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Decision Support System for Determining Employees for Official Travel with the Analytic Network Process (ANP) Method

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ABSTRACT

Official travel is an official trip from the place of position to the destination and returns to the original position. In this case, the official trip is adjusted to the main duties and functions (Tupoksi) of officials/employees, including for improving the quality of human resources such as attending training, technical guidance, seminars, and comparative studies. With the large number of official travel documents that are made and received, data search will be inefficient in terms of time and energy for determining employees who are following an official trip that is ordered by the manual system also causing the possibility that the official/employee to be assigned is not accurate. So that at this time we need a more structured official travel document management system to simplify and be right on target in determining employees who take official trips. So that information technology or system is needed to support the assignment of official trips. The purpose of this study is to apply the Analytic Network Process (ANP) method in analyzing data on employee determination for official travel and to build a decision support system for determining employees for official travel using the analytic network process (ANP) method. After conducting the research, the researchers concluded that to apply the analytic hierarchy process (ANP) method in data analysis, the determination of employees for official travel must follow the ANP processing steps by comparing the values of each criterion to produce a criterion and alternative comparison matrix, performing supermatrix calculations (Supermatrix, Weighted, and Limit).

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1. INTRODUCTION

The use of technology nowadays is increasingly fast, so that every company must follow these developments, both private and government companies. The government/service of each regency/city is on an official trip in every sector. Every year, the Public Works and Spatial Planning Office of Karo Regency dispatches or assigns employees for official trips.

Official travel is an official trip from the place of position to the destination and returns to the original position. In this case, the official trip is adjusted to the main duties and functions (Tupoksi) of officials/employees, including to improve the quality of human resources such as attending training, technical guidance, seminars, and comparative studies. For the assignment of

official travel staff, usually, the Karo District Public Works and Spatial Planning Office first look at who is ready and who is not too busy in office affairs. In the current information age, one of the main problems is how to process data in such a way as to produce information that is useful and easy to use by information users. The existing mail management administration system is still manual. With the large number of official travel documents that are made and received, data search will be inefficient in terms of time and energy for determining employees who are following an official trip that is ordered by the manual system also causing the possibility that the official/employee to be assigned is not accurate. So that at this time we need a more structured official travel document management system in order to simplify and be right on target in determining employees who take official trips. So that information technology or system is needed to support the assignment of official trips.

Decision Support Systems (DSS) can assist in determining official travel. Methods that can be used in SPK include the Analytic Network Process (ANP) method[1], [2][3], [4]. The Analytic Network Process (ANP) method is a development of the Analytical Network Process (AHP) method[5], [6]. The ANP method is able to improve AHP weaknesses in the form of the ability to accommodate linkages between criteria or alternatives[5], [7], [8]. The ANP method is systematic and precise in the decision-making process that is able to show the value of each media with criteria set by universities or decision-makers based on systematic data analysis for the purpose of determining official travel[9]–[11].

2. RESEARCH METHOD

The steps that will be taken in completing this research will be carried out from the beginning to the end of the study in sequence until the results to be found, by utilizing the ANP method, as shown below:

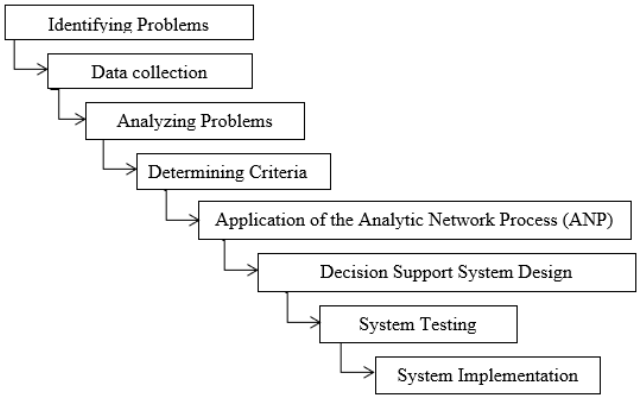


Figure 1. Research Framework

a. Identify the Problem
   The first step in this research is to identify the problem to find out what problems exist in the Karo District Public Works and Spatial Planning Office.
b. Data Collection
   The steps taken in data collection are by observing and distributing questionnaires to stakeholders in the Karo District Public Works and Spatial Planning Office.
c. Analyzing the Problem
   Analyzing the problem is a stage that will be carried out to find out what problems exist in the Karod Regency Public Works and Spatial Planning Office in the course of this assignment, thus the researcher knows better the limits and scope of the research.
d. Determining Criteria
   In determining the criteria, the researcher distributes a questionnaire with choices, for each stakeholder determining the trip of duty, the questionnaire filler can also add to the criteria needed in determining official travel employees.
e. Application of the Analytic Network Process (ANP) Method
   In the Testing process, there are steps that are taken in the process of completing this research.

f. System Design
In the system design stages that describe the system building design made by the UML (Unified Modeling Language) method. The design of this system consists of interface design, Use Case Diagrams, Activity Diagrams, and Class Diagrams.
And the development of the system performs system design regarding the existing activity system built with PHP and MySQL as the database.

g. System Testing
At the testing stage of the decision support system in determining the task journey using the Black Box method.

h. System implementation
At the implementation stage, the system is implemented according to the stage where the system is ready to be operated at the Karo District Public Works and City Arrangement Office.

