

Utilization SAW Method to Choose Goods Suppliers at PT.King Computer

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Abstract

The operation of a good system in a company is inseparable from the support of business partners, but it is impossible to obtain if the partner or supplier of goods does not work as the target of the company itself. Given these problems, it is deemed necessary to create a DSS system that can assist directors in determining suitable suppliers to work together. In making this SPK, the SAW method starts from the selection of types of goods, selects criteria and sub-criteria, and determines the weights of each criterion. This study produced an SPK, with six main criteria and their respective weights, based on the criteria entered and processed in accordance with the rules of the SAW method, CV. Eka Makmur was chosen as the most suitable recommendation to become a supplier for all in one PC items. At the testing stage, three methods have been carried out namely black box, output testing, and user acceptance test.

Keywords—DSS, SAW, Supplier

1. INTRODUCTION

The company is an organization that aims to create wealth through the businesses it creates. To be able to operate requires a good and comprehensive system that starts from strategic planning to the evaluation stage [1],[2]. To achieve the goal the company must create a good system that consists of several functional components that are interconnected properly [3]. Problems experienced by PT. King Computers is often the case of delays in shipping stock of goods caused by the negligence of the company to determine a good supplier so that not infrequently resulting in losses, it is deemed necessary to create a system that can really help the company's management in choosing a supporting company or supplier. Decision support systems using the method of simple additive weighting (SAW) is a form or way to overcome these problems.

In the development of information technology decision support systems have been made with a variety of methods, as well as different objects. Research on employee performance appraisal uses the simple additive weighting (SAW) method. The study states that the SAW method is very well used in decision making, but in this study, there are some weaknesses including testing not done in detail so there is no data that clearly proves that testing has been successfully carried out [4].

Decision support system research on acceptance of venture capital loans at BPR PMM Bank concludes the SAW method used has similarities between manual calculations and the final results of the application that has been designed, but in this study has the disadvantage that testing is not found in the paper, so there is no proof of conformity between manual counts and decision support systems [5].

Another study using the SAW method is determining the location of disaster logistics in the city of Jakarta. The research resulted in mapping the location of a disaster warehouse to conduct first aid for flood victims, there are eight criteria to determine the location of a disaster emergency warehouse, this research has a weakness that has not been applied into the application decision support system and only in the form of design [6].

Another study that uses the SAW method that discusses the selection of Bidik Misi scholarship acceptance of this research concluded that the SAW method can work well in the ranking [7]. The SAW method is also used in research that discusses the recruitment of new employees at PT. Warta Media Nusantara, in this study also states that SAW is suitable to be applied in making a ranking, but this research has not been implemented into an application. [8].

2. RESEARCH METHODOLOGY

2.1 Research Flow

This study has several important steps that appear as in Figure 1 research flow, making research flow aims to provide an overview for the readers so they can understand the steps taken in this study.

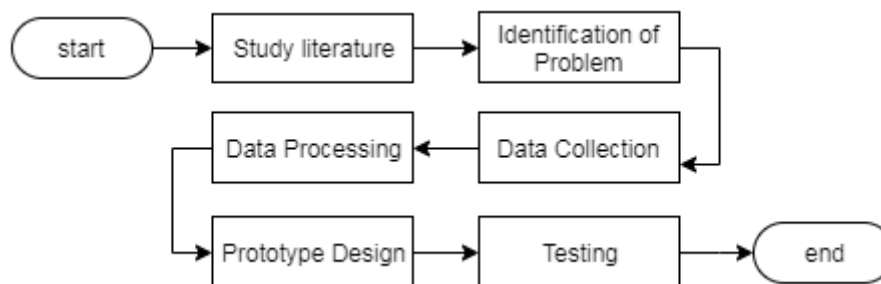


Figure 1 Research Flow

There are six important steps in this research, the first stage is the study of literature, the step is to study matters related to the research topic, while the sources of literature in the form of papers, journals, thesis research results, proceedings, archives and articles that have the characteristics or the similarity of topics discussed in this study. In the second stage, the identification of the problem to be solved or given a solution is done. After further identification in the third stage, the researchers collected data and information sourced from books or from PT. King Computer. Furthermore, in the fourth stage, data processing is carried out by following the rules in PT. King Computer and adjusted to the rules of the method used that is the SAW method it aims to make it easier to move data into the prototype that was made. The fifth step is to design or create a prototype that is used to prove the manual calculations that have been made. The final step is to test the suitability between manual calculations and DSS.

2.2 Simple Additive Weighting (SAW) method

The SAW method has a basic concept of finding the number of ranks for each alternative and for all attributes and requires normalization of the matrix, the SAW method is able to choose the best alternative from a number of alternatives based on predetermined criteria [9][10][11][12].

