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SIMPLE ADDITIVE WEIGHTING METHOD DECISION SUPPORT SYSTEM IN CEMENT SELECTION AT UD.WENDY JAYA

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Abstract: Technology is a tool for processing, storing, and modifying data to obtain information. Decision Support System (DSS) is a model-based system with data processing procedures and considerations to assist managers in decision-making. In the context of UD Wendy Jaya Store, which still uses manual methods for selecting superior cement, this is considered less effective and inefficient, resulting in cement selection that does not meet the criteria and lacks accuracy. This research employs a quantitative method with the aim of determining decisions for selecting superior cement and designing a decision support system using the Simple Additive Weighting (SAW) method based on predetermined criteria. The implementation results show that the Decision Support System for Determining Superior Cement provides convenience and speed in selecting superior cement at UD Wendy Jaya Store according to the expected criteria. The results of calculations using the Simple Additive Weighting (SAW) method rank each alternative, with the most superior alternative being three-wheel cement, considering several criteria such as price, compressive strength, fineness, water capacity, and setting time.

Keywords: simple additive weighting (SAW); decision support systems; UD. wendy jaya.

Abstrak: Teknologi adalah alat untuk mengolah, menyimpan, dan memodifikasi data guna mendapatkan informasi. Sistem Pendukung Keputusan (Decision Support System/DSS) merupakan sistem berbasis model dengan prosedur pemrosesan data dan pertimbangan untuk membantu manajer dalam pengambilan keputusan. Dalam konteks Toko UD. Wendy Jaya, yang masih menggunakan cara manual untuk pemilihan semen unggul, hal ini dianggap kurang efektif dan tidak efisien, mengakibatkan pemilihan semen tidak sesuai kriteria dan tidak akurat. Penelitian ini menggunakan metode kuantitatif, dengan tujuan untuk mengetahui keputusan pemilihan semen unggul dan merancang sistem pendukung keputusan menggunakan metode Simple Additive Weighting (SAW) berdasarkan kriteria yang ditentukan. Hasil implementasi menunjukkan bahwa sistem pendukung keputusan Menentukan Semen Unggul memberikan kemudahan dan kecepatan dalam pemilihan semen unggul pada Toko UD. Wendy Jaya sesuai dengan kriteria yang diharapkan. Hasil dari perhitungan dengan menggunakan metode Simple Additive Weighting (SAW) adalah perangkingan setiap alternatif yaitu diperoleh alternatif yang paling unggul adalah semen tiga roda ditinjau dari beberapa kriteria harga, kuat tekanan, kehalusan, kapasitas air dan waktu mengeras.

Kata kunci: simple additive weighting (SAW); sistem pendukung keputusan; UD.wendy jaya

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INTRODUCTION

The widespread utilization of computers in support work man for all fields of work in all regions of the world, making an impact wide for development infrastructure Which supports it [1] . Convenience Which obtained among them For saving processing time, energy efficiency and natural resources [2] . Wrong One Which has created is program/system survey. Now This has Lots generated or produced A tool a survey that can measure something, especially regarding the selection of superior cement in shops [3] .

Now it has Lots generated or produced A tool survey that can measure something, especially regarding the selection of superior cement in shops. According to research conducted by Jeperson Hutahaean and Muliati Badaruddin with the title "Decision Support System for Selection of Private Vocational Schools Recipient of Assistance Funds Applying the Simple Additive Weighting (SAW) Method" this research uses The SAW method used a case study of the selection of private vocational schools receiving aid funds, while the research carried out was a case study of the selection of superior cement at UD Wendy Jaya, although the method was the same but the case study was different [4] . This system can be a reference for cement quality to be able to provide the best quality, with research This expected cement quality can improved [5] .

UD.Wendy Jaya which is located on Jl. Hamlet V Berumbung Lower, Teladan Village, District. Tinggi Raja, Asahan Regency is one of the shops still using manual methods to select superior cement agency. The impact of this problem is that the selection of superior cement is not suitable with the existing criteria so that the selection of superior cement at the UD. Wendy Jaya store Still No accurate , according to research conducted by Alwendi and Dasril Aldo with the title "Decision Support System For Selecting The Best Handphone Shop In Padang Sidimpuan City Using The Oreste Method" this research uses the Oreste method in selecting the best cellphone shop in Padang City sidimpuan but only manual calculations, while the current research has used a system which will greatly simplify the calculation process unlike previous research [6] .

By these problems, there needs to be a solution that can be found handle that matter with make a Support System Decision, the research conducted by Refika Ratna Dilla and Dito Putro Utomo with the title "The Best Mechanic Selection Decision Support System Using the Operational Competitiveness Rating Analysis (OCRA) Method Case Study: Auto2000" explains that the method used in employee selection is suitable where the results include final grades and rankings, as well as the research carried out The results also include final grades and rankings, but what is different is the method used, namely the SAW method, which is very appropriate to use in this research [7].