3. RESULTS AND DISCUSSION

a. Discussion of Pairwise Comparison Weights

Table 1. Evaluation Comparison between criteria against alternative A01

CODE	K01	K02	K03	K04	K05
K01	1,000	0,200	3,000	5,000	2,000
K02	5,000	1,000	4,000	8,000	9,000
K03	0,333	0,250	1,000	3,000	2,000
K04	0,200	0,125	0,333	1,000	0,333
K05	0,500	0,111	0,500	3,000	1,000
Total	**7,033**	**1,686**	**8,833**	**20,000**	**14,333**

After the number of columns is determined, the numbers in the 5x5 matrix are divided by the number of their respective columns to produce a 5x7 matrix as the result of the sum of the following columns:

Table 2. Skala Pembobotan Perbandingan antar kriteria terhadap alternatif A01

CODE	K01	K02	K03	K04	K05	Total	*Priority Vector*
K01	0,142	0,119	0,340	0,250	0,140	0,990	0,198
K02	0,711	0,593	0,453	0,400	0,628	2,785	0,557
K03	0,047	0,148	0,113	0,150	0,140	0,598	0,120
K04	0,028	0,074	0,038	0,050	0,023	0,214	0,043
K05	0,071	0,066	0,057	0,150	0,070	0,413	0,083
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 2 Priority Vector shows the weight of each criterion, so in this case, K02 is the highest / most important weight of 0.557.

Table 3. Evaluation Comparison between criteria against alternative A02

CODE	K01	K02	K03	K04	K05
K01	1,000	6,000	4,000	0,333	0,500
K02	0,167	1,000	0,333	0,125	0,143
K03	0,250	3,000	1,000	0,167	0,200
K04	3,000	8,000	6,000	1,000	2,000
K05	2,000	7,000	5,000	0,500	1,000
Total	**6,417**	**25,000**	**16,333**	**2,125**	**3,843**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 4. Weighting Scale Comparison of criteria against alternative A02

CODE	K01	K02	K03	K04	K05	Total	*Priority Vector*
K01	0,156	0,240	0,245	0,157	0,130	0,928	0,186
K02	0,026	0,040	0,020	0,059	0,037	0,182	0,036
K03	0,039	0,120	0,061	0,078	0,052	0,351	0,070
K04	0,468	0,320	0,367	0,471	0,520	2,146	0,429
K05	0,312	0,280	0,306	0,235	0,260	1,393	0,279
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 4, the Priority Vector shows the weight of each criterion, so in this case, K04 is the highest / most important weight of 0.429.

Table 5. Evaluation Comparison between criteria against alternatives A03

CODE	K01	K02	K03	K04	K05
K01	1,000	4,000	2,000	3,000	0,500
K02	0,250	1,000	0,333	0,500	0,200
K03	0,500	3,000	1,000	2,000	0,333
K04	0,333	2,000	0,500	1,000	0,250
K05	2,000	5,000	3,000	4,000	1,000
Total	**4,083**	**15,000**	**6,833**	**10,500**	**2,283**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 6. Weighting Scale Comparison of criteria against alternatives A03

CODE	K01	K02	K03	K04	K05	Total	*Priority Vector*
K01	0,245	0,267	0,293	0,286	0,219	1,309	0,262
K02	0,061	0,067	0,049	0,048	0,088	0,312	0,062
K03	0,122	0,200	0,146	0,190	0,146	0,805	0,161
K04	0,082	0,133	0,073	0,095	0,109	0,493	0,099
K05	0,490	0,333	0,439	0,381	0,438	2,081	0,416
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 6, the Priority Vector shows the weight of each criterion, so in this case, K05 is the highest / most important weight of 0.416.

Table 7. Evaluation Comparison between criteria against alternatives A04

CODE	K01	K02	K03	K04	K05
K01	1,000	5,000	3,000	0,143	0,333
K02	0,200	1,000	0,333	0,111	0,143
K03	0,333	3,000	1,000	0,111	0,200
K04	7,000	9,000	9,000	1,000	5,000
K05	3,000	7,000	5,000	0,200	1,000
Total	**11,533**	**25,000**	**18,333**	**1,565**	**6,676**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 8. Weighing Scale Comparison of criteria against alternative A04

CODE	K01	K02	K03	K04	K05	Total	*Priority Vector*
K01	0,087	0,200	0,164	0,091	0,050	0,592	0,118
K02	0,017	0,040	0,018	0,071	0,021	0,168	0,034
K03	0,029	0,120	0,055	0,071	0,030	0,304	0,061
K04	0,607	0,360	0,491	0,639	0,749	2,846	0,569
K05	0,260	0,280	0,273	0,128	0,150	1,090	0,218
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 8, Priority Vector shows the weight of each criterion, so in this case, K04 is the highest / most important weight of 0.569.

Table 9. Evaluation Comparison between criteria against alternatives A05

CODE	K01	K02	K03	K04	K05
K01	1,000	1,000	2,000	0,250	0,500
K02	1,000	1,000	2,000	0,200	0,333
K03	0,500	0,500	1,000	0,167	0,333
K04	4,000	5,000	6,000	1,000	3,000
K05	2,000	3,000	3,000	0,333	1,000
Total	**8,500**	**10,500**	**14,000**	**1,950**	**5,167**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 10. Weighing Scale Comparison of criteria against alternative A05

CODE	K01	K02	K03	K04	K05	Total	*Priority Vector*
K01	0,118	0,095	0,143	0,128	0,097	0,581	0,116
K02	0,118	0,095	0,143	0,103	0,065	0,523	0,105
K03	0,059	0,048	0,071	0,085	0,065	0,328	0,066

K04	0,471	0,476	0,429	0,513	0,581	2,469	0,494
K05	0,235	0,286	0,214	0,171	0,194	1,100	0,220
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 10, Priority Vector shows the weight of each criterion, so in this case, K04 is the highest / most important weight of 0.494.