The final result of the SAW method is ranking each weighted value to obtain wisdom or recommendations that serve as a guide or guide in making a decision.

2.3 System Design

a. Data Flow Diagram

Data flow diagrams are data intended to describe the stages or processes that occur in the system that is being designed or developed. By using the DFD model the flow or flow of data can be detected easily. In the use of the DFD model starting from the context diagram then the tier diagram, level 1 diagram to the detailed diagram, this can be conditioned by the complexity of the Decision Support System developed[5], [13]. DFD level 1 can be seen in figure 2 Data flow diagram.

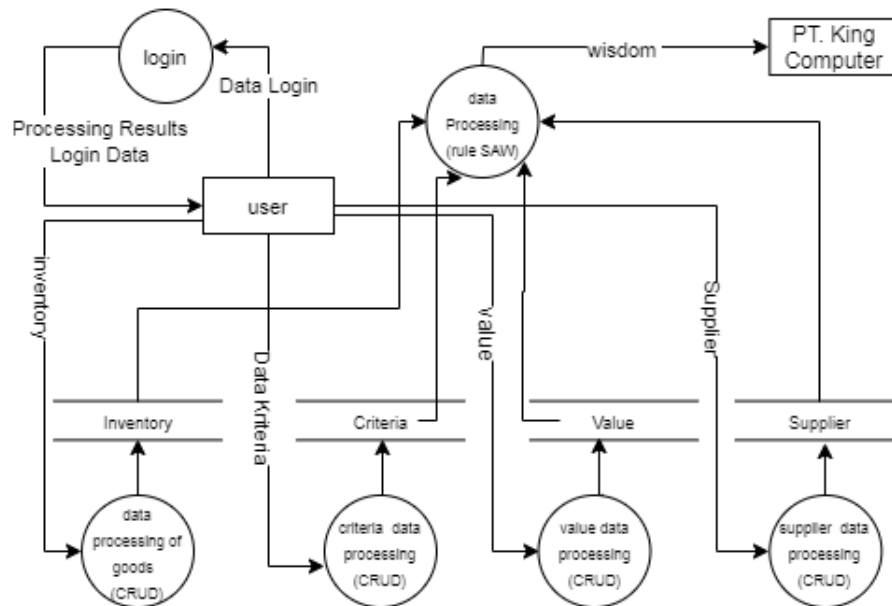


Figure2Data Flow Diagram Level 1

In Figure 2 illustrates the data flow that occurs in the decision support system application, an admin can perform the create, read, update and delete (CRUD) functions on the SPK, data that can be processed such as login data, item data, criteria data, weight data, then the system can send the processing results of each data that has been inputted into the system, while the data sent by the system to the admin can be in the form of visual appearance or results that can be printed.

b. Database Design

The database is a collection of data that are interconnected or related to each other, stored on computer hardware and used by software to manipulate it. [14][15][16]. The database design in this decision support system can be seen in Figure 3.

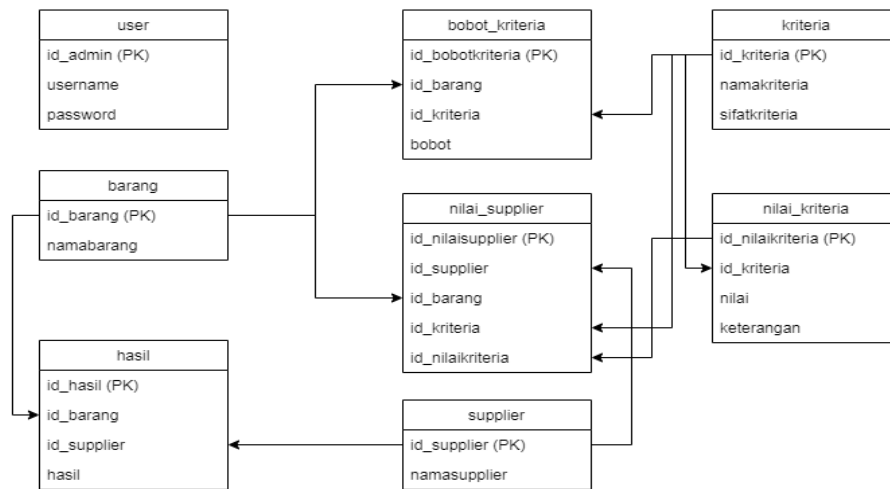


Figure3Design of Decision Support System Database

Figure 3 illustrates the database design with 8 tables used in this CMS, including user tables, table barang, table bobot_kriteria, table nilai_supplier, table supplier, table kriteria, table nilai_kriteria dan table hasil. Of the eight tables, seven tables are related, while one table stands alone, namely the user table. Table barang has *primary key*(PK) id_barang which is related to table bobot_kriteria, table nilai_supplier and table hasil, table supplier related to table hasil dan table nilai_supplier melalui id_supplier as *primary key*. Table kriteria pass through id_kriteria as *primary key* related to table bobot_kriteria, table nilai_supplier, and table nilai_kriteria. Then table nilai_kriteria related to table nilai_supplier pass through id_nilaikriteria as *primary key*.

