LAPTOP SELECTION DECISION SUPPORT SYSTEM USING METHOD *ANALYTICAL HIERARCHY PROCESS* (AHP)

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Abstract

This study aims to create a decision support system using the AHP method in order to get the priority order of criteria and alternatives in determining the best laptop choice for STEI Jakarta students. This research uses a Qualitative approach, which is measured using Expert Choice and processed using Microsoft Excel. The population of this study is students who are on the STEI Jakarta campus. The sample was determined based on the simple random sampling method, with a total sample of 92 respondents. The data used in this study are primary and secondary data. Data collection techniques using a questionnaire. The results of the study prove that the importance level of criteria in the selection of laptops produces the priority scale / weight as follows: priority I is the price criteria with a weight of 0.303, priority II is a memory capacity criterion with a weight of 0.256, priority III is a hard disk capacity criteria with a weight of 0.252, and priority IV is screen size criteria with weight gain of 0.189. From the results of the assessment of the importance level of alternatives in the selection of laptops it produces the priority scale / weight as follows: the first alternative priority is the Asus laptop with the highest weight gain 0.306, the second alternative priority is the HP laptop weighing 0.304, the third alternative priority is the Acer laptop with a weight of 0.206, and the fourth alternative priority is a Toshiba laptop weighing 0.184..

Keywords : Analytical Hierarchy Process, Decision Support System, Laptop Selection

I.   INTRODUCTION

Based on the Bank Indonesia Consumer Survey (SKBI) in June 2019, consumer optimism for buying durable goods has increased, especially electronic goods. Quoted from the consumer survey report in June 2019 by Bank Indonesia (BI), currently the June 2019 Economic Condition Index (IKE) has increased to 114.7, which previously in May 2019 was 113.5. This increase was driven by strengthening consumer confidence in buying durable goods. The increase was 116.6, higher than the previous month's 115.6. The types of durable goods that encourage this optimism are electronic goods such as; television, laptop, and cellphone (Bank Indonesia, 2019).

The best brands provide quality assurance. Furthermore, a brand is actually a tangible and intangible value represented in a trademark that can create its own value and influence in the market if it is properly regulated. With various laptop brands on the

market, it will clearly influence consumer behavior to choose brands with various features offered by sellers (Zaki, 2015: 1-2).

A decision support system is an alternative solution or alternative action from a number of alternative solutions and actions to solve a problem, so that the problem can be resolved effectively and efficiently. The decision system functions for several things, among others, as a comprehensive understanding of the problem, as providing a systematic framework of thinking, can guide, in the application of decision-making techniques, and improve the quality of a decision (Situmorang, 2017: 15-16). The AHP method also takes into account the validity up to the tolerance limit for the consistency of the various criteria and alternatives chosen by the decision maker. This is used to anticipate inconsistencies that may occur. So that users can determine the right choice of laptop according to their needs and budget. Various laptop brands that exist today, made research taking samples of laptop brands that are in great demand by consumers today, namely Acer, Asus, Hawlett Packard (HP) and Toshiba.

This research will look at how the use of decision support systems for choosing a laptop brand when using the AHP method for students of the Indonesian College of Economics (STEI) Jakarta.

II. LITERATURE REVIEW
2.1   Research Review

The first research by Yeriko AN Tampi, Sifrid S. Pangemanan and Ferdinand J. Tumewu (2016) with the title "Customer Decision Making in Choosing a Laptop Using the Analytical Hierarchy Process Method (Case: HP, Asus and Toshiba)" The results show that device specifications are criteria the most important thing is having the highest weight of 0.300, followed by the core technical features factor with a weight of 0.229, the feature value added factor with a weight of 0.213, followed by price and payment conditions with a weight of 0.130 and physical appearance factors with a weight of 0.127. In the results of selecting the best laptop, HP is the laptop that is most popular and chosen by respondents. HP has the highest score of 0.533, followed by Asus 0.327, and then Toshiba 0.140. The results are valid because the data comparisons by respondents are valid and consistent as shown by the overall inconsistency of the results for all criteria, namely 0.05. In general, the level of consistency is satisfactory (acceptable) if the overall inconsistency is <0.10.