Table 11. Comparative Evaluation among alternatives to K01

CODE	A01	A02	A03	A04	A05
A01	1,000	3,000	5,000	0,333	0,500
A02	0,333	1,000	3,000	0,200	0,250
A03	0,200	0,333	1,000	0,143	0,167
A04	3,000	5,000	7,000	1,000	2,000
A05	2,000	4,000	6,000	0,500	1,000
Total	**6,533**	**13,333**	**22,000**	**2,176**	**3,917**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 12. Weighing Scale Comparison between alternatives to K01

CODE	A01	A02	A03	A04	A05	Total	*Priority Vector*
A01	0,153	0,225	0,227	0,153	0,128	0,886	0,177
A02	0,051	0,075	0,136	0,092	0,064	0,418	0,084
A03	0,031	0,025	0,045	0,066	0,043	0,209	0,042
A04	0,459	0,375	0,318	0,460	0,511	2,123	0,425
A05	0,306	0,300	0,273	0,230	0,255	1,364	0,273
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 12, Priority Vector shows the weight of each alternative, so in this case, A04 is the highest / most important weight of 0.425.

Table 13. Comparative evaluation among alternatives to K02

CODE	A01	A02	A03	A04	A05
A01	1,000	3,000	3,000	3,000	3,000
A02	0,333	1,000	1,000	1,000	1,000
A03	0,333	1,000	1,000	1,000	1,000
A04	0,333	1,000	1,000	1,000	1,000
A05	0,333	1,000	1,000	1,000	1,000
Total	**2,333**	**7,000**	**7,000**	**7,000**	**7,000**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 14. Weighing Scale Comparison between alternatives to K02

CODE	A01	A02	A03	A04	A05	Total	*Priority Vector*
A01	0,429	0,429	0,429	0,429	0,429	2,143	0,429
A02	0,143	0,143	0,143	0,143	0,143	0,714	0,143
A03	0,143	0,143	0,143	0,143	0,143	0,714	0,143
A04	0,143	0,143	0,143	0,143	0,143	0,714	0,143
A05	0,143	0,143	0,143	0,143	0,143	0,714	0,143
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 14, Priority Vector shows the weight of each alternative, so in this case, A01 is the highest / most important weight of 0.429.

Table 15. Comparative evaluation among alternatives to K03

CODE	A01	A02	A03	A04	A05
A01	1,000	1,000	1,000	1,000	1,000
A02	1,000	1,000	1,000	1,000	1,000
A03	1,000	1,000	1,000	1,000	1,000
A04	1,000	1,000	1,000	1,000	1,000
A05	1,000	1,000	1,000	1,000	1,000
Total	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 16. Weighing Scale Comparison between alternatives to K03

CODE	A01	A02	A03	A04	A05	Total	*Priority Vector*

A01	0,200	0,200	0,200	0,200	0,200	1,000	0,200
A02	0,200	0,200	0,200	0,200	0,200	1,000	0,200
A03	0,200	0,200	0,200	0,200	0,200	1,000	0,200
A04	0,200	0,200	0,200	0,200	0,200	1,000	0,200
A05	0,200	0,200	0,200	0,200	0,200	1,000	0,200
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 16, Priority Vector shows the weight of each alternative, so in this case, everything shows the same result, namely 0.200.

Table 17. Comparative evaluation among alternatives to K04

CODE	A01	A02	A03	A04	A05
A01	1,000	2,000	3,000	0,143	0,200
A02	0,500	1,000	2,000	0,125	0,167
A03	0,333	0,500	1,000	0,111	0,143
A04	7,000	8,000	9,000	1,000	3,000
A05	5,000	6,000	7,000	0,333	1,000
Total	**13,833**	**17,500**	**22,000**	**1,712**	**4,510**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 18. Weighing Scale Comparison between alternatives to K04

CODE	A01	A02	A03	A04	A05	Total	*Priority Vector*
A01	0,072	0,114	0,136	0,083	0,044	0,451	0,090
A02	0,036	0,057	0,091	0,073	0,037	0,294	0,059
A03	0,024	0,029	0,045	0,065	0,032	0,195	0,039
A04	0,506	0,457	0,409	0,584	0,665	2,622	0,524
A05	0,361	0,343	0,318	0,195	0,222	1,439	0,288
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 18, Priority Vector shows the weight of each alternative, so in this case, A04 is the highest / most important weight of 0.524.

