



Decision Support System Feasibility Lending At KSU Mitra Karya Cooperative Customer Unit XXVIII with Analytical Hierarchy Process Method

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ABSTRACT

Decision Support System (DSS) is a system that can assist a person in making accurate decisions and targeted. Many problems can be solved by using CMS, one of which is determining the feasibility of a credit recipient customers. There are several methods that can be used in building a CMS one of them is the Analytical Hierarchy Process (AHP). AHP is yan method most widely used in solving problems that are multiple criteria, such as the eligibility determination SPK customer credit recipients. This study using AHP in determining credit worthiness recipient customers on Business Multipurpose Cooperative Unit of Work Partners XXVIII. In determining the credit worthiness of customers receiver, there are several criteria on which to base decisions, among others Dwelling, Income, dependents, and The work. The end result of this research is the result of global priority customer criteria, sorted from highest to lowest, so the cooperative can easily make decisions by looking at the results.

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1. Introduction

The system is running in the KSU Cooperative Decision Making Unit of Work Partners XXVIII still using manual processes and databases that are used in the form of paper, so it takes a long time for processing. And granting credit lending to customers was given only to capitalize confidence which only knows the address of the home, business, and ask for the file in the form of photocopy of ID card without any collateral and survey the location. Other obstacles that are difficult to store and archive search as well as the risk of data loss is greater. It is influential to customers in a long wait the decision of the company.

2. Theory

2.1 Understanding Decision Support System

Decision support system (DSS) is part of a computer-based information system including a knowledge-based system or knowledge management is used to support decision making in an organization or company. Can also be regarded as a computer system that processes data into information to make a decision on a specific semi-structured problems. SPK can be described as a system that is capable of supporting ad hoc analysis of data, and decision modeling, decision-oriented and used in times that are not ordinary.

2.2 Analitychal Hierarchy Process (AHP)

Definition According to Dr. Asthma Th. Ibraheem & Atia Noor S. (2016: 25-26). AHP is a general theory of measurement. It is used to obtain the relative priority on an absolute scale (invariance under transformations of identity) of both pairwise comparisons and continuous in multilevel hierarchical structure. This comparison may be drawn from actual measurements or from a fundamental scale that reflects the relative strengths of the preferences and feelings.

There are seven procedures in AHP among others, are as follows:





1. Define unstructured problems.
2. Developing AHP hierarchy.
3. Pairwise comparisons.
4. Estimating the relative weights.
5. Check consistency.
6. Obtaining the overall rankings.
7. Checking the consistency of the hierarchy

Table 1.
Randaom index list Consistency

Matrix size	value IR
1.2	0,00
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49
11	1.51
12	1.48
13	1.56
14	1.57
15	1.59

3. Results and Discussion

a) Basic scale Pairwise Comparison

Table 2
Basic Scale Comparison Criteria

Intensitas Interests	definition
1	Both elements are equally important
3	Elements that one a little bit more important than any other element
5	Elements which one is more important than other elements
7	One very important element than other elements
9	One absolutely essential element than other elements
2,4,6,8	Values between two values adjacent consideration

b) Steps Settlement

1) Pairwise Comparison matrix Criteria

Kriteria	Tempat Tinggal	Penghasilan	Tanggungan	Pekerjaan
Tempat Tinggal	1	3	5	7
Penghasilan	0,33	1	3,00	5
Tanggungan	0,2	0,33	1	3
Pekerjaan	0,14	0,2	0,33	1
Jumlah	1,67	4,53	9,33	16

Figure 1, Couples Peningkatan matrix Criteria

- 2) Calculating the weight criterion by way of normalization of the value of each pairwise comparison matrix column by dividing each value in the column with the corresponding sum.





Normalisasi	Tempat Tinggal	Penghasilan	Tanggungan	Pekerjaan	Jumlah	Priorita
Tempat Tinggal	0,6	0,66	0,54	0,44	2,24	0,56
Penghasilan	0,2	0,22	0,32	0,31	1,05	0,26
Tanggungan	0,12	0,07	0,11	0,19	0,49	0,12
Pekerjaan	0,08	0,04	0,04	0,06	0,22	0,06
Jumlah	1	1	1	1	4	1