The second research by Arsyan Syaina Ahmad and Erma Delima Sikumbang (2018) with the title "The Analitycal Hierarchy Process Method in a Laptop Selection Decision Support System" The results showed that the price criterion is the preferred criterion with the acquisition of a weight of 0.134, followed by the criteria for a processor with a weight of 0.044, then VGA type criteria with a weight of 0.038, and the last criterion is RAM capacity with a weight of 0.032. Selection of the best laptop that suits your needs in terms of price, processor, RAM capacity, and VGA type is the Lenovo laptop that is most in demand by respondents with the highest weight value of 0.031, followed by second place, namely Asus laptops with a weight value of 0.018, then Dell laptops in third place with a weight value of 0.014, while HP laptops occupy the lowest position with a weight value of 0.004.

The third research by Ari Saputra (2014) entitled "Decision Support System for Choosing a Computer (Laptop) Using the Analytical Hierarchy Process (AHP) Method" The results show that the global priority order of the calculation of factors that determines people's buying interest as consumers of laptops. namely, Toshiba laptops and Acer laptops rank first, because both have a total value equal to the value (0.39), HP laptops rank second with a total score (0.38), while Axioo laptops rank third with a total value (0.36). With the results that have been found, the laptops that are more in demand by consumers based on the criteria are Toshiba and Acer laptops.

The fourth research by Christoffel CT Supit, Sifrid S. Pangemanan and Ferdinand Tumewu (2018) with the title "Choosing the Best Smartphone Using the Analytical Hierarchy Process Method (Case Study of Lenovo, Asus and Oppo)" Based on the results of the overall data analysis, customers will choose Lenovo. as the most preferred smartphone in Manado compared to other alternatives. The results show that when consumers want to buy a smartphone, they prefer to choose Lenovo as the most preferred smartphone among other alternatives. Lenovo has the highest score with a weight of 0.38, in second place is Asus with a weight of 0.35, and followed by Oppo in the last position with a weight of 0.27. Whereas in selecting alternative smartphone criteria, price is the most important factor in selecting a smartphone with a weight of 2.32645, followed by the smartphone endurance criteria with a weight of 1.68889, the criteria for device specifications weighing 1.13962, the criteria for smartphone appearance design with a weight of 0.56667, and the last position of the device function criteria is a weight of 0.34223.

The fifth research was conducted by Suhendra Sunarsa and Rani Irma Handayani (2015) with the title "Laptop Selection Decision Support System for Employees at PT. INDOTEKNO using the Analytical Hierarchy Process Method "The results show that Samsung laptops are prioritized over Asus laptops and HP laptops. The sum result is a calculation that has been determined by the respondents of employees of PT. INDOTEKNO by choosing the most popular Samsung laptop with a weight gain of 49.2%, then followed by the HP laptop with a weight gain of 27.2%, and the last position is Asus with a weight gain of 23.6%. While the results of the overall calculation of the Analytical Hierarchy Process for selecting laptops using the expert choice application on the laptop criteria, namely the Samsung brand is the most popular with a weight of 46.8% while Asus 33.9% and HP 19.2%, on the criteria of superior Samsung processors. with a weight of 58.5% compared to HP and Asus, on the VGA application criteria Samsung is again superior to HP and Asus laptops, on the RAM capacity criteria, Samsung is far superior with 73.2% weight results compared to HP and Asus laptops, then on the capacity criteria hard drives, Samsung gets a weight of 39.1%, HP laptops get a weight of 32.5% and Asus laptops get a weight of 28.4%.

The sixth study by Yunita et al (2019) entitled "Application of Analytical Hierarchy Process Method in Laptop Selection" The results showed that Samsung laptops were more desirable than Lenovo laptops and HP laptops. This is indicated by the results that have been calculated based on the sum of the weights of each laptop's criteria. Based on the results obtained, the model criteria on Samsung laptops get the number of weights (0.43), followed by Lenovo laptops (0.17) and HP laptops (0.10).) and HP laptops (0.03), on the results of obtaining price criteria, Samsung laptops obtained a number of weights (0.05), followed by HP laptops (0.03) and Lenovo laptops (0.02) .

The seventh research was conducted by Abadi et al (2018) with the title "Implementation of Fuzzy Analytical Hierarchy Process on Notebook Selection" The results showed that the test results using the Analytical Hierarchy Process method from the notebook selection and used five criteria, namely price, processor. , RAM capacity, memory capacity, hard disk capacity, then the conclusion results were calculated where the order of Zyrex notebooks was most chosen with a priority of 16%, HP 15%, Asus 14%, Apple 13%, Samsung and Axioo 11% , Acer and Toshiba with a priority of 10% so the results of the analysis using the AHP method are effective and efficient methods for consumers in choosing purchasing decisions.

