

Decision Making System Determination of assistance Home renovation With Weight product and simple additive weighting

^{1st} Dwi Marisa Efendi¹, ^{2nd} Asefandi², ^{3rd} Rustam³,
{dwimarisa@dcc.ac.id¹, asefandi189@gmail.com², rustamdcc89@gmail.com³}

STMIK Dian Cipta Cendikia Kotabumi, Lampung¹, STMIK Dian Cipta Cendikia Kotabumi,
Lampung², STMIK Dian Cipta Cendikia Kotabumi, Lampung³...

Abstract. Home used for shelter, [1][2] communities don't have home, its because poverty factor. [3] The government has a program that can eradicate poverty, one of which is a home renovation program. Data obtained from about poverty rate in Lampung province amounted to 13.01% in September 2018, [4] This Program is given to residents according to the criteria specified. Currently A home renovation program is still subjective, This research uses the method WP and saw There are 11 criteria , it needs to solve this problem. They are Work, land Status of residence, Wall house, drinking water source, fuel for cooking, MCK Condition, consumption (meat, milk, chicken) per year, highest education of family head, family head income, roof structure, floor type

Keywords: home, saw, wp, criteria, Decision Making System.

1 Introduction

The house is a place of residence and family gathering place[1] Because of poverty factor, They are hard to get a habitable home[2] Especially happened in North Lampung. Data from bps in Lampung province amounted 13.01% in September, And in March 2018 by 13.14%[3]. Based on the above data, the percentage increased. Government has several programs, it is home renovation[4]The Program is given to the poor, Communities in North Lampung, This program is provided in cash, Then this money will be bought in the tool building tools. It aims to avoid misuse of aid funds. The program is given to the community, with certain criteria and conditions. However, in fact, the selection of beneficiaries is still subjective. Not only that,,but also any problem at this program, they are Limited amount of funds. Based on the problems above, a decision-making system is required. It is necessary to help determine the recipients of the most appropriate funding.not onli that but also this program need some criteria, they are Work, land Status of residence, Wall house, drinking water source, fuel for cooking, MCK Condition, consumption (meat, milk, chicken) per year, highest education of family head, family head income, roof structure, floor type.

For the above problem, Researchers use two methods, they are weight product (WP) dan Simple additive weighting(SAW)[5]. These two methods are useful for getting the best results. These two methods are used for previous research. This is because both of these methods have a good selectivity. This method also includes the objectives of the criteria, not only benefit criteria but also cost criteria[6], finally, with both these methods, We can know the best results, not only that but also we can accommodate aid on target

2.1 Decision Making System

Fuzzy set theory is an appropriate tool which uses the natural language that humans use to control complex systems such as Home Renovation Program[7] Decision making considers a decision as a specific information processing process. It studies the cognitive processes that lead to decisions and the way information is processed in these processes.[8].

The traditional DSS “dialog – data – model “ architecture (Sparago and Waston 1997), limits communication between the system’s components, communications with external system’s components and also the components, communication with external systems in ways independent of any pre-specified control mechanism (Kresten and Noronha 1999). A major problem with this architecture is that it does not have plug-and-play philosophy[9].

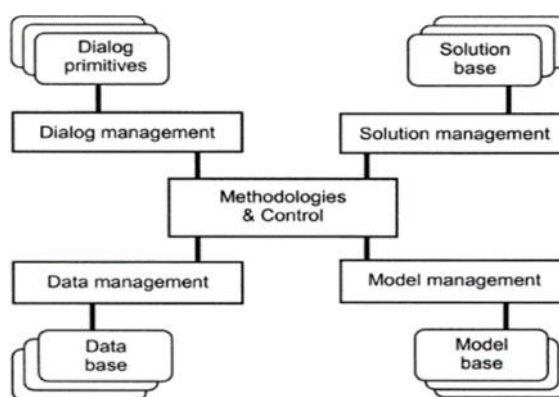


Figure 1. Generic DSS Architecture

SPK is aimed at decisions that require assessment[8], SPK can be interpreted as a computer-based system consisting of three main components that interact with each other's language system (communication between users and other SPK components) Knowledge system (Domain knowledge Repository, procedure) and problem processing system (relationship between two other components)[8].

2.2 The House

The house is a building that serves as a residence or residential and family coaching facilities [2]. In previous studies the use of Saw method was used for the selection of ideal housing location by Erwin Panggabean[9].