Table 19. Comparative evaluation among alternatives to K05

CODE	A01	A02	A03	A04	A05
A01	1,000	0,250	0,200	0,500	0,333
A02	4,000	1,000	0,500	3,000	2,000
A03	5,000	2,000	1,000	4,000	3,000
A04	2,000	0,333	0,250	1,000	0,500
A05	3,000	0,500	0,333	2,000	1,000
Total	**15,000**	**4,083**	**2,283**	**10,500**	**6,833**

After the total column is determined, the numbers in the 5x5 matrix are divided by the total column for each to produce a 5x7 matrix totaling the following columns:

Table 20. Weighing Scale Comparison between alternatives to K05

CODE	A01	A02	A03	A04	A05	Total	*Priority Vector*
A01	0,067	0,061	0,088	0,048	0,049	0,312	0,062
A02	0,267	0,245	0,219	0,286	0,293	1,309	0,262
A03	0,333	0,490	0,438	0,381	0,439	2,081	0,416
A04	0,133	0,082	0,109	0,095	0,073	0,493	0,099
A05	0,200	0,122	0,146	0,190	0,146	0,805	0,161
Total	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**5,000**	**1,000**

From Table 20, Priority Vector shows the weight of each alternative, so in this case, A03 is the highest / most important weight of 0.416.

b. Results of System Implementation

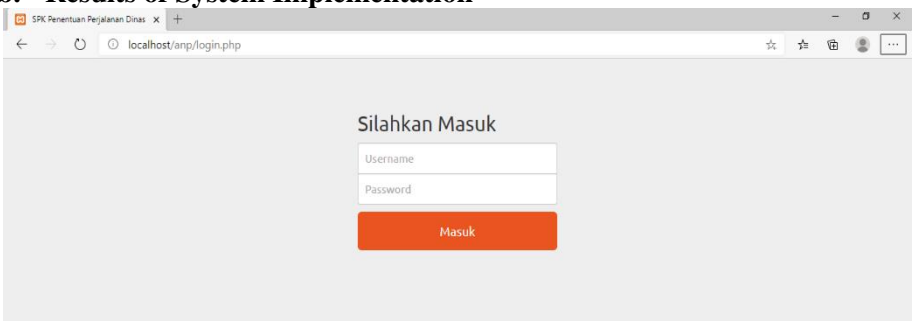


Figure 2. Login Page

The login page is used to secure the system from irresponsible users before entering the Main Menu. Where the enter button is used to validate the username and password that we have filled in the text box provided.

Figure 3. Main Page

The Main Menu page is the first time you log in and displays all menus provided by the system.

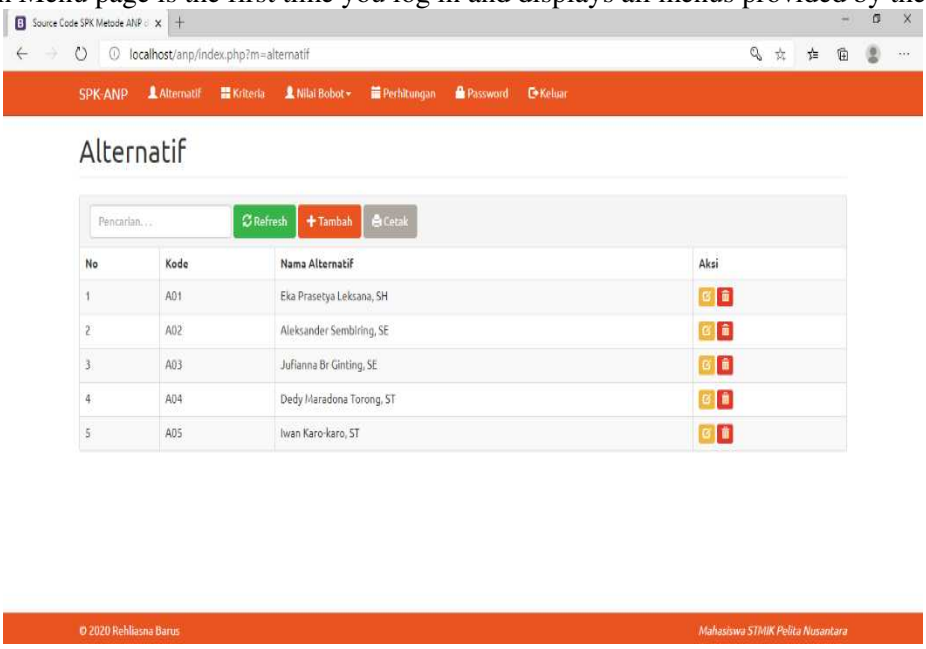


Figure 4. Alternative Inputs page

An alternative page is a page that functions to add, edit, and delete employees who will be selected on an official trip or alternative. Where the refresh button is used to refresh data, the plus button is used to add an alternative, the print button is used to print an alternative to a printer or to a pdf. In the action table, there are two commands for editing and deleting existing alternatives.

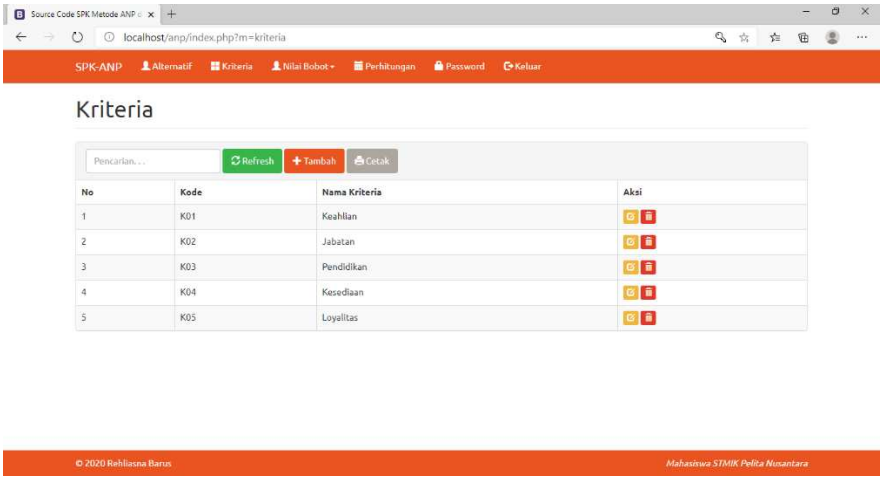


Figure 5. Criteria Input page

Criteria page is a page that is used to manage criteria data. Where the refresh button is used to refresh data, the plus button is used to add criteria, the print button is used to print criteria to a printer or to a pdf. In the action table, there are two commands for editing and deleting existing criteria.

