

BAB IV

HASIL PENELITIAN DAN PEMBAHASAN

4.1. Profil Responden

Dalam penelitian ini penulis menyebarkan 30 kuesioner dimana kuesioner tersebut diisi oleh karyawan khususnya pada bagian produksi. Setiap karyawan mengisi satu kuesioner yang telah dirancang sendiri oleh penulis yang dikembangkan dari kuesioner sebelumnya.

Tabel IV.1.

Profil Responden (Karyawan)

No	Klasifikasi Responden	Jumlah	Total
1	Jenis Kelamin :		
	Laki – Laki	26	30
	Perempuan	4	
2	Umur : 23-28 thn	30	30
3	Bagian : Produksi	30	30

Sumber : Data dari kuisoner yang diolah

Tabel IV.2.

Profil Responden (Supervisor)

No	Kasifikasi Responden	Jumlah	Total
1	Jenis Kelamin :		
	Laki – Laki	1	1
	Perempuan	0	0
2	Umur : 40 thn	1	1
3	Bagian : Produksi	1	1

Sumber : Data dari kuisoner yang diolah

4.2. Analisis dengan Metode *Simple Additive Weighting*

Dalam penentuan karyawan terbaik pada departemen produksi pada PT. Hasura Mitra Gemilang, Pihak perusahaan melakukan pendataan dalam penentuan karyawan terbaik dengan kriteria - kriteria yang telah ditentukan. Salah satu penyelesaian masalah penentuan karyawan terbaik pada departemen produksi di PT. Hasura Mitra Gemilang, maka diperlukan kriteria dan bobot dalam melakukan perhitungannya sehingga memperoleh hasil alternative terbaik dengan metode *Simple Additive Weighting* sebagai berikut :

1. Menentukan masing-masing setiap kriteria.

Tabel IV.3.
Ketentuan Kriteria

Kode	Kriteria
C1	Absensi Kehadiran
C2	Kerjasama
C3	Berprilaku Baik
C4	Disiplin
C5	Inisiatif

Sumber : Data dari kuisoner yang diolah

2. Selanjutnya memberikan nilai bobot untuk masing - masing kriteria

Tabel IV.4.
Penentuan Nilai Bobot Kriteria

Kriteria(Cj)	Range(%)	Bobot(W)
C1	30	0,3
C2	25	0,25
C3	20	0,2
C4	15	0,15
C5	10	0,1

Sumber : Data dari kuisoner yang diolah

Adapun kriteria dan pembobotan yang dilakukan penulis dalam penelitian penentuan karyawan terbaik, yaitu sebagai berikut :

a. Kriteria Absensi Kehadiran

Tabel IV.5.

Kriteria Absensi Kehadiran

Absensi Kehadiran (C1)	Keterangan	Nilai
10% - 20%	Sangat Rendah	1
30% - 40%	Rendah	2
50% - 60%	Sedang	3
70% - 80%	Tinggi	4
90% - 100%	Sangat Tinggi	5

Sumber : Data dari kuisioner yang diolah

b. Kriteria Kerjasama

Tabel IV.6.

Kriteria Kerjasama

Kerjasama	Keterangan	Nilai
1 – 6	Sangat Rendah	1
7 – 12	Rendah	2
13 – 18	Sedang	3
19 – 24	Tinggi	4
25 – 30	Sangat Tinggi	5

Sumber : Data dari kuisioner yang diolah

c. Kriteria Berprilaku Baik

Tabel IV.7.

Kriteria Berprilaku Baik

Berprilaku Baik	Keterangan	Nilai
1 – 2	Sangat Rendah	1
3 – 4	Rendah	2
5 – 6	Sedang	3
7 – 8	Tinggi	4
9 – 10	Sangat Tinggi	5

Sumber : Data dari kuisoner yang diolah

d. Kriteria Disiplin

Tabel IV.8.