3. RESULTS AND DISCUSSION

The success of a company is inseparable from the partners of the company itself, in this case, the supplier or supplier of goods, profits or profits can be obtained to the maximum if all partners work well, it is definitely the hope of all company owners.

Therefore a decision support system is designed by considering various criteria in accordance with the wishes of the company itself, in order to assist policy makers in determining the best supplier.

3.1 Types of goods

The types of goods that will be sent by the supplier can be seen as shown in table 3.1 Types of Goods.

Table 3. 1Types of goods

| No | Types of goods | Category |
|----|----------------|------------|
| 1 | Laptop | Electronic |
| 2 | All In One PC | Electronic |
| 3 | Monitor | Electronic |

Table 3.1 shows the types of goods to be sent through suppliers including laptops, all-in-one PCs, and monitors. Of the three types of goods are electronic categories.

3.2Determination of Criteria

The criteria are determined based on the needs of the company and in Table 3.2 List of criteria has been made according to the needs.

Table 3. 2List of Criteria

| Id Criteria | Criteria |
|--------------------|-----------------------|
| 1 | Delivery time |
| 2 | Discount |
| 3 | Service |
| 4 | The warranty |
| 5 | Authenticity of Goods |
| 6 | payment term |

Table 3.2 lists the main criteria consisting of speed of delivery, discount, service, guarantee, authenticity of goods and payment term, from the six criteria chosen because they are considered the most suitable for current needs.

3.3Weight Determination

The determination of weights is made based on a level of importance of the criteria determined into fuzzy numbers which can be seen in Table 3.3 Value Levels.

Table 3. 3Value Levels

| value | information |
|--------------|--------------------|
| 0.00 | Very low |
| 0.25 | Low |
| 0.50 | The middle |
| 0.75 | High |
| 1.00 | Very High |

Table 3.3 explains that there are five levels of weights used in this decision support system, and have been converted into fuzzy numbers, 0.00 is a very low value, 0.25 is a low category, 0.50 is a middle category, a value is 0.75 with a high category while 1.00 is a very high category.

After determining the criteria and the next level of determining sub-criteria to provide a level of value for each predetermined criterion, it can be seen in table 3.4 list of sub criteria.

Table 3. 4List of Sub Criteria

| No | Criteria | Value | Trait |
|-----------|-----------------|--------------|------------------|
| 1 | Delivery time | 0.25 | 1 Day |
| 2 | Delivery time | 0.50 | 2 Day- 7 day |
| 3 | Delivery time | 0.75 | 7 Day -1 month |
| 4 | Delivery time | 1.00 | 1 month more |
| 5 | Discount | 0.25 | 0% (there is no) |
| 6 | Discount | 0.50 | 1%-10% |
| 7 | Discount | 0.75 | 11%-20% |
| 8 | Discount | 1.00 | 20% more |

| | | | |
|----|-----------------------|------|------------------|
| 9 | Services | 0.00 | Very bad |
| 10 | Services | 0.25 | Bad |
| 11 | Services | 0.50 | Enough |
| 12 | Services | 0.75 | Good |
| 13 | Services | 1.00 | Very Good |
| 14 | The warranty | 0.25 | there is no |
| 15 | The warranty | 0.50 | less than 1 year |
| 16 | The warranty | 0.75 | 1 year- 2 year |
| 17 | The warranty | 1.00 | 2 more years |
| 18 | Authenticity of Goods | 0.50 | Faked |
| 19 | Authenticity of Goods | 1.00 | Orginal |
| 20 | Payment term | 0.25 | Less than 1 week |
| 21 | Payment term | 0.50 | 1 week – 2 week |
| 22 | Payment term | 0.75 | 3 week– 4 week |
| 23 | Payment term | 1.00 | 1 month more |

In table 3.4 explains each criterion and its value given by companies that have been adjusted to the needs in the field, for example, the discount rate is given a value division of four categories, i.e. if there is no discount then the value is 0.25, if the discount is 1% -10% then given 0.50 value if the discount is 11% -20%, then a value of 0.75 is given, whereas if the discount exceeds 20% then a value of 1.00 is given.