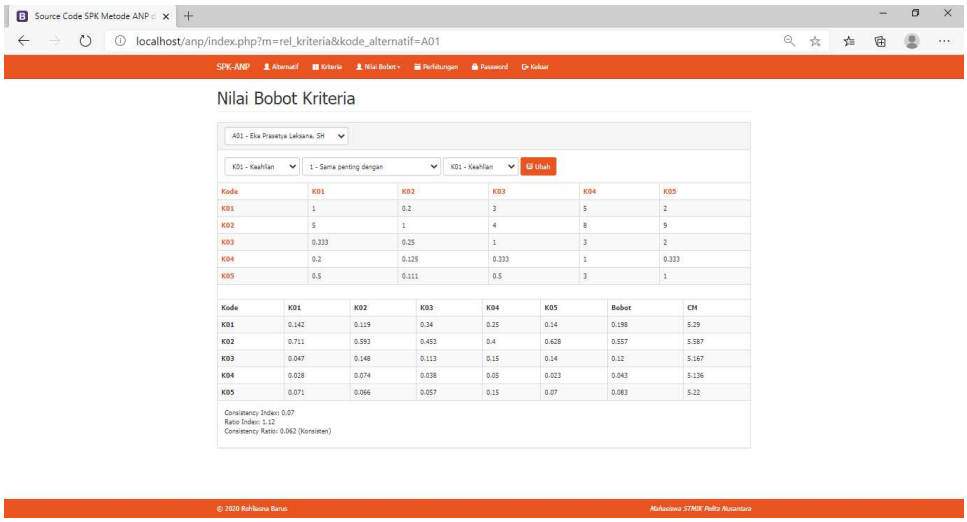


Figure 6. Page Weight Value Input Criteria Against Alternatives

The Criteria Weight Value page is the page that will be used by the user to set or process the criteria weight values that have been set. Where the admin will choose to give the criteria weight value between the criteria and pressing the change command to fill in the comparison matrix value.

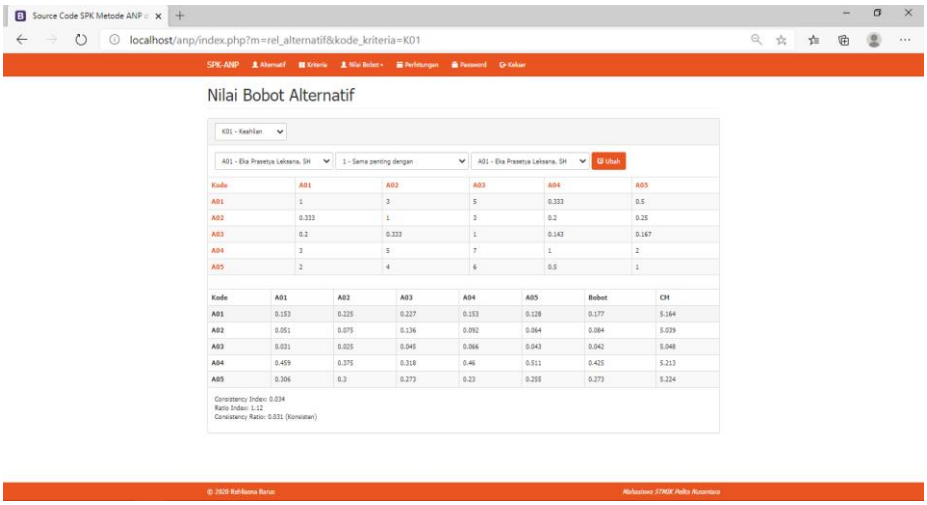
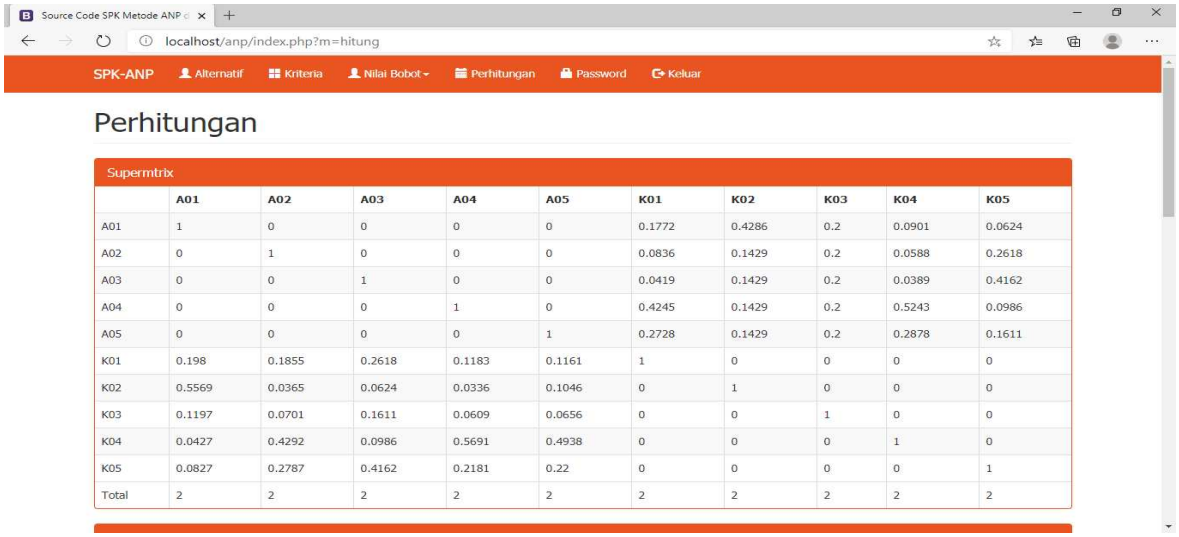


