

The Employee Promotion Base On Specification Job's Performance Using: MCDM, AHP, And ELECTRE Method

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Abstract: The process of promotion required in every company. To perpetrating the promotion of position in company is required of job assessment objectively so this result will give proving truly. In reality the success of company affected to whom will lead the company because the assessment specifically is giving real evidence concerning been perpetrated. Thus, it required some various assessment criteria for specification working performance which is reflected to well-skillful of each personal to be promoted for position based on the expectation in the future. The assessment of specification job's performance uses ELECTRE Method. It uses seven elected specifications of job's performance that collaborated to Multi-Criteria Decision Making (MCDM) between Analytic Hierarchy Process (AHP) and ELECTRE as preference data of analysis for specification job's performance of promoting position. The result found from the level by using Electre method to promote some position by using the specification of job's performance consecutively: First ranking by the value 9,60 for K5, the Second have 5.97 for K11, the third have 5,92 for K12, the forth have 3,89 for K14, the fifth have 3,83 for K15, the sixth have 3,47 for K15, the seventh have 2,40 for K7, the eighth have 1,12 for K19, the ninth have 0,88 for K6, the tenth have 0,32 for K17, the eleventh have 0,12 for K9, from the twelfth to the twenty-second rank or the last rank are not accepted, because they are negative weight.

Keywords: *promotion, specification job's performance, MCDM, AHP, ELECTRE.*

I. INTRODUCTION

The process of measuring of job's performance in every company is an important thing to be perpetrated because it will give effect significantly towards company live progress.

The selection of job's performance of the employee is objectively making by using multi-criteria that considering to assessment consistently of each employee, the parameters required of assessment preference which is make by used Analytic Hierarchy Process (AHP) method. The form of hierarchy model of each its interest. The most criteria of preference give measurement in deciding who the finest employee to be promoted is.

To determine how of job's performance once can be built by hierarchy of AHP model, and then do analysis of interest can be collaborated with Multi-Criteria Decision Making (MCDM). While the analysis of decision in advance using ELCTRE method for process of elimination.

AHP is a simplicity model of many crucial problem turned to be simple that can be understood in hierarchy format. Many AHP is used to do process of evaluation as a follow: [1]. Selecting, [2], [3], [4], measuring [5], developing whether decision or hierarchy in decision production [6], so there are many interest which is used to accomplish the problems whether qualitative or quantitative [7]. Thus, to accomplish the problem of job's performance selecting, AHP has an important role for being interest [8].

MCDM is one of the model using as a comparison analysis for AHP data [9], with the result that MCDM is an optimal collaboration that is applying in AHP despite of another model estimation such as Electre. As the respond for the comparison MCDM [10] may develop as analysis of comparative characteristic.

ELECTRE is Length of Elimination et Choice Translating reality [11] to decide the multi-attribute decision which related in deciding the rank position. Electre is used and developed to decide that have many conditions [12], contrast to AHP where it can be viewed less flexible if there were many condition been used.

The process of measurement toward the employee job's performance have multi-criteria characteristic which is consist

of seven criterias, whereas each criteria has two exclusive criteria assessment; those have biggest number as the best (High is the best) or those have lowest number as the best (Low is the best). It can be said that it is totally difficult how to measure the employee for job's performance if faced the comparison condition capsize. It must be recognized previously the range of each criteria and determined the maximum number, minimum number of multi-criteria that it is been consideration for the assessment.

II. THEORETICAL REVIEW

Criteria Decision Making (MCDM), and The Process of elimination with ELECTRE Method

2.1. Promotion Position.

According [13] the promotion of position has to do with some assessment criteria's, each criteria can be recognized from some skillful interest. The skillful is a totally of the result which can be responsibility while the performance in job's achievement is the result of the quality and quantity have reached by an employee in implement its jobs based on the regulation gave to him/her. The following criteria's is used to promote an employee consist of seven-criteria's; (1) intelligence, (2) planning, (3) dependability, (4) reaction behavior, (5) failed jobs, (6) quantity of work, (7) knowledge of job. Each criteria, then, has two categories especially, the assessment High is the best (HB) refers to the highest number is the best or Low is the best (LB) refers to lowest number is the best.