Kriteria Disiplin

Disiplin	Keterangan	Nilai
1 – 6	Sangat Rendah	1
7 – 12	Rendah	2
13 – 18	Sedang	3
19 – 24	Tinggi	4
25 – 30	Sangat Tinggi	5

Sumber : Data dari kuisoner yang diolah

e. Kriteria Inisiatif

Tabel IV.9.**Kriteria Inisiatif**

Inisiatif	Keterangan	Nilai
1 – 2	Sangat Rendah	1
3 – 4	Rendah	2
5 – 6	Sedang	3
7 – 8	Tinggi	4
9 – 10	Sangat Tinggi	5

Sumber : Data dari kuisioner yang diolah

3. Menentukan nilai rating kecocokan dari setiap nama karyawan pada setiap kriteria.

Tabel IV.10.**Ranting Kecocokan**

No	Alternatif	Kriteria				
		Absensi Kehadiran	Kerjasama	Berprilaku Baik	Disiplin	Inisiatif
1	A ₁	5	5	4	4	1
2	A ₂	4	4	4	4	1
3	A ₃	4	3	3	3	1
4	A ₄	5	5	5	3	1
5	A ₅	4	4	3	3	1
6	A ₆	4	4	4	4	1

7	A_7	4	4	3	3	1
8	A_8	4	4	4	4	1
9	A_9	4	4	4	3	2
10	A_{10}	5	5	5	5	4
11	A_{11}	4	4	4	3	2
12	A_{12}	4	4	3	3	1
13	A_{13}	4	4	2	2	1
14	A_{14}	5	3	2	5	4
15	A_{15}	3	2	1	4	4
16	A_{16}	5	3	2	1	2
17	A_{17}	4	1	5	2	3
18	A_{18}	3	3	3	2	2
19	A_{19}	4	4	5	2	2
20	A_{20}	5	5	5	2	2
21	A_{21}	4	5	5	3	3
22	A_{22}	3	3	4	4	4
23	A_{23}	4	4	2	1	1
24	A_{24}	4	2	1	5	1
25	A_{25}	5	1	5	5	2
26	A_{26}	4	2	3	3	5
27	A_{27}	5	4	3	2	4
28	A_{28}	4	4	4	5	3
29	A_{29}	5	5	5	1	5
30	A_{30}	4	5	3	2	4

Sumber : Data dari kuisioner yang diolah

4. Langkah selanjutnya membuat matriks keputusan yang dibentuk dari table

Rating Kecocokan sebagai berikut :

$$x = \begin{bmatrix} 5 & 5 & 4 & 4 & 1 \\ 4 & 4 & 4 & 4 & 2 \\ 4 & 3 & 3 & 3 & 1 \\ 5 & 5 & 5 & 3 & 1 \\ 4 & 4 & 3 & 3 & 1 \\ 4 & 4 & 4 & 4 & 1 \\ 4 & 4 & 3 & 3 & 1 \\ 4 & 4 & 4 & 4 & 1 \\ 4 & 4 & 4 & 3 & 2 \\ 5 & 5 & 5 & 5 & 4 \\ 4 & 4 & 4 & 3 & 2 \\ 4 & 4 & 3 & 3 & 1 \\ 4 & 4 & 2 & 2 & 1 \\ 5 & 3 & 2 & 5 & 4 \\ 3 & 2 & 1 & 4 & 4 \\ 5 & 3 & 2 & 1 & 2 \\ 4 & 1 & 5 & 2 & 3 \\ 3 & 3 & 3 & 2 & 2 \\ 4 & 4 & 5 & 3 & 1 \\ 5 & 5 & 5 & 2 & 2 \\ 4 & 5 & 5 & 3 & 3 \\ 3 & 3 & 4 & 4 & 4 \\ 4 & 4 & 2 & 1 & 1 \\ 4 & 2 & 1 & 5 & 1 \\ 5 & 1 & 5 & 5 & 2 \\ 4 & 2 & 3 & 3 & 5 \\ 5 & 4 & 3 & 2 & 4 \\ 4 & 4 & 4 & 5 & 3 \\ 5 & 5 & 5 & 1 & 5 \\ 4 & 5 & 3 & 2 & 4 \end{bmatrix}$$

Tabel 4.11.
Penggolongan Kriteria

Kriteria	Keuntungan (<i>benefit</i>)	Biaya (<i>cost</i>)
Absensi Kehadiran	√	
Kerjasama	√	
Berprilaku Baik		√
Disiplin		√
Inisiatif		√

