JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol. IX No 4, September 2023, hlm. 629-636 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v9i4.2203
Available online at http://jurnal.stmikroyal.ac.id/index.php/jurteksi

APPLICATION OF THE WEIGHTED PRODUCT METHOD FOR DETERMINING ASSISTANCE OF JOINT BUSINESS GROUP

Sri Wahyuni[1*], Iqbal Kamil Siregar[1], Sudarmin[1]
[1]System Information, STMIK Royal Kisaran
Email: *kisaranyuni7@gmail.com

Abstract: Asahan District Social Service is one of the government agencies in Asahan District. This agency is tasked with serving the community and providing the best information for the community, especially in terms of data processing. One of the government programs used to tackle poverty is KUBE. In general, the problems that occur in KUBE are still not optimal and not on target, so that sometimes many residents protest because residents who should receive assistance do not receive assistance and conversely residents who should not have the right to receive assistance from the Joint Business Group (KUBE). By knowing the deficiencies found in the manual calculations carried out by the Asahan District Social Service. So that beneficiaries can be determined according to the criteria determined by the Asahan District Social Service. Then a system was created using the Weighted Product method to carry out accurate calculations in providing assistance made with the PHP programming language with MySQL Database, to create a new computerized decision support which is a good alternative by prioritizing effectiveness and efficiency in determining the provision of assistance to Joint Business Groups (Joint Business Groups). KUBE). The purpose of designing a Joint Business Group assistance decision system can assist Asahan Regency social service employees in determining the granting of Joint Business Groups (KUBE).

Keywords: decision support system; KUBE; weighted product (WP)

Abstrak: Dinas Sosial Kabupaten Asahan merupakan salah satu instansi pemerintah yang ada di Kabupaten Asahan. Badan ini bertugas untuk melayani masyarakat dan memberikan informasi terbaik bagi masyarakat terutama dalam hal pengolahan data. Salah satu program pemerintah yang digunakan untuk menanggulangi kemiskinan adalah KUBE. Secara umum permasalahan yang terjadi di KUBE masih belum optimal dan belum tepat sasaran, sehingga terkadang banyak warga yang protes karena warga yang seharusnya menerima bantuan tidak mendapatkan bantuan dan sebaliknya warga yang seharusnya tidak berhak mendapatkan bantuan dari Kelompok Usaha Bersama (KUBE). Dengan mengetahui kekurangan yang terdapat pada perhitungan manual yang dilakukan oleh Dinas Sosial Kabupaten Asahan. Sehingga dapat ditentukan penerima manfaat sesuai dengan kriteria yang ditentukan oleh Dinas Sosial Kabupaten Asahan. Tujuan dibuat sistem dengan menggunakan metode Weighted Product untuk melakukan perhitungan yang akurat dalam pemberian bantuan yang dibuat dengan bahasa pemograman PHP dengan Database MySQL, untuk membuat pendukung keputusan terkomputerisasi baru yang merupakan alternatif yang baik dengan mengutamakan efektifitas dan efisiensi dalam penentuan pemberian bantuan Kelompok Usaha Bersama (KUBE). Maka perancangan sistem keputusan bantuan Kelompok Usaha Bersama dapat membantu pegawai dinas sosial Kabupaten Asahan dalam menentukan pemberian Kelompok Usaha Bersama (KUBE).

Kata kunci: KUBE; sistem pendukung keputusan; weighted product (WP)

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INTRODUCTION

KUBE to create community activities according to their needs. In providing assistance at the Asahan District Social Service there is no selection that is too strict. Anyone who is entitled to receive assistance is allowed, the most important thing is that assistance is given because there is still a family relationship [1]. Decision support systems can handle semi-structured and unstructured situations, a problem can be described as a structured and unstructured problem only by paying attention to the decision maker or certain [2].

This actually creates problems for the community resulting in social inequality. To overcome this, it is necessary to have assessment criteria that have been set by the Asahan district social service in order to determine who is entitled to assistance and who is not entitled to assistance [3]. The problems that occur in the provision of Joint Business Group (KUBE) assistance are still not optimal and not on target, so that sometimes many residents protest because residents who should receive assistance do not receive assistance and vice versa, residents who should not be entitled to receive Joint Business Group assistance (KUBE) [4]. For this reason, criteria are needed in a decision support system to determine residents who are entitled to receive Joint Business Group (KUBE) assistance [5]. The calculation of determining the granting of Joint Business Group (KUBE) assistance is carried out using the Ms.excel application. the selection process for providing Joint Business Group assistance (KUBE) has not been implemented into the database so if an error occurs in data input, the data must be checked and recalculated [6].

The purpose of this study is to later design a decision-making system for providing Joint Business Group assistance (KUBE) in the form of a Web-based application, apply the Weighted Product method to perform accurate calculations in providing Assistance Group Joint Business Assistance (KUBE) at the Asahan Regency Social Service and to be able to help employees of the Asahan District Social Service in determining the provision of Joint Business Group (KUBE) assistance.