In overcoming this problem, an information design system is necessary is by managing cement data to produce information in the form well-organized report , according to research conducted by Bagus Nur Ihwa, Natalia Silalahi, and Rivalri Kristianto Hondro with the title "Decision Support System for Selecting the Best Prosecutor by

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Applying the MABAC Method (Case Study: Medan District Prosecutor's Office)", the results of this research are the selection of the best prosecutor at the Medan District Prosecutor's Office where the system used is desktop-based, while the research carried out is by creating a website-based system [8] . Apart from that, it also requires something a very supportive system in selecting superior cement at the UD.Wendy Jaya store .

One method that can be used in decision making for determine election cement superior that is with method Simple Additives Weighting (SAW) , according to research conducted by Zulfi Azhar, Neni Mulyani, Jeperson Hutahaean, and Ade Mayhaky with the title "The Best E-Commerce Selection Decision Support System Using the MOORA Method" this research uses the moora method where this method can produce accurate results, as this research must prioritize the selection of a method that is better than previous research, namely the SAW method where this method is very suitable to be used in the case of selecting superior cement at UD. Wendy Jaya [9] .

The aim of this research is first to determine the decision to select superior cement and design a decision support system for selecting superior cement at UD stores. Wendy Jaya is based on predetermined criteria, then the second is that by building this system it will be useful for shops in determining superior cement at UD. Wendy Jaya and also the last one applied the simple additive weighting (SAW) method to determine decisions in selecting superior cement at the UD.Wendy Jaya store, According to research conducted by Nursaka Putra, Dedi Rahman Habibie, and Ika Fitri Handayani by title "Supplier selection decision support system at TB. NAMEENE with the SAW method", among other things , helps companies make the best decisions then choose which supplier will send on time and implement the application. The latest research carried out has updates or developments, including this cement selection system which can really make it easier for shop owners to guarantee which cement is the most superior, then with a website-based system the owner can access the system anywhere and at any time and is also easy to use. Even though they both use the same method, they are different from the case studies carried out in previous research [10] .

METHOD

The problem solving technique in this research namely quantitative, a method that relies on objective measurements and mathematical (statistical) analysis of data samples obtained through questionnaires, polls, tests, test hypotheses proposed in the research [11]. The data collection methods used are as follows:

Interview

Interview had done For gather data primary with method interview The resource person is directly the owner of the UD Shop. Wendy Jaya is Mr Waluyo on December 13, 2023, with submit a number of question Which related by election cement superior in UD. Wendy Jaya.

Observation

In this research, direct observation of objects is carried out research related to the selection of superior cement at UD. Wendy Jaya.

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Documentation

The retrieval of data obtained through determination data election cement superior in UD. Wendy Jaya.

The Simple Additive Weighting (SAW) method is one method in method taking decision Which most simple in step solving the method, SAW only do normalization process by having i matrix s which is seen from columns and rows done withdrawal mark highest called with mark maximum and drawing the lowest value in a row is called with a minimum value, normalizes the values in a matrix to compare and evaluate the relative performance of the various entities or variables represented by the matrix.

This a commonly used technique in data analysis , normalize the value if the benefit value or includes the benefit criteria then This is done by dividing each row value by the highest value owned by the row, And If is criterion value form cost the lowest value of the row is divided with mark line [12]. Algorithm method Simple Additive Weighting (SAW) is an algorithm with a method summation weighted [13]. Method This need process normalization matrices decision (x) to something scale Which can compared to with all ratings alternative Which there is [14] . Step solution SAW given equality formula (1) as following:

$$rij = \begin{cases} \dfrac{X_{ij}}{MaxX_{ij}} & \text{If j is benefit attribute} \\ \dfrac{MinX_{ij}}{X_{ij}} & \text{If j is cost attribute} \end{cases} \quad (1)$$

Information :
Rij : ratings performance normalized
$MaxX_{ij}$: maximum value for each row and column
$MinX_{ij}$: minimum value of each row and column
X_{ij} : rows and columns of the matrix
Benefits : If mark biggest is best
Cost : If mark smallest

Mark preference For every alternatives (Vi) given as:

$$V_i = \sum_{j=1}^{n} W_j r_{ij} \quad (2)$$

Information:
Vi : mark rank For every alternative
Wj : weight value of each criterion
rij : matrix normalization value

Greater Vi value indicates that alternative 'A' more selected h [15]. The data contains 5 basic criteria for determining superior cement at UD. Wendy Jaya and data on 10 alternatives that were sampled in determining superior cement that had been approved by UD.Wendy Jaya criteria for determining superior cement at UD. Wendy Jaya :

The first step that must be taken is to give weight to each criterion in table 1.

