IJCCS (Indonesian Journal of Computing and Cybernetics Systems)
Vol.13, No.4, October 2019, pp. 333~344
ISSN (print): 1978-1520, ISSN (online): 2460-7258
DOI: https://doi.org/10.22146/ijccs.47219

Group Decision Support System Using The Analytic Network Process and Borda Methods for Selecting Housing Construction Sites

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Abstrak

Banyaknya lahan untuk lokasi pembangunan perumahan saat ini, mengakibatkan developer dalam memilih lokasi pembangunan perumahan tanpa memperhatikan kondisi lahan, infrastruktur, sosial ekonomi dan Tata Ruang Kota. Untuk mengatasi masalah tersebut diperlukan suatu sistem komputer berupa Sistem Pendukung Keputusan Kelompok (GDSS) yang dapat membantu dalam pemilihan Lokasi Pembangunan Perumahan.

Penelitian ini bertujuan untuk meng-implementasikan Sistem Pendukung Keputusan Kelompok dengan metode Analitical Network Process (ANP) dan Borda untuk menentukan pemilihan lokasi pembangunan perumahan yang tepat dan cepat. GDSS diperlukan karena terdapat 3 Decision Maker Individu (pengambil keputusan Individu) yaitu, Decision Maker-1(analis kondisi lahan) menilai berdasar Kondisi Lahan, Decision Maker-2 (analis infrastruktur) menilai berdasar Infrastruktur, Decision Maker-3(analis Sosial ekonomi) menilai berdasar Sosial Ekonomi dan 1 Decision Maker kelompok untuk mengambil keputusan akhir. Metode ANP digunakan untuk pembobotan kriteria dari setiap alternatif Lokasi, hingga perankingan alternatif lokasi pembangunan perumahan untuk masing-masing Decision Maker individu. Metode Borda digunakan untuk menggabungkan hasil perankingan yang dilakukan oleh Decision Maker Kelompok sehingga mendapatkan perankingan akhir sebagai penentu Lokasi Pembangunan Perumahan.

Hasil akhir penilitian ini berupa sistem pendukung keputusan yang memberikan informasi berupa perangkingan, dimana rangking dengan nilai tertinggi yang menjadi prioritas lokasi pembangunan perumahan.

***Kata kunci**— GDSS, Perumahan, ANP, BORDA*

Abstract

The amount of land for the current location of housing development has resulted in developers choosing the location of housing development regardless of the condition of the land, infrastructure, socio-economic. To overcome this problem a computer system is needed in the form of a GDSS that can assist in the selection of Housing Development Locations.

This study aims to implement a GDSS with ANP and Borda methods to determine the selection of the right and fast housing development location. GDSS is needed because there are 3 Individual Decision Makers, DM-1 assessing based on Land Conditions, DM-2 assessing Infrastructure-based, DM-3 assess the Socio-Economic and Decision Maker based groups to make the final decision. The ANP method is used to weight the criteria from each alternative location, to the alternative ranking of housing construction locations for each individual Decision Maker. The Borda method is used to combine the results of ranking carried out by the Group Decision Maker so that it gets the final ranking as a determinant of the Location of Housing Development.

The final result of this research is a decision support system that can help developers to get a priority recommendation according to the needs of the developer.

***Keywords—** GDSS, Housing, ANP, BORDA*

Received July 2nd,2019; Revised July 18th, 2019; Accepted July 29th, 2019

1. INTRODUCTION

The amount of land for the current location of housing development has resulted in developers tending to choose the location of housing development regardless of the condition of the land, infrastructure, socio-economic and urban spatial planning, so that many residential lands have the potential to flood, the water environment is less clean, densely populated, even land expensive but the conditions are not as desired.

Based on these problems, a solution is needed, namely implementing a Decision Support System (SPK) in order to provide priority location information by Developers in the selection of housing development locations. Decision Support System (SPK) is a system that is able to provide problem solving capabilities and communication skills for problems with semi-structured and unstructured conditions. This system is used to help decision making in semi-structured situations and unstructured situations, where no one knows for sure how decisions should be made [1].