Several references were taken by the author as material for consideration to help research which has almost the same problem, "Decision Support System for Selecting the Best Lecturer Using the Weighted Product (WP) Method at STMIK Royal". The results of this study are to facilitate Higher Education Institutions (Foundations) in selecting the best lecturers who will receive awards later [7]. "Decision Support System for Determining Recipients of Home Improvement Assistance Using the Weighted Product Method in Borbor District" [8]. "Selection of Recipients of Direct Cash Assistance Using the Weighted Product Method and ISO 9126" [9]. "Decision Support System for Employee Recruitment Using the Web-Based Weighted Product Method" [10]. "Decision Support System for Selecting Outstanding Students Using the Weighted Product Method" [11].

METHOD

Each decision alternative is compared to the others by shifting a number of ratios, one for each decision criterion. Each ratio is elevated to power

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equivalent to the relative weight of the corresponding criterion. This process is the same as the normalization process.
The steps in calculating the Weighted Product (WP) method are multiplying all the attributes for all alternatives with the weight as a positive rank for the cost attribute and the multiplication results are added up to produce a value for each alternative. Then divide the value of V for each alternative by the value of each alternative. Then find the best alternative order that will be the decision.

Preference for alternative Ai is given to the formula:

$S_i = \prod_{j=1}^{n} X_{ij_{wj}}$ with i = 1,2, …, m ……. (1)

Where :
S : expressing alternative preferences is analogous to vector S.
X : denotes the criterion value.
W : states the weight of the criteria.
i : declares an alternative.
j : states the criteria.
n : declares many criteria

where Σwj = 1. wj is a rank with a positive value for the profit attribute, and a negative value for the cost attribute.
The relative preference of each alternative is given in the formula:

$V\, i = \frac{\prod_{j=1}^{n} X_{ij}wj}{\prod_{j=1}^{n}(X_{j*})w_j}$ with i = 1,2, …, m ……. (2)

Where :
V : expressing alternative preferences is analogous to vector V.
X : denotes the criterion value.
W : states the weight of the criteria.
i : declares an alternative.
j : states the criteria.
n : states the number of criteria.
* : specifies the number of criteria that have been scored on the S vector.

The research framework that was carried out was as a flow or stage in solving a problem. Acceptance of Joint Business Group (KUBE) assistance at the Asahan Regency Social Service which was designed using the PHP and MySQL programming languages.

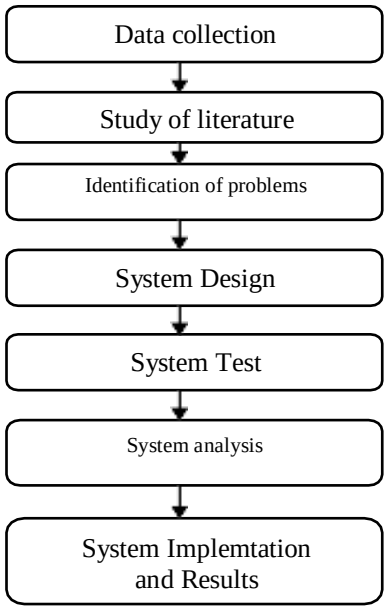

Image 1. Research Framework

The problem at this stage is to do research to find out the problems that exist in the Asahan District Social Service and find the right solution. Explanation of the research framework above, namely: 1. Data collection is carried out in order to obtain the information needed in order to achieve research objectives by conducting interviews and observations. 2. Literature Study, After collecting data, the researcher conducts a literature study by searching for theoretical foundations obtained from various sources to complement concepts and theories, so that they have a good and appropriate scientific basis and knowledge. 3. The researcher identified the problem by explaining what problems were found. 4.

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System Design, In designing this system the things that are done are as follows making a model design using information system flow, and Unified Modeling Language (UML), database design, and User Interface design (program input and output). 5. System Testing, After making the system design, the system is first tested to find out whether the designed decision support system is in accordance with the calculation method used and system trials are also carried out to find out errors that occur in the system starting with inputting data into application using black box. 6. System Analysis, Analysis of the existing system needs to be done before analyzing the problems, system weaknesses, and system requirements. 7. System Implementation and Results, After the system trials have been carried out, the next stage is the system implementation stage where this stage is the system implementation stage which will later assist in reducing and eliminating existing problems.

Determination of Criteria

The criteria needed to determine Joint Business Group Assistance (KUBE) are the type of business, production innovation, workforce and ownership of business location.

