Jakarta).
- [3] Pengukuran Kinerja Dengan Pendekatan Balance Score Card Berbasis Analytic Network Process (Anp) Pada Pt. Muliaoffset Packindo.
- [4] Penilaian Kinerja Karyawan Berdasarkan Kompetensi Spencer Dengan Menggunakan Metode Analytic Network Process (Anp) Studi Kasus Di Bagian Produksi Ud. Mhd Jaya Kec. Ujungpangkah Gresik.
- [5] Rijanto E dkk. 2012 *Analisis Jabatan Pusat Penelitian Tenaga Listrik Dan Mekatronik Lipi* (Bandung).
- [6] Saaty T L 1997 “Fundamentals of the analytic network process,” *In ISAHP 199*, Kobe, Japan.
- [7] Spencer L M and Spencer S M 1933 *Competence at Work: Models for Superior Performance* (New York: John Wiley & Sons, Inc.).
- [8] Standard Kompetensi Seorang Peneliti, Dokumen Peraturan Kepala Lipi Nomor 04/E/2009, LIPI, Bandung.