Group decision support system (Group Decision Support System) is "a computer-based system that supports a group of people who are joined in a task (or purpose) together that provides an interface that can be shared" [2]. In this study, GDSS is needed because there are 3 Individual Decision Makers namely, Decision Maker-1 (land condition analyst) assessing based on Land Conditions, Decision Maker-2 (infrastructure analyst) assessing Infrastructure based, Decision Maker-3 (socio-economic analysts) assessing based on Socio-Economic and 1 Decision Maker groups to make final decisions.

Decision support systems have several methods that can be used, one of which is ANP. Analytic Network Process (ANP) is a generalization of the Analytic Hierarchy Process (AHP), taking into account the dependence between hierarchical elements. The Analytic Network Process (ANP) method is one method that is able to represent the importance of various parties by considering the interrelationships between existing criteria and sub-criteria [3].

ANP produces some of the best decisions that have been ranked, but to determine one of the best choices, an advanced method is needed, namely Borda. Borda's method for selecting winners who have the most points. The ANP method is used to objectify the weighting of the criteria used while the Borda method is needed to select one among several ranking groups obtained from the ANP method.

2. METHODS

2.1 System Analysis

This system is designed as a tool for decision making from several decision makers to get recommendations on the selection of housing development locations using the ANP (Analytic Network Process) method while to combine the income results of each decision maker using the BORDA method. Decision Support System This group will be built based on the website so that the results of problem solving from several decision makers are directly carried out in any place and sent to the interested parties..

2.2 Group Decision Support System Model

"The Group Decision Support System (GDSS) is an interactive computer-based system that facilitates semi-structured and unstructured problem solving by several decision makers who work together as a group". The Group Decision Support System is needed because there are 3 Individual Decision Makers and 1 Decision Maker group to make final decisions. The steps taken by the individual decision maker are illustrated in Figure 1.

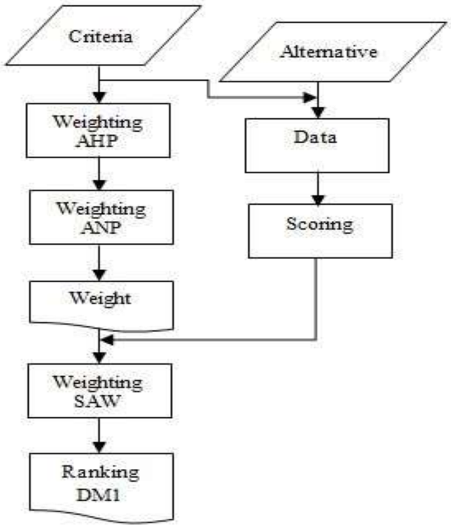

Figure 1 Individual decision maker

Based on Figure 1 the individual decision maker includes several stages, namely:

1) Each individual decision maker makes weighting using the AHP method.
2) Determine the dependence using the dependency matrix which then applies the ANP method.
3) Selecting Alternatives and Data based on predetermined Criteria.
4) Applying with the SAW method

After the individual decision maker performs a ranking, then the group decision maker is then grouped using the BORDA method. The steps taken by the decision maker group are illustrated in Figure 2.

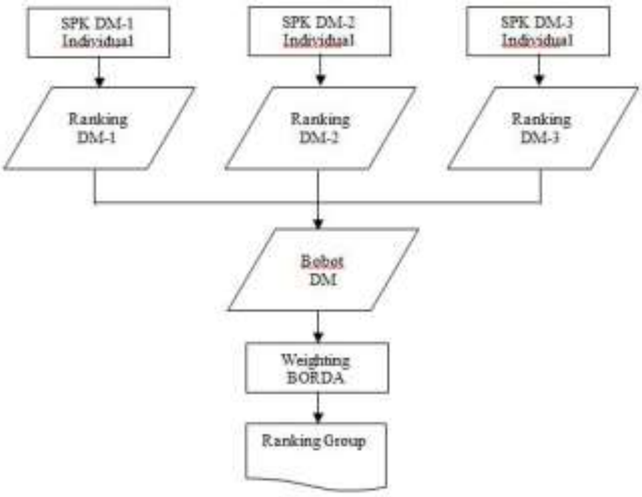

Figure 2 Application of the Borda method

Based on Figure 2 the Dependent Criteria explains that after each Decision Maker produces a decision with the Individual SPK then the BORDA Method is applied to produce Group Decisions.