The HB categories have planning, quantity of work, and knowledge of job while the LB consist of intelligence, dependability, reaction behavior, and failed jobs. The distributing its assessment is using about the sense that must be understood specifically known as normalization.

$$R_{ij} = \frac{(X_{ij} - X'_{ij})}{(X^*_{ij} - X'_{ij})} \quad (1)$$

R_{ij} : Matrix Normalization,

X_{ij} : The Searching Number,

X^*_{ij} : Biggest Number,

X'_{ij} : Lowest Number,

i : Assessed Employee (K1...K22)

j : Seven Criteria's.

2.2. Analytic Hierarchy Process (AHP)

Specificity of the AHP has the appropriate allocation in comparison to pair all over the line of human activity [14], AHP is able to handle the problems of whether qualitative or quantitative whereas its application with modeling hierarchical decomposed [16] to make easier of the analysis and determine the comparison in each level.

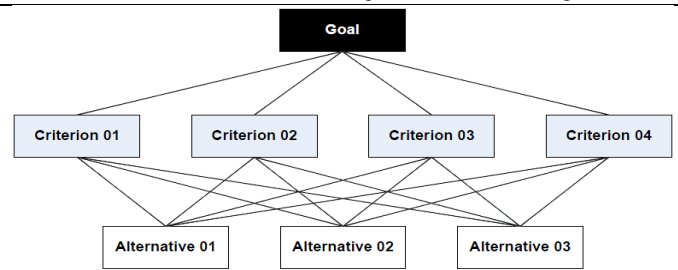


Fig. 1. Hierarchy for all level [14]

In this proses, the AHP has significant role to decide the description of the number of interest of each criteria as preference which is measured based on the number interest in hierarchy model format. Then, it arranged onto pairwise matric format.

2.3. Multi-Criteria Decision Making (MCDM).

MCDM method have been the most used and also have own superiority [15] in deciding of decision that is developed of the AHP [16], MCDM is able to make comparison which is produced of the rank in every level such as criteria or an alternative. In this research the priority number which is produced by MCDM utilized to analyze preference out ranking. It is used ELECTRE method whereas is collaborated method.

TABLE I
CRITERIA PAIRWISE MATRICES [17]

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1n} \\ a_{21} & a_{22} & a_{23} & \cdots & a_{2n} \\ \vdots & & & & \\ a_{n1} & a_{n2} & a_{n3} & \cdots & a_{nn} \end{bmatrix}$$

The role of MCDM is decided of number of each preference which compared to AHP, while the observation data was proceed by collaborated of ELECTRE method. The final result of this criteria found of the instrument been used such as the questionnaire is using MCDM with a number of iteration to get an eigenvalue optimal number, thus this can be standardized of the quality preference of the seven criteria's used in this research.

2.4. ELECTRE.

This means Elimination et Choice Translating Reality [11] ELECTRE is the part of the multi-criteria method such as MCDM, the difference is locate on the condition comparative at ELECTRE which is very strong resulting in the occurrence of difference with AHP [12], moreover ELECTRE is able to use to examine of gen transfer detection [18] so the develop of ELECTRE by the comparative of concordance and discordance were more diverge of the result been got. Even though the effect of MAX and MIN number were able to affect more concerning to decision have produced. In deciding

concordance number between the alternative uses the (second formulation), while discordance uses the (third formulation).

$$C(i, i') = \sum_j w_j, \text{ where } R_{i,j} > R_{i',j} \quad (2)$$

$$D(i, i') = \sum_j w_j, \text{ where } R_{i,j} < R_{i',j} \quad (3)$$

To decide about the simple ranking can be determined with the subtraction of the Concordance and discordance. The following is a step of the research to promote some employee based on job's performance as seen at (Fig. 2).

