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DECISION SUPPORT SYSTEM FOR SELECTING EDUCATIVE EQUIPMENT SUPPLIERS IN TOKO ANDA V7

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Abstract: Toko Anda v7 is a shop that sells office stationery and school teaching aids. One of the items frequently ordered at Toko Anda v7 is educational teaching aids (APE). So that shop activities can continue to run, suppliers have a very important role, for this reason the supplier selection process is one of the important decisions that must be taken by the shop. However, this is a problem because each supplier has its own advantages and disadvantages. To help Toko Anda v7 in choosing suppliers, a decision support system was designed. The decision support system is able to provide alternative decision options that can be chosen by decision makers in Toko Anda v7 in determining suppliers of educational teaching aids. The method used in the decision selection process in this decision support system is Weighted Product (WP). Calculations using the Weighted Product (WP) method are able to provide decisions with fast and efficient calculations. The results of designing this decision support system are able to provide a ranking of alternative suppliers based on predetermined criteria.

Keywords: Decision Support System; Supplier; Weighted Product

Abstrak: Toko Anda v7 adalah toko yang bergerak dalam penjualan alat tulis kantor dan alat peraga sekolah. salah satu barang yang sering dipesan di Toko Anda v7 adalah alat peraga edukatif (APE). agar aktivitas toko tetap dapat berjalan suplier memiliki peran yang sangat penting, untuk itu proses pemilihan suplier menjadi salah satu keputusan yang penting yang harus diambil oleh toko. namun hal tersebut menjadi masalah karena setiap suplier memiliki kelebihan dan kekurangan masing-masing. untuk membantu Toko Anda v7 dalam memilih suplier maka dirancanglah sebuah sistem penunjang keputusan. sistem penunjang keputusan mampu memberikan pilihan alternatif keputusan yang bisa dipilih oleh pembuat keputusan di Toko Anda v7 dalam menentukan suplier alat peraga edukatif. metode yang digunakan dalam proses pemilihan keputusan di sistem penunjang keputusan ini adalah Weighted Product (WP). Perhitungan dengan metode Weigthted Product (WP) mampu memberikan keputusan dengan perhitungan yang cepat dan efisien. hasil dari perencangan sistem penunjang keputusan ini mampu memberikan perangkingan alternatif suplier berdasarkan kriteria-kriteria yang telah ditentukan.

Kata kunci: Pemasok; Sistem Penunjang Keputusan; Weighted Product

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INTRODUCTION

Toko Anda v7 is a shop that is engaged in selling office stationery and school teaching aids. One of the items frequently ordered at Toko Anda v7 is educational props (APE). To fulfill these orders, Toko Anda v7 needs help from suppliers [1]. Suppliers play an important role in maintaining the availability of stock of goods for the continuity of buying and selling transaction activities in the shop. Good cooperation between shops and suppliers is very necessary so that buying and selling activities in the shop can be maintained and stock of goods is always available. For this reason, the supplier selection process is a decision that has many considerations and is very important for a shop to take [2]. When choosing a supplier for Toko Anda v7, several criteria are taken into consideration, such as quality of goods, completeness, price, shipping costs, guarantee and delivery time. Next, these criteria will be used to assess and select suppliers from existing potential suppliers [3], [4].

A decision support system is a system used to solve decision-making problems that have varying levels of complexity by utilizing information technology. The decision support system is not the main determinant in decision making but rather acts as a second opinion that can provide recommendations in decision making [5]. Decision Support Systems (DSS) can also be interpreted as a knowledge management system that can support the decision making process by management. This system can provide alternative options to help solve problems and the ability to communicate problems in semi-structured and structured conditions. Decision making with SPK is carried out by processing data and information with certain procedures [6], [7].