2.3 Weighted Product method

Weighted Product method uses the multiplication indicator to link the rating of the attribute, where the rating of each attribute should be first rounded with the weight of the corresponding attribute. This process is similar to the normalization process. The preference for alternatives is given as follows [10].

$$S_i = \sum_{j=1}^n X_{ij} \dots \dots \dots (1)$$

Description

- n : criterias
- Π :Product
- S : Vektor
- i : Alternatif
- X :Kriteria
- j : Kriteria

$$\frac{w_j}{\sum w_j} \dots \dots \dots (2) \dots \dots$$

W : Menyatakan Bobot Kriteria
 J : Menyatakan Kriteria
 With $i = 1, 2, \dots, m$; where $\sum_{j=1}^n w_{-j} = 1$ w_{-j} is the rank of positive value for profit and negative value for the cost attribute.

$$V_i = \frac{\prod_{j=1}^n X_{ij} w_j}{\prod_{j=1}^n (x_{*ij}) w_j} \dots \dots \dots (3)$$

- n : Banyaknya Kriteria
- Π :Product
- j : Kriteria
- l : Menyatakan Alternatif
- x : Menyatakan Nilai Kriteria
- i : Alternatif
- w : Menyatakan Bobot Kriteria
- v : Menyatakan Preferensi Alternative dianalogikan sebagai vector v
- * : Menyatakan banyaknya Kriteria yang telah dinilai pada vector s

For the Keriteria divided into two categories of positive value included in the benefit and negative value included in the cost of Kereteria.

2.4 Simple Additive Wighting (SAW)

This method is a method with a weighted summation, the basic concept of the SAW method is to look for the weighted summation of the performance rating of each alternative on all attributes. Ni Didasarkan method to solve problems in multi process decision making [10]

This method is widely used in decision making process with many criteria or attributes, this method requires the process of normalizing decision Matrix (x) to a scale that can be compared with all existing alternative rating. [12]

$$R_{ij} = \frac{X_{ij}}{\max X_{ij}} \text{ adalah atribut keuntungan (benefit)}$$

$$\frac{\min X_{ij}}{X_{ij}} \text{ adalah atribut kerugian (cost)}$$

Description:

- Rij = normalized performance Rating from Ai alternatives in the Cj attribute:
- i = 1, 2, ..., m and
- j = 1, 2, ..., n
- Max Xij = The largest value of each criterion
- i Min Xij = smallest value of each criterion
- I Xij = value of attribute belonging to each criterion
- Benefit = If the largest value is the best
- Cost = if the smallest value is the best value preference for each alternative...

(Vi) Given the following formula as follows

$$V_i = \pi \sum_{j=1}^n W_{ij} r_{ij} \dots\dots\dots$$

Description:

Vi = rank for any alternate

WJ = weight value of the rank (of each alternative)

cartridges = value of normalized performance rating the greater value

Vi indicates that an Iebih alternative was chosen

2.5 System development Methods

System development methods used are waterfall model or classic life cycle [13], consisting of: 1) Communication: Project initiation Requirements gathering, 2) Planning: Estimating scheduling tracking, 3) Modeling: Analysis design, 4) Construction: Code test, and 5) Deployment: Delivery Support Feedback

3.1 Conclusions and results

The highest score is the head of the family who is most deserving of the Raskin and the lowest value is the unworthy value of getting Raskin

Table 1. Result (sorting)

No	Nama Penerima Raskin (Alternatif)	V
1	ROHIDAH	0.6283
2	JUMARI	0.2075
3	SUPRI	0.4283
4	RUSWANTO	0.6485
5	HENDRA	0.7369
6	MARSONO	0.5394
7	SUTAR YONO	0.1202
8	EKO	0.7227
9	SIDO	0.5828
10	SARING	0.7635

Based on the table above using 10 samples then get the Mean value as follows: 0.100000000

Table 2 Default value lookup Error

NO	KETERANGAN	NILAI
1	WP error value Satandar	0,00889
		0,09428
2	SAW error value Satandar	0,0478
		0,2186

Based on table above using 10 samples, get the standard value of Error values as follows: 0.00889, 0.09428

The result of the comparison of the results of the prediction table and the method of WP and SAW in obtaining the following results:

Table. 3 WP Results

<i>Column1</i>	
Mean	0,1
Standard Error	0,009043027
Median	0,107608288
Mode	#N/A
Standard Deviation	0,028596561
Sample Variance	0,000817763
Kurtosis	-0,276844079
Skewness	-0,97392137
Range	0,079824853
Minimum	0,04877324
Maximum	0,128598093
Sum	1
Count	<u>10</u>