The eighth research was conducted by Lobo et al (2018) with the title "Smartphone Selection Using Analytic Hierarchy Process" The results showed that the use of the AHP method on smartphone purchasing decisions with the criteria taken into consideration namely cost, camera, internal memory, battery life, and model, prospective buyers dominate more ph3 type smartphones with the acquisition of a weight value (0.35878), then followed by smartphone type ph4 with the acquisition of value weights (0.23874),

while the third and fourth positions are smartphone type ph2 with weight (0.21569) and smartphone type ph1 with weight (0.18597).

2.2 Definition of the System

According to Gelinas and Dull (2012: 11) the system is a set of interdependent elements that together achieve certain goals.

According to Romney and Steinbart (2015: 3) The system is a series consisting of two or more components that are interconnected and interact with each other to achieve goals where the system is usually divided into smaller sub-systems that support larger systems.

2.3 Definiton of Information

According to Romney and Steinbart (2015: 4) Information (information) is data that has been managed and processed to provide meaning and improve the decision-making process. As its role, users make better decisions as the quantity and quality of information increases.

2.4 Definiton of System Information

The decision is a choice from a variety of alternatives that are taken based on criteria and rational reasons (Vercellis, 2009: 24). Meanwhile, Turban and Aronson (2011: 75) suggest that a decision support system is a system intended to support managerial decision makers in semistructured and structured decision situations.

2.5 *Analytical Hierarchy Process* (AHP)

Taylor (2014: 449) states that the Analytical Hierarchy Process (AHP) is a method for ranking decision alternatives and selecting the best with several criteria, AHP develops one numerical value to rank each alternative decision, based on the extent to which each alternative meets the criteria. decision maker.

AHP has many advantages in explaining the decision-making process. One of them is that it can be graphically depicted so that it is easily understood by all parties involved in decision making (Kusrini, 2007: 133).

1. The main principles of AHP.

   Decision making in the AHP methodology is based on four basic principles, namely (Kusrini, 2007: 134):

   (1) Creating a hierarchy

   After the problem is defined, it is necessary to do a decomposition, namely breaking the whole into based on the grouping of its elements. The decomposition is carried out with the aim of decomposing the elements so that further solutions are not possible, so that several levels of problems can be obtained.

   (2) Assessment of criteria and alternatives

   This principle means making an assessment of the relative importance of two elements at a certain level in relation to the levels above which are presented in the form of a pairwise comparison matrix.

   (3) Synthesis of priority

   From each pairwise comparison, an eigen vector is searched, which is a matrix which can define the matrix A. Aiming to get local priority, because the pairwise comparison matrix is present at each level, to get global priority a synthesis between the local priority must be performed.

   (4) Logical consistency

Consistency has two meanings. The first is that similar objects can be grouped according to uniformity. Second, it concerns the level of relationship between objects based on certain criteria.

2. The stages of using AHP.

   The stages of decision making in the AHP method are basically as follows (Syukron, 2014: 257):

(1) Defining the problem and determining the desired solution. Complex problems can be easily understood using a simple frame of mind, most problems become difficult to solve because the solving process is carried out without seeing the problem as a particular system and structure.

(2) Creating a hierarchical structure starting with a general purpose, followed by the criteria you want to rank for. The hierarchy of problems is structured to assist the decision-making process by paying attention to all decision elements involved in the system. At the highest level of the hierarchy, stated goals, objectives of the system are looking for a solution to the problem. The next level is an elaboration of that goal

(3) Forming a pairwise comparison matrix. Comparisons are made based on the choices or judgments of the decision maker by assessing the levels of importance of an element compared to other elements

(4) Normalizing the data by dividing the value of each element in the paired matrix by the total value of each column.

(5) Calculating the eigenvector value and testing its consistency. If it is not consistent, then data retrieval (preference) needs to be repeated. The eigenvector value in question is the maximum eigenvector obtained by using Matlab or manually.

(6) Repeating steps, 3, 4, and 5 for all levels of the hierarchy.

(7) Calculate the eigenvector of each pairwise comparison matrix. The eigenvector value is the weight of each element. This step is to synthesize the choice in finding the priority of the elements at the lowest level of the hierarchy until the goal is achieved.

(8) Check for hierarchy inconsistencies. If the CR value <0.1 then the judgment data assessment must be corrected.

