Journal of Information System and Technology Research

journal homepage: https://journal.aira.or.id/index.php/jistr/

Decision Support System SAW Method Exporter Foreign Trade Section

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ARTICLE INFO

Article history:

Received Jan 28, 2022
Revised Jan 28, 2022
Accepted Jan 28, 2022
Available online Jan 28, 2022

Keywords:

SAW
Export
Decisson Support System

ABSTRACT

Exports can be said to be activities of transporting goods or commodities between agencies. Exports can generally be carried out by medium-sized businesses for strategies to compete in international markets. exports can provide foreign exchange earnings for the agency of origin of the goods or commodities. The problem in this research is that it is not known which PT exports of goods is better than other PT. This research process uses a decision support system to determine which exporting company is more profitable for the agency, which is better in terms of points, the number of days the goods arrive (20%), the weight of the goods (20%), packaging (25%), method (15%), type of goods (20%). The purpose of this study is to determine the best export of goods using a decision support system using the SAW (Simple Additive Weighting) method. In this case, Data collection techniques used in this case are library research, observation. and using the Simple Additive Weighting (SAW) method to assist in making decisions to determine which export of goods from PT is the best.

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1. INTRODUCTION

An information system is a system within an organization that combines the day-to-day transaction processing needs that support operations, and represents the organization's management and activities, and provides the availability of reports required by external parties.[1]

Advances in Information Technology Today's hardware and software for both devices have grown so rapidly that almost all human work can be done using computers. Therefore, they say that computers are tools for people to complete their work. The case caused a race between private and public institutions to improve performance and take the best steps to overcome competition in various fields.[2]

Decision making is the process of selecting alternative courses of action to achieve goals. This decision determines the course-based selection which is carried out through a systematic approach. The process of turning questions into information by collecting data and adding it to influencers needs to be considered when making decisions.[3]

The research objective is to determine the best export by using the Simple Additive Weighting (SAW) method with the best export decision support system. In this research, the data collection technique used is literature study, observation. by using the Simple Additive Weighting (SAW) method to assist decision making in determining which export from PT is the best.

A decision support system is a system that can form various information aimed at certain problems that must be solved by managers and can help managers make decisions.[4] the benefits of SPK by using the SAW method are more appropriate when applied to the problems that exist in the agency. This method was chosen because it allows to choose the best option from several selected options. It is a viable option for the best export parts based on predefined criteria. This research is to determine the weight value for each attribute, followed by a ranking process to determine the best

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alternative.[5] The advantage of the SAW model compared to other decision models is a more accurate assessment because it is based on predetermined criteria and preference weights. [6]

The Export Rating System is a system used by the Ministry of Industry and Trade of North Sumatra to sort the export system and rank the highest exports of goods. The results of this export decision will be a tool for decision making such as shipping and receiving goods. The assessment is carried out using 5 criteria: Packaging Time, Weight of the Goods, Payment Method using a Decision Support System with the SAW method.

A website, or web for short, is an electronic page that provides information over the Internet that can be accessed from anywhere in the world as long as it is connected to the Internet. Website can be defined as a collection of multi-page pages that contain information in the form of text, images, video, audio, and other animated digital data delivered via an internet connection.[7]

2. RESEARCH METHOD

This research method is the method used to find the data needed to summarize the survey results. In this case the researcher uses the SAW method to obtain the necessary information. In particular, the SAW method helps determine the best export of goods by weight per kilogram using a decision support system.

2.1 Research Object

The research conducted is to determine the assessment of the best export goods company with a decision support system and the SAW method.[8]

The following is an overview of the research through several stages:

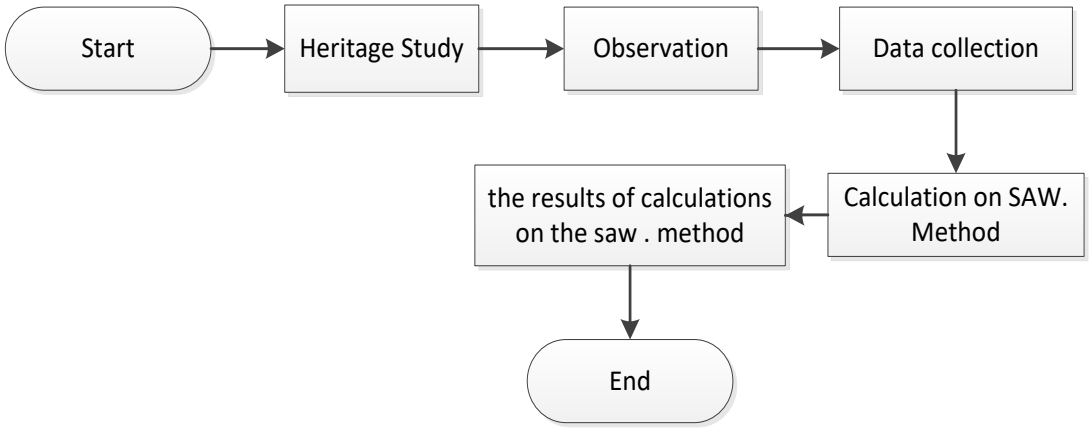

Figure 1 research stages

2.2 Data Collection

Data collection carried out by the author in order to support the achievement of data collection by carrying out activities:

1. Observation can be said to be a data collection technique in the process of direct observation and systematically recording the activities under study.
2. This stage is in terms of determining the best export process with criteria consisting of packaging, weight of goods, method of payment, amount to goods and types of goods and weights assessed.[9]

2.3 SAW Method

(SAW) Simple Additive Weighting is a method that can be used to make decisions. The concept of Simple Complementary Weighting (SAW) is to find the total weight value for each option in the criteria.

2.4 SAW Method Calculation

The following is an overview of the stages of selection in the SAW method:

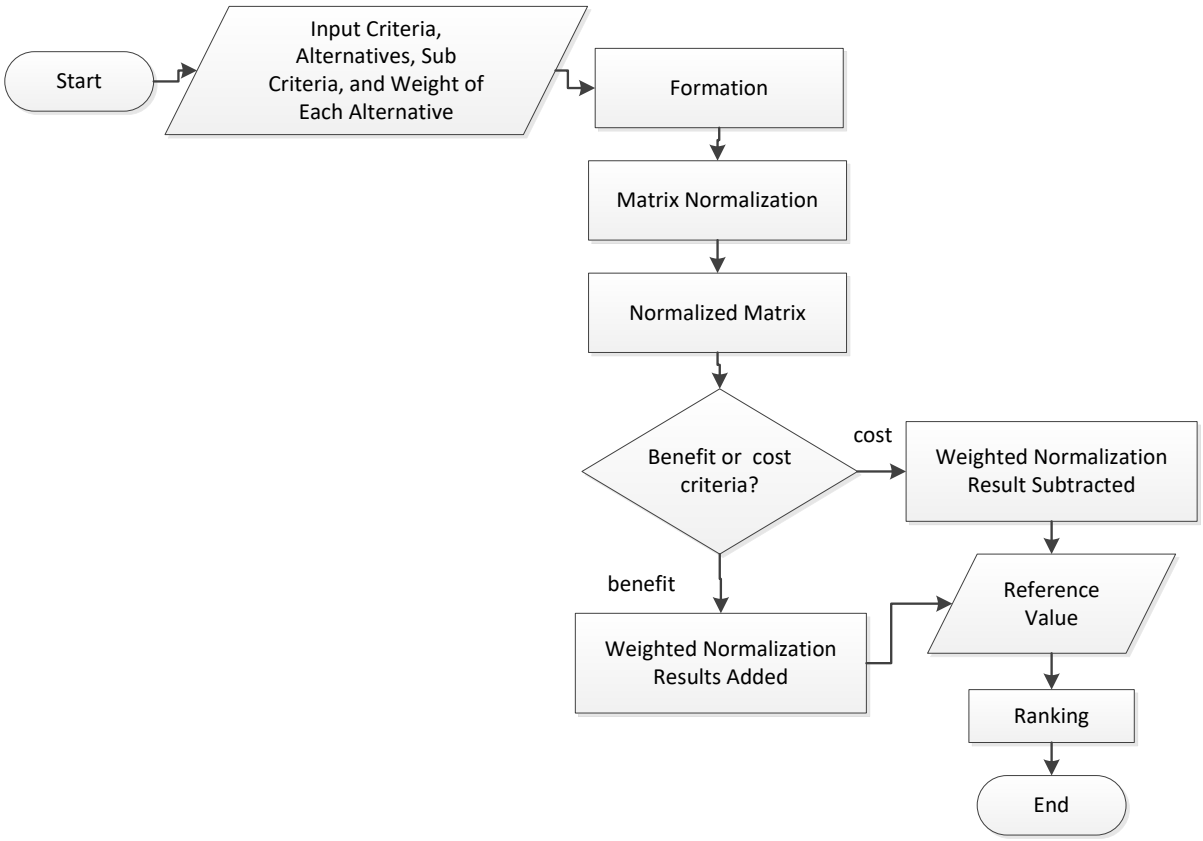

Figure 2 SAW Completion Flowchart

The calculation steps for the SAW method are as follows:

1. Determine Alternatives (Ai).
2. Determining criteria to be used as a references in making decisions(Cj).
3. Determine the preference weight (W) for each criterion. W=[W1 W2 W3 ... W4]
4. Making a match rating table for each alternative and criteria.
5. Create a decision matrix (X) which is formed from the rating table of the suitability of each alternative (Ai) on each predetermined criterion (Cj).
6. Normalize the decision matrix X by calculating the normalized performance rating value (rij) from the alternative (Ai) on performance(Cj).
7. The results of the normalized (rij) performance rating assessment and from a normalized matrix (R).[10]

Analyzing and Applying the SAW Method The first process is to classify and make decisions on the selected criteria. These criteria are divided into two attribute categories: benefit and cost criteria.

Benefit If the value of each criterion, the higher the value, the better. For example: Value of goods, packaging, etc. Cost If the value of each criterion is getting smaller, the value is better. For example: Amount to goods.[11]

Formula to perform Normalization

$$R_{ij} = \begin{cases} \frac{x_{ij}}{\max x_{ij}}, jika\ j \\ atribut\ keuntungan(benefit) \\ \frac{\min x_{ij}}{x_{ij}}, jika\ j \\ atribut\ biaya(cost) \end{cases}$$

Rij = Normalized performance rating
Maxij = Maximum value Each row and column
Minij = Minimum value Each row and column
Xij = Matrix Rows and Columns [12]

3. RESULTS AND DISCUSSION

At this stage the SAW method is used to determine the best export and is implemented using a web-based application. The results of the web-based implementation are:

Use Case SPK System Best export rating

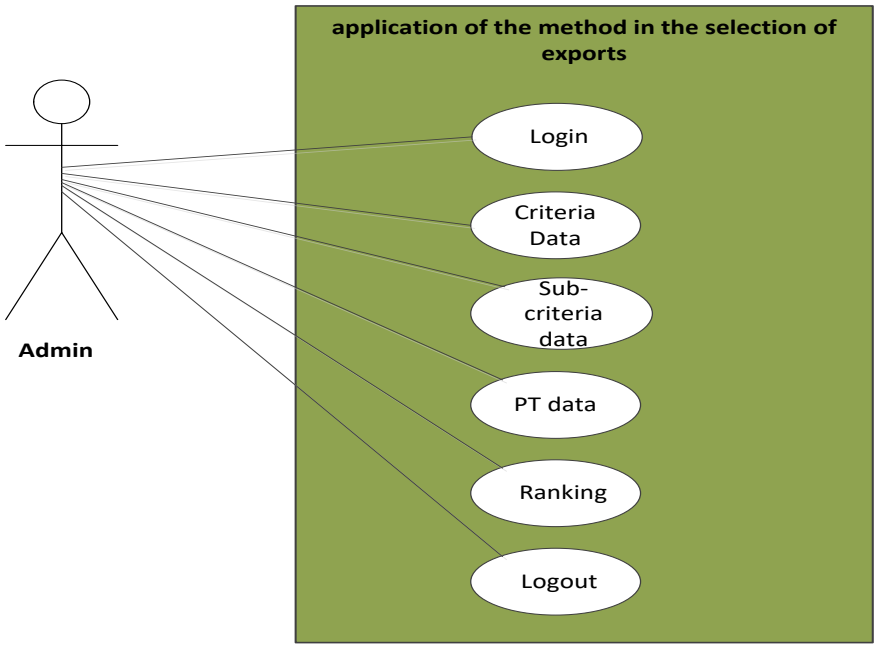

Figure 3 use case diagram of SPK

Figure 3 above shows the best use of the export assessment SPK program system in Disperindag using the SAW method. Where the Admin logs in, then adds Criteria Data, then adds Sub Criteria Data, then adds Employee Data and will be processed so that the ranking results are obtained. Then the Admin logs out. For the Use Case Scenario, it can be seen in table 1 below.