3.4 Calculating Values Based on Weight and Criteria

To determine the value or rank of each supplier is given a weight according to the rules that have been made, it can be seen in table 3.5

Table 3. 5 Nilai Supplier

| Supplier | Criteria | | | | | |
|------------------|---------------|----------|----------|----------|-----------------------|-----------------------|
| | Delivery time | Discount | Services | Warranty | Authenticity of Goods | Authenticity of Goods |
| CV. Eka Makmur | 0,5 | 0,75 | 0,5 | 1 | 1 | 1 |
| CV. Bersaudara | 1 | 0,75 | 0,5 | 1 | 1 | 0,5 |
| CV. Saudara Dua | 0,25 | 0,75 | 0,75 | 0,75 | 0,5 | 0,5 |
| CV. Ramai Makmur | 0,75 | 1 | 0,5 | 0,75 | 1 | 1 |

Table 3.5 shows the value of each supplier in each category, for example, CV. Brother Two on the delivery speed criterion has a value of 0.25, the discount criterion has a value of 0.75, the service criterion has a value of 0.75, the warranty criterion has a value of 0.75, the authenticity criterion has a value of 0.5 and on the payment due criteria has a value of 0.5. Normalization is done to obtain the ranking.

alternative 1

$$r_{11} = \frac{\min \{0.5; 1; 0.25; 0.75\}}{0.5} = \frac{0.25}{0.5} = 0.5 \quad r_{14} = \frac{1}{\max \{1; 1; 0.75; 0.75\}} = \frac{1}{1} = 1$$

$$r_{12} = \frac{0.75}{\max\{0.75; 0.75; 0.75; 1\}} = \frac{0.75}{1} = 0.75$$

$$r_{15} = \frac{1}{\max\{1; 1; 0.5; 1\}} = \frac{1}{1} = 1$$

$$r_{13} = \frac{0.5}{\max\{0.5; 0.5; 0.75; 0.5\}} = \frac{0.5}{0.75} = 0.667$$

$$r_{16} = \frac{1}{\max\{1; 0.5; 0.5; 1\}} = \frac{1}{1} = 1$$

alternative 2

$$r_{21} = \frac{\min\{0.5; 1; 0.25; 0.75\}}{1} = \frac{0.25}{1} = 0.25$$

$$r_{24} = \frac{1}{\max\{1; 1; 0.75; 0.75\}} = \frac{1}{1} = 1$$

$$r_{22} = \frac{0.75}{\max\{0.75; 0.75; 0.75; 1\}} = \frac{0.75}{1} = 0.75$$

$$r_{25} = \frac{1}{\max\{1; 1; 0.5; 1\}} = \frac{1}{1} = 1$$

$$r_{23} = \frac{0.5}{\max\{0.5; 0.5; 0.75; 0.5\}} = \frac{0.5}{0.75} = 0.667$$

$$r_{26} = \frac{1}{\max\{1; 0.5; 0.5; 1\}} = \frac{0.5}{1} = 0.5$$

alternative 3

$$r_{31} = \frac{\min\{0.5; 1; 0.25; 0.75\}}{0.25} = \frac{0.25}{0.25} = 1$$

$$r_{34} = \frac{0.75}{\max\{1; 1; 0.75; 0.75\}} = \frac{0.75}{1} = 1$$

$$r_{32} = \frac{0.75}{\max\{0.75; 0.75; 0.75; 1\}} = \frac{0.75}{1} = 0.75$$

$$r_{35} = \frac{0.5}{\max\{1; 1; 0.5; 1\}} = \frac{0.5}{1} = 0.5$$

$$r_{33} = \frac{0.75}{\max\{0.5; 0.5; 0.75; 0.5\}} = \frac{0.75}{0.75} = 1$$

$$r_{36} = \frac{0.5}{\max\{1; 0.5; 0.5; 1\}} = \frac{0.5}{1} = 0.5$$

alternative 4

$$r_{41} = \frac{\min\{0.5; 1; 0.25; 0.75\}}{0.75} = \frac{0.25}{0.75} = 0.333$$

$$r_{44} = \frac{0.75}{\max\{1; 1; 0.75; 0.75\}} = \frac{0.75}{1} = 0.75$$

$$r_{42} = \frac{1}{\max\{0.75; 0.75; 0.75; 1\}} = \frac{1}{1} = 1$$

$$r_{45} = \frac{1}{\max\{1; 1; 0.5; 1\}} = \frac{1}{1} = 1$$

$$r_{43} = \frac{0.5}{\max\{0.5; 0.5; 0.75; 0.5\}} = \frac{0.5}{0.75} = 0.667$$

$$r_{46} = \frac{1}{\max\{1; 0.5; 0.5; 1\}} = \frac{1}{1} = 1$$

The results of the normalization are converted into a normalization matrix, which then determines the preference value, then multiplied by the weight of each criterion.