Sumber : Data dari kuisioner yang diolah

Pertama - tama melakukan normalisasi matriks X :

- a. Untuk kriteria Absensi kehadiran termasuk kedalam atribut keuntungan (*benefit*). Jadi :

$$\begin{aligned}
 R_{11} &= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}} \\
 &= \frac{5}{5} = 1
 \end{aligned}$$

$$R_{21}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{31}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{41}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{51}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{61}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{71}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{81}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{91}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{101}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{111}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{121}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{131}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{141}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{151}$$

$$= \frac{3}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{161}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{171}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{181}$$

$$= \frac{3}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{191}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{201}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{211}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{221}$$

$$= \frac{3}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{231}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{241}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{251}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{261}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{271}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{281}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{291}$$

$$= \frac{5}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{5}{5} = 1$$

$$R_{301}$$

$$= \frac{4}{\text{Max}\{5; 4; 4; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 5; 3; 5; 4; 3; 4; 5; 4; 3; 4; 4; 5; 4; 5; 4; 5; 4\}}$$

$$= \frac{4}{5} = 0,8$$

b. Untuk kriteria nilai kerjasama termasuk kedalam atribut keuntungan (*benefit*). Jadi :

$$R_{12}$$

$$= \frac{5}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{22}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{32}$$

$$= \frac{3}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{42}$$

$$= \frac{5}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{5}{5} = 1$$

$$R_{52}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{62}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{72}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{82}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{92}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{102}$$

$$= \frac{5}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{5}{5} = 1$$

$$R_{111}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{122}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{132}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{142}$$

$$= \frac{3}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{152}$$

$$= \frac{2}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{2}{5} = 0,4$$

$$R_{162}$$

$$= \frac{3}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{172}$$

$$= \frac{1}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{1}{5} = 0,2$$

$$R_{182}$$

$$= \frac{3}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{192}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{202}$$

$$= \frac{5}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{5}{5} = 1$$

$$R_{212}$$

$$= \frac{5}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{5}{5} = 1$$

$$R_{222}$$

$$= \frac{3}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{3}{5} = 0,6$$

$$R_{232}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{242}$$

$$= \frac{2}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{2}{5} = 0,4$$

$$R_{252}$$

$$= \frac{1}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{1}{5} = 0,2$$

$$R_{262}$$

$$= \frac{2}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{2}{5} = 0,4$$

$$R_{272}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{282}$$

$$= \frac{4}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{4}{5} = 0,8$$

$$R_{292}$$

$$= \frac{5}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{5}{5} = 1$$

$$R_{302}$$

$$= \frac{5}{\text{Max}\{5; 4; 3; 5; 4; 4; 4; 4; 4; 5; 4; 4; 4; 3; 2; 3; 1; 3; 4; 5; 5; 3; 4; 2; 1; 2; 4; 4; 5; 5\}}$$

$$= \frac{5}{5} = 1$$

c. Untuk kriteria Berprilaku baik termasuk kedalam atribut biaya (*cost*).

Jadi :

$$R_{13}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{23}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{33}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{43}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{53}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{63}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{73}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{83}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{93}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{103}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{113}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{123}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{133}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{143}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{153}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{1}$$

$$= \frac{2}{1} = 2$$

$$R_{163}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{173}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{183}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 1,5$$

$$R_{193}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{203}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 2,5$$

$$R_{213}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 2,5$$

$$R_{223}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 2$$

$$R_{233}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{243}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{1}$$

$$= \frac{2}{1} = 2$$

$$R_{253}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 2,5$$

$$R_{263}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{273}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{283}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{4}$$

$$= \frac{2}{4} = 2$$

$$R_{293}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{5}$$

$$= \frac{2}{5} = 2,5$$

$$R_{303}$$

$$= \frac{\text{Min}\{4; 4; 3; 5; 3; 4; 3; 4; 4; 5; 4; 3; 2; 2; 1; 2; 5; 3; 5; 5; 5; 4; 2; 1; 5; 3; 3; 4; 5; 3\}}{3}$$

$$= \frac{2}{3} = 0,6$$

d. Untuk kriteria Disiplin termasuk kedalam atribut biaya (*cost*).

