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A Combination of Simple Additive Weighting (SAW)AND Stepwise Weight Assessment Ratio Analysis (Swara) to Provide the Best Alternative in Choosing Laptop Types

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ABSTRACT

This study aims to integrate the Simple Additive Weighting (SAW) and Stepwise Weight Assessment Ratio Analysis (SWARA) methods in a Decision Support System for selecting a laptop type. Using a quantitative approach, primary and secondary data are collected to evaluate important attributes of a laptop such as brand, price, RAM, processor, and others. Through a structured research process, the relative weight of each attribute is determined using the SWARA method, while the final value of each laptop is calculated using the SAW method. The results of this study are expected to provide the best alternative in selecting a laptop type, making it easier for students to choose a laptop that suits their needs. With the integration between SAW and SWARA, it is hoped that this study can contribute to the development of a more structured and accurate Decision Support System in the context of selecting a laptop type.

Keyword : Simple Additive Weighting (SAW); Stepwise Weight Assessment Ratio Analysis (SWARA); Sistem Pendukung Keputusan; Pemilihan Laptop

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1. INTRODUCTION

Laptops are a technological device that has great benefits for society, especially students. Its functions are very diverse, used as a tool to search for information, compile reports, monitor work, and have many other uses according to the needs of its users. There are various types and brands of laptops on the market, each with varying prices according to its specifications.

Currently, the existence of laptops is no longer a very luxurious item, but rather a necessity in daily activities. Starting from office work, college assignments, even in daily communication, the existence of laptops is very much needed. Many brands and types of laptops are sold on the market, of course with varying prices that make it difficult for users to determine the choice that suits their needs. It is not uncommon for users to buy laptops with specifications that are not adjusted to their use. For example, buying a laptop with high specifications, but its use is only limited to typing work. In fact, with these "high" specifications, users can use laptops for other heavier work, such as creating a program or a design. Of course, the problems that arise can be minimized by designing a system that can provide alternative decisions on choosing a laptop. In this study, the researcher used the SWARA (Stepwise Weight Assessment Ratio Analysis) method which functions as an analysis of the weighting of the criteria used based on the understanding of an expert and the SAW (Simple Additive Weight) method as a tool for giving values or rankings based on the values that the previous alternatives had.

Decision Support System is a system that supports managerial decision makers in semi-structured decision situations. Decision support systems are intended to be a tool for decision makers to expand a person's capabilities in choosing a laptop for students. The basis of this research is to design a website for a decision-making system for selecting laptop specifications so that buyers can make the right choice of laptop according to the appropriate specifications. System users can use this system anytime and anywhere. There are several methods of decision-making systems, the Stepwise Weight Assessment Ratio Analysis (SWARA) and Simple Additive Weighting (SAW) methods have different uses in alternatives for choosing the best type of laptop. SWARA is used to determine the relative weight of

criteria by considering the ratio between criteria, involving consultation with users to determine the level of importance. SWARA provides more detailed and detailed results, especially when there are complex interdependencies between criteria in choosing a laptop. On the other hand, SAW assigns weight to each criterion without considering the ratio between criteria, which makes it more suitable for cases where the criteria stand alone without complex dependencies. SAW simplifies the assessment process by assigning a total value to each alternative based on the weight of the predetermined criteria.

The combination of these two methods can provide a comprehensive and structured approach, combining the advantages of SWARA in determining the ratio weight and the advantages of SAW in simple assessment, to help users make more informed and detailed laptop selection decisions.

Similar research has previously been conducted by Salmon, S., and Arfyanti, I. (2022) with the title Application of Simple Additive Weighting Method (SAW) and Stepwise Weight Assessment Ratio Analysis (SWARA) in Supporting Decisions for Pharmacist Employee Recruitment Selection. The results of the study were the selection of alternative A4 on behalf of Tika which had a value of 95% as the alternative that best met the standards. The combination of the two methods, namely SWARA as a weighting method and SAW as a ranking method, helped to improve the results of the study to be clearer with criteria data that had advantages over the weighted value results and increased the results by 95% of the fulfillment of the required criteria values. The weight value is not only based on guesses or random values made to meet 100% of the study. This research is easy to understand and the results are much more optimal.

2. RESEARCH METHOD/MATERIAL AND METHOD/LETERATURE REVIEW

A. Stepwise Weight Assessment Ratio Analysis (SWARA) Method

SWARA (Stepwise Weight Assessment Ratio Analysis) is used to solve problems in the Rational dispute resolution process from an economic, social and other perspectives, after finding the required attributes, a weight value search is carried out for the attributes where the steps involve lawyers, experts in helping to determine the highest and lowest values of an attribute (Fauziyyah, H. F. and Munrawan, M. 2024) The application of the SWARA method allows applications to be wiser in decision making. SWARA is a systematic approach that allows for a comprehensive analysis of each criterion by giving it the right weight, reflecting its relative importance (Gunawan and Ariany. 2023). The SWARA weighting process involves steps to compare pairs of criteria, where relative preferences are measured and then converted into weights. Thus, SWARA weighting is not only about giving values, but also creating a hierarchical structure that reflects the relative level of significance between criteria. Through this weighting, SWARA provides a strong foundation for informed and accurate decision making in complex situations and requires multi-criteria evaluation (Assrani, D, and Sirait, P. 2021). As a ranking method, it helps make research findings more comprehensive with criteria data that have advantages over weight values and increase results by 95% of meeting the required criteria values. The weight value does not only depend on guesswork or random numbers chosen to meet 100% of the research (Salmon & Arfyanti, 2022).