Use Case SPK Best export assessment	
purpose	Allows Admin to search for the best export assessment, using the SAW method.
Actor	Admin
Initial Condition	Validated and valid login
Main Scenario	Admins can create (tambah), update (memperbarui), edit, delete (hapus) the criteria and sub-criteria data. Admin can input value on alternative data. The program displays the results of recommendations (rankings) for the best export assessment.
Skenario Alternatif	If the create, update, edit, delete (CRUD) error occurs, a dialog message "data failed to save" will appear. If the input value is not done in its entirety, a dialog message "please fill out this field" will appear.
Final Condition	Logout

Table 1.Use Case Scenario SPK Best export assessment

WEB-Based SAW

1. Added Topic or title

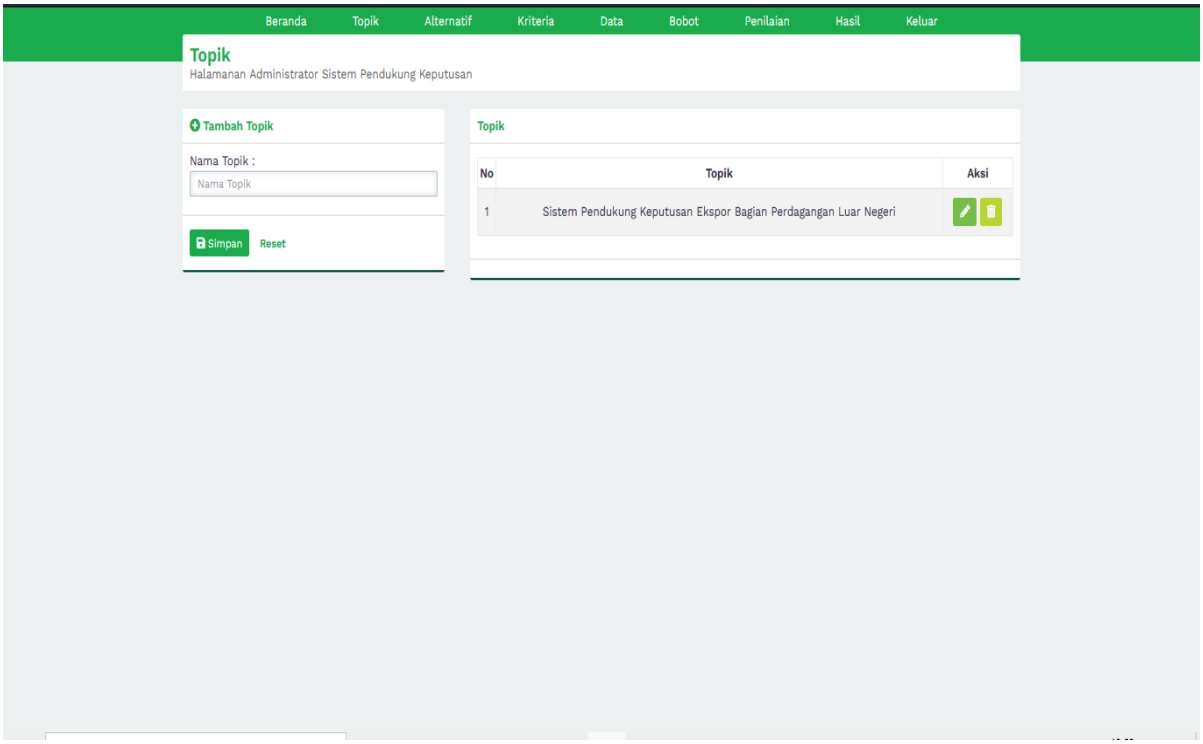

Figure 4 Administrator View

In figure 4, after we open localhost/SAW here we can enter a title or topic, and there is also a save and reset button, after we input the title we can immediately click save so that the title we input will appear on the topic page.

2. Add Alternative

An alternative is added in the form of the name of the company that exports the goods