Jadi :

$$R_{14}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{24}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{34}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{44}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{54}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{64}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{74}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{84}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{4}$$

$$= \frac{2}{4} = 0,5$$

$$R_{94}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{104}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{114}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{124}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{134}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{144}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{154}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{4}$$

$$= \frac{2}{4} = 1,5$$

$$R_{164}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{1}$$

$$= \frac{2}{1} = 2$$

$$R_{174}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{184}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{194}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{204}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{214}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{224}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{4}$$

$$= \frac{2}{4} = 1,5$$

$$R_{234}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{1}$$

$$= \frac{2}{1} = 2$$

$$R_{244}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{254}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{264}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{3}$$

$$= \frac{2}{3} = 0,6$$

$$R_{274}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{2}$$

$$= \frac{2}{2} = 1$$

$$R_{284}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{5}$$

$$= \frac{2}{5} = 0,4$$

$$R_{294}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{1}$$

$$= \frac{2}{1} = 2$$

$$R_{304}$$

$$= \frac{\text{Min}\{4; 4; 3; 3; 3; 4; 3; 4; 3; 5; 3; 3; 2; 5; 4; 1; 2; 2; 3; 2; 3; 4; 1; 5; 5; 3; 2; 5; 1; 2\}}{2}$$

$$= \frac{2}{2} = 1$$

e. Untuk kriteria Inisiatif termasuk kedalam atribut biaya (*cost*).

Jadi :

$$R_{15}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{25}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{2}$$

$$= \frac{1}{2} = 0,5$$

$$R_{35}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{45}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{55}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{65}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{75}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{85}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{95}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{2}$$

$$= \frac{1}{2} = 0,5$$

$$R_{105}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{4}$$

$$= \frac{1}{4} = 0,25$$

$$R_{115}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{2}$$

$$= \frac{1}{2} = 0,5$$

$$R_{125}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{135}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{145}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{4}$$

$$= \frac{1}{4} = 0,25$$

$$R_{155}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{4}$$

$$= \frac{1}{4} = 0,25$$

$$R_{165}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{2}$$

$$= \frac{1}{2} = 0,5$$

$$R_{175}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{3}$$

$$= \frac{1}{3} = 0,33$$

$$R_{185}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{2}$$

$$= \frac{1}{2} = 0,5$$

$$R_{195}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{205}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{2}$$

$$= \frac{1}{2} = 0,5$$

$$R_{215}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{3}$$

$$= \frac{1}{3} = 0,33$$

$$R_{225}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{4}$$

$$= \frac{1}{4} = 0,25$$

$$R_{235}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{245}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{1}$$

$$= \frac{1}{1} = 1$$

$$R_{255}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{2}$$

$$= \frac{1}{2} = 0,5$$

$$R_{265}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{5}$$

$$= \frac{1}{5} = 0,2$$

$$R_{275}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{4}$$

$$= \frac{1}{4} = 0,25$$

$$R_{285}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{3}$$

$$= \frac{1}{3} = 0,33$$

$$R_{295}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{5}$$

$$= \frac{1}{5} = 0,2$$

$$R_{305}$$

$$= \frac{\text{Min}\{1; 2; 1; 1; 1; 1; 1; 1; 2; 4; 2; 1; 1; 4; 4; 2; 3; 2; 1; 2; 3; 4; 1; 1; 2; 5; 4; 3; 5\}}{4}$$

$$= \frac{1}{4} = 0,25$$

Kemudian dari hasil normalisasi di atas dibuat dalam matriks ternormalisasi

(R) sebagai berikut :