Table 1. Weight Value

Weight Value		
Definition	Value	Weight
Not good	1	0
Not good	2	0.4
Currently	3	0.6
Good	4	0.8
Very good	5	1

Table 2. Weighting of Business Type Criteria

Criteria	Scale	Value
Type of business	Culinary	5
	Laundry Business	4
	Livestock Business	3
	Convection Business	2
	Handycrafts	1

Table 3. Weighting of Productive Age Criteria

Criteria	Scale	Value
Productive Age	25 – 30	5
	31 – 35	4
	36 – 40	3
	41 – 45	2
	➢ 46	1

Table 4. Weighting of Production Innovation Criteria

Criteria	Scale	Value
Production Innovation	Integrated system	5
	Using technology	4
	The technology already exists but it hasn't been used yet	3
	Operational activities are still conventional. Poor	2
	No Innovation	1

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Table 5. Weighting of Labor Criteria

Criteria	Scale	Value
Labor	➢ 15	5
	12 – 14	4
	9 – 11	3
	6 – 8	2
	< 5	1

Table 6. Weighting Criteria for Ownership of Business Locations

Criteria	Scale	Value
Business Location Ownership	Right of ownership	5
	Profit Sharing	4
	Rent	3
	Don't have a location	2

Table 7. Criteria Weight for Each Joint Business Group Assistance (KUBE)

No	Joint Business Name	Criteria				
		Type of business	Productive age	Business Location Ownership	Labor	Production Innovation
1	Asahan Sejahtera	2	2	3	2	5
2	Sinar Sejahtera	2	3	3	2	5
3	Harapan Baru	4	3	3	3	4
4	Sinar Harapan	5	4	2	2	3
5	Tirta Karya	4	4	3	4	4
6	Abadi Bersama	5	5	5	4	4
7	Usaha Sejahtera	4	2	2	4	3
8	Maju Bersama	4	2	2	3	3
9	Asri Jaya	5	4	3	2	2
10	Mekar Jaya	3	4	3	3	4

Calculation of Weighted Product (WP)

Next, the calculation of the Weighted Product (WP) method will be carried out with the repair of the weight repair value first. The initial weights W = (4, 3, 4, 3, 3) will be fixed so that the total weights ∑Wj = 1, where W is the weight of each criterion that the Admin enters.

$$W_j = \frac{W\_Initj}{\sum_{j=1}^{n} W\_Initj} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

W1(Land area) = $\frac{4}{4+3+4+3+3}$

W1(Land area) = 0,2353

W2(Productive age) = $\frac{3}{4+3+4+3+3}$

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W2(Productive age) = 0, 1764

W3(Production innovation) = $\frac{4}{4+\ 3+4+\ 3+3}$

W3(Production innovation) = 0,2353

W4(Labor) = $\frac{3}{4+\ 3+4+3+\ 3}$

W4(Labor) = 0, 1764

W5(Business Location Ownership) = $\frac{3}{4+\ 3+4+3+3}$

W5(Business Location Ownership) = 0, 1764.

Table 8. Ranking Results of Joint Business Group Assistance Alternatives

No	**Alternatif/Nama Usaha Bersama**	**Hasil**	**Rangking**
1	Asahan Sejahtera	0.0625	10
2	Sinar Sejahtera	0.0671	8
3	**Harapan Baru**	**0.0816**	**3**
4	Sinar Harapan	0.0728	6
5	**Tirta Karya**	**0.0903**	**2**
6	**Abadi Bersama**	**0.1117**	**1**
7	Usaha Sejahtera	0.0691	7
8	Maju Bersama	0.0657	9
9	Asri Jaya	0.0746	5
10	Mekar Jaya	0.0803	4

As for the data that the candidates received assistance were approximately 13 Joint Business Groups in Lima Puluh Pesisir District, for this reason the researchers took samples (alternatives), from the 13 recipients selected to become 3 recipients, this can be obtained from the calculation of alternative preferences for Joint Business Group Assistance (KUBE)) above, the decision for the selection of the alternatives is selected from the highest score, then those selected as Joint Business Group Assistance recipients (KUBE) are the Abadi Bersama, Tirta Karya and Harapan Baru Joint Business Groups, which are eligible to be recommended as Joint Business Group Assistance recipients (KUBE).

RESULT AND DISCUSSION

Criteria Data Form

The Criteria data form is inputting, editing, canceling and deleting Criteria data

Image 2. Criteria Data Form

Criteria Data Input Form

The Criteria data input form is the input, editing, cancellation and deletion of Criteria data.

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Image 3. Criteria Data Input Form

Alternative Data Form

Alternative data form is inputting, editing, canceling and deleting alternative data.

Image 4. Alternative Data Form

Alternative Data Input Form

Alternative data input form is an alternative data editing.

Image 5. Alternative Data Input Form

WP Method Calculation Form

The WP calculation form is a display of the results of the criteria and alternative vaues.

Image 6. WP Method Calculation Form

WP Method Calculation Result Form

The WP Method calculation results form is a display of the results of the criteria and alternative values.

Image 7. WP Method Calculation Result Form

CONCLUSION

The decision support system for joint business group assistance (KUBE) at the Asahan District Social Service is an application that can assist in making decisions and providing assistance to the community. This program provides 5 (five) assessment criteria that will be assessed in each KUBE. The results of the assessment will be checked using this method, after which the ranking will be based on the highest WP number. After testing the system, it was found that the results of the application had been authenticated so that users who did not have usernames and passwords could not manage the data processing process Joint business group assistance decision support system (KUBE).

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