2.6 Relationship Between Research Variables

The relationship between research variables that can be described as a guide to solving research problems in this thesis is represented by a flowchart. In AHP research, the criteria are usually arranged in a hierarchical form. The criteria in this study are the criteria used by consumers in choosing laptop purchasing decisions. The election problem is organized into two hierarchical levels. At the highest level of the hierarchy, the goals, objectives of the system for which the solution is sought are stated. At level one, it is a description of these objectives, namely the criteria that must be considered in making decisions. At level two are the alternatives to be selected.

III. RESEARCH METHOD

The research method used in this study was cross-sectional, namely by collecting information from a sample of the population that was taken only once (Malhotra et al, 2012: 95). Data collection will be carried out using survey techniques by distributing questionnaires to student respondents from the Indonesian College of Economics (STEI) Jakarta.

Looking at the unit of analysis above, the sampling in this study is to take the Probability Sampling technique. Selection of sampling aims to determine the sample by taking certain data that are deemed appropriate and related to the research being carried out. In this study, data collection was carried out to obtain the information needed to limit the problem in the study. The methods used are as follows:

1) Library Research
2) Observation
3) Documentation

The data analysis method used in the Analytical Hierarchy Process (AHP) method uses the assistance of expert choice software. This was done in order to make it easier to process the respondent's questionnaire data more quickly and accurately. The data processing and discussion stages were carried out in the following ways:

1) Construct a hierarchical structure of the problem.

2) Creating a pairwise comparison matrix.

3) Calculating the weight / priority of each criterion:

(1) Make a pairwise comparison of each criterion.

(2) The results of the respondent's assessment are then averaged using a geometric mean or measuring average.

(3) The results of each pairwise comparison are presented in a pairwise comparison matrix.

(4) Divide each element in a certain column by the value of the number of the column.

(5) The results are then normalized to obtain the matrix eigenvector by averaging the number of rows against the four criteria.

(6) Calculating the consistency ratio.

IV. RESEARCH RESULTS AND DISCUSSION

4.1 Calculate the weight / priority of each variable

4.1.1 Variable level 1 (criteria)

Calculating the weight / priority of the criterion variable is done after averaging the pairwise comparison matrix values that have been obtained through filling out the questionnaire, these values are then averaged using a geometric mean. This is done because AHP only requires one answer for the comparison matrix.

Table 1. Pairwise Comparison Matrix on Laptop Criteria

Kriteria	Harga	Kapasitas memori	Kapasitas *harddisk*	Ukuran layar
Harga	1	1,342	1,509	1,101
Kapasitas memori	0,745	1	1,021	1,626
Kapasitas *harddisk*	0,663	0,979	1	1,711
Ukuran layar	0,908	0,615	0,584	1

Sumber: Data Diolah (2020)

In Table 1, it is the calculation result of each comparison matrix between laptop criteria. From the calculation of pairwise comparisons between variables in choosing the criteria for laptops, the weights / priorities are obtained which are shown in the following table:

Table 2. Priority of Interest (Weight) Criteria in Laptop Selection

Kriteria	Bobot (*vector eigen*)	Prioritas
Harga	0,303	I
Kapasitas memori	0,256	II
Kapasitas *harddisk*	0,252	III
Ukuran layar	0,189	IV

Sumber: Data Diolah (2020)

4.1.2 Variable level 2 (alternative)

Calculating the weight / priority of each laptop selection compared to each criterion is carried out after averaging the pairwise comparison matrix values obtained through filling out a questionnaire, these values are averaged using geometric averages. This is done because AHP only requires one answer for the ratio matrix.

1. Evaluation of alternatives based on price criteria

The results of the calculation of the alternative valuation comparison matrix based on the price criteria are summarized in the following table:

Table 3. Alternative Pairwise Comparison Matrix for Laptop Selection Based on Price Criteria

Alternatif	Asus	HP	Acer	Toshiba
Asus	1	1,146	1,276	1,416
HP	0,872	1	1,450	1,824
Acer	0,784	0,690	1	1,092
Toshiba	0,706	0,548	0,915	1

Sumber: Data Diolah (2020)

Table 3 is the calculation result of each comparison matrix between alternative laptops against the price criteria. After obtaining the numbers above, the weights / priorities are obtained which are shown in the following table :

Table 4. Price Criteria Weighting Alternative Selection of Laptop Based Assessment

Alternatif	Asus	HP	Acer	Toshiba	Bobot (*Eigen Vector*)
Asus	0,297	0,339	0,275	0,266	0,294
HP	0,259	0,295	0,312	0,342	0,302
Acer	0,233	0,204	0,215	0,205	0,214
Toshiba	0,210	0,162	0,197	0,188	0,189

Table 4. above shows the results of the assessment based on the price criteria in choosing a laptop. HP laptops are the priority with the highest weight, 0.302. This shows that the majority of STEI Jakarta students have the initial capital that can afford to buy a HP laptop with the highest price of IDR 6,250,000.