$$x = \begin{bmatrix} 1 & 0,6 & 0,5 & 0,5 & 1 \\ 0,8 & 0,8 & 0,5 & 0,5 & 0,5 \\ 0,8 & 0,6 & 0,6 & 0,6 & 1 \\ 1 & 1 & 0,4 & 0,6 & 1 \\ 0,8 & 0,8 & 0,6 & 0,6 & 1 \\ 0,8 & 0,8 & 0,5 & 0,5 & 1 \\ 0,8 & 0,8 & 0,6 & 0,6 & 1 \\ 0,8 & 0,8 & 0,5 & 0,5 & 1 \\ 0,8 & 0,8 & 0,5 & 0,6 & 0,5 \\ 1 & 1 & 0,4 & 0,4 & 0,25 \\ 0,8 & 0,8 & 0,5 & 0,6 & 0,5 \\ 0,8 & 0,8 & 0,6 & 0,6 & 1 \\ 0,8 & 0,8 & 1 & 1 & 1 \\ 1 & 0,6 & 1 & 2,5 & 0,25 \\ 0,6 & 0,4 & 2 & 1,5 & 0,25 \\ 1 & 0,6 & 1 & 2 & 0,5 \\ 0,8 & 0,2 & 0,4 & 1 & 0,33 \\ 0,6 & 0,6 & 1,5 & 1 & 0,5 \\ 0,8 & 0,8 & 0,4 & 0,6 & 1 \\ 1 & 1 & 2,5 & 1 & 0,5 \\ 0,8 & 1 & 2,5 & 0,6 & 0,33 \\ 0,6 & 0,6 & 2 & 1,5 & 0,25 \\ 0,8 & 0,8 & 1 & 2 & 1 \\ 0,8 & 0,4 & 2 & 0,4 & 1 \\ 1 & 0,2 & 2,5 & 0,4 & 0,5 \\ 0,8 & 0,4 & 0,6 & 0,6 & 0,2 \\ 1 & 0,8 & 0,6 & 1 & 0,25 \\ 0,8 & 0,8 & 2 & 0,4 & 0,33 \\ 1 & 1 & 2,5 & 2 & 0,2 \\ 0,8 & 1 & 0,6 & 1 & 0,25 \end{bmatrix}$$

5. Langkah terakhir adalah proses pencarian perankingan atau nilai terbaik dengan memasukan setiap kriteria dan nilai bobot yang digunakan dalam

perankingan ini yaitu $W = [0,3 \ 0,25 \ 0,2 \ 0,15 \ 0,1]$ maka proses prankingan adalah sebagai berikut:

$$\begin{aligned} V_1 &= (1)(0,3) + (0,6)(0,25) + (0,5)(0,2) + (0,5)(0,15) + (1)(0,1) \\ &= 0,3 + 0,15 + 0,1 + 0,075 + 0,1 \\ &= 0,725 \end{aligned}$$

$$\begin{aligned} V_2 &= (0,8)(0,3) + (0,8)(0,25) + (0,5)(0,2) + (0,5)(0,15) + (0,5)(0,1) \\ &= 0,24 + 0,2 + 0,1 + 0,075 + 0,05 \\ &= 0,665 \end{aligned}$$

$$\begin{aligned} V_3 &= (0,8)(0,3) + (0,6)(0,25) + (0,6)(0,2) + (0,6)(0,15) + (1)(0,1) \\ &= 0,24 + 0,15 + 0,12 + 0,09 + 0,1 \\ &= 0,7 \end{aligned}$$

$$\begin{aligned} V_4 &= (1)(0,3) + (1)(0,25) + (0,4)(0,2) + (0,6)(0,15) + (1)(0,1) \\ &= 0,3 + 0,25 + 0,08 + 0,09 + 0,1 \\ &= 0,82 \end{aligned}$$

$$\begin{aligned} V_5 &= (0,8)(0,3) + (0,8)(0,25) + (0,6)(0,2) + (0,6)(0,15) + (1)(0,1) \\ &= 0,24 + 0,2 + 0,12 + 0,09 + 0,1 \\ &= 0,75 \end{aligned}$$

$$\begin{aligned} V_6 &= (0,8)(0,3) + (0,8)(0,25) + (0,6)(0,2) + (0,6)(0,15) + (1)(0,1) \\ &= 0,24 + 0,2 + 0,12 + 0,09 + 0,1 \end{aligned}$$