$$R = \begin{bmatrix} 0.5 & 0.75 & 0.667 & 1 & 1 & 1 \\ 0.25 & 0.75 & 0.667 & 1 & 1 & 0.5 \\ 1 & 0.75 & 1 & 1 & 0.5 & 0.5 \\ 0.333 & 1 & 0.667 & 0.75 & 1 & 1 \end{bmatrix}$$

$$A = (0.75*0.5)+(0.75*0.75)+(0.75*0.667)+(0.5*1)+(1*1)+(0.75*1) = 3.6875$$

$$B = (0.75*0.25)+(0.75*0.75)+(0.75*0.667)+(0.5*1)+(1*1)+(0.75*0.5) = 3.1250$$

$$C = (0.75*1)+(0.75*0.75)+(0.75*1)+(0.5*0.75)+(1*0.5)+(0.75*0.5) = 3.3125$$

$$D = (0.75*0.333)+(0.75*1)+(0.75*0.667)+(0.5*0.75)+(1*1)+(0.75*1) = 3.6250$$

3.5 User Interface

In the decision support system that has been designed, it can be started from the input the name of the milk goods to the needs of the company, it can be done by a user, while the module for managing data items can be seen in figure 4.

+ Tambah data

Nama Barang :

Daftar Barang

| No | Nama | Aksi |
|----|---------------|---|
| 1 | Laptop | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 2 | All in one PC | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 3 | Monitor | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |

Figure4Item Data Module

In Figure 4 is a module to manage data items, a user can perform the function of creating, read, update and delete (CRUD) of data and types of goods that fit the needs of the company, in the application module the goods have been inputted with three types of items namely laptop, all in one PC and monitor.

Data that has been inputted subsequently a user can manage supplier data as shown in figure 5.

+ Tambah data

Nama Supplier :

Daftar Supplier

| No | Nama | Aksi |
|----|-----------------|---|
| 1 | CV. Eka Makmur | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 2 | CV. Bersaudara | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 3 | CV. Saudara Dua | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |
| 4 | CV. Gelora | <input type="button" value="Edit"/> <input type="button" value="Delete"/> |

Figure5Supplier Data Module

In Figure 5 is a module that can be used to manage supplier data, a user can perform the create, read, update and delete (CRUD) functions of supplier data needed by the company, the supplier data module has been inputted by several suppliers which are usually the company's choice such as CV. Eka Makmur, CV. Brothers and sisters, CV. Saudara Dua, CV. Surge and several other suppliers.

The supplier data that has been inputted by the user can then make the specified criteria in accordance with the needs of the company and in the decision support system that has been designed, the criteria have two characteristics, namely, cost and benefit. The criteria module can be seen in Figure 6.

Tambah data

Nama kriteria :

Sifat kriteria :

Simpan **Reset**

Daftar Kriteria













| No | Nama | Sifat | Aksi |
|----|----------------------|---------|---|
| 1 | kecepatan pengiriman | Cost |   |
| 2 | Tingkat Diskon | Benefit |   |
| 3 | Pelayanan | Benefit |   |
| 4 | garansi | Benefit |   |
| 5 | keaslian barang | Benefit |   |
| 6 | tempo pembayaran | Benefit |   |

Figure6Criteria Data Module

In Figure 6 explains the criteria used in the decision support system that has been designed, there are six main criteria, namely delivery speed, discount rates, service, guarantee, the authenticity of goods, and payment tempo. These six criteria will be solved into sub criteria as shown in Figure 7.

Tambah data

Kriteria :

Nilai :

Keterangan :

Simpan **Reset**

Daftar Sub Kriteria

Semua Kriteria









| No | Nama | Nilai | Sifat | Aksi |
|----|----------------------|-------|------------------|---|
| 1 | kecepatan pengiriman | 0.25 | 1 Hari |   |
| 2 | kecepatan pengiriman | 0.5 | 2 hari – 7 hari |   |
| 3 | kecepatan pengiriman | 0.75 | 7 hari – 1 bulan |   |
| 4 | kecepatan pengiriman | 1 | 1 bulan lebih |   |

Figure7Sub Criteria Data Module

In figure 7 the sub criteria data module explains the level of value that depends on the needs of the company, for example, the sub criteria data module has been solved from the main criteria of speed of delivery into four parts, namely 1 (one) day given a value of 0.25, 2-7 (two to seven) a day is given a value of 0.5, 7 days - 1 (one) month is given a value of 0.75, and if it exceeds 1 (one) month a value of 1.00 is given. in full the values and sub criteria can be seen in table 3.4.