B. Simple Additive Weighting (SAW) Method

The Simple Additive Weighting (SAW) method is one of the Multi-Attribute Decision Making (MADM) techniques used to overcome decision-making problems with many criteria (Hutagalung F.S. 2020). In this method, the first step is to determine the criteria and their weights, then create a decision matrix containing the performance rating of each alternative on each criterion. Continued by normalizing the decision matrix to ensure the same scale, followed by calculating the total value by multiplying the normalized rating value by the criterion weight. The end result is a ranking of alternatives, where the alternative with the highest total value is considered the best choice. Although simple and easy to implement, the SAW method still has weaknesses such as the assumption of independence between criteria and sensitivity to changes in weight. Examples of its application include selecting the best employees, suppliers, or investment locations.

C. Stages of Creating a Laptop Type Selection Website

The following are the stages of creating a Web-Based Company Laptop Lending website using . Case study on UMSU students:

1. Needs Analysis:
   a) Identify the needs of a laptop type selection system for UMSU students.

b) Create a questionnaire for students and several laptop stores that sell online to understand the requirements and objectives of the website.

2. Planning:
   a) Create a system design and website display design
   b) Determine the required features, such as criteria data, sub-criteria data, calculation data, etc.
3. Create a Database:
   a) Create a database structure according to the planned design.
   b) Create a laptop data table, and student data
4. Create a Model:
   a) Create models to access and manipulate data in the database.
   b) Implement CRUD (Create, Read, Update, Delete) functions for laptop data and student data.
5. Create a Controller
   a) Create controllers that will handle application logic.
   b) Examples of controllers needed include: controllers for selecting laptop types.
6. Creating Views
   a) Creating web page views using HTML, CSS and Javascript.
   b) Integrating views with data from models and controllers using PHP Laravel syntax.
7. Implementing the Weight Determination feature using the swara method:
   a) Creating a page that determines the weight value using the swara method.
8. Implementing the Final Result Data Determination Feature using the saw method:
   a) Creating a page that determines the final value and ranking using the saw method.
9. Testing
   a) Conducting tests to ensure the website is functioning properly
   b) Testing all features that have been implemented.
10. Testing:
    a) Conducting tests to ensure the website is functioning properly.
    b) Testing again after launch to ensure everything is running well.
11. Launching:
    a) Prepare a server to host the website.
    b) Upload the website code and database to the server.
    c) Do another test run after the launch to make sure everything is running well.

The use case diagram for creating a website to find alternative laptop selection is as follows:
Actor:
- User and Admin
Use Cases:
a) View Criteria Data
b) Edit Sub Criteria
c) Alternative Data
d) Assessment Data
e) Final Result Data
f) View Laptop List

3. RESULTS AND DISCUSSION

This study aims to select the best laptop using the SWARA (Stepwise Weight Assessment Ratio Analysis) weighting method. This method is used to determine the right weight for each criterion based on expert knowledge. After that, the calculation of the criteria value for each laptop brand is carried out using the SAW (Simple Additive Weight) method.

Table 1. Priority Weight of Criteria 2

Criteria Weight		RANK
Weight	PRICE	3
Weight	SCREEN	5
Weight	PROCESSOR	4
Weight	RAM	2
Weight	HARDISK	4
Weight	VGA	3
Weight	BATTERY	5
Weight	WEIGHT	5

A. Weight Determination Using the SWARA Method

Table 2. Laptop weight

Brand	Price	RAM	HARDISK	PROcessor	Screen	VGA	Bateray	Weight
HP 14s-dq2535TU	4	1	1	2	3	2	2	2
Asus VivoBook 15 X515MA	4	3	3	1	3	2	3	2
Dell Inspiron 14 5401	3	3	3	3	3	3	4	3
Lenovo IdeaPad Slim 3i	3	3	3	3	3	3	4	2
Asus VivoBook 14 X413EA	3	3	3	4	3	3	3	3
Acer Swift 3 SF314-57G	3	3	3	3	3	3	3	1
HP Envy x360 13	2	5	3	4	3	4	4	4
Lenovo IdeaPad Slim 5i Pro	1	5	3	3	3	5	4	4
Acer Aspire 7 A715-75G	1	5	3	5	4	4	5	4
Dell Inspiron 14 3493	4	1	1	2	3	2	2	2

B. Ranking using the SAW Method

Here are some stages in the completion using the SAW method:

1.C1

$R_{1,2} = 1/4 = 0,25$
$R_{2,2} = 1/4 = 0,25$
$R_{3,1} = 1/3 = 0,333$
$R_{4,1} = 1/3 = 0,333$

5.C5

$R_{1,5} = 3/4 = 0,75$
$R_{2,5} = 3/4 = 0,75$
$R_{3,5} = 3/4 = 0,75$
$R_{4,5} = 3/4 = 0,75$

$R_{5,1} = 1/3 = 0,333$
$R_{1,2} = 1/3 = 0,333$
$R_{2,2} = 1/2 = 0,5$
$R_{3,1} = 1/1 = 1$
$R_{4,1} = 1/1 = 1$
$R_{5,1} = 1/4 = 0,25$