2. Evaluation alternatives based on memory capacity criteria

The results of the calculation of the alternative assessment comparison matrix based on the memory capacity criteria are summarized in the following table:

Table 5. Alternative Pairwise Comparison Matrix for Laptop Selection Based on Memory Capacity Criteria

Alternatif	Asus	HP	Acer	Toshiba
Asus	1	1,903	1,073	1,087
HP	0,525	1	2,094	1,954
Acer	0,932	0,478	1	1,093
Toshiba	0,920	0,512	0,915	1

Sumber: Data Diolah (2020)

Table 5 is the calculation result of each comparison matrix between alternative laptops against the memory capacity criteria. After obtaining the calculation results in the table above, the weights shown in the following table are obtained:

Table 6. Alternative Assessment Weights for Laptop Selection Based on Memory Capacity Criteria

Sumber: Data Diolah (2020)

Table 6 above is the result of the eigenvector value of the memory capacity criteria. The table shows that the priority of laptops based on memory capacity criteria is the Asus laptop which has the highest weight with a weight of 0.302. This shows that the majority of STEI Jakarta students prefer Asus laptops because the minimum memory capacity required is 6 Giga Bytes (GB).

3. Evaluation alternatives based on hard disk capacity criteria

The results of the calculation of the alternative assessment comparison matrix based on the hard drive capacity criteria are summarized in the following table:

Table 7. Alternative Pairwise Comparison Matrix for Selection of Laptops Based on Hard Drive Capacity Criteria

Alternatif	Asus	HP	Acer	Toshiba
Asus	1	1,813	1,170	1,508
HP	0,551	1	1,871	2,561
Acer	0,854	0,535	1	1,357
Toshiba	0,663	0,391	0,737	1

Sumber: Data Diolah (2020)

Table 7.is the results of the acquisition of each comparison matrix between alternative laptops against the hard drive capacity criteria. The results are then used as

Alternatif	Asus	HP	Acer	Toshiba	Bobot (*Eigen Vector*)
Asus	0,296	0,489	0,211	0,212	0,302
HP	0,156	0,257	0,412	0,381	0,301
Acer	0,276	0,123	0,197	0,213	0,202
Toshiba	0,272	0,131	0,180	0,195	0,195

an assessment the best laptop alternative weights shown in the following table:

Table 8. Alternative Assessment Weights for Laptop Selection Based on Hard Drive Capacity Criteria

Alternatif	Asus	HP	Acer	Toshiba	Bobot (*Eigen Vector*)
Asus	0,326	0,485	0,245	0,235	0,323
HP	0,180	0,267	0,391	0,399	0,309
Acer	0,278	0,143	0,209	0,211	0,210
Toshiba	0,216	0,104	0,154	0,156	0,158

Sumber: Data Diolah (2020)

Table 8. shows the final results of the laptop based on the hard drive capacity criteria. Asus laptops are the highest priority with a weight of 0.323. This shows that Asus laptops are the choice of STEI Jakarta students because of the standardization required for hard disk capacity, namely 1 Tera Byte (TB).

4. Evaluation of alternatives based on screen size capacity criteria

The results of the calculation of the alternative assessment comparison matrix based on the screen size capacity criteria are summarized in the following table:

Table 9. Pairwise Comparison Matrix for Alternative Selection of Laptops Based on Screen Size Criteria

Alternatif	Asus	HP	Acer	Toshiba
Asus	1	1,081	1,688	1,376
HP	0,925	1	1,666	1,576
Acer	0,592	0,600	1	1,093
Toshiba	0,727	0,635	0,915	1

Sumber: Data Diolah (2020)

Table 9 is the calculation result of each comparison matrix between alternative laptops against the screen size criteria that have been summed and averaged through the results obtained from the comparison matrix between the previous laptop criteria, then the weights shown in the following table are obtained:

Table 10. Alternative Assessment Weights for Laptop Selection Based on Screen Size Criteria