Table 1. Criterion weights

Code	Criteria	Weight
C1	Price	0.25
C2	Strong Pressure	0.2
C3	Subtlety	0.2
C4	Water Capacity	0.2
C5	Time Hardens	0.15

After giving weight to each criterion, the next step is to determine the scale and weight value for each criterion. The weight scale has its own

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meaning and value, the explanation in question can be seen in the following tables:

Table 2. Price Criteria (C1)

Scale	Value Weight
60000	5
55000	3
50000	1

Table 3. Pressure Strength Criteria (C2)

Scale	Value Weight
Strong Pressure	5
Currently	3
Not strong pressure	1

Table 4. Smoothness Criteria (C3)

Scale	Value Weight
Fine	5
Currently	3
Not Subtle	1

Table 5. Water Capacity Criteria (C4)

Scale	Value Weight
Good	5
Currently	3
Not enough	1

Table 6. Hardening Time Criteria (C5)

Scale	Value Weight
Good	5
Currently	3
Not enough	1

After determining the scale value and weight of each criterion, the next step is to determine the assessment results data. assessment by giving a value to each alternative first. 10 cement alternatives with various brands are filled with criteria values based on facts in the field and assessments that have been obtained previously. It can be seen on the table 7.

Table 7. Assessment Result Data

Alternative	Criteria				
	C1	C2	C3	C4	C5
Three Wheels	5	5	5	5	5
Garuda	5	5	3	3	3
Red and white	5	5	3	3	5
Holsim	5	5	3	5	5
Gresik	3	3	3	3	3
Padang	1	3	3	3	3
Rajawali	5	3	3	3	3
King stone	3	3	3	3	3
Instant Elephant	5	3	3	3	3
Jakarta	1	3	3	3	3

After carrying out the process of normalizing the values of each alternative for each criterion, a normalization matrix is obtained as in table 8.

Table 8. Normalization Matrix

Criteria				
C1	C2	C3	C4	C5
1	1	1	1	1
1	1	0.6	0.6	0.6
1	1	0.6	0.6	1
1	1	0.6	1	1
0.6	0.6	0.6	0.6	0.6
0.2	0.6	0.6	0.6	0.6
1	0.6	0.6	0.6	0.6
0.6	0.6	0.6	0.6	0.6
1	0.6	0.6	0.6	0.6
0.2	0.6	0.6	0.6	0.6

p ranking at the ranking stage there is a process of adding up the results of multiplying the normalized matrix with the weight values. The results of these calculations are then ranked. The alternative with the highest value is the best recommendation in determining decisions [16] .

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The results of calculating the Preference value (V) for each alternative can be made in the following table :

Table 9. Table Results Ranking

Ranking	Alternative	Mark
1	A001	1
2	A004	0.92
3	A003	0.84
4	A002	0.78
5	A007	0.7
6	A009	0.7
7	A005	0.6
8	A008	0.6
9	A006	0.5
10	A010	0.5

From table 9, it can be seen that A001 has the highest value among the other alternatives. So from the case example it can be concluded that the SAW method has provided the best recommendation for A001.

RESULTS AND DISCUSSION

The superior cement selection system at UD. The resulting Wendy Jaya is web-based, which can be accessed via a web browser. Has several features according to object needs, namely admin management, owner management, and superior cement ranking results. This system is also equipped with a login menu as a security wall as well as a way to verify the level of system users [17] .

The ranking of all cement calculation results at UD. Wendy Jaya is as follows: first place, namely Tiga Wheel Cement, then second place, namely Holcim Cement, next in third place is Red and White Cement, next in fourth place is Garuda Cement, next in fifth place is Rajawali Cement, next in sixth place is Elephand Instant Cement, next in seventh place is Semen Gresik, next in eighth place is Semen Batu Raja, next in ninth place is Semen Padang, next in tenth place is Semen Jakarta.

Image 1. Main menu

Form contains menus and sub menus found in the admin system that have been previously designed. Users can choose menus provided by the system that has been created.

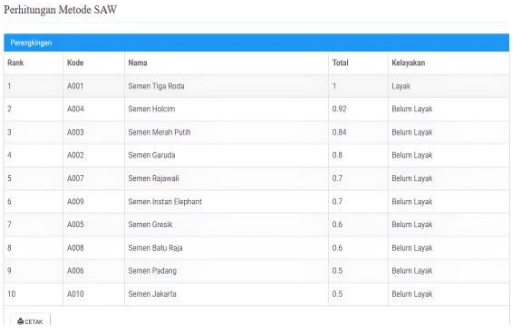

Image 2. Calculation menu

Form a display of the results of the criteria and alternative values, therefore the main ranking results obtained from this calculation are the highest value, namely three-wheel cement (A001), where the cement meets or is superior to the criteria of price, pressure strength, fineness, capacity water and hardening time.

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CONCLUSION

The use of the SAW method, which is implemented into the information system so that users can easily implement the system in selecting superior cement is considered to make things very easy for UD.Wendy Jaya. This is a success in this research in applying the SAW method to help with problems in the UD.Wendy Jaya business sector. It is hoped that in the future, this research can be continued and developed to select cement quality based on specific factors or the kind of building it is intended for, hopefully it can be developed with a more dynamic method too.

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