Figure 2. Normalization Comparison Criteria

$$CI = (\lambda \max - n) / (n - 1)$$

$$\lambda \max = (1.67 \times 0.56) + (4.53 \times 0.26) + (9.33 \times 0.12) + (16 \times 0.66) = 4.19$$

$$CI = (4.1982 - 4) / (4 - 1) = 0.06$$

$$CR = CI / IR \text{ (Index Random)}$$

$$= 0.06 / 0.9$$

$$= 0.07$$

3) Alternative Pairwise Comparison matrix for Criterion Shelter

Tempat Tinggal			
Alternatif	Nasabah 1	Nasabah 2	Nasabah 3
Nasabah 1	1	3	5
Nasabah 2	0,33	1	3
Nasabah 3	0,2	0,33	1
Jumlah	1,53	4,33	9

Figure 3. Alternative Comparison Matrix

4) Calculating alternative weighting by way of normalization value of each pairwise comparison matrix column by dividing each value in the column with the corresponding sum.

Normalisasi	Nasabah 1	Nasabah 2	Nasabah 3	Jumlah	Prioritas
Nasabah 1	0,65	0,69	0,56	1,9	0,63
Nasabah 2	0,22	0,23	0,33	0,78	0,26
Nasabah 3	0,13	0,08	0,11	0,32	0,11
Jumlah	1	1	1	3	1

Figure 4. Normalisasi Comparison of Alternative

$$CI = (\lambda \max - n) / (n - 1)$$

$$\lambda \max = (1.53 \times 0.63) + (4.33 \times 0.26) + (9 \times 0.11) = 3.08$$

$$CI = (3.0796 - 3) / (3 - 1) = 0.04$$

$$CR = CI / IR \text{ (Index Random)}$$

$$= 0,04 / 0,58$$

$$= 0.07$$

5) Pairwise Comparison Matrix Alternative for Income Criteria

Penghasilan			
Alternatif	Nasabah 1	Nasabah 2	Nasabah 3
Nasabah 1	1	2	3
Nasabah 2	0,5	1	3
Nasabah 3	0,33	0,33	1
Jumlah	1,83	3,33	7

Figure 5. Alternative Comparison Matrix





- 6) Calculating alternative weighting by way of normalization value of each pairwise comparison matrix column by dividing each value in the column with the corresponding sum.

Normalisasi	Nasabah 1	Nasabah 2	Nasabah 3	Jumlah	Prioritas
Nasabah 1	0,55	0,6	0,43	1,58	0,53
Nasabah 2	0,27	0,3	0,43	1	0,33
Nasabah 3	0,18	0,1	0,14	0,42	0,14
Jumlah	1	1	1	3	1

Figure 6. Normalisasi Comparison of Alternative

$$CI = (\lambda \max - n) / (n - 1)$$

$$\lambda \max = (1.83 \times 0.53) + (3.33 \times 0.33) + (7 \times 0.14) = 3.05$$

$$CI = (3.05 - 3) / (3 - 1) = 0.02$$

$$CR = CI / IR \text{ (Index Random)}$$

$$= 0.02 / 0.58$$

$$= 0.03$$

- 7) Alternative Pairwise Comparison matrix for Dependents Criteria

Tanggung			
Alternatif	Nasabah 1	Nasabah 2	Nasabah 3
Nasabah 1	1	3	4
Nasabah 2	0,33	1	3
Nasabah 3	0,25	0,33	1
Jumlah	1,58	4,33	8

Figure 7. Alternative Comparison Matrix

- 8) Calculating alternative weighting by way of normalization value of each pairwise comparison matrix column by dividing each value in the column with the corresponding sum.

Normalisasi	Nasabah 1	Nasabah 2	Nasabah 3	Jumlah	Prioritas
Nasabah 1	0,63	0,69	0,5	1,82	0,61
Nasabah 2	0,21	0,23	0,38	0,82	0,27
Nasabah 3	0,16	0,08	0,12	0,36	0,12
Jumlah	1	1	1	3	1

Figure 8. Comparison of Alternative Normalisasi

$$CI = (\lambda \max - n) / (n - 1) \quad \lambda \max = (1.58 \times 0.61) + (4.33 \times 0.27) + (8 \times 0.12) = 3.09$$

$$CI = (3.09 - 3) / (3 - 1) = 0.05$$

$$CR = CI / IR \text{ (Index Random)}$$

$$= 0.05 / 0.58$$

$$= 0.09$$

- 9) Pairwise Comparison Matrix Alternative for Work Criteria

Pekerjaan			
Alternatif	Nasabah 1	Nasabah 2	Nasabah 3
Nasabah 1	1	2	5
Nasabah 2	0,5	1	4
Nasabah 3	0,2	0,25	1
Jumlah	1,70	3,25	10

Figure 9 . Alternative Comparison Matrix





10) Calculating alternative weighting by way of normalization value of each pairwise comparison matrix column by dividing each value in the column with the corresponding sum.