2.3 AHP Method

AHP method is one model for decision making that can help human thinking. This method was originally developed by Thomas L. Saaty in the early 1970s [4]. In using the AHP method there are several steps or steps that must be done. The stages of the AHP method in this study are illustrated in Figure 3.

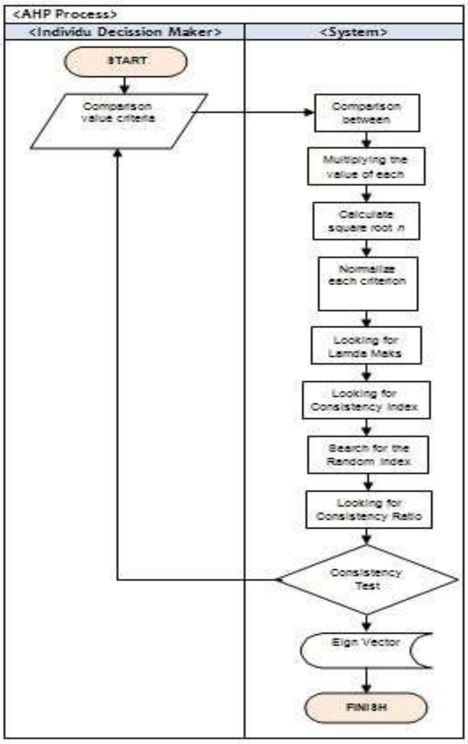

Figure 3 The stages of the AHP method in individual decision maker

Stage 1 - Pairwise comparison matrix.

The pairwise comparison rating scale is a way to be able to provide qualitative opinions on a value. For various problems, a scale of 1 to 9 is the best scale in expressing [5]. The results of the pairwise comparison matrix in this study are listed in Table 1.

Table 1 Matrix results of pairwise comparisons

	KT	**BB**	**LL**	**LPD**	**ST**	**BPT**	**SPL**	**VM**
KT	1,00	1,00	3,00	3,00	3,00	4,00	5,00	3,00
BB	1/1	1,00	5,00	7,00	2,00	7,00	5,00	5,00
LL	1/3	1/5	1,00	2,00	3,00	4,00	2,00	2,00
LPD	1/3	1/7	1/2	1,00	1,00	2,00	3,00	3,00
ST	1/3	1/2	1/3	1/1	1,00	4,00	3,00	5,00
BPT	1/4	1/7	1/4	1/2	1/4	1,00	2,00	3,00
SPL	1/5	1/5	1/2	1/3	1/3	1/2	1,00	2,00
VM	1/3	1/5	1/2	1/3	1/5	1/3	1/2	1,00
Total	**3,78**	**3,39**	**11,08**	**15,17**	**10,78**	**22,83**	**21,50**	**24,00**

Stage 2 - Calculation of priority weights

Priority weights are calculated after pairwise comparisons are carried out by multiplying each element in a row of rows and then the power of n, where n is the number of criteria according to equation (1).

$$M_i = \prod_{j=1}^{n} . b_{ij}, i = 1,2,3,...,n \qquad (1)$$

Information:

$i = 1,2,3,...,n$ is the number of elements

$M_1 = \prod_{j=1}^{n} 1 \times 1 \times 3 \times 3 \times 3 \times 4 \times 5 \times 3 = 1620$

$M_2 = \prod_{j=1}^{n} 1 \times 1 \times 5 \times 7 \times 2 \times 7 \times 5 \times 5 = 12250$

$M_3 = \prod_{j=1}^{n} 0{,}33 \times 0{,}20 \times 1 \times 2 \times 3 \times 4 \times 2 \times 2 = 6{,}336$

$M_4 = \prod_{j=1}^{n} 0{,}33 \times 0{,}14 \times 0{,}50 \times 1 \times 1 \times 2 \times 3 \times 3 = 0{,}429$

$M_5 = \prod_{j=1}^{n} 0{,}33 \times 0{,}50 \times 0{,}33 \times 1 \times 1 \times 4 \times 3 \times 5 = 3{,}333$