To determine the value for each criterion, a user can access the weights module, which looks like in figure 8.

Tambah data

Jenis Barang

kecepatan pengiriman

Tingkat Diskon

Pelayanan

Daftar Bobot








| No | Nama Barang | Aksi |
|----|---------------|---|
| 1 | Laptop |    |
| 2 | All in one PC |    |
| 3 | Monitor |    |

Figure8Weight Module

Figure 8 the weight module is a form that can be accessed by a user if he wants to give weight to the criteria of each item, for example, a user selects all in one pc then the user can assign values to each subcriterion.

After giving weight to the items that will be ordered, then weighting the suppliers in accordance with the data owned by the company, while the assessment of the supplier can be seen in Figure 9.

Detail data

Nama Supplier
CV. Eka Makmur

Jenis Barang
All in one PC

kecepatan pengiriman
2 hari – 7 hari

Tingkat Diskon
11% – 20%

Daftar Nilai

Semua Jenis Barang










| No | Nama Barang | Nama Supplier | Aksi |
|----|-------------|---------------|---|
| 1 | Labtop | CV. Ekaristi |    |
| 2 | Labtop | CV. Maju Jaya |    |
| 3 | Labtop | CV. Melati |    |

Figure9Supplier Assessment Module

Figure 9 is a module that functions to input the assessment of suppliers starting from the selection of suppliers, types of goods, delivery speed, discount rates, service, guarantee, the authenticity of goods and payment terms.

After all the data is inputted then the user can access the results form to obtain wisdom or recommendations from the decision support system, while the recommendations from the SPK that have been designed can be seen in Figure 10.

| <div>  HASIL Halamanan Utama Hasil Penilaian </div> | | | | | | | |
|--|----------------------|----------------|-------------------|-----------------|------------------|-------|-----------|
| All in one PC | | | | | | | Cetak Pdf |
| Perangkingan | | | | | | | |
| Alternative | Kriteria | | | | | | Hasil |
| | kecepatan pengiriman | Tingkat Diskon | Pelayanan garansi | keaslian barang | tempo pembayaran | | |
| CV. Eka Makmur | 0.375 | 0.5625 | 0.50025 | 0.5 | 1 | 0.75 | 3.68775 |
| CV. Saudara Dua | 0.1875 | 0.5625 | 0.50025 | 0.5 | 1 | 0.375 | 3.12525 |
| CV. Gelora | 0.75 | 0.5625 | 0.75 | 0.375 | 0.5 | 0.375 | 3.3125 |
| CV. Ramai Makmur | 0.24975 | 0.75 | 0.50025 | 0.375 | 1 | 0.75 | 3.625 |
| Jadi rekomendasi pemilihan supplier All in one PC jatuh pada CV. Eka Makmur dengan Nilai 3.688 | | | | | | | |

Figure10Results Module

Figure 10 provides recommendations or wisdom based on data that has been input into the system and processed using the Simple Additive Weighting (SAW) method by selecting all in one PC items and four suppliers, with different values, CV. Eka Makmur as the best supplier.

3.6 Testing

Testing is a proof of the steps of manual calculations and system calculations, in addition, testing is also done to find out whether the decision support system can work well.

a. Black Box Testing

Black box testing is done with the aim of knowing the functionality of the SPK that has been designed, testing is carried out on all modules in the decision support system. The results of testing with the black box method can be seen in table 3.6

Table 3. 6Black Box Method Test Results

| No | Scenarios in Testing | Expected results | Test result |
|----|--|--|-------------|
| 1 | In the login form, enter the wrong username and password | Remain in the login form and get the incorrect username and password information | Valid |
| 2 | At the login form enter the correct user name and password | The user goes to the main menu form | Valid |
| 3 | In all modules, a CRUD function | Data can be input and stored in the | Valid |

| | | | |
|---|--|--|-------|
| | test is performed | database, displayed, edited and deleted | |
| 4 | Entering data items, suppliers, criteria and weights, further processing | The results module can display wisdom or recommendations based on ranking. | Valid |
| 5 | Clicking on the print results button | Files can be printed in the form of a.PDF file | Valid |
| 6 | Click the log out button | Back to the login menu | Valid |

Table 3.6 is the result of testing using the black box method, each module is tested for functionality, the testing is carried out in detail but the data displayed is only partial and focused on the most important parts.

b. Output testing

Testing output is a form of testing that matches manual calculations and the final results of the SPK that have been designed, in this test will get results between failing or succeeding, meaning that if the data processed through Microsoft Excel and SPK has the same results then the test is declared successful or valid whereas if the data processed is not the same then the test is considered a failure or invalid. The results of testing the output can be seen in table 3.7.