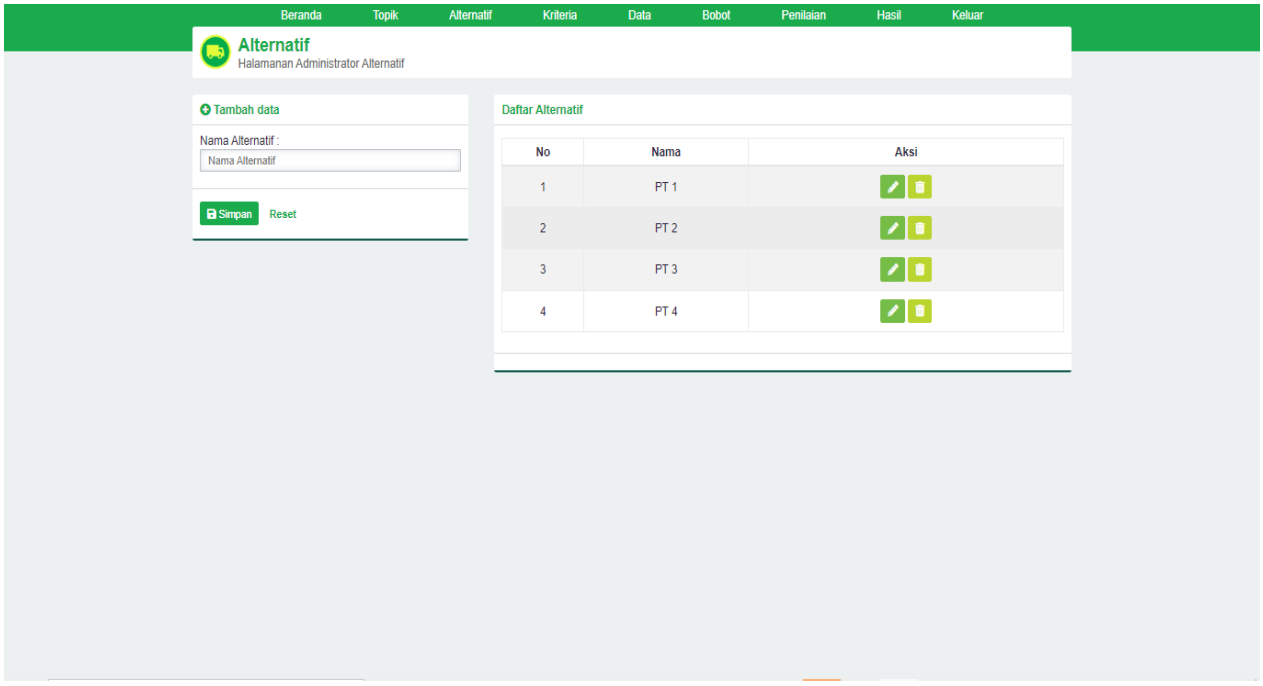

Figure 5 Alternative Views

In Figure 5, after inputting the title or topic, we enter the alternative page, where we input the alternative data that we have created, after input, click save, then the alternative data that we input will appear on the alternative page.

3. Add criteria

Adding criteria that will be used as export goods .

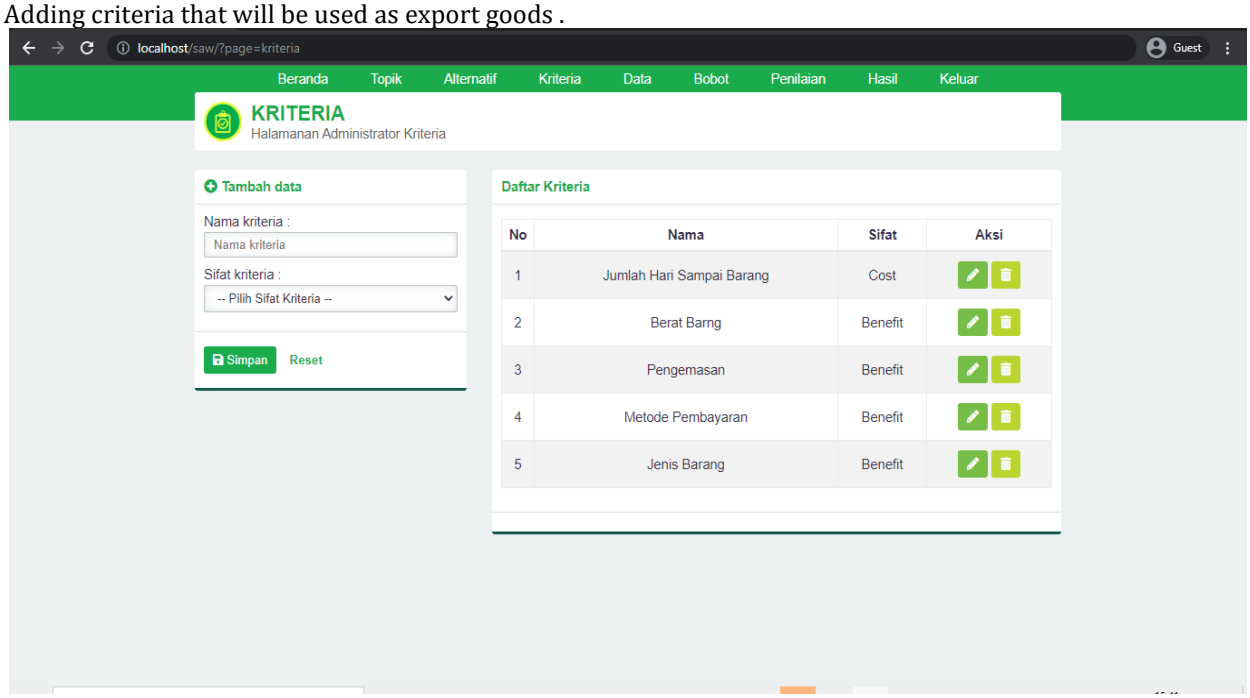

Figure 6 Criteria Display

In Figure 6, after inputting alternative data, we enter the criteria page, where we add the criteria data and the characteristics of the criteria that we have created, after being inputted, click save and then the criteria data that we input will appear on the criteria page.