Based on the table above using 10 samples, get the following WP value: Mean: 0.1 Standard Deviation: 0.028596561 standard Error: 0.009043027

Based on the results of the comparison of the results of the Prediction table Stalakian method A and B get the following results

Table. 4 WP Results

<i>Column1</i>	
Mean	0,5
Standard Error	0,070137683
Median	0,605555353
Mode	#N/A
Standard Deviation	0,221794827
Sample Variance	0,049192945
Kurtosis	-0,008880554
Skewness	-1,047340517
Range	0,643268234

Minimum	0,120224509
Maximum	0,763492743
Sum	5
<u>Count</u>	<u>10</u>

Based on the table above using 10 samples, get the Topsis value as follows: Mean: 0.5 Standard Deviation: 0.221794827 standard Error: 0.070137683

Based on observations using the method WP and SAW by doing the weighted, we see that both methods have similarities in the process, but these two methods result in an error value and then deduced the best results (SAW 0.070137683)

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References

1. [1]Irwana, Chintya, Zaki Faizin Harahap, and Agus Perdana Windarto. "SPK: ANALISA METODE MOORA PADA WARGA PENERIMA BANTUAN RENOVASI RUMAH." *Jurnal Teknologi Informasi MURA* 10.1 (2018): 47-54.
2. [2] INDONESIA, PRESIDEN REPUBLIK, and Presiden Republik Indonesia. "Undang Undang No. 4 Tahun 1992 Tentang: Perumahan dan Pemukiman." *Lembaran Negara RI Tahun 115* (1992).
3. [3] Listyaningsih, Vickky, et al. "DSS PEMILIHAN PENERIMA BANTUAN PERBAIKAN RUMAH DENGAN METODE WEIGHTED PRODUCT." *SEMNASTEKNOMEDIA ONLINE* 5.1 (2017): 3-5.
4. [4] <https://www.republika.co.id/berita/ekonomi/keuangan/19/01/15/pldbfj368-bps-sebut-penduduk-miskin-di-lampung-tersisa-sejuta-jiwa>
5. Fatkhurrochman, Fatkhurrochman, and Dwi Astuti. "ANALISIS PERBANDINGAN METODE TOPSIS DAN SAW DALAM PENENTUAN PENERIMA BANTUAN PEMBANGUNAN RUMAH MASYARAKAT KURANG MAMPU." *SEMNASTEKNOMEDIA ONLINE* 6.1 (2018): 2-8.
6. [6] Mude, Muhammad Aliyazid. "Perbandingan Metode SAW dan TOPSIS pada kasus UMKM." *ILKOM Jurnal Ilmiah* 8.2 (2016): 76-81.
7. [7] Agustin, Yoga Handoko, and Hendra Kurniawan. "Sistem Pendukung Keputusan Penilaian Kinerja Dosen Menggunakan Metode Weighted Product (Studi Kasus: Stmik Pontianak)." *Seminar Nasional Informatika (SNIf)*. Vol. 1. No. 1. 2017.
8. [8] Yunus, Mahmud, Harry Soekotjo Dachlan, and Purnomo Budi Santoso. "Spk pemilihan calon pendonor darah potensial dengan Algoritma C4. 5 dan Fuzzy Tahani." *Jurnal EECCIS* 8.1 (2014): 47-54.
9. [9] Panggabean, Erwin. "Sistem Pendukung Keputusan Penentuan Lokasi Perumahan Ideal Menggunakan Metode Fuzzy Simple Additive Weighting." *Jurnal Times* 4.1 (2015): 13-17.
10. [10] Kusumawardani, Danik. "Sistem Pendukung Keputusan Penerima Bantuan Rumah Layak Huni Dengan Menggunakan Metode Weighted Product (WP)." *FASILKOM UDINUS* (2014).
11. [11] Radhitya, Yogha, and Fitro Nur Hakim. "Rancang Bangun Sistem Pendukung Keputusan Penentuan Penerima Beasiswa Dengan Metode SAW." *Speed-Sentra Penelitian Engineering dan Edukasi* 8.2 (2016).
12. [12]Nofriansyah, D. "Konsep Data Mining Versus Pendukung Keputusan, Yogyakarta: CV." Budi Utama (2014)of conference. Place of publication: Publisher's name; Year of publication. p. page numbers.