$$= 0,75$$

$$V_7 = (0,8)(0,3) + (0,8)(0,25) + (0,5)(0,2) + (0,5)(0,15) + (1)(0,1)$$

$$= 0,24 + 0,2 + 0,1 + 0,075 + 0,1$$

$$= 0,715$$

$$V_8 = (0,8)(0,3) + (0,8)(0,25) + (0,5)(0,2) + (0,5)(0,15) + (1)(0,1)$$

$$= 0,24 + 0,2 + 0,1 + 0,075 + 0,1$$

$$= 0,715$$

$$V_9 = (0,8)(0,3) + (0,8)(0,25) + (0,5)(0,2) + (0,6)(0,15) + (0,5)(0,1)$$

$$= 0,24 + 0,2 + 0,1 + 0,09 + 0,05$$

$$= 0,68$$

$$V_{10} = (1)(0,3) + (1)(0,25) + (0,4)(0,2) + (0,4)(0,15) + (0,25)(0,1)$$

$$= 0,3 + 0,25 + 0,08 + 0,06 + 0,025$$

$$= 0,715$$

$$V_{11} = (0,8)(0,3) + (0,8)(0,25) + (0,5)(0,2) + (0,6)(0,15) + (0,5)(0,1)$$

$$= 0,24 + 0,2 + 0,1 + 0,09 + 0,05$$

$$= 0,68$$

$$V_{12} = (0,8)(0,3) + (0,8)(0,25) + (0,6)(0,2) + (0,6)(0,15) + (1)(0,1)$$

$$= 0,24 + 0,2 + 0,12 + 0,09 + 0,1$$

$$= 0,75$$

$$V_{13} = (0,8)(0,3) + (0,8)(0,25) + (1)(0,2) + (1)(0,15) + (1)(0,1)$$

$$= 0,24 + 0,2 + 0,2 + 0,15 + 0,1$$

$$= 0,89$$

$$V_{14} = (1)(0,3) + (0,6)(0,25) + (1)(0,2) + (2,5)(0,15) + (0,25)(0,1)$$

$$= 0,3 + 0,15 + 0,2 + 0,375 + 0,025$$

$$= 0,85$$

$$V_{15} = (0,6)(0,3) + (0,4)(0,25) + (2)(0,2) + (1,5)(0,15) + (0,25)(0,1)$$

$$= 0,18 + 0,1 + 0,4 + 0,225 + 0,025$$

$$= 0,93$$

$$V_{16} = (1)(0,3) + (0,6)(0,25) + (1)(0,2) + (2)(0,15) + (0,5)(0,1)$$

$$= 0,3 + 0,15 + 0,2 + 0,3 + 0,05$$

$$= 1$$

$$V_{17} = (0,8)(0,3) + (0,2)(0,25) + (0,4)(0,2) + (1)(0,15) + (0,33)(0,1)$$

$$= 0,24 + 0,025 + 0,08 + 0,15 + 0,033$$

$$= 0,528$$

$$V_{18} = (0,6)(0,3) + (0,6)(0,25) + (1,5)(0,2) + (1)(0,15) + (0,5)(0,1)$$

$$= 0,18 + 0,15 + 0,3 + 0,15 + 0,05$$

$$=0,83$$

$$V_{19} = (0,8)(0,3) + (0,8)(0,25) + (0,4)(0,2) + (0,6)(0,15) + (1)(0,1)$$

$$= 0,24 + 0,2 + 0,08 + 0,09 + 0,1$$

$$=0,71$$

$$V_{20} = (1)(0,3) + (1)(0,25) + (2,5)(0,2) + (1)(0,15) + (0,5)(0,1)$$

$$= 0,3 + 0,25 + 0,5 + 0,15 + 0,05$$

$$=1,25$$

$$V_{21} = (0,8)(0,3) + (1)(0,25) + (2,5)(0,2) + (0,6)(0,15) + (0,33)(0,1)$$

$$= 0,24 + 0,25 + 0,5 + 0,09 + 0,033$$

$$=1,113$$

$$V_{22} = (0,6)(0,3) + (0,6)(0,25) + (2)(0,2) + (1,5)(0,15) + (0,25)(0,1)$$

$$= 0,18 + 0,15 + 0,4 + 0,225 + 0,025$$

$$=0,98$$