Figure 7. Alternative Value Input to Criteria page

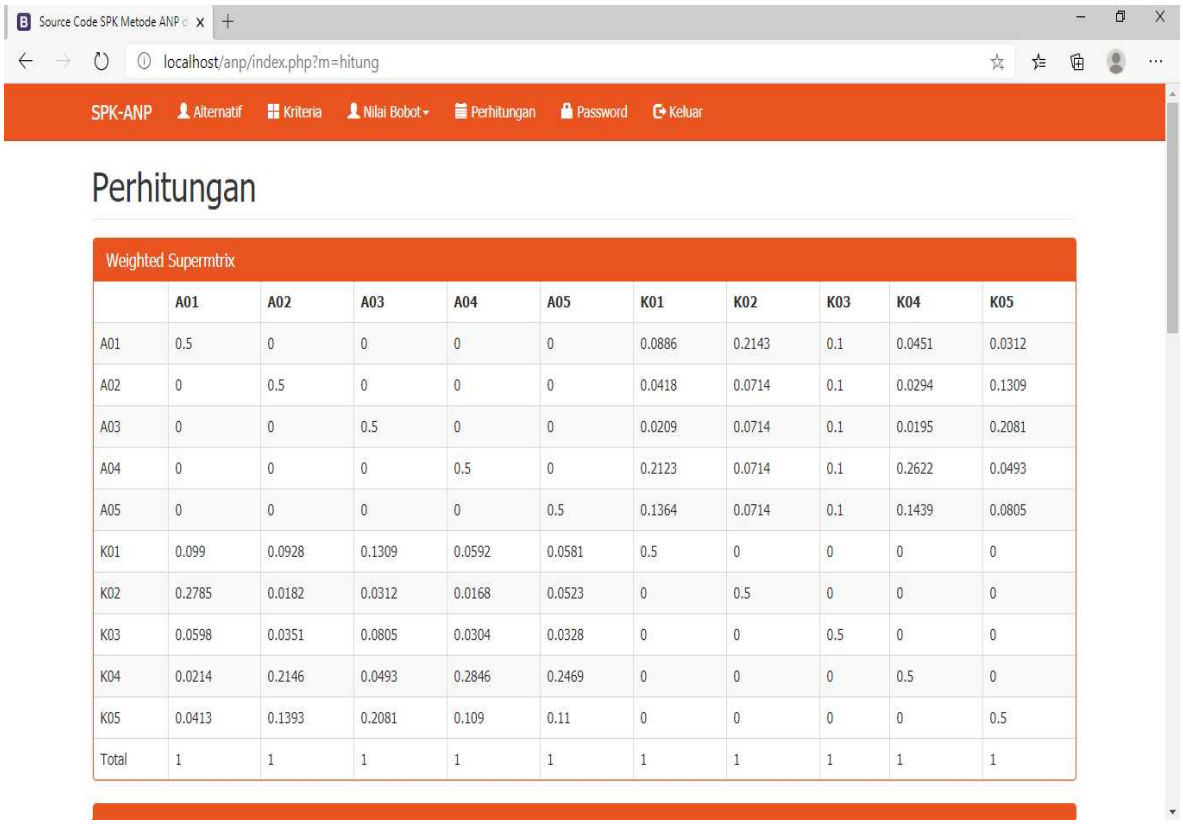
Alternative Weight Value Page is the page that will be used by the user to set or process the Alternative weight values that have been set. On this page, the user will choose Criteria, then create a comparison matrix between the criteria.

To see the calculation results of the questionnaire entered into the application, namely by looking at the Supermatrix. The next supermatrix, namely the weighted supermatrix, is obtained by multiplying all the elements in the components of the supermatrix by the values contained in the cluster matrix. The last Supermatrix Limit Supermatrix is obtained by increasing the weighted supermatrix weight by multiplying the supermatrix by itself several times. When