$M_6 = \prod_{j=1}^{n} 0{,}25 \times 0{,}14 \times 0{,}25 \times 0{,}50 \times 0{,}25 \times 1 \times 2 \times 3 = 0{,}007$

$M_7 = \prod_{j=1}^{n} 0{,}20 \times 0{,}20 \times 0{,}50 \times 0{,}33 \times 0{,}33 \times 0{,}50 \times 1 \times 2 = 0{,}002$

$M_8 = \prod_{j=1}^{n} 0{,}33 \times 0{,}20 \times 0{,}50 \times 0{,}33 \times 0{,}20 \times 0{,}33 \times 0{,}50 \times 1 = 0{,}00036$

After calculating the multiplication of each element, the next step is to calculate the square root *n* of M_i equation (2).

$$\overline{W_i} = \sqrt[n]{M_i} \quad (2)$$

Information:

$\overline{W_i}$ = The weight of the criteria that have not been normalized

$\overline{W_1} = \sqrt[8]{1620} = 2{,}52$

$\overline{W_2} = \sqrt[8]{12250} = 3{,}24$

$\overline{W_3} = \sqrt[8]{6{,}336} = 1{,}26$

$\overline{W_4} = \sqrt[8]{0{,}429} = 0{,}90$

$\overline{W_5} = \sqrt[8]{3{,}333} = 1{,}16$

$\overline{W_6} = \sqrt[8]{0{,}007} = 0{,}53$

$\overline{W_7} = \sqrt[8]{0{,}002} = 0{,}47$

$\overline{W_8} = \sqrt[9]{0{,}00036} = 0{,}37$

The next step is to normalize $\overline{W_i}$ to get the eign vector value from the results of the root calculation in the previous stage divided by the total number ($\overline{W_i}$)with **equation (3).**

$$W_i = \frac{\overline{W_i}}{\sum_{i=1}^{n} \overline{W_i}} \quad (3)$$

Nilai W_i is the priority priority of the criteria for the criteria to *-i*

$$\sum_{i=1}^{9} 2{,}52 + 3{,}24 + 1{,}26 + 0{,}90 + 1{,}16 + 0{,}53 + 0{,}47 + 0{,}37 = 10{,}46$$

$W_1 = \frac{2{,}52}{10{,}46} = 0{,}24$

$W_2 = \frac{3{,}24}{10{,}46} = 0{,}31$

$W_3 = \frac{1{,}26}{10{,}46} = 0{,}12$

$W_4 = \frac{0{,}90}{10{,}46} = 0{,}09$

$W_5 = \frac{1{,}16}{10{,}46} = 0{,}11$

$W_6 = \frac{0{,}53}{10{,}46} = 0{,}05$

$W_7 = \frac{0{,}47}{10{,}46} = 0{,}04$

$W_8 = \frac{0{,}37}{10{,}46} = 0{,}04$

Stage 3 - Testing consistency

Stages of consistency testing is a process to check the consistency of a paired comparison comparison conducted consistently or not. If at this stage the pairwise comparison process is declared consistent then proceed to the next stage, but if it is not consistent then the decision to refill the importance level value on each criterion.

The initial step at this stage is to find the value λ_{maks} (maximum eign value) by accumulating the amount of multiplication between the number of multiplication results between the number of each column in the paired comparison with the weighting criteria, with equation (4).

$$\lambda_{maks} = \sum_{i=1}^{n} \sum_{j=1}^{n} b_{ij} W_i \quad (4)$$

Information:

λ_{maks} = The largest eigenvalue of the matrix has the order *n*

W = Weighted normalized criteria

n = many elements

$$\lambda_{maks} = \sum_{i=1}^{n} \sum_{j=1}^{n} b_{ij} W_i$$

$$=1(3{,}78 \times 0{,}24) + (3{,}39 \times 0{,}31) + (11{,}08 \times 0{,}12) + (15{,}17 \times 0{,}09) + (10{,}78 \times 0{,}11) +$$

$$(22{,}83 \times 0{,}05) + (21{,}50 \times 0{,}04) + (24{,}00 \times 0{,}04) = 8{,}78$$

After obtaining the value of λ_{maks} the next step look for the value of the consistency index (CI) for the number of criteria n with equation (5).

$$CI = \frac{\lambda_{maks} - n}{n-1} \quad (5)$$

Information:
CI = *consistency index*
λ_{maks} = The largest eigenvalue of the matrix has the order *n*
n = Matrix order

$$CI = \frac{8{,}78 - 8}{8 - 1} = 0{,}11$$

Consistency Ratio (CR) is obtained by dividing the index value into consistency with a random index value. The RI value corresponds to the value Random Index with **equation (6)**, which can be seen in Table 2 .