$$V_{23} = (0,8)(0,3) + (0,8)(0,25) + (1)(0,2) + (2)(0,15) + (1)(0,1)$$

$$= 0,24 + 0,2 + 0,2 + 0,3 + 0,1$$

$$=1,04$$

$$V_{24} = (0,8)(0,3) + (0,4)(0,25) + (2)(0,2) + (0,4)(0,15) + (1)(0,1)$$

$$= 0,24 + 0,1 + 2,2 + 0,06 + 0,1$$

$$=2,7$$

$$V_{25} = (1)(0,3) + (0,2)(0,25) + (2,5)(0,2) + (0,4)(0,15) + (0,5)(0,1)$$

$$= 0,3 + 0,05 + 0,5 + 0,06 + 0,05$$

$$=0,96$$

$$V_{26} = (0,8)(0,3) + (0,4)(0,25) + (0,6)(0,2) + (0,6)(0,15) + (0,2)(0,1)$$

$$= 0,24 + 0,1 + 0,12 + 0,09 + 0,02$$

$$=0,57$$

$$V_{27} = (1)(0,3) + (0,8)(0,25) + (0,6)(0,2) + (1)(0,15) + (0,25)(0,1)$$

$$= 0,3 + 0,2 + 0,12 + 0,15 + 0,025$$

$$=0,795$$

$$V_{28} = (0,8)(0,3) + (0,8)(0,25) + (2)(0,2) + (0,4)(0,15) + (0,33)(0,1)$$

$$= 0,24 + 0,2 + 0,4 + 0,06 + 0,033$$

$$=0,933$$

$$V_{29} = (1)(0,3) + (1)(0,25) + (2,5)(0,2) + (2)(0,15) + (0,2)(0,1)$$

$$= 0,3 + 0,25 + 0,5 + 0,3 + 0,02$$

$$=1,37$$

$$V_{30} = (0,8)(0,3) + (1)(0,25) + (0,6)(0,2) + (1)(0,15) + (0,25)(0,1)$$

$$= 0,24 + 0,25 + 0,12 + 0,15 + 0,025$$

=0,785

Nilai perhitungan perankingan untuk setiap alternative dengan nilai V_i dapat dilihat pada table berikut :

Tabel IV.12.

Hasil Perankingan

No	Alternatif	Kode	Hasil
		Alternatif	Perankingan
1	Adi karyadi	A_1	0,725
2	Toni	A_2	0,665
3	Sarmadi	A_3	0,7
4	Anwar ali	A_4	0,82
5	Endang	A_5	0,75
6	Wati	A_6	0,75
7	Primus besa	A_7	0,715
8	Ahmad sobari	A_8	0,715
9	Sunarmi	A_9	0,68
10	Muhamad ali	A_{10}	0,715

11	Muhamad baeduri	A_{11}	0,68
12	Rubiyah	A_{12}	0,75
13	Indri yani	A_{13}	0,89
14	Hotib hidayat	A_{14}	0,85
15	Ahmad roji	A_{15}	0,93
16	Adam	A_{16}	1
17	Taptayani	A_{17}	0,528
18	Eman	A_{18}	0,83
19	Agus sarif	A_{19}	0,71
20	Obi	A_{20}	1,25
21	Doni	A_{21}	1,113
22	Lutfi	A_{22}	0,98
23	Prans	A_{23}	1,04
24	Nurjen	A_{24}	2,7
25	Hasan	A_{25}	0,96
26	Sanusi	A_{26}	0,57
27	Mulyawan	A_{27}	0,795
28	Yanto	A_{28}	0,933

29	Yahya	A ₂₉	1,37
30	Muhtar lutfi	A ₃₀	0,785

Sumber : Data kuesioner yang diolah

Selanjutnya alternative diurutkan darinilai V terbesar kenilai V terkecil, alternative dengan nilai V terbesar merupakan solusi yang terbaik, sebagai berikut:

Tabel IV.13.