$R_{5,5} = 3/4 = 0,75$
$R_{1,5} = 3/4 = 0,75$
$R_{2,5} = 3/4 = 0,75$
$R_{3,5} = 3/4 = 0,75$
$R_{4,5} = 4/4 = 1$
$R_{5,5} = 3/4 = 0,75$

2. C2

$R_{1,2} = 1/5 = 0,2$
$R_{2,2} = 1/5 = 0,2$
$R_{3,2} = 3/5 = 0,6$
$R_{4,2} = 3/5 = 0,6$
$R_{5,2} = 3/5 = 0,6$
$R_{1,2} = 3/5 = 0,6$
$R_{2,2} = 5/5 = 1$
$R_{3,1} = 5/5 = 1$
$R_{4,1} = 5/5 = 1$
$R_{5,1} = 1/5 = 0,333$

6.C6

$R_{1,6} = 2/5 = 0,4$
$R_{2,6} = 3/5 = 0,6$
$R_{3,6} = 4/5 = 0,8$
$R_{4,6} = 3/5 = 0,6$
$R_{5,6} = 3/5 = 0,6$
$R_{1,5} = 3/5 = 0,6$
$R_{2,5} = 4/5 = 0,8$
$R_{3,5} = 4/5 = 0,8$
$R_{4,5} = 5/5 = 1$
$R_{5,5} = 2/5 = 0,4$

3. C3

$R_{1,3} = 1/3 = 0,333$
$R_{2,3} = 3/3 = 1$
$R_{3,3} = 3/3 = 1$
$R_{4,3} = 3/3 = 1$
$R_{5,3} = 3/3 = 1$
$R_{1,2} = 3/3 = 1$
$R_{2,2} = 3/3 = 1$
$R_{3,1} = 3/3 = 1$
$R_{4,1} = 3/3 = 1$
$R_{5,1} = 1/3 = 0,333$

7.C7

$R_{1,7} = 2/5 = 0,4$
$R_{2,7} = 2/5 = 0,4$
$R_{3,7} = 3/5 = 0,6$
$R_{4,7} = 3/5 = 0,6$
$R_{5,7} = 3/5 = 0,6$
$R_{1,5} = 3/5 = 0,6$
$R_{2,5} = 4/5 = 0,8$
$R_{3,5} = 5/5 = 1$
$R_{4,5} = 4/5 = 0,8$
$R_{5,5} = 2/5 = 0,4$

4. C4

$R_{1,4} = 2/5 = 0,4$
$R_{2,4} = 1/5 = 0,2$
$R_{3,4} = 3/5 = 0,6$
$R_{4,4} = 3/5 = 0,6$
$R_{5,4} = 4/5 = 0,8$
$R_{1,2} = 3/5 = 0,6$
$R_{2,2} = 4/5 = 0,8$
$R_{3,1} = 3/5 = 0,6$
$R_{4,1} = 5/5 = 1$
$R_{5,1} = 2/5 = 0,4$

8.C8

$R_{1,8} = 2/4 = 0,5$
$R_{2,8} = 2/4 = 0,5$
$R_{3,8} = 3/4 = 0,75$
$R_{4,8} = 2/4 = 0,5$
$R_{5,8} = 3/4 = 0,75$
$R_{1,5} = 1/4 = 0,25$
$R_{2,5} = 4/4 = 1$
$R_{3,5} = 4/4 = 1$
$R_{4,5} = 4/4 = 1$
$R_{5,5} = 2/4 = 0,25$

The results are collected again to form a matrix so that it looks as follows:

0,25	0,2	0,333	0,4	0,75	0,4	0,4	0,5
0,25	0,2	1	0,2	0,75	0,6	0,4	0,5
0,333	0,6	1	0,6	0,75	0,8	0,6	0,75
0,333	0,6	1	0,6	0,75	0,6	0,6	0,5
0,333	0,6	1	0,8	0,75	0,6	0,6	0,75
0,333	0,6	1	0,6	0,75	0,6	0,6	0,25
0,5	1	1	0,8	0,75	0,8	0,8	1
1	1	1	0,6	0,75	0,8	1	1
1	1	1	1	1	1	0,8	1
0,25	0,333	0,333	0,4	0,75	0,4	0,4	0,25

C. Setting Preference Values

To determine the preference value, the normalized value is multiplied by the weight calculated using the SWARA method. The following are the criteria weights obtained:
C1 = 0.028031415861852 C2 = 0.0047009206724844 C3 = 0.11177959658491 C4 = 0.059177433486131 C5 = 0.32889881299677 C6 = 0.26909902881554 C7 = 0.012013463940794 C8 = 0.18629932764152.