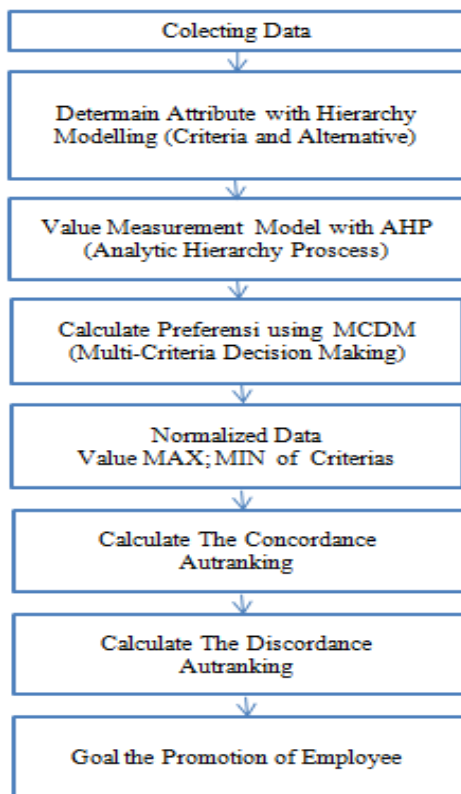


Fig. 2. The Model of the Hierarchy employee promotion based on job's performance.

III. IMPLEMENTATION AND RESULTS

The making of hierarchy is total description of the research which is created the conceptual solution. Hierarchy is a fundamental understanding of the model which consists of three levels: (1) Goal level means to be main target in the selection of the employee job's performance to be promoted in a company; (2) Criteria level, means the barometer for measuring a number of criteria determined by the of number as the preferences of each criteria been used. The preference obtained based on a hierarchical model processed in iterations until there is no difference against the eigenvalue, the value of this eigenvalue is the number obtained in optimum.

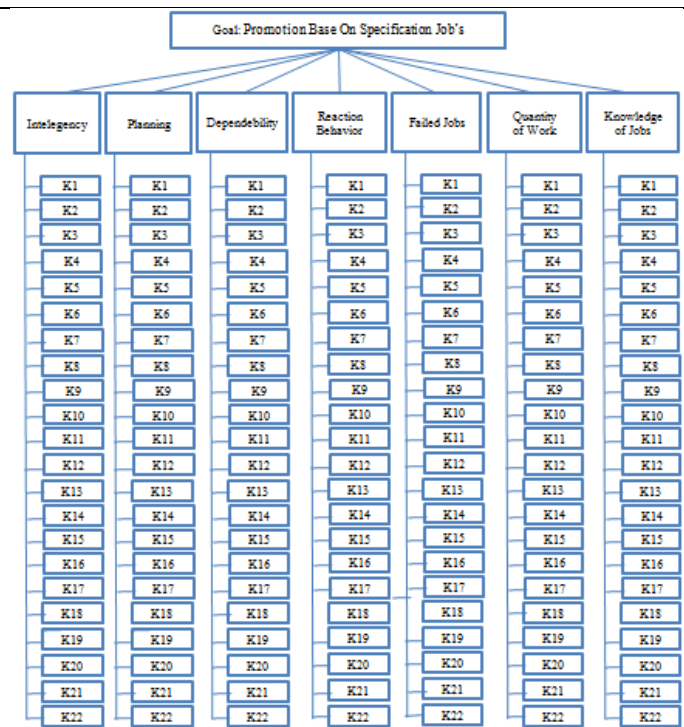


Fig. 3. Hierarchy Modeling Employee Promotions.

The result finding comes from the whole criteria which is perpetrated by MCDM method and it can be seen on (TABLE II).

TABLE II
CRITERIA OF PREFERENCE

Criteria	IG	PL	DP	RB	FJ	QW	KJ
Value	0.23	0.16	0.19	0.15	0.07	0.11	0.09

This table of the seven criteria's shows the result of the number interest. It is found of the observation through AHP method that is about input of the questioner's instrumentation and it aims to process the counting of ELECTRE.