One of the methods that can be used in SPK is Weighted Product (WP). The Weighted Product (WP) method connects attribute ratings using multiplication, before multiplying each attribute rating is raised to the power of the attribute's weight [8]. This process is also the same as the normalization process. Calculations using the Weighted Product (WP) method can be done relatively quickly with a high level of efficiency. This is one of the advantages of the Weighted Product (WP) method [9]. The concept of choosing a decision using the Weighted Product (WP) method is that the best choice has a short distance from the positive ideal solution and a long distance from the negative ideal solution. The Weighted Product (WP) method has the advantage of choosing the best decision alternative using a weighting technique from several existing alternatives [10].

Previous research related to decision support systems for supplier selection using the Weighted Product (WP) method, among others. Decision support system for determining the quality of ready-to-sell tempeh using the product weight method [10]. The decision support system implemented in this research can speed up determining the quality of tempeh ready for sale in a shorter time and with same criteria.

The decision support system for selecting building material suppliers uses the product weight method at PT. Create Arsigriya [1]. The decision support system can select building material suppliers efficiently to minimize the company's risk in procuring raw materials and components which has been a problem for the company.

The decision support system for vendor selection in the supply chain uses

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the weighted product method at PT. Nagasena Sinar Jaya [8]. In research conducted at PT. Nagasena Sinar Jaya's decision support system succeeded in providing recommendations to the company in selecting the supply chain application vendor that will be used by the company.

Decision support system for selecting raw material suppliers using the weighted product method [11]. Decision support system applications are used to overcome supplier selection problems. The decision support system can provide recommendations for the best suppliers from ten suppliers who are alternative decision choices in the system.

The determination of yarn supplier by using the weight product method [12]. In this research, a decision support system is used in selecting yarn to be used in production. The decision support system created can filter fourteen existing suppliers and provide recommendations for the best supplier choices based on predetermined criteria..

Selection of office equipment suppliers using the weighted product method at Yapdi Bandar Pulau Private Vocational School [7]. Yapdi Bandar Pulau Private High School utilizes a decision support system to overcome quality problems and delays in the supply of goods that occur. By using a decision support system, SMK Swasta Yapdi Bandar Pulau School can choose the best supplier for procuring office goods at their school.

To help solve supplier selection problems in Toko Anda v7, a supplier selection decision support system was created. The decision support system designed in this research uses the Weighted Product (WP) method to carry out the calculation process in decision making. Later this spk will help Toko Anda v7 to determine the best supplier based on existing criteria and alternatives [11]–[13].

METHOD

The decision support system designed is a system that will be used to help select suppliers in Toko Anda v7. To obtain the data needed to build a decision support system for selecting suppliers for Toko Anda v7 using three methods, namely observation, interviews and literature study. At the observation stage, observations are made of the stages of the decision-making process in Toko Anda v7 in determining supplier choices as well as studying documents and data related to supplier selection and collecting alternative choices for existing educational teaching aids (APE) suppliers. Next, conduct interviews with the parties involved in selecting suppliers to obtain the criteria used in selecting suppliers at Toko Anda v7. After the required data is obtained, proceed with a literature review by collecting journals and books that are relevant to the supplier selection case being researched to support the research being carried out. From the results of data collection, six alternative supplier options were obtained, namely supplier a, supplier b, supplier c, supplier d, supplier e and supplier f. The criteria that will be used in determining suppliers of educational teaching aids (APE) are quality, completeness, price, shipping costs, guarantee, delivery time [1], [11], [14].

After all the data required in the research was collected, a decision support system was designed to solve the problem of decision making in selecting suppliers in Toko Anda v7 . This system will later become an interactive information system that can provide information, modeling and data

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manipulation capabilities to help make decisions on selecting suppliers in Toko Anda v7 [9], [15].

To select the best alternative supplier from a number of existing suppliers with a decision support system, data processing and calculations are carried out using the Weighted Product (WP) method. The steps taken to find the best alternative using the Weighted Product (WP) method are: [5], [10].