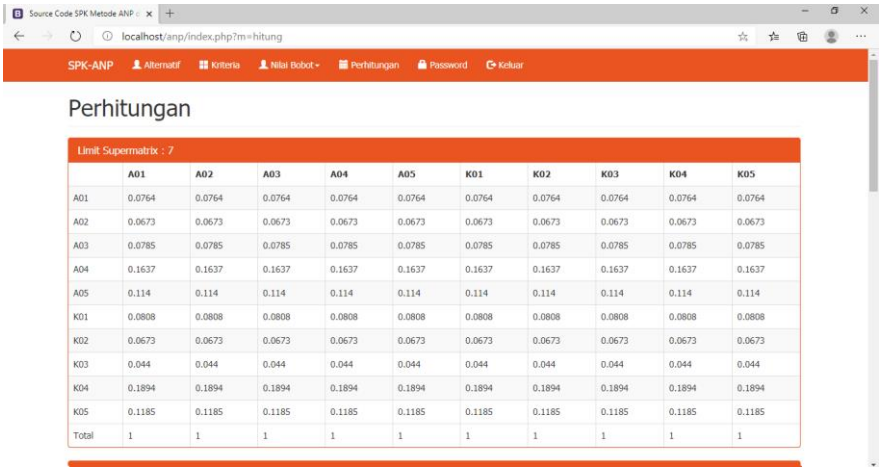
	A01	A02	A03	A04	A05	K01	K02	K03	K04	K05
A01	1	0	0	0	0	0.1772	0.4286	0.2	0.0901	0.0624
A02	0	1	0	0	0	0.0836	0.1429	0.2	0.0588	0.2618
A03	0	0	1	0	0	0.0419	0.1429	0.2	0.0389	0.4162
A04	0	0	0	1	0	0.4245	0.1429	0.2	0.5243	0.0986
A05	0	0	0	0	1	0.2728	0.1429	0.2	0.2878	0.1611
K01	0.198	0.1855	0.2618	0.1183	0.1161	1	0	0	0	0
K02	0.5569	0.0365	0.0624	0.0336	0.1046	0	1	0	0	0
K03	0.1197	0.0701	0.1611	0.0609	0.0656	0	0	1	0	0
K04	0.0427	0.4292	0.0986	0.5691	0.4938	0	0	0	1	0
K05	0.0827	0.2787	0.4162	0.2181	0.22	0	0	0	0	1
Total	2	2	2	2	2	2	2	2	2	2

Figure 8. Supermatrix Results page



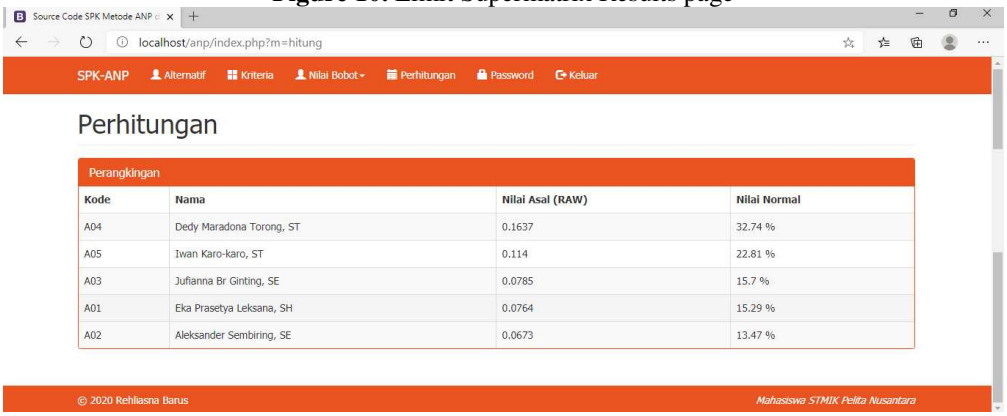
	A01	A02	A03	A04	A05	K01	K02	K03	K04	K05
A01	0.5	0	0	0	0	0.0886	0.2143	0.1	0.0451	0.0312
A02	0	0.5	0	0	0	0.0418	0.0714	0.1	0.0294	0.1309
A03	0	0	0.5	0	0	0.0209	0.0714	0.1	0.0195	0.2081
A04	0	0	0	0.5	0	0.2123	0.0714	0.1	0.2622	0.0493
A05	0	0	0	0	0.5	0.1364	0.0714	0.1	0.1439	0.0805
K01	0.099	0.0928	0.1309	0.0592	0.0581	0.5	0	0	0	0
K02	0.2785	0.0182	0.0312	0.0168	0.0523	0	0.5	0	0	0
K03	0.0598	0.0351	0.0805	0.0304	0.0328	0	0	0.5	0	0
K04	0.0214	0.2146	0.0493	0.2846	0.2469	0	0	0	0.5	0
K05	0.0413	0.1393	0.2081	0.109	0.11	0	0	0	0	0.5
Total	1	1	1	1	1	1	1	1	1	1

Figure 9. The Weighted Supermtrix Results page



	A01	A02	A03	A04	A05	K01	K02	K03	K04	K05
A01	0.0764	0.0764	0.0764	0.0764	0.0764	0.0764	0.0764	0.0764	0.0764	0.0764
A02	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673
A03	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785	0.0785
A04	0.1637	0.1637	0.1637	0.1637	0.1637	0.1637	0.1637	0.1637	0.1637	0.1637
A05	0.114	0.114	0.114	0.114	0.114	0.114	0.114	0.114	0.114	0.114
K01	0.0808	0.0808	0.0808	0.0808	0.0808	0.0808	0.0808	0.0808	0.0808	0.0808
K02	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673	0.0673
K03	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
K04	0.1894	0.1894	0.1894	0.1894	0.1894	0.1894	0.1894	0.1894	0.1894	0.1894
K05	0.1185	0.1185	0.1185	0.1185	0.1185	0.1185	0.1185	0.1185	0.1185	0.1185
Total	1	1	1	1	1	1	1	1	1	1

Figure 10. Limit Supermatrix Results page



Kode	Nama	Nilai Asal (RAW)	Nilai Normal
A04	Dedy Maradona Torong, ST	0.1637	32.74 %
A05	Iwan Karo-karo, ST	0.114	22.81 %
A03	Jufianna Br Ginting, SE	0.0785	15.7 %
A01	Eka Prasetya Leksana, SH	0.0764	15.29 %
A02	Aleksander Sembiring, SE	0.0673	13.47 %

Figure 11. Rating/Decision Results page

The Rating / Decision Result page is used to view the final decision result of the process.