Table 2 Random index

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0,58	0,9	1,12	1,24	1,32	1,41	1,45	1,49	1,51	1,48	1,56	1,57	1,59

Because the number *n* (Criteria) = 8 then RI = 1.41

$$CR = \frac{CI}{RI} \tag{6}$$

Information:
CR = consistency ratio
RI = Random Index

$$CR = \frac{0{,}11}{1{,}41} = 0{,}08$$

Based on the calculation results that the value of the consistency ratio is 0.08 so that it is smaller than 0.1 then the weighting assessment is declared consistent and can be used for the next process without being refilled.

2.4 ANP Method

Analytic Network Process was developed by Thomas L. Saaty in 1996 [6]. The main concept in ANP is influence, while AHP is preference. AHP has a level of objectives, criteria, subcriteria and alternatives. Each level contains each element. In ANP networks, levels in ANP are called clusters that can have criteria and alternatives in them with feedback. Alternatives can depend or have relevance to criteria such as the hierarchy but can also depend on other alternatives.

The stages of the AHP method in this study are illustrated in Figure 4.

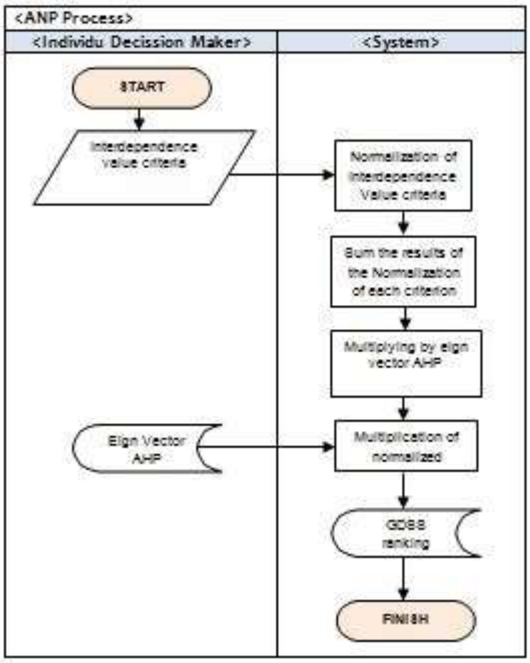

Figure 4 The stages of the ANP method in the Individual Decision Maker

Stage 1 - Relationship Matrix interdependence criteria.
The interdependence relationship in this study is shown in Figure 5.

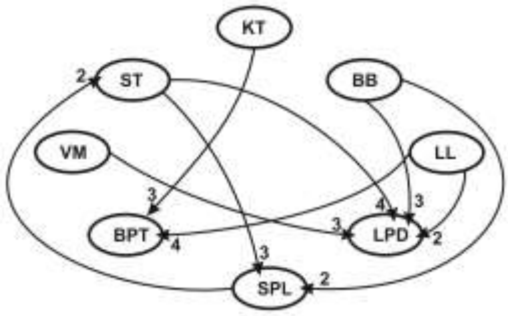

Figure 5 Relationship interdependence between criteria

From Figure 5, the interdependence relationship between criteria, the value of the effect of interdependence given by Decision Maker is the following conditions:

- Location Criteria with Future Development Prospects (LPD) affected by Flood Free (BB) of 3, Land Area (LL) of 2, Attractive View (VM) of 3, Land Status (ST) of 4.
- Criteria for Land Use (SPL) are influenced by Flood Free (BB) of 2, Land Status (ST) of 3.
- Criteria for land maturation (BPT) costs are influenced by the condition of the soil (KT) of 3, soil carrying capacity (DDT) of 2, land area (LL) of 4.
- The criteria for Land Status (ST) are influenced by Appropriate Land Use (SPL) of 2.