Table 3. 7Output Test Results

| Testing | Criteria | Manual Calculation | DSS calculation | Ket |
|---------|------------------------------------|---------------------|-------------------|-------|
| Case | Supplier: CV. Eka Makmur | CV Eka makmur : | CV Eka makmur : | Valid |
| | Types of goods: all in one PC | 3.68775 | 3.68775 | |
| | Delivery time: 2-7 Day | CV. Saudara Dua : | CV. Saudara Dua : | |
| | Discount : 11%-20% | 3.1252 | 3.1252 | |
| | Sevices: Enough | CV. Gelora : 3.3125 | CV. Gelora : | |
| | Warranty: 2 years more | CV. Ramai Makmur : | 3.3125 | |
| | The authenticity of Goods: orginal | 3.625 | CV. Ramai | |
| | Payment term: 1 month more | | Makmur : 3.625 | |
| | Supplier: CV. Saudara Dua | | | |
| | Types of goods: all in one PC | | | |
| | Delivery time: 1 month more | | | |
| | Discount : 11%-20% | | | |
| | Sevices: Enough | | | |
| | Warranty: 2 years more | | | |
| | The authenticity of Goods: orginal | | | |
| | Payment term: 1-2 week | | | |
| | Supplier: CV. Gelora | | | |
| | Types of goods: all in one PC | | | |
| | Delivery time: 1 Day | | | |
| | Discount : 11%-20% | | | |
| | Sevices: Good | | | |
| | Warranty:1- 2 Years | | | |
| | The authenticity of Goods: Faked | | | |
| | Payment term: 1-2 Week | | | |
| | Supplier: CV. Ramai Makmur | | | |
| | Types of goods: all in one PC | | | |

Delivery time: 7 Day- 1 month
 Discount: 20% more
 Services: enough
 Warranty: 1- 2 Year
 The authenticity of Goods: original
 Payment term: 1 month more

In testing the output contained in table 3.7 by selecting the type of goods all in one PC, with six main criteria and weights determined as in the table, between manual and system calculations have in common so that the test was declared successful or valid.

c. *User Acceptance Testing*

User Acceptance Test aims to find out whether the decision support system that has been designed can be put to good use by the user, while the User Acceptance Test results can be seen in table 3.8.

Table 3. 8 User Acceptance Test Result

| No | Question | Percentage of Respondents' Answers (%) | | | | |
|-------|---|--|----|----|----|----|
| | | SB | B | N | KB | TB |
| 1 | Does the system have a CRUD function? | 90 | 10 | | | |
| 2 | Does the system have wisdom or recommendations? | 80 | 20 | | | |
| 3 | Does SPK can solve the problem on target? | 80 | 20 | | | |
| 4 | Does SPK can provide flexibility in processing data? | 70 | 20 | 10 | | |
| 5 | Is the wisdom generated is enough in solving problems in the company? | 80 | 10 | | 10 | |
| Total | | 80 | 16 | 2 | 2 | 0 |

In table 3.8 User Acceptance Test conducted on five users by giving questions related to the system with very true criteria (SB), true (B) neutral (N), incorrect (KB) and incorrect (TB). From the five respondents obtained a very correct percentage of (SB) 80%, correct answers (B) 16%, neutral answers (N) 2%, incorrect answers (KB) 2% and incorrect (TB) 0%.

4. CONCLUSION

In this study, researchers can draw some conclusions including the following:

1. By utilizing the SAW method to design a supplier selection decision support system, it is very good because it can provide the best supplier recommendations based on the criteria and weights that have been inputted on the system.
2. With the criteria and the weight that has been entered into the system, from the four potential suppliers selected CV. Eka Makmur is the best recommendation for PT. King Computers to be chosen as a supplier.
3. In this research, 3 testing methods have been carried out, the first black box method testing of 6 (six) conditions displayed all successfully performed, the output testing method between manual and system calculations has the same value so that it is declared successful or valid, and user acceptance testing get a very correct answer as much as 80%.

5. SUGGESTION

In this study the authors provide several suggestions that can be done by subsequent researchers in making decision support systems, especially on the use of simple additive weighting (SAW) methods, as for the suggestions given are as follows:

1. To better know the wisdom accuracy of the SPK, it should be used in combination with other methods, so that the results of the SPK can be compared.
2. Testing decision support systems can be added to several testing methods not just black boxes, output testing, and user acceptance tests.