4. Add Sub-criteria

Here we add sub-criteria that we have set ourselves

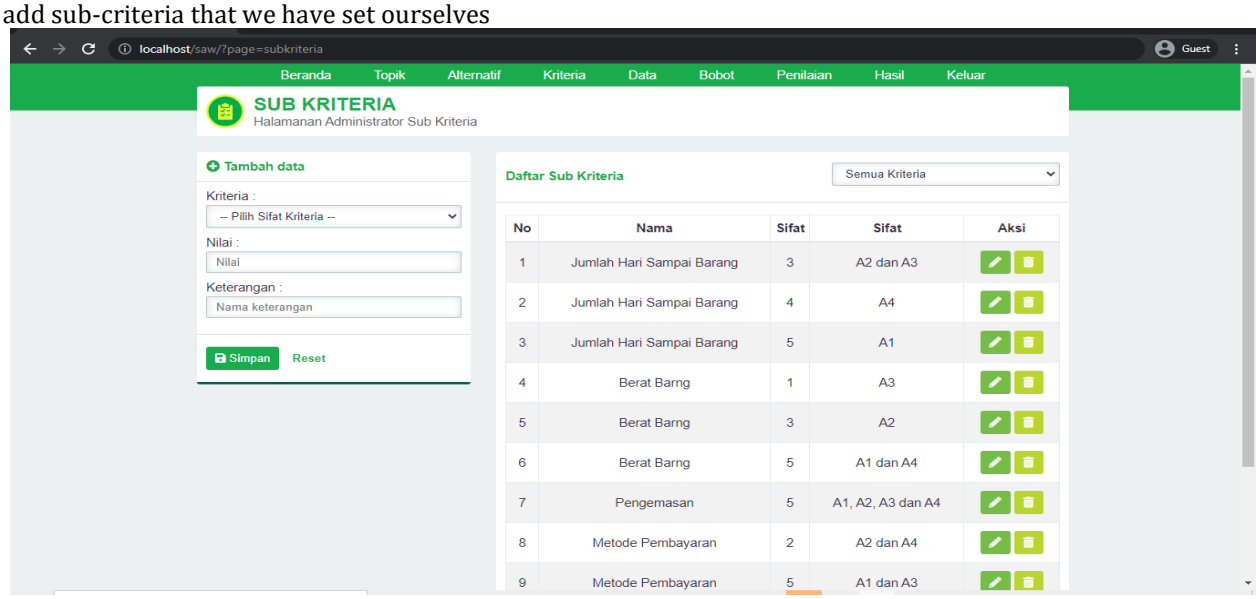

Figure 7 Display of Sub Criteria

In Figure 7, after inputting the criteria and criteria data, we enter the criteria page, then there we add some sub-criteria data that we have created, after being inputted, click save and then the sub-criteria data that we input will appear on the sub-criteria page.