Stage 2 - The normalization matrix interdependence criteria

Stage 3 - Calculate the criteria weight with interdependence
By multiplying the weight of the results of the AHP method with the ANP matrix, multiplication of weights interdependence with the interdependence effect matrix is in table 3.

Table 3 AHP weight multiplication with interdependence of normalized ANP criteria

	KT	BB	LL	LPD	ST	BPT	SPL	VM		Eigen Vector		Score
KT	0,25	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,24		**0,06**
BB	0,00	0,17	0,00	0,00	0,00	0,00	0,00	0,00		0,31		**0,05**
LL	0,00	0,00	0,14	0,00	0,00	0,00	0,00	0,00		0,12		**0,02**
LPD	0,00	0,50	0,29	1,00	0,50	0,00	0,00	0,75	x	0,09	=	**0,26**
ST	0,00	0,00	0,00	0,00	0,13	0,00	0,67	0,00		0,11		**0,09**
BPT	0,75	0,00	0,57	0,00	0,00	1,00	0,00	0,00		0,05		**0,12**
SPL	0,00	0,33	0,00	0,00	0,38	0,00	0,33	0,00		0,04		**0,05**
VM	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,25		0,04		**0,01**

2.5 SAW Method

The SAW method is often also known as the weighted sum method. The basic concept of the SAW method is to find a weighted sum of performance ratings on each alternative on all attributes [8]. The stages of the SAW method in this study are illustrated in Figure 6.

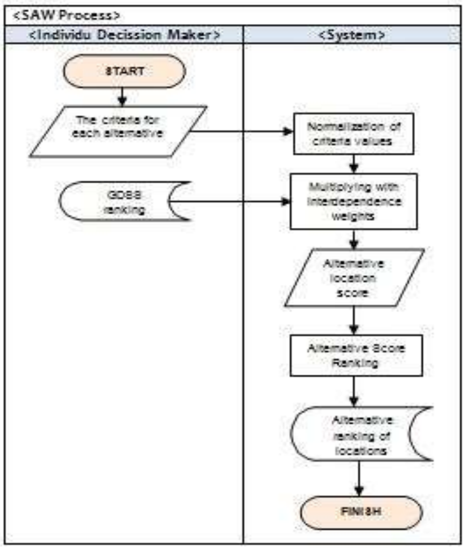

Figure 6 Stages of the SAW method in Individual Decision Maker

Stage 1 - Criteria for each Alternative.

Make a Z decision matrix measuring m x n, where m = alternative will be selected and n = criteria. The criteria of the decision maker (land condition analyst) that are beneficial include: Criteria for Soil Condition (KT), Flood Free (BB), Land Area (LL), Environment with Future Prospects (LPD), Land Status (ST), In Accordance with Land Allocation (SPL). Cost criteria include: Land Ripening Costs (CPM), and Attractive View (VM). Alternative weights for each criterion are listed in table 4.

Table 4 Alternative weights for each criterion

Alternative	Criteria							
	KT	BB	LL	LPD	ST	BPT	SPL	VM
A1	5	4	5	2	3	3	2	2
A2	4	3	2	5	2	4	3	4
A3	5	5	3	3	2	4	1	4
A4	3	4	5	3	3	2	4	3
A5	4	3	5	4	2	3	3	3
The highest score	5	5	5	5	3		4	
Lowest value						2		2

Stage 2 - Gives weight values.

Give preference weight (*W*) by the decision maker for each predetermined criterion.

Stage 3 - Normalization of the matrix.

Normalize the Z decision matrix by calculating the normalized performance rating value (rij) of the Ai alternative on the Cj attribute. The results of the analogized alternative weight matrix are shown in Table 5.