REFERENCES

- [1] K. Verni and G. Memarista, "Analisis Kinerja Perusahaan Menggunakan Metode Balanced Scorecard (Studi Kasus Pada PT . Aditya Sentana Agro)," *Agora*, vol. 5, no. 1, p. 7, 2017.
- [2] W. A. D. Retnawan, P. Kindangen, and J. L. Sepang, "Analisa Kinerja Perusahaan Dengan Menggunakan Pendekatan Balance Scorecard (Studi Kasus Pada Pt United Tractor, Tbk)," *J. Berk. Ilm. Efisiensi*, vol. 16, no. 3, pp. 219–229, 2016.
- [3] R. L. Putri, "Peningkatan Kualitas Produk Melalui Penerapan Prosedur dan Sistem Produksi : Studi Pada UD Wijaya Kusuma Kota Blitar," *J. WRA*, vol. 4, no. 2, pp. 813–828, 2016.
- [4] A. P. Windarto, "PENILAIAN PRESTASI KERJA KARYAWAN PTPN III PEMATANGSIANTAR DENGAN METODE SIMPLE ADDITIVE WEIGHTING (SAW)," *J. Ris. Sist. Inf. Dan Tek. Inform.*, vol. 2, no. 1, pp. 84–95, 2017.
- [5] P. Hasan, "SISTEM PENDUKUNG KEPUTUSAN PENERIMAAN KREDIT MODAL USAHA PADA PT.BANK BPR PMM," *J. Sist. Inf. DAN Teknol. Inf.*, vol. 7, no. 1, pp. 77–88, 2018.
- [6] Nawindah, "Simple Additive Weighting (SAW) Mathematics Method for Warehouse Disaster Location Selection In Central Jakarta, Indonesia," *Int. J. Pure Appl. Math.*, vol. 117, no. 15, pp. 795–803, 2017.
- [7] R. Fauzan, Y. Indrasary, and N. Muthia, "Sistem Pendukung Keputusan Penerimaan Beasiswa Bidik Misi di POLIBAN Dengan Metode SAW Berbasis Web," *J. Online Inform.*, vol. 2, no. 2, p. 79, 2018.
- [8] A. Setyawan, F. Y. Arini, and I. Akhlis, "Comparative Analysis of Simple Additive Weighting Method and Weighted Product Method to New Employee Recruitment Decision Support System (DSS) at PT. Warta Media Nusantara," *Sci. J. Informatics*, vol. 4, no. 1, pp. 34–42, 2017.
- [9] N. Setiawan *et al.*, "Simple additive weighting as decision support system for determining employees salary," *Int. J. Eng. Technol.*, vol. 7, no. 2.14 Special Issue 14, pp. 309–313, 2018.
- [10] I. Kaliszewski and D. Podkopaev, "Simple additive weighting - A metamodel for multiple criteria decision analysis methods," *Expert Syst. Appl.*, vol. 54, pp. 155–161, 2016.
- [11] A. P. and S. M. Widyastuti, "Simple Additive Weighting Method on Intelligent Agent for Urban Forest Health Monitoring," *INTERNATIONAL Conf. Comput. Control. INFORMATICS ITS Appl.*, pp. 132–135, 2014.
- [12] N. Nurmalini and R. Rahim, "Study Approach of Simple Additive Weighting For Decision Support System," *Int. J. Sci. Res. Sci. Technol.*, vol. 3, no. 3, pp. 541–544, 2017.
- [13] David, "Application of Forward Chaining in Expert Systems for Diagnosing Corn Pests and Plant Diseases," *Semin. Nas. Inform.*, 2014.

- [14] W. S. Dewi, R. Hammad, E. Pawan, and Yuliana, "Analisis dan Perancangan Sistem Basis Data SIAP PPDB Online," in *Seminar Nasional Sistem Informasi dan Teknologi Informasi 2018*, 2018, pp. 791–796.
- [15] Risa and Y. Yakub, "Perancangan Sistem Informasi Penggajian Pada PT. Eagle Indo Pharma," *J. Sisfokom (Sistem Inf. dan Komputer)*, vol. 3, no. 2, pp. 24–29, 2014.
- [16] S. Mulyati, B. A. Sujatmoko, T. I. M. Wira, R. Afif, and R. A. Pranata, "Normalisasi Database Dan Migrasi Database Untuk Memudahkan Manajemen data," *Sebatik*, pp. 124–129, 2013.