5. Determining Weight

Here we add criteria data

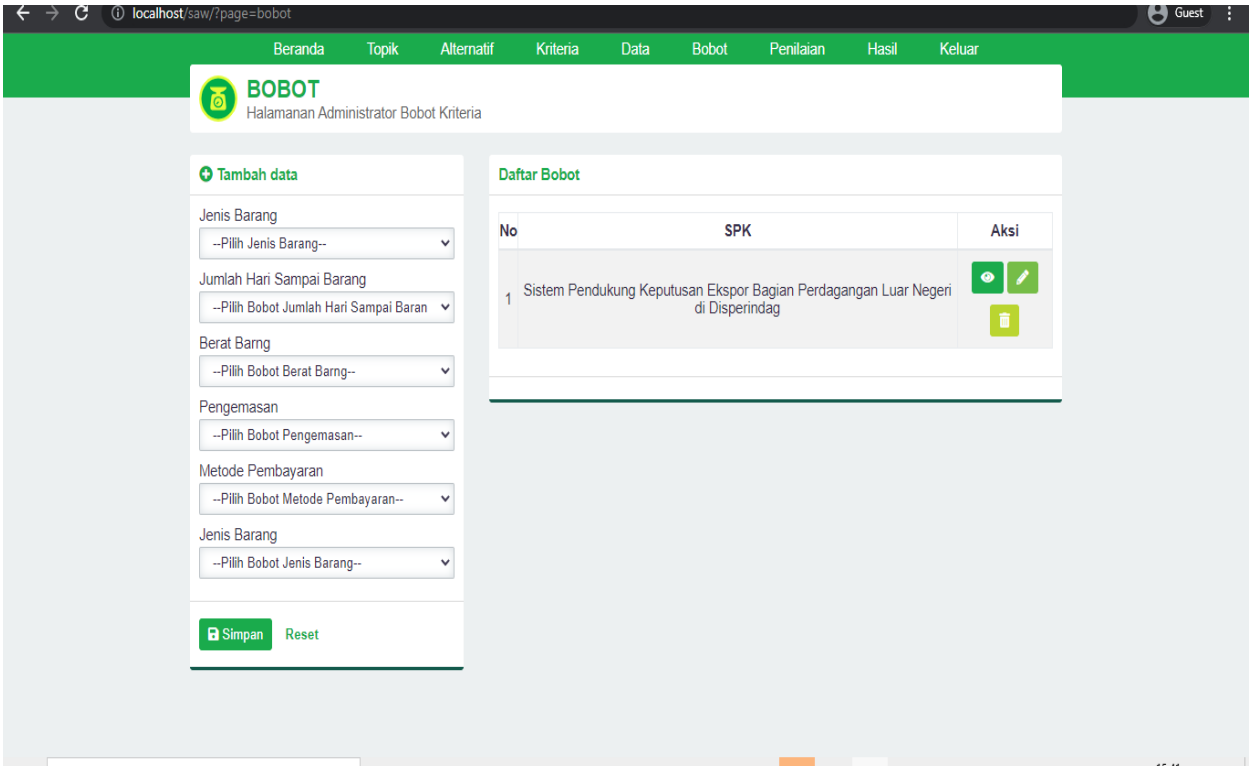

Figure 8 Display of Determination Weights

In Figure 8, after inputting the sub-criteria we enter the weights page, then there add the weight data from the 5 criteria that have been made, after being inputted, click save and then the weight data from the 5 criteria that we input will appear on the weights page.