4. CONCLUSION

To apply the Nnalytic Network Process (ANP) method in the data analysis of determining employees for official travel, the ANP has to follow the steps of the ANP by comparing the values of each criterion to produce a comparison matrix of criteria and alternatives, performing supermatrix calculations (Supermatrix, Weighted, and Limit). So that the total global priority is obtained as the final result of the calculation/decision process. To build a decision support system for determining employees for official trips using the Analytic Network Process (ANP) method, the authors first conducted a system requirements analysis, performed calculations using the ANP method, designed systems using UML, database design, user interface design, and web-based system development.

REFERENCES

[1] A. R. Sinaga and Y. Hasan, "APLIKASI PENDUKUNG KEPUTUSAN PENENTUAN DOSEN PEMBIMBING SKRIPSI S1 TEKNIK INFORMATIKA," 2015. [Online]. Available: https://s3.amazonaws.com/academia.edu.documents/40796550/31._Jurnal__ALEX.pdf?response-content-disposition=inline%3B filename%3D31._Jurnal_ALEX.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=ASIATUSBJ6BAPZF7ABG3%2F20200418%2Fus-east-1%2Fs3%2Faws4_r.

[2] A. Rikki, "Pengujian Sistem Pendukung Keputusan Metode Simple Additive Weighting dan Weighted Product dengan Matlab," *MEANS (Media Inf. Anal. dan Sist.*, vol. 2, no. 1, pp. 47–51, 2017.

[3] M. R. A. Kaluku and N. Pakaya, "PENERAPAN PERBANDINGAN METODE AHP-TOPSIS DAN ANP-TOPSIS MENGUKUR KINERJA SUMBER DAYA MANUSIA DI GORONTALO," *Ilk. J. Ilm.*, 2017, doi: 10.33096/ilkom.v9i2.121.124-131.

[4] D. Nurlaila, D. Supriyadi, and A. E. Amalia, "Penerapan Metode Analytic Network Process (ANP) Untuk Pendukung Keputusan Pemilihan Tema Tugas Akhir (Studi Kasus: Program Studi

S1 Informatika ST3 Telkom)," *J. Inform. J. Pengemb. IT Poltek Tegal*, 2017.

[5] L. Hamdani, M. Y. Nasution, and M. Marpaung, "Solusi Permasalahan Perzakatan di BAZNAS dengan Metode ANP: Studi tentang Implementasi Zakat Core Principles," *Muqtasid J. Ekon. dan Perbank. Syariah*, 2019, doi: 10.18326/muqtasid.v10i1.40-56.

[6] S. Sumiyatun and R. Wardoyo, "KOMBINASI METODE ANP DAN TOPSIS DALAM MENENTUKAN PRIORITAS MEDIA PROMOSI PERGURUAN TINGGI (STUDI KASUS: STMIK AKAKOM YOGYAKARTA)," *JIKO (Jurnal Inform. dan Komputer)*, 2016, doi: 10.26798/jiko.2016.v1i2.34.

[7] N. Huda, D. Anggraini, K. M. Ali, N. Rini, and Y. Mardoni, "KOMPARASI AHP DAN ANP PENENTUAN SOLUSI PENGELOLAAN ZAKAT (KASUS DKI DAN SULSEL)," *EKUITAS (Jurnal Ekon. dan Keuangan)*, 2018, doi: 10.24034/j25485024.y2013.v17.i3.345.

[8] M. Abdillah, Ilhamsyah, and R. Hidayati, "Penerapan Metode Analytic Network Process (Anp) Berbasis Android Sebagai Sistem Pendukung Keputusan Dalam Pemilihan Tempat Kos," *J. Coding, Rekayasa Sist. Komput. Untan*, 2018.

[9] E. Rohadi, P. P. Arhandi, and S. Faza, "IMPLEMENTASI WEB CRAWLER DAN PERANGKINGAN DATA HOTEL MENGGUNAKAN METODE ANP," *J. Inform. Polinema*, 2017, doi: 10.33795/jip.v4i1.148.

[10] T. Nugroho and A. S. Rusydiana, "MENGEMBANGKAN AGROINDUSTRI JAWA TIMUR: PENDEKATAN METODE ANALYTIC NETWORK PROCCES," *J. Ilmu Ekon. Terap.*, 2018, doi: 10.20473/jiet.v3i1.8025.

[11] I. Purnamasari and K. Afnisari, "Penentuan Dosen Berprestasi Menggunakan Metode Analytical Network Process," *INTENSIF J. Ilm. Penelit. dan Penerapan Teknol. Sist. Inf.*, 2018, doi: 10.29407/intensif.v2i2.12119.