Alternatif	Asus	HP	Acer	Toshiba	Bobot (*Eigen Vetor*)
Asus	0,308	0,326	0,320	0,273	0,307
HP	0,285	0,302	0,316	0,312	0,304
Acer	0,183	0,181	0,190	0,217	0,193
Toshiba	0,224	0,191	0,174	0,198	0,197

Sumber: Data Diolah (2020)

Table 10. shows that the weight of the laptop rating based on screen size, Asus laptops have the highest priority with a weight gain of 0.307. Based on this assessment, Asus laptops are prioritized laptops because the minimum screen size required is 14.1 Inch

4.2 Calculating the Consistency Ratio (CR) of each variable

The CR value calculation is used to confirm the CR value. If the CR value is ≤ 0.10 it means there is no need to repeat it, and if the CR value is> 0.10 then the comparison matrix must be corrected.

4.2.1 Variable level 1 (criteria)

The following table is a calculation of the summation matrix based on the results of the laptop criteria.

Table 11. Calculation Results of the Addition Matrix Based on Laptop Criteria

Kriteria	Harga	Kapasitas memori	Kapasitas *harddisk*	Ukuran layar	Jumlah	Bobot (*Eigen Vector*)
Harga	0,302	0,341	0,367	0,202	1,212	0,303
Kapasitas memori	0,225	0,254	0,248	0,299	1,026	0,256
Kapasitas *harddisk*	0,200	0,249	0,243	0,315	1,006	0,252
Ukuran layar	0,274	0,156	0,142	0,184	0,756	0,189

The values of Table 11. are the results of calculating the pairwise comparison matrix based on the laptop criteria which are then used to calculate the CR value.

The table below outlines the results that have been obtained based on the calculation of the previous comparison matrix

Table 12. Consistency Ratio Calculation Results Based on Laptop Criteria

Jumlah	Bobot (*Eigen Vector*)	Hasil (λ)	Jumlah (λ maks)	*Consistency Index* (CI)	*Consistency Ratio*
1,212	0,303	1,515			
1,026	0,256	1,282	5,000	0,250	0,063
1,006	0,252	1,258			
0,756	0,189	0,945			

Sumber: Data Diolah (2020)

Table 12. shows that the results of the calculation of the consistency ratio based on the laptop criteria obtained a CR value of 0.063. Because the CR value (0.063) <0.10, it can be concluded that the calculation results are consistent and do not need to be repeated.

4.2.2 Variable level 2 (alternatif)

The following table presents the results of calculating the weight of alternative assessments in selecting the best laptop based on laptop criteria.

Table 13. Consistency Ratio Calculation Results Based on Laptop Alternatives to Price Criteria

Jumlah	*Eigen Vector*	Hasil	Jumlah	CI	CR
1,177	0,294	1,471			
1,209	0,302	1,512	5,000	0,250	0,063
0,857	0,214	1,071			
0,757	0,189	0,946			

Table 14. Consistency Ratio Calculation Results Based on Laptop Alternatives to Memory Capacity Criteria

Jumlah	*Eigen Vector*	Hasil	Jumlah	CI	CR
1,208	0,302	1,510			
1,205	0,301	1,506	5,000	0,250	0,063
0,808	0,202	1,010			
0,779	0,195	0,973			

Sumber: Data Diolah (2020)

Table 15. Consistency Ratio Calculation Results Based on Laptop Alternatives to Hard Drive Capacity Criteria

Jumlah	*Eigen Vector*	Hasil	Jumlah	CI	CR
1,291	0,323	1,613			
1,237	0,309	1,546	5,000	0,250	0,063
0,842	0,210	1,052			
0,630	0,158	0,788			

Sumber: Data Diolah (2020)

Table 16. Consistency Ratio Calculation Results Based on Laptop Alternatives to Screen Size Criteria

Jumlah	*Eigen Vector*	Hasil	Jumlah	CI	CR
1,227	0,307	1,534			
1,215	0,304	1,519	5,000	0,250	0,063
0,770	0,193	0,963			

0,787	0,197	0,984				

Based on the calculation of the four tables, it shows that the results of the calculation of the consistency ratio based on the alternative laptop to the laptop criteria obtained a CR value of 0.063. Because the CR value (0.063) <0.10, it can be concluded that the calculation results are consistent and do not need to be repeated.