6. Evaluation

The assessment here is taken from 5 criteria for exporting goods

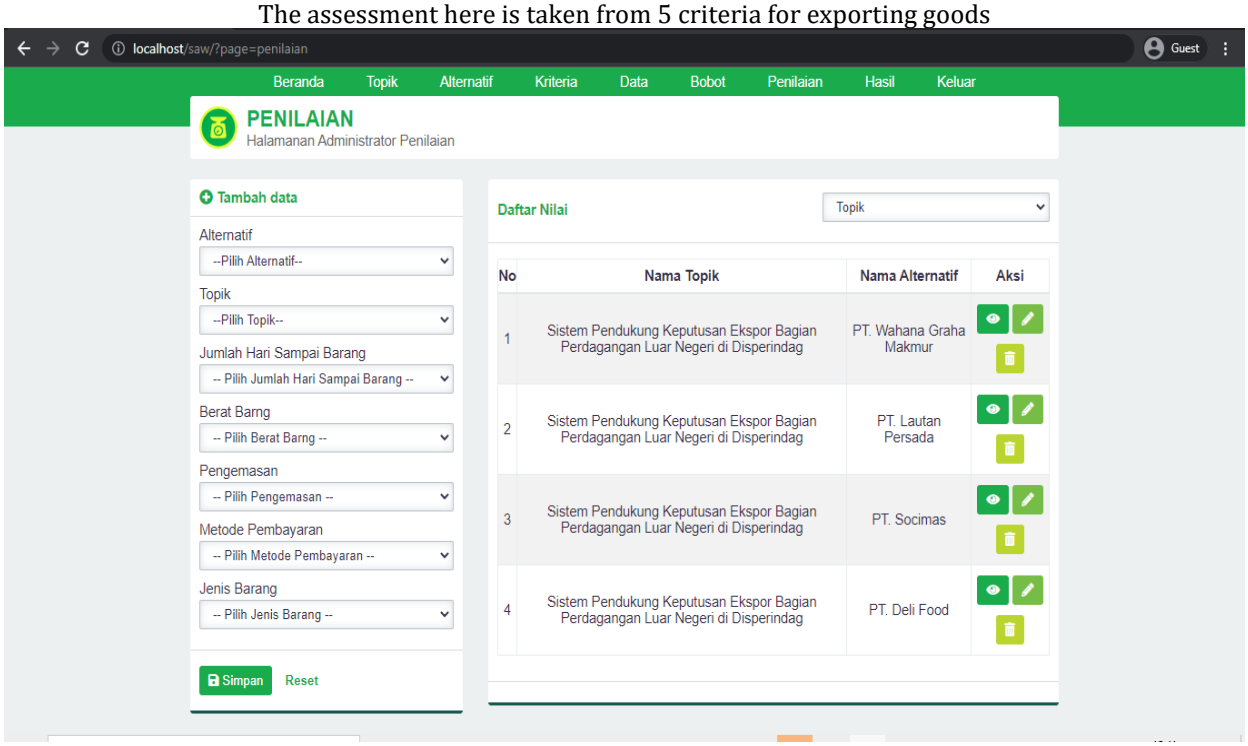

Figure 9 Rating Display

In Figure 9, after inputting the weight data, we enter the assessment page, then there we add data from the 5 criteria and alternatives that have been made, after input, click save and then the data from the 5 criteria and alternatives that we input will appear on the assessment page.

7. Results

And the results will be obtained from the system calculations of all criteria and alternatives.

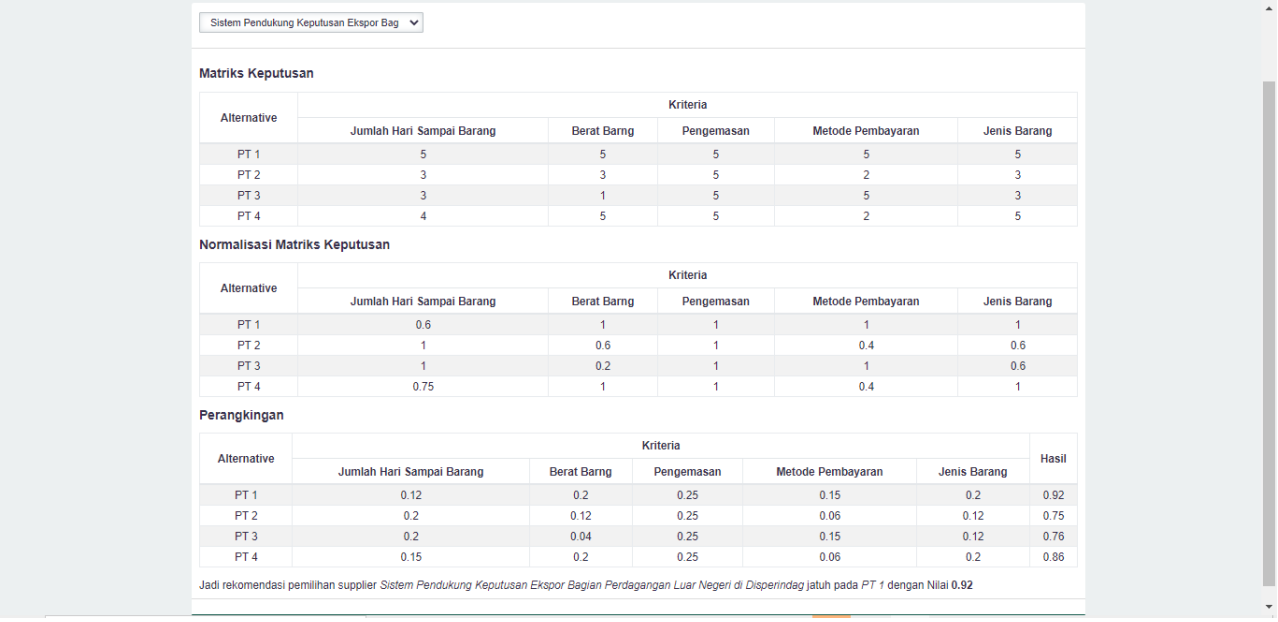

Figure 10 Results Display

In Figure 10, after inputting everything we enter the assessment page, then there, from the beginning we input until the end, an assessment of everything we input on the assessment page will appear.

4. CONCLUSION

From the results of the research that has been described in the previous section , it can be concluded that the design of filing applications facilitates archiving. This application can also be used as a digital mail storage area, making it easier to find letters. By using the waterfall method which is passed from several stages, Needs Analysis, Implementation Design, testing stages and maintenance stages. This application uses a dreamweaver text editor with the PHP programming language and a database manager using MySQL. Suggestions for further research is to develop applications by adding several features to improve services, and can be developed into the mobile version and also add features as needed.

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