0,25 (0.028031415861852)	0,2 (0.0047009206724844)	0,333 (0.11177959658491)
0,25 (0.028031415861852)	0,2 (0.0047009206724844)	1 (0.11177959658491)
0,333 (0.028031415861852)	0,6 (0.0047009206724844)	1 (0.11177959658491)
0,333 (0.028031415861852)	0,6 (0.0047009206724844)	1 (0.11177959658491)
0,333 (0.028031415861852)	0,6 (0.0047009206724844)	1 (0.11177959658491)
0,333 (0.028031415861852)	0,6 (0.0047009206724844)	1 (0.11177959658491)
0,5 (0.028031415861852)	1 (0.0047009206724844)	1 (0.11177959658491)
1 (0.028031415861852)	1 (0.0047009206724844)	1 (0.11177959658491)
1 (0.028031415861852)	1 (0.0047009206724844)	1 (0.11177959658491)
0,25 (0.028031415861852)	0,33 (0.0047009206724844)	0,333 (0.11177959658491)

0,4 (0.059177433486131)	0,75 (0.32889881299677)	0,4 (0.26909902881554)
0,2 (0.059177433486131)	0,75 (0.32889881299677)	0,6 (0.26909902881554)
0,6 (0.059177433486131)	0,75 (0.32889881299677)	0,8 (0.26909902881554)
0,6 (0.059177433486131)	0,75 (0.32889881299677)	0,6 (0.26909902881554)
0,8 (0.059177433486131)	0,75 (0.32889881299677)	0,6 (0.26909902881554)
0,6 (0.059177433486131)	0,75 (0.32889881299677)	0,6 (0.26909902881554)
0,8 (0.059177433486131)	0,75 (0.32889881299677)	0,8 (0.26909902881554)
0,6 (0.059177433486131)	0,75 (0.32889881299677)	0,8 (0.26909902881554)
1 (0.059177433486131)	1 (0.32889881299677)	1 (0.26909902881554)
0,4 (0.059177433486131)	0,75 (0.32889881299677)	0,4 (0.26909902881554)

0,4 (0.012013463940794)	0,5 (0.18629932764152)
0,4 (0.012013463940794)	0,5 (0.18629932764152)
0,6 (0.012013463940794)	0,75 (0.18629932764152)
0,6 (0.012013463940794)	0,5 (0.18629932764152)
0,6 (0.012013463940794)	0,75 (0.18629932764152)
0,6 (0.012013463940794)	0,25 (0.18629932764152)
0,8 (0.012013463940794)	1 (0.18629932764152)
1 (0.012013463940794)	1 (0.18629932764152)
0,8 (0.012013463940794)	1 (0.18629932764152)
0,4 (0.012013463940794)	0,25 (0.18629932764152)

The following is the result of multiplying the normalization value by the criteria weight value:

0,007007853965463	0,00094018413449688	0.03720776160534293
0,007007853965463	0,00094018413449688	0.11177959658491
0,009334461481996717	0,00282055240349064	0.11177959658491
0,009334461481996717	0,00282055240349064	0.11177959658491
0,009334461481996717	0,00282055240349064	0.11177959658491
0,009334461481996717	0,00282055240349064	0.11177959658491
0,014015707930926	0.0047009206724844	0.11177959658491
0.028031415861852	0.0047009206724844	0.11177959658491
0.028031415861852	0.0047009206724844	0.11177959658491
0,007007853965463	0,001551303822920852	0.03720776160534293

0.0236709733944524	0.2466741097475775	0.107639611526216
0.0118354866972262	0.2466741097475775	0.161459417289324
0.0355064600916786	0.2466741097475775	0.21527922305145
0.0355064600916786	0.2466741097475775	0.161459417289324
0.047341946788905	0.2466741097475775	0.161459417289324
0.0355064600916786	0.2466741097475775	0.161459417289324
0.047341946788905	0.2466741097475775	0.21527922305145
0.0355064600916786	0.2466741097475775	0.21527922305145
0.059177433486131	0.32889881299677	0.26909902881554
0.0236709733944524	0.2466741097475775	0.067274757203885

0.0048053855763176	0.09314966382076
0.0048053855763176	0.09314966382076
0.0072080783644764	0.13972449573114
0.0072080783644764	0.09314966382076
0.0072080783644764	0.13972449573114
0.0072080783644764	0.04657483191038
0.0096107711526352	0.18629932764152
0.012013463940794	0.18629932764152
0.0096107711526352	0.18629932764152
0.0048053855763176	0.04657483191038

D. Ranking

The best ranking or numbering of several submitted candidates is done by adding up the scores for each candidate based on all the criteria that have been assessed to determine preferences. As follows:

- A1 = 0,007007853965463 + 0,00094018413449688 + 0.03720776160534293 + 0.0236709733944524 + 0.2466741097475775 + 0.107639611526216 + 0.0048053855763176 + 0.09314966382076 = 0.52114392170763
- A2 = 0,007007853965463 + 0,00094018413449688 + 0.11177959658491 + 0.0118354866972262 + 0.2466741097475775 + 0.161459417289324 + 0.0048053855763176 + 0.09314966382076 = 0.6376516978160751.
- A3 = 0,009334461481996717 + 0,00282055240349064 + 0.11177959658491 + 0.0355064600916786 + 0.2466741097475775 + 0.21527922305145 + 0.0072080783644764 + 0.13972449573114 = 0.76833538688325
- A4 = 0,009334461481996717 + 0,00282055240349064 + 0.11177959658491 + 0.0355064600916786 + 0.2466741097475775 + 0.161459417289324 + 0.0072080783644764 + 0.09314966382076 = 0.66794074920955.
- A5 = 0,009334461481996717 + 0,00282055240349064 + 0.11177959658491 + 0.047341946788905 + 0.2466741097475775 + 0.161459417289324 + 0.0072080783644764 + 0.13972449573114 = 0.72635106781725
- A6 = 0,009334461481996717 + 0,00282055240349064 + 0.11177959658491 + 0.0355064600916786 + 0.2466741097475775 + 0.161459417289324 + 0.0072080783644764 + 0.04657483191038 = 0.62136591729905
- A7 = 0,014015707930926 + 0.0047009206724844 + 0.11177959658491 + 0.047341946788905 + 0.2466741097475775 + 0.21527922305145 + 0.0096107711526352 + 0.18629932764152 = 0.83570160357215
- A8 = 0.028031415861852 + 0.0047009206724844 + 0.11177959658491 + 0.0355064600916786 + 0.2466741097475775 + 0.21527922305145 + 0.012013463940794 + 0.18629932764152 = 0.84028451759415
- A9 = 0.028031415861852 + 0.0047009206724844 + 0.11177959658491 + 0.059177433486131 + 0.32889881299677 + 0.26909902881554 + 0.0096107711526352 + 0.18629932764152 = 0.9975973072128
- A10 = 0,007007853965463 + 0,001551303822920852 + 0.03720776160534293 + 0.0236709733944524 + 0.2466741097475775 + 0.067274757203885 + 0.0048053855763176 + 0.04657483191038 = 0.52114392170763

The results of using the simple additive weight method can be seen in the following table:

Table 3. Ranking value results

Brand	Quantity	RANK
Acer Aspire 7 A715-75G	1	1
HP Envy x360 13	0.84	2
Lenovo IdeaPad Slim 5i Pro	0.84	3
Dell Inspiron 14 5401	0.77	4
Asus VivoBook 14 X413EA	0.73	5
Lenovo IdeaPad Slim 3i	0.67	6
Asus VivoBook 15 X515MA	0.64	7
Acer Swift 3 SF314-57G	0.62	8
HP 14s-dq2535TU	0.52	9
Dell Inspiron 14 3493	0.52	10

E. Website Appearance

1. Login Page

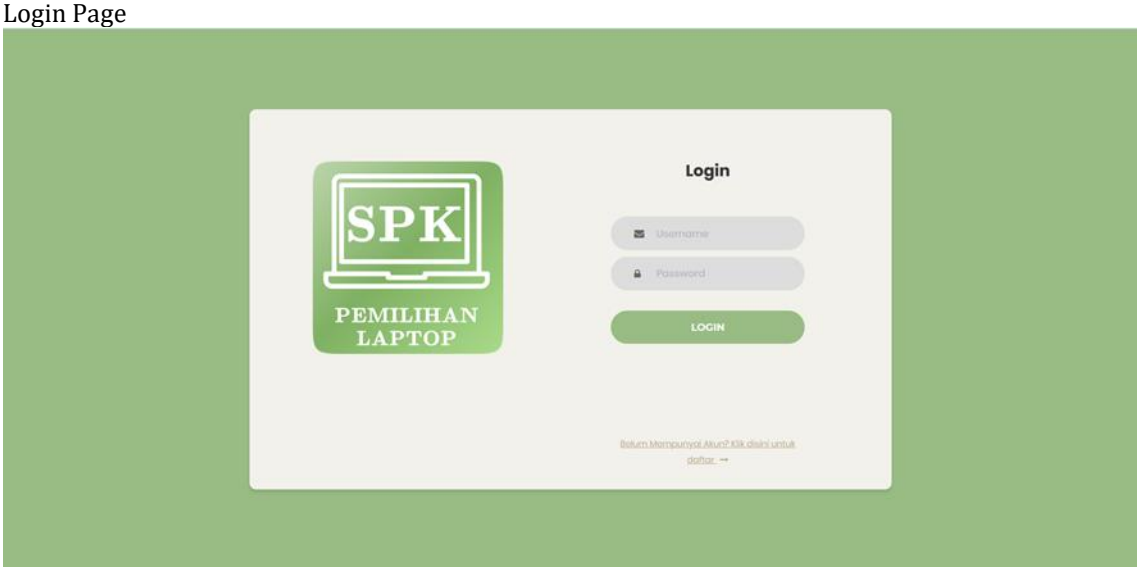


Fig 1. Login Page

The login page is a page that allows users to access the system by filling in the username and password form. After filling in the username and password, the user must select the login button to enter the system. If the username and password entered are correct, the user will be directed directly to the dashboard. However, if the username and password are incorrect, the user will not be able to enter the system.