Hasil Pengurutan Alternatif

No	Alternatif	Kode	Hasil
		Alternatif	Perankingan
1	Nurjen	A ₂₄	2,7
2	Yahya	A ₂₉	1,37
3	Obi	A ₂₀	1,25
4	Doni	A ₂₁	1,113
5	Frans	A ₂₃	1,04
6	Adam	A ₁₆	1
7	Lutfi	A ₂₂	0,98
8	Hasan	A ₂₆	0,96
9	Yanto	A ₂₈	0,933

10	Ahmad roji	A_{15}	0,93
11	Indri yani	A_{13}	0,89
12	Hotib hidayat	A_{14}	0,85
13	Eman	A_{18}	0,83
14	Anwar ali	A_4	0,82
15	Mulyawan	A_{27}	0,795
16	Muhtar lutfi	A_{30}	0,785
17	Endang	A_5	0,75
18	Wati	A_6	0,75
19	Rubiyah	A_{12}	0,75
20	Adi karyadi	A_1	0,725
21	Primus besa	A_7	0,715
22	Ahmad sobari	A_8	0,715
23	Muhamad ali	A_{10}	0,715
24	Agus sarif	A_{19}	0,71
25	Sarmadi	A_3	0,7
26	Sunarmi	A_9	0,68
27	Muhamad baeduri	A_{11}	0,68

28	Tony	A_2	0,665
29	Sanusi	A_{26}	0,57
30	Taptayni	A_{17}	0,528

Sumber : Data kuesioner yang diolah

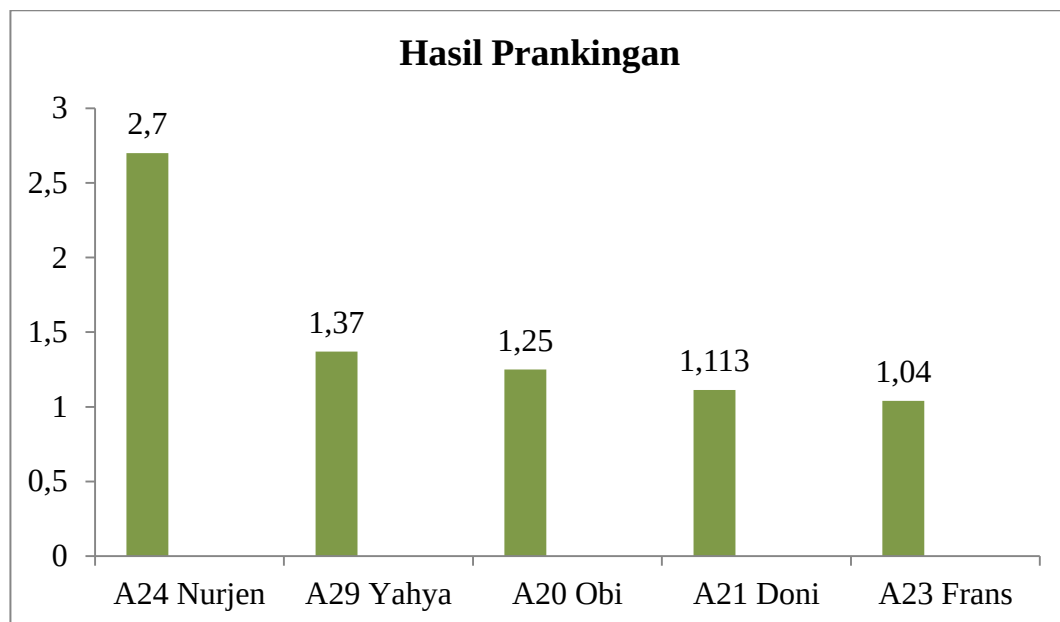
Dari hasil perhitungan diatas dapat ditentukan lima orang karyawan yang berhak mendapatkan predikat karyawan terbaik sesuai hasil dari nilai $V_1 - V_{30}$ dengan nilai terbesar yang pertama adalah Nurjen, Yahya, Obi, Doni dan Frans.

Tabel IV.14.
Data Karyawan Terbaik

Alternatif	Kode Alternatif	Hasil Perangkingan
Nurjen	A_{24}	2,7
Yahya	A_{29}	1,37
Obi	A_{20}	1,25
Doni	A_{21}	1,113
Frans	A_{23}	1,04

Sumber : Data kuisisioner yang diolah

Berdasarkan hasil perhitungan dan hasil pengurutan yang diterima untuk menentukan karyawan terbaik adalah alternatif yang terbaik.



Sumber : Data kuisioner yang diolah

Gambar IV.1 Diagram Batang