Normalisasi	Nasabah 1	Nasabah 2	Nasabah 3	Jumlah	Prioritas
Nasabah 1	0,59	0,62	0,5	1,71	0,57
Nasabah 2	0,29	0,31	0,4	1	0,33
Nasabah 3	0,12	0,08	0,1	0,3	0,1
Jumlah	1	1	1	3	1

Figure 10. Comparison of Alternative Normalisasi

$$CI = (\lambda \max - n) / (n - 1) \lambda \max = (1.71 \times 0.57) + (3.25 \times 0.33) + (10 \times 0.1) = 3.04$$

$$CI = (3.04 - 3) / (3 - 1) = 0.02$$

$$CR = CI / IR (\text{Index Random})$$

$$= 0,02 / 0,58$$

$$= 0.03$$

11) The results of the calculation process decision support system with the customer due diligence AHP method wherein

Kriteria	Tempat Tinggal	Penghasilan	Tanggungan	Pekerjaan	Hasil Akhir	Ranking
Prioritas	0.56	0.26	0.12	0.06		
Nasabah 1	0.63	0.53	0.61	0.57	0.6	1
Nasabah 2	0.26	0.33	0.27	0.33	0.28	2
Nasabah 3	0.11	0.14	0.12	0.1	0.12	3

Figure 11. The calculation results

With the results obtained from the calculation process by using AHP, Customer is the highest value that can be received, the Customer 1 with a value of 0.6.

4. System Implementation

Broadly speaking Openness display interface design decision support using AHP is

a) Main Menu Display

on page The main menu the user is prompted to fill out the criteria and alternatives as well as the weight has been determined, then processed. And if the user wants to get out of the main page the user clicks the logout (exit). Here is the main page

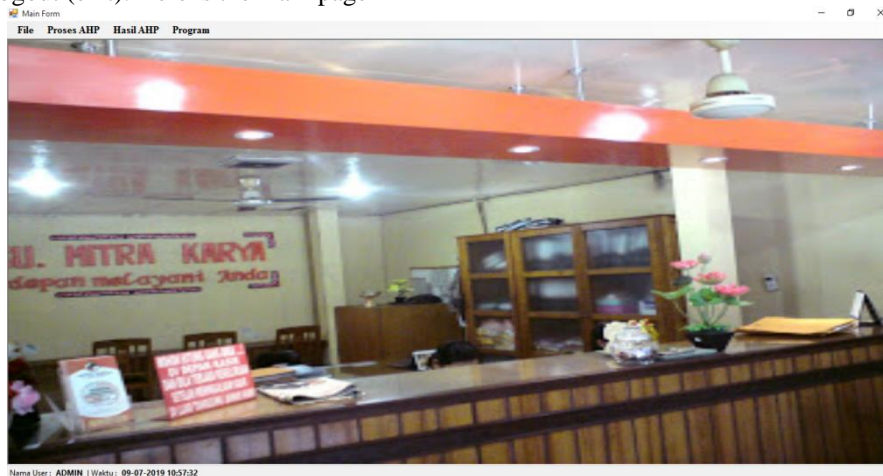


Figure 12. Main course





b) Display Results AHP Process

In the form of AHP process results, will be shown an alternative code, alternate name, value, rank, and captions.

Kode Alternatif	Nama Alternatif	Nilai	Rangking	Keterangan
A1	Nasabah 1	0.6	1	
A2	Nasabah 2	0.28	2	
A3	Nasabah 3	0.12	3	

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Figure 13, AHP Process Results

5. Conclusion

Based analisisa process, design and implementation of the use of decision support systems in cooperative customer due diligence KSU Mitra Karya XXVIII Unit can be concluded as follows:

This application is built to facilitate the decision making due diligence of customers with faster and better based on the data that has been acquired and processed.

- With the process of decision support systems in cooperative customer due diligence KSU Mitra Karya XXVIII Unit can assist companies in selecting the appropriate client be considered.
- By applying the AHP method kopeasi company KSU Mitra Karya XXVIII can find customers who deserve to be given credit loans with their customers and their weight values can get assessment results quickly.
- Design Decision Support System applications using Microsoft Visual Studio 2010 and Microsoft Access 2007 database to produce a system that can determine customers in cooperative KSU Mitra Karya XXVIII Unit

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