TABLE III
THE TABLE OF OBSERVATION

Employee	IG	PL	DP	RB	FJ	QW	KJ
K1	74.05	64.67	73.94	84.33	14.02	18.59	9.63
K2	86.03	94.23	84.23	73.25	13.45	97.81	15.04
K3	66.73	83.18	94.67	48.85	27.84	30.59	27.66
K4	99.50	60.75	75.22	64.84	15.92	22.43	99.52
K5	43.18	76.35	62.45	56.52	16.58	61.77	45.27
K6	63.22	65.58	63.20	65.34	25.67	22.54	60.33
K7	61.96	67.22	65.34	68.48	15.23	31.67	56.24
K8	64.72	61.85	72.82	67.93	16.34	25.53	50.32
K9	56.73	67.56	68.26	67.33	14.85	30.64	11.85
K10	72.16	74.33	82.88	56.00	13.84	24.63	77.53
K11	67.34	78.76	67.24	65.34	20.22	86.33	86.00
K12	57.82	80.65	68.33	77.32	25.00	76.94	86.34
K13	63.37	75.34	67.57	74.38	24.34	79.72	76.56
K14	66.23	80.64	90.34	52.86	15.63	82.94	54.33
K15	45.43	72.23	82.45	63.88	16.00	83.21	63.87
K16	56.22	63.93	85.92	72.93	24.73	75.38	75.32
K17	57.93	68.58	79.95	83.56	24.63	83.67	67.11
K18	67.41	67.77	75.66	52.23	16.39	23.66	12.76
K19	68.57	82.54	78.46	49.38	17.94	72.45	14.63
K20	82.35	88.46	76.48	48.92	26.22	20.46	27.34
K21	79.65	70.34	66.12	52.54	18.63	19.34	53.81
K22	91.47	79.75	72.16	83.62	19.67	81.34	78.56

The data above shows that table three is about basic data of the research mainly in promoting an employee and it will process by ELECTRE method of twenty-two employees (K1 up to K22) for promotion of the position selection. Those data must be specified first about the quantity maximum and the quantity minimum (see the number in bold). The data can be standardized of the normalization process. The table of the normalization which is concerning based on the formulation 1, of course, by knowing the range of its the value is. Here is the result of the normalization on (TABLE IV).

TABLE IV
NORMALIZATION

Employee	IG	PL	DP	RB	FJ	QW	KJ
K1	0.45	0.12	0.64	0.00	0.96	0.00	0.00
K2	0.24	1.00	0.32	0.31	1.00	1.00	0.06
K3	0.58	0.67	0.00	1.00	0.00	0.15	0.20
K4	0.00	0.00	0.60	0.55	0.83	0.05	1.00
K5	1.00	0.47	1.00	0.78	0.78	0.55	0.40
K6	0.64	0.14	0.98	0.54	0.15	0.05	0.56
K7	0.67	0.19	0.91	0.45	0.88	0.17	0.52
K8	0.62	0.03	0.68	0.46	0.80	0.09	0.45
K9	0.76	0.20	0.82	0.48	0.90	0.15	0.02
K10	0.49	0.20	0.37	0.88	0.97	0.08	0.76
K11	0.57	0.54	0.85	0.54	0.53	0.86	0.85
K12	0.74	0.59	0.82	0.20	0.20	0.74	0.85
K13	0.64	0.44	0.84	0.28	0.24	0.77	0.74
K14	0.59	0.59	0.13	0.89	0.85	0.81	0.50
K15	0.96	0.34	0.38	0.58	0.82	0.82	0.60
K16	0.77	0.09	0.27	0.32	0.22	0.72	0.73
K17	0.74	0.23	0.46	0.02	0.22	0.82	0.64
K18	0.57	0.21	0.59	0.90	0.80	0.06	0.03
K19	0.55	0.65	0.50	0.99	0.69	0.68	0.06
K20	0.30	0.83	0.56	1.00	0.11	0.02	0.20
K21	0.35	0.29	0.89	0.90	0.64	0.01	0.49
K22	0.14	0.57	0.70	0.02	0.57	0.79	0.77

From (TABLE IV), the next step is deciding the number of concordance and discordance. So it has upside meaning of each that will continue to decide about the ranking number can be found by knowing the difference of concordance and discordance.