2. Home Page

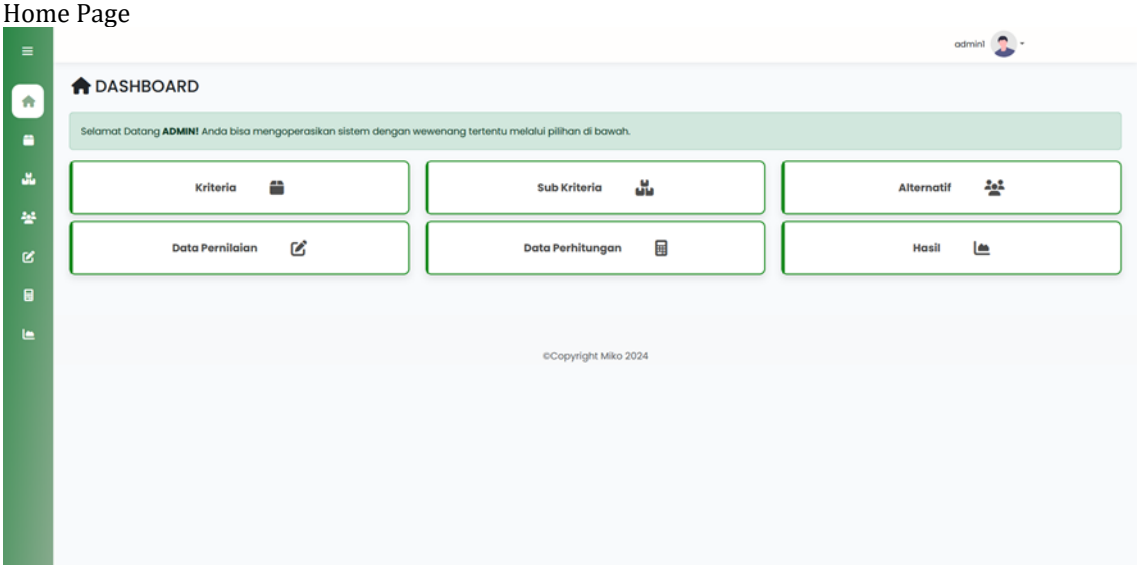


Fig 2. Home Page

This is the main page. On this page the system displays the features available on the system for the user.

3. Alternative Data Page

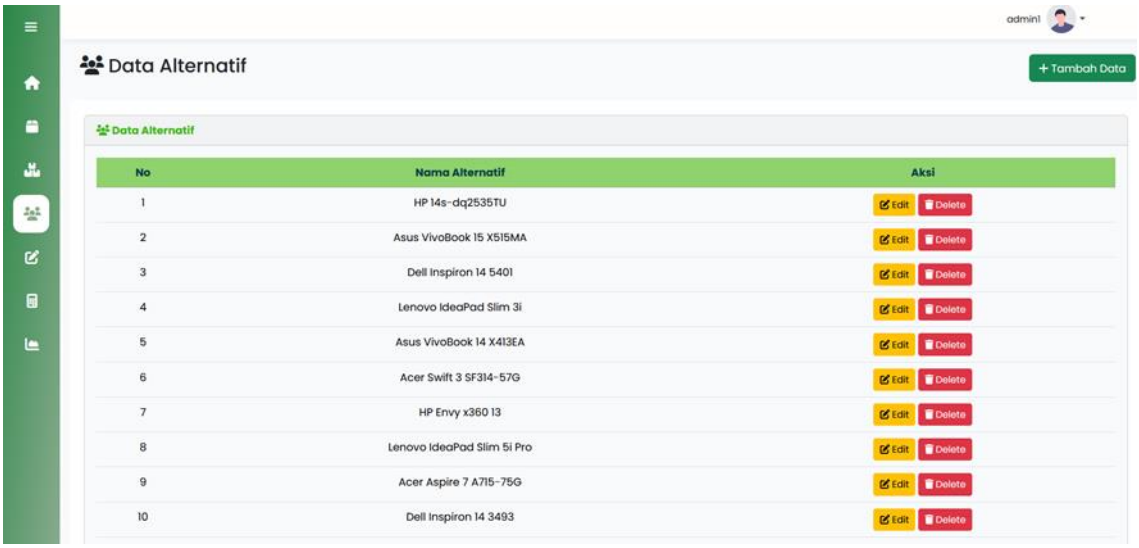


Fig 3. Alternative Data Page

This is an alternative data menu page. On this page, the admin can manage laptop brand data by adding data, editing data, deleting data.