4.3 Choosing the Best Laptop

In choosing the best laptop, first, the evaluation value of each alternative is sought for each criterion that is considered by STEI Jakarta students in determining the decision to choose a laptop. Therefore, to get a global value (global priority), the weight / priority importance of each criterion must be multiplied by the evaluation value.

The following table is a summary of the paired comparison eigenvectors of alternative laptops against each laptop criteria:

Table 17. Value of Alternative Global Priority in Selecting the Best Laptop

Kriteria	Alternatif			
	Asus	HP	Acer	Toshiba
Harga	0,089	0,091	0,065	0,057
Kapasitas memori	0,077	0,077	0,052	0,050
Kapasitas *harddisk*	0,081	0,078	0,053	0,040
Ukuran layar	0,058	0,057	0,036	0,037
Global Priority	0,306	0,304	0,206	0,184

Table 17. shows that Asus laptops get the highest global priority rating with weight gain (0.306). With these advantages, it proves that the Asus laptop is a laptop that is prioritized by STEI Jakarta students in selecting the best laptop.

4.4. Research Findings

In the results of the research that has been carried out, the researcher found that the most influential criterion in the selection of laptops chosen by STEI Jakarta students is the price criteria which is the maximum result of all laptop criteria with a weight of 0.303. The majority of STEI Jakarta students prioritize price criteria because price is taken into consideration before buying a laptop by adjusting the student's budget. While the screen size criteria get the minimum results from other criteria with a weight of 0.189, because the screen size criteria do not really have an effect on laptop performance in carrying out activities and daily activities of STEI Jakarta students.

Based on the price criteria, the HP laptop alternative is a priority with a weight of 0.302. This shows that the majority of STEI Jakarta students have the initial capital to buy a laptop at the price that HP laptops have.

While the best alternative choice of laptop on the criteria for memory capacity, hard disk capacity, and screen size for alternative laptops that are prioritized according to the assessment of STEI Jakarta students is Asus laptops. The results of this assessment are different from the provisional assessment where HP laptops are superior, the difference in these results is obtained based on the final results which show that Asus laptops are superior to other laptop alternatives.

In addition, the Asus laptop received the highest global priority value with a weight obtained of 0.306 and the laptop that took the final position was the Toshiba laptop with a weight gain of 0.184. This assessment is the final result for prospective buyers, especially STEI Jakarta students, as a consideration in buying a laptop according to their capital.

V. CONCLUSION AND SUGGESTION

5.1 Conclusion

From the description of the research results in Chapter IV, it can be concluded as follows:

1) The decision support system for choosing a laptop appropriately uses the Analythical Hierarchy Process (AHP) method, which is the importance of formulating priority laptop criteria for potential customers, then identifying alternative laptops based on these objective criteria for assessment / comparison between criteria, and comparisons between laptop alternatives for each criterion. Furthermore, the weights obtained from the comparison results are added up to determine the overall priority based on the criteria and alternatives. After that, measure the level of consistency between the criteria and the laptop alternatives against each criterion.

2) The criteria for laptops chosen by the majority of STEI Jakarta students are the price criteria, because based on the calculation on the normalization of the price criteria matrix has the most dominant weight compared to other criteria. The laptop alternative chosen by the majority of STEI Jakarta students is Asus laptops because of the three criteria (memory capacity, hard drive capacity, and screen size) Asus laptops get the highest score.

3) Overall, based on the criteria in choosing a laptop brand and specifications on the STEI Jakarta campus, the best laptop to be used as a reference when buying is Asus laptop because Asus laptops are the brand that has the most dominant priority / weight among other laptop brands.

5.2 Suggestion

Based on the results of the analysis and conclusions above, here are some suggestions that can be recommended by researchers, namely:

1) For prospective consumers who are still ordinary or do not have the right recommendations in choosing a laptop brand and specifications, you should pay attention to the weight of the criteria on the quality of the laptop, because each criteria for a laptop has different weights. Thus, potential customers can combine these criteria to get a brand and specifications for laptops that suit consumers' money and needs.

2) For further research, researchers can use other criteria and alternatives in accordance with the needs and wants, and should take the same sub-criteria. In selecting respondents, researchers are advised to take respondents who do not have a laptop in order to get answers that are more in line with purchasing decisions. In addition to choosing a laptop, the AHP method can also be used to solve other multi-criteria problems as a decision support tool, for example to solve problems in choosing a cellphone brand in a company with criteria that need to be observed are design, camera quality, RAM capacity, and battery life.

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