1) Determine the criteria in supplier assessment and assign weight values according to the level of importance and determine the nature of these criteria.
2) Provide a value for each criterion and determine the weight value for the criteria used.
3) Assess existing alternatives based on decision selection criteria.
4) Normalize the weights of the criteria.

$$W_j = \frac{w_j}{\sum w_j} \quad (1)$$

5) Carry out a search process to determine the value of vector S.

$$S_i = \prod_{j=1}^{n} X_{i_j}^{w_j} \quad (2)$$

6) Perform a search to determine the value of vector V.

$$V_i = \frac{s_i}{\sum s_i} \quad (3)$$

7) ranking the results of vector Vi calculations. The first order of ranking results will be the best decision choice.

RESULTS AND DISCUSSION

From the information and data that has been previously collected by observing the stages carried out in Toko Anda v7 to select suppliers as well as studying existing documents and data, interviewing relevant parties involved in selecting suppliers, as well as reviewing the problems being faced through relevant journals and books. Next, data and information processing is carried out to create a decision support system design for selecting suppliers of educational teaching aids in Toko Anda v7 . To carry out data processing in this decision support system, the method used is Weighted Product (WP). The steps for finding the best supplier using the Weighted Product (WP) method can be seen.

1) Determine the criteria used in selecting suppliers and assess the weight of the criteria based on the level of importance of the criteria. The decision selection criteria and weight values used in determining suppliers in Toko Anda v7 can be seen in table 1.

Tabel 1. Criteria weight values and criteria properties

Kriteria		Bobot	Tipe
Quality	K1	5	Benefit
Options	K2	3	Benefit
Price	K3	4	Cost
Shipping cost	K4	4	Cost
Warranty	K5	3	Benefit
Delivery Time	K6	2	Cost

2) Determine the assessment points from the criteria and assign weight values. The criteria values and value weights are in the criteria value table.

Tabel 2. Criteria Values and Weights

Keterangan	Bobot
Very good	5
Good	4
Fair	3
Bad	2
Very Bad	1

3) Provide an assessment of each alternative supplier choice based on existing criteria. The alternative

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options that will be selected in this decision support system and their values can be seen in the following table of alternatives and values.

Tabel 3. Alternatif Dan Nilainya

	K1	K2	K3	K4	K5	K6
A1	5	4	3	4	2	3
A2	5	5	4	5	2	3
A3	4	5	5	2	5	4
A4	3	3	5	5	3	2
A5	4	4	3	3	5	4
A6	3	3	5	5	2	2

Tabel 4. Hasil

W_i	S_i	V_i
W1 = 0,2381	S_1 =1,1077	V1 = 0,1738
W2 = 0,1429	S_2 = 1,0376	V2 = 0,1628
W3 = 0,1905	S_3 = 1,2452	V3 = 0,1954
W4 = 0.1905	S_4= 0,9015	V4 =0,1415
W5= 0, 1429	S_5 = 1,2306	V5 = 0,1931
W6 = 0,0952	S_6 = 0,8508	V6 =0,1335

4) Ranking the vector v values produced in the calculation, the vector Vi value with the largest will be the best recommended choice. From the calculation process, supplier choices can be ranked from the highest Vi vector value to the lowest. From the calculation results, alternative supplier A3 has the highest value, namely 0.1954, followed by alternative suppliers A5 and A1 with values of 0.1931 and 0.1738 respectively. The next three ranks below are A2, A4, and A 6 with vector Vi values of 0.1628, 0.1415 and 0.1335. So the best supplier choice resulting from calculations using the WP method is the alternative supplier A3.

CONCLUSION

From the results of the decision support system design that has been carried out, it can be concluded that the decision support system designed can provide recommendations for alternative decision options to determine supplier choices in Toko Anda v7 . The Weighted Product (WP) method used in processing data in selecting suppliers can produce rankings that can help decision makers in making decisions. The decision results from this system can be used as considerations by decision makers in determining suppliers in Toko Anda v7 . The decision support system resulting from this research is not intended to replace the role of the decision maker in determining supplier choices in Toko Anda v7 but rather to help provide decision recommendations only.

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