Table 5 Results of normalizing alternative weight matrices of each criterion

Alternatve	Criteria							
	KT	BB	LL	LPD	ST	BPT	SPL	VM
A1	1,00	0,80	1,00	0,40	1,00	0,67	0,50	1,00
A2	0,80	0,60	0,40	1,00	0,67	0,50	0,75	0,50
A3	1,00	1,00	0,60	0,60	0,67	0,50	0,25	0,50
A4	0,60	0,80	1,00	0,60	1,00	1,00	1,00	0,67
A5	0,80	0,60	1,00	0,80	0,67	0,67	0,75	0,67
TOTAL	4,20	3,80	4,00	3,40	4,00	3,33	3,25	3,33

Stage 4 - Multiplying the normalized matrix (N) with the preference weight value (*W*).

Perform a ranking process by multiplying the normalized matrix (N) with the preference weight value (W).

Stage 5 - Determine the preference value for each alternative.

Determine the preference value for each alternative (*Vi*) by summing the results between the normalized matrix (N) with the preference weight (*W*) with equation (8):

$$V_i = \sum_{j=1}^{n} w_j r_{ij} \quad (8)$$

Information:

V_i = ranking for each alternative

Wj = weight values of each criterion

Rij = normalized performance rating

A larger Vi value indicates that the alternative Ai is the best alternative.

2.6 Borda Method

Borda method is a voting method that can complete group decision making, where in each application the decision maker gives a rating based on the available alternative choices, the selection process in Borda method, each voter is given an alternative choice [9]. The alternative with the highest value is the consideration to be chosen [10]. The steps taken by the decision maker (admin) in collecting group ranking using the BORDA method in this study are illustrated in Figure 7.

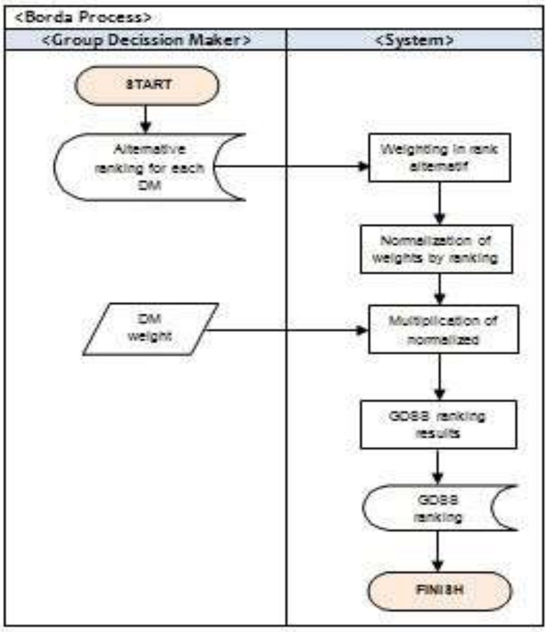

Figure 7 Stages of the BORDA method in group decision maker

Stage 1 - Determine the Weight of each Decision Maker,

Stage 2 - Establishing alternative ranking results from each decision maker is then normalized, as shown in Table 6.

Table 6 Normalization of the weight of ranking decision maker alternatives with rank

	A1	A2	A3	A4	A5
DM 1	5	1	3	4	2
DM 2	4	3	5	2	1
DM 3	4	2	5	1	2

Stage 4 - Normalization of alternative weights.

By multiplying the alternative ranking the decision maker is normalized by the weight of the decision maker. The multiplication of normalization of alternative weights, is shown in Table 7.

Table 7 Multiplication of alternative weight normalization

	A1	A2	A3	A4	A5
DM 1	1,5	0,3	0,9	1,2	0,6
DM 2	2	1,5	2,5	1	0,5
DM 3	4	2	5	1	2
Total	7,5	3,8	8,4	3,2	3,1

3. RESULTS AND DISCUSSION

3.1 Discussion Of Test Results

Developers in the process of selecting housing development locations are only based on subjective opinions by each decision maker. The location decisions by decision makers and developers are in the areas of Bekonang and Gentan. Testing the support system for group decisions on choosing the location of housing development aims to see whether the system has met the needs of the developer or not, both in the process that occurs in the system and the final results provided.