4. Criteria Date Page

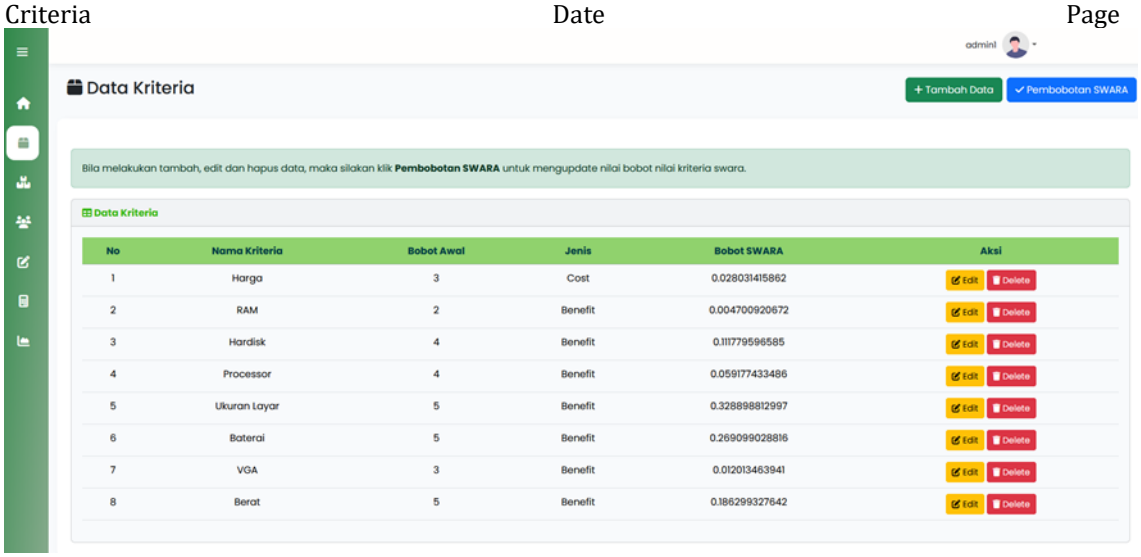
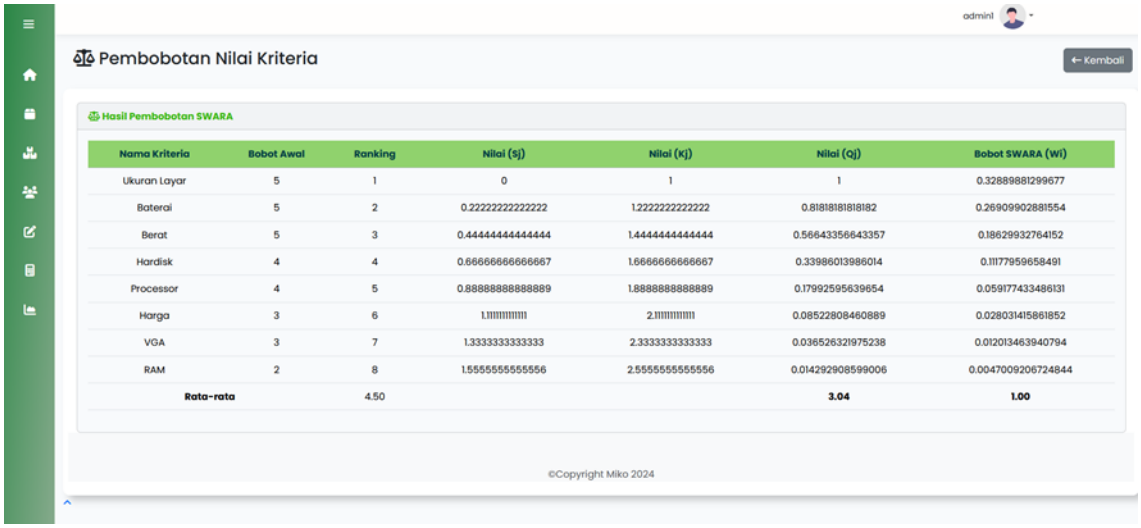


Fig 4. Criteria Date Page

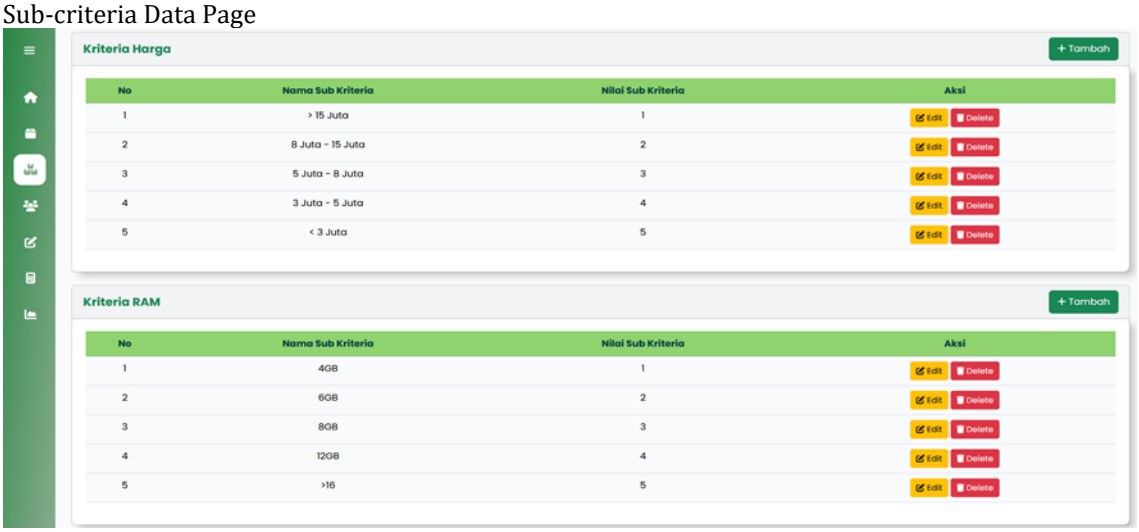
This criteria data page allows the admin to perform various management related to criteria data. The admin can add, edit, or delete criteria data as needed. After that, the admin can weight the value using the SWARA method after determining the weight for each criterion such as price, RAM, hard disk capacity, processor type, and so on. Then the weighting results will appear as follows:



Nama Kriteria	Bobot Awal	Ranking	Nilai (Sj)	Nilai (Kj)	Nilai (Qj)	Bobot SWARA (Wi)
Ukuran Layar	5	1	0	1	1	0.32889881299677
Baterai	5	2	0.22222222222222	1.2222222222222	0.81818181818182	0.26909902881554
Berat	5	3	0.44444444444444	1.4444444444444	0.56643356643357	0.18629932764152
Hardisk	4	4	0.66666666666667	1.6666666666667	0.33986013986014	0.11177959658491
Processor	4	5	0.88888888888889	1.8888888888889	0.17992595639654	0.059177433486131
Harga	3	6	1.1111111111111	2.1111111111111	0.08522808460889	0.028031415861852
VGA	3	7	1.3333333333333	2.3333333333333	0.036526321975238	0.012013463940794
RAM	2	8	1.5555555555556	2.5555555555556	0.014292908599006	0.0047009206724844
Rata-rata		4.50			**3.04**	**1.00**

Fig 5. Criteria Value Weighting Page

5. Sub-criteria Data Page



No	Nama Sub Kriteria	Nilai Sub Kriteria	Aksi
1	> 15 Juta	1	Edit Delete
2	8 Juta - 15 Juta	2	Edit Delete
3	5 Juta - 8 Juta	3	Edit Delete
4	3 Juta - 5 Juta	4	Edit Delete
5	< 3 Juta	5	Edit Delete

No	Nama Sub Kriteria	Nilai Sub Kriteria	Aksi
1	4GB	1	Edit Delete
2	6GB	2	Edit Delete
3	8GB	3	Edit Delete
4	12GB	4	Edit Delete
5	>16	5	Edit Delete

Fig 6. Sub-criteria Data Page

This page is a Sub-criteria data page. On this page the admin can manage sub-criteria data by adding data, editing data, deleting data.

6. Final Result Page

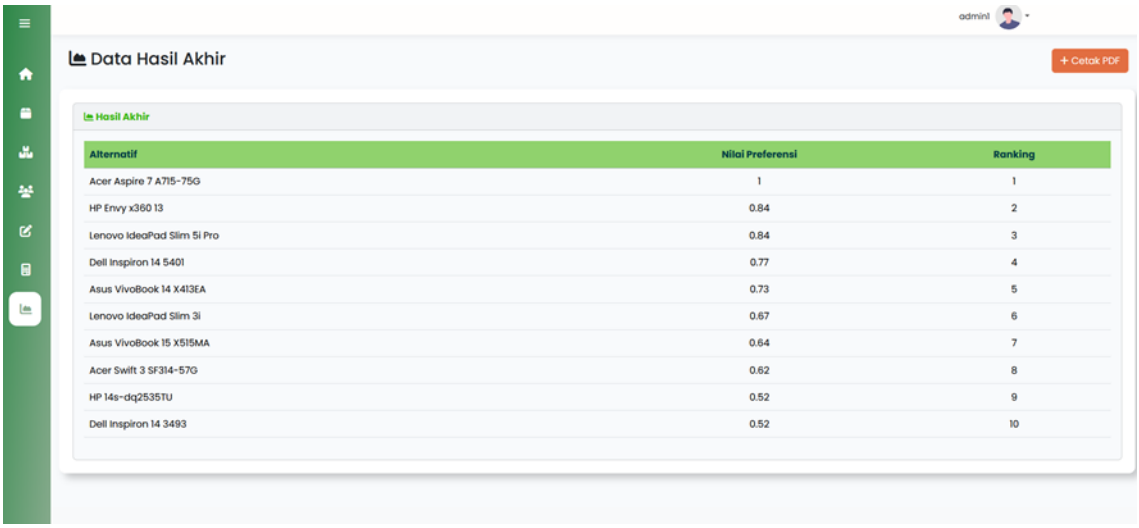


Fig 7. Final Result Page

This is the final result page. Where admin and user can see the results of the calculation of the combination of SWARA and SAW methods in choosing the best laptop recommendations.

4. CONCLUSION

Based on the results of the research conducted on the combination of Simple Additive Weighting (SAW) and Stepwise Weight Assessment Ratio Analysis (SWARA) in selecting a laptop type, several conclusions can be drawn as follows: The combination of the Simple Additive Weighting (SAW) and Stepwise Weight Assessment Ratio Analysis (SWARA) methods provides a comprehensive approach in determining the weight of the criteria ratio and the total value of each laptop alternative. SWARA provides more detailed results, especially in cases of complex interdependence between criteria, while SAW is more suitable for stand-alone criteria without complex dependencies. A decision support system designed by integrating SAW and SWARA can help users, especially students, in choosing the type of laptop that suits their needs and preferences. With the combination of these two methods, decision makers can obtain more detailed and structured information to support the optimal laptop selection process.

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