Each employee (K1 up to K22) if take a look at the result of concordance and discordance, can be determined the level of the employee from the measurement of the specification its performance.

The formulation of number 2 can be used to looking for concordance while the formulation of number three can be used to looking for discordance. The next is arranging into Pairwise Matrix in deciding of each number [C_i] as a total of Concordance and [D_i] as a total of Discordance. Pairwise matrix is collaboration between Concordance and Discordance, can be seen in the (TABLE V).

TABLE V
RESUME OF CONCORDANCE AND DISCORDANCE.

Employee	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13	K14	K15	K16	K17	K18	K19	K20	K21	K22
K1		0.42	0.24	0.63	0.06	0.06	0.06	0.21	0.06	0.18	0.06	0.06	0.06	0.24	0.34	0.29	0.24	0.24	0.24	0.24	0.06	0.06
K2	0.47		0.49	0.55	0.31	0.31	0.31	0.31	0.42	0.31	0.31	0.47	0.47	0.49	0.31	0.49	0.47	0.42	0.42	0.31	0.31	0.71
K3	0.76	0.51		0.65	0.31	0.41	0.31	0.41	0.52	0.82	0.55	0.31	0.31	0.31	0.31	0.31	0.31	0.76	0.66	0.61	0.65	0.55
K4	0.37	0.45	0.35		0.65	0.43	0.27	0.33	0.27	0.29	0.33	0.33	0.33	0.29	0.35	0.51	0.51	0.35	0.35	0.45	0.27	0.33
K5	0.94	0.69	0.63	0.83		0.89	0.83	0.83	0.94	0.67	0.64	0.64	0.79	0.42	0.79	0.79	0.79	0.78	0.59	0.69	0.73	0.64
K6	0.94	0.69	0.59	0.67	0.11		0.45	0.84	0.45	0.42	0.58	0.34	0.58	0.53	0.18	0.49	0.34	0.53	0.53	0.69	0.63	0.58
K7	0.94	0.69	0.69	0.73	0.17	0.55		0.84	0.39	0.52	0.48	0.40	0.64	0.59	0.24	0.55	0.40	0.69	0.59	0.69	0.63	0.64
K8	0.79	0.69	0.59	0.67	0.17	0.16	0.16		0.11	0.52	0.30	0.22	0.22	0.42	0.18	0.40	0.40	0.69	0.59	0.69	0.40	0.46
K9	0.94	0.58	0.58	0.73	0.06	0.55	0.61	0.89		0.22	0.22	0.22	0.35	0.33	0.66	0.33	0.27	0.17	0.27	0.51	0.46	1.00
K10	0.82	0.69	0.61	0.71	0.33	0.58	0.48	0.48	0.48		0.22	0.22	0.33	0.35	0.33	0.66	0.33	0.27	0.17	0.51	0.51	0.46
K11	0.94	0.69	0.45	0.67	0.36	0.58	0.52	0.70	0.70	0.78		0.61	0.76	0.39	0.54	0.76	0.76	0.78	0.63	0.69	0.60	0.79
K12	0.94	0.53	0.69	0.67	0.36	0.66	0.60	0.78	0.54	0.78	0.50		0.50	0.68	0.44	0.54	0.84	0.78	0.63	0.69	0.60	0.84
K13	0.94	0.53	0.69	0.67	0.21	0.66	0.36	0.78	0.54	0.67	0.24	0.50		0.53	0.44	0.60	0.66	0.78	0.63	0.69	0.60	0.58
K14	0.76	0.51	0.51	0.71	0.58	0.47	0.41	0.58	0.52	0.65	0.61	0.47	0.47		2.06	0.47	0.37	0.66	0.51	0.51	0.66	0.71
K15	0.76	0.69	0.69	0.65	0.27	0.82	0.76	0.82	0.76	0.67	0.46	0.56	0.56	0.63		0.89	0.61	0.66	0.51	0.51	0.66	0.56
K16	0.61	0.51	0.69	0.49	0.21	0.45	0.45	0.60	0.45	0.34	0.24	0.46	0.40	0.53	0.11		0.51	0.45	0.45	0.51	0.45	0.40
K17	0.76	0.53	0.69	0.49	0.21	0.66	0.60	0.60	0.36	0.67	0.24	0.40	0.34	0.63	0.39	0.49		0.60	0.45	0.51	0.45	0.71
K18	0.76	0.58	0.24	0.61	0.22	0.47	0.31	0.37	0.42	0.73	0.46	0.22	0.22	0.34	0.34	0.55	0.40		0.48	0.58	0.56	0.46
K19	0.76	0.69	0.34	0.83	0.41	0.47	0.41	0.41	0.52	0.83	0.37	0.37	0.37	0.49	0.49	0.55	0.55	0.52		0.40	0.71	0.61
K20	0.52	0.69	0.66	0.55	0.31	0.31	1.15	0.31	0.42	0.49	0.31	0.31	0.31	0.49	0.49	0.49	0.49	0.42	0.60		0.41	0.55
K21	0.70	0.69	0.35	0.73	0.27	0.37	0.31	0.60	0.60	0.49	0.40	0.40	0.40	0.34	0.34	0.55	0.55	0.44	0.29	0.59		0.64
K22	0.70	0.29	0.45	0.67	0.36	0.42	0.36	0.54	0.36	0.54	0.21	0.16	0.42	0.29	0.44	0.60	0.66	0.54	0.39	0.45	0.36	