3.2 Testing the AHP Method

Testing AHP method is used to determine the priority weights of each criterion in the housing construction site selection system. Priority weights are used in calculations with the number of values for each criterion. Before priority weights are used, we need to test the consistency of the ratio, if the results are consistent, then it is used for the next calculation. The results of the check calculation consistency with the AHP method, listed in Table 8 below:

Table 8 Calculation of checks for consistency of AHP

	KT	BB	LL	LPD	ST	BPT	SPL	VM	Multiplier multiplication	Square root	Eigen Vector
KT	1,00	1,00	3,00	3,00	3,00	4,00	5,00	3,00	1620	2,52	0,24
BB	1,00	1,00	5,00	7,00	2,00	7,00	5,00	5,00	12250	3,24	0,31
LL	0,33	0,20	1,00	2,00	3,00	4,00	2,00	2,00	6,4	1,26	0,12
LPD	0,33	0,14	0,50	1,00	1,00	2,00	3,00	3,00	0,429	0,90	0,09
ST	0,33	0,50	0,33	1,00	1,00	4,00	3,00	5,00	3,333	1,16	0,11
BPT	0,25	0,14	0,25	0,50	0,25	1,00	2,00	3,00	0,007	0,53	0,05
SPL	0,20	0,20	0,50	0,33	0,33	0,50	1,00	2,00	0,002	0,47	0,04
VM	0,33	0,20	0,50	0,33	0,20	0,33	0,50	1,00	0,000	0,37	0,04
Total	3,78	3,39	11,08	15,17	10,78	22,83	21,5	24	13880,17		
λ_{maks}	8,78										
CI	0,11										
RI	1,41										
CR	0,08										

Based on the calculation results that the value of the consistency ratio is 0.08 so that it is smaller than 0.1, the weighting assessment is declared consistent and can be used for the next process without being refilled.

3.3 Testing the ANP Method

After knowing the priority weights obtained from the AHP calculation and the effect of interdependence on the ANP stage, then multiplying the weight of the results of the AHP method with the ANP matrix, the results of the multiplication will be used in the SAW ranking process shown in Table 9.

Table 9 Results of multiplication of AHP with a matrix of interdependence effects

Criteria	Weight
Land Condition	0,06
Free flood	0,05
Land area	0,02
Location of Future Prospects	0,26
Land Status	0,09
Land Ripening Costs	0,12
In accordance with land allotment	0,05
Attractive View	0,01

3.4 Testing the SAW Method

Based on the calculation of criteria weights in each decision maker carried out by the ANP method, after each Decision Maker calculates the multiplication of interdependent criteria with the weight of the criteria of each alternative, it is known that the highest to lowest score results are ranked, ranking results of the Decision Maker Analysis of Land Conditions are listed in table 10.

Table 10 DM 1 ranking results

No.	Location	Code	Score
1	Gentan	A1	0,51
2	Makamhaji	A4	0,47
3	Bekonang	A3	0,45
4	Baturetno	A5	0,42
5	Palur Raya	A2	0,39

3.5 Testing the Borda Method

After each decision maker produces a decision with the Individual SPK using the AHP, ANP, and SAW methods then the Decision Maker Group as the final decision maker, applies the BORDA Method to produce the final decision. The results of the group decision support system for selecting the location of housing construction are listed in table 11.

Table 11 Final Results of the system Supporting the Decision of the Housing Development Site Selection Group

Ranking	Score	Location	
1	8,4	A3	Bekonang
2	7,5	A1	Gentan
3	3,8	A2	Palur Raya
4	3,2	A4	Makamhaji
5	3,1	A5	Baturetno

From these results, it can be concluded that the location that is a priority in the selection of housing development locations is Alternative 3 with a location in Bekonang with a value of 8.4 so that it can be stated that this Information System can help Developers prioritize housing construction locations.

4. CONCLUSIONS

This Decision Support System can help developers provide appropriate recommendations in making decisions regarding the selection of housing development locations. Because before using the Information System on the location of housing development, in choosing the location of housing construction, it is only based on subjective opinion by each decision maker without considering the condition of the land, infrastructure, City Spatial Planning.

5. SUGGESTION

From the results of the above research, there are a number of things that need to be added and developed from a group decision support system for the selection of housing development locations, which can be developed by utilizing other decision methods that are more concise in selecting location recommendations so as to accelerate a recommendation for development location choices. housing.

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