So, regarding to (TABLE V), it can be arranged of each column to Concordance and Discordance, whereas at the last can be used to decide of the ranking of each employee in promotion based on specification of job's performance result. See (TABLE VI).

TABLE VI
OUTRANKING ELECTRE RESULT

Employee	Concordance	Discordance	C-D	Ranking
K1	4.05	16.12	-12.07	22
K2	8.66	12.34	-3.68	20
K3	10.34	11.22	-0.88	13
K4	7.81	13.91	-6.10	21
K5	15.54	5.94	9.60	1
K6	11.16	10.28	0.88	9
K7	12.12	9.72	2.40	7
K8	8.83	12.23	-3.40	19
K9	9.95	9.83	0.12	11
K10	9.54	11.59	-2.05	15
K11	13.70	7.73	5.97	2
K12	13.59	7.67	5.92	3
K13	12.30	8.83	3.47	6
K14	13.20	9.31	3.89	4
K15	13.50	9.67	3.83	5
K16	9.31	11.41	-2.10	16
K17	10.78	10.46	0.32	10
K18	9.32	11.53	-2.21	17
K19	11.10	9.98	1.12	8
K20	10.28	11.52	-1.24	14
K21	10.05	10.77	-0.72	12
K22	9.21	12.28	-3.07	18

IV. CONCLUSION

The multi-criteria decision Making is a method that uses the plural which shaped criteria can be combined to AHP method and ELECTRE.

The AHP can be modeled to build a hierarchy that become as description to understand the problem been discussed,

while MCDM is used about to decide the comparison which is used to decide preference multi-criteria as a measurement to decide the level have implemented with Electre Method.

Electre, as a decisive decision of outranking, found decision of concordance and discordance of the ranking decision. The result found from the level by using Electre method to promote some position by using the specification of job's performance consecutively: The First ranking by the value 9,60 for K5, the Second have 5.97 for K11, the third have 5,92 for K12, the forth have 3,89 for K14, the fifth have 3,83 for K15, the sixth have 3,47 for K15, the seventh have 2,40 for K7, the eighth have 1,12 for K19, the ninth have 0,88 for K6, the tenth have 0,32 for K17, the eleventh have 0,12 for K9, the twelfth until the twenty-second or the last ranking was unaccepted, because they have negative value.

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