



Decision Support System Application in Selecting The Feasibility of Home Credit Application Using AHP Method

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ABSTRACT

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Kata Kunci : Pre-Test, Post-Test dan Hasil Belajar

Penelitian ini bertujuan untuk mengetahui Pengaruh Pemberian Pre-Test Dan Post-Test Terhadap Hasil Belajar Matakuliah Metode Penelitian Mahasiswa AMIK MEDICOM. Penelitian ini menggunakan tiga variabel yang terdiri dari satu variabel terikat yaitu Hasil Belajar (Y), sedangkan variabel bebas yaitu Pre-Test (X_1) Post-Test (X_2). Jenis penelitian yang digunakan adalah *explanatory research* melalui penelitian asosiatif, yaitu penelitian yang bertujuan untuk menjelaskan pengaruh antara dua variabel atau lebih. Dalam penelitian ini yang menjadi populasinya adalah Mahasiswa Akademi Informatika dan Komputer Medicom dengan Program Studi Manajemen Informatika Tingkat 2 (dua) semester 4 yang belajar di Jl. Darat No. 74 Medan berjumlah 254. Sampel dalam penelitian ini 30% dari populasi yaitu berjumlah 76 orang. Metode pengumpulan data dilakukan dengan kuesioner dan studi kepustakaan. Analisis data dilakukan dengan uji kualitas data (validitas dan reliabilitas), uji asumsi klasik, uji t (uji parsial), uji F (uji simultan).

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1. Introduction

The house is a primary need that functions as a place for humans to live and carry on their life. Initially, a house for a place to live was built by the owner himself, but with the growing economy and with a variety of human activities, people have to buy houses from other parties, both individuals and development companies. Some people cannot afford to buy a house with cash because of the high price of the house offered to buyers.

To ease the burden of paying for the purchase of a house, an intermediary is needed who will provide a facility called a KPR (Home Ownership Credit). A bank will provide KPR with criteria that must be met by the buyer, but with this KPR system, the number of prospective buyers will increase, so that the bank will experience difficulties. Errors can be made by the bank in granting mortgages can result in the risk of bad credit so that it will detrimental to the bank.

In this process, the bank needs to make decisions in determining the provision of mortgages. The problem that is currently being encountered is the credit applicant's desire that is not in accordance with his / her abilities. So the bank must select the best possible mortgage buyers. Therefore, the bank takes a long time in selecting the required documents for prospective mortgage buyers.

To solve the problems that occur in the bank, a system is needed regarding "Decision Support System Application in Selecting The Feasibility of Home Credit Application Using The AHP Method". With the help of a decision making system, it can reduce the risk of credit default by the buyer, and check the buyer's document can be done quickly at a lower cost. With computers, making decisions can be done quickly and get better decisions.

2. Theoretical Basis

Turban stated that the DSS is "a system capable of providing problem solving and communication skills for problems with semi-structured and unstructured conditions." [1]. Moore and Chang, DSS can be described as a system capable of supporting sadhoc data analysis and decision modeling. , decision-oriented, future planning orientation, and used in unusual times [2]. Raymond Mc Leod explained that DSS is a specific formation income system that is intended to solve a specific problem that must be solved by managers at various levels [3].

3. Research Methodology



The research methodology is the stages or descriptions carried out during the research. In general, the overall stages of the research can be seen as in the following figure:
 The Preliminary Study describes several stages of the design which are also literature studies and interviews conducted, namely:

- A. Determine the research location
- B. Determine the data requirements used
- C. Research Data
- D. Data Processing
- E. Application of the Profile Matching Method

3.1 Defenition Of Ahp Method

Analytical Hierarchy Process is a decision support method proposed by Thomas L. Saaty [6]. This method describes the problem on multi criteria so that it becomes a hierarchy.

3.2 Stage Of The AHP Method

According to Kadarsyah and Ali (1998), steps were taken defining the problem and determining the solution
 Creating a hierarchical structure with the main objective.

- A. Making a comparison matrix that describes the contribution of each element
- B. The definition of comparison, so that the entire value is $n * [(n-1) / 2]$, n is the number of elements to be compared
- C. Calculate the eigenvalues and test
- D. Repeat steps 3,4,5Hitung vector eigen dari setiap matriks

The late calculation sums up the values of each column and row in question, if A is a paired comparison matrix, then a weight vector is formed:

$$(A) (W T) = (n) (W T)$$

By doing ... in such a way :

- 1) Normalize each column j in matrix A

$$\sum_i a(i, j) = 1$$
- 2) Calculate the average value for each line i

$$W_i = i / n \sum_i a(i, j)$$

- E. Check hierarchy consistency

Test the comparison matrix by testing:

Calculate: $(A) (W T)$

Calculate consistent index:

$$CI = (t-n) / (n-1)$$

Index random RIn is the mean value of CI randomly selected

Calculate the consistency ratio

$$CR = CI / [RI]$$

3.3 Methods For Choosing A Home Loan Application

The elements of consideration and assessment of choosing a home loan application using the AHP method are as follows:

Table 1
 Process for Consideration and Assessment of Mortgage Applications

No	Judgment Criteria	Value					%Score
		Very less	Less	Very less	Enough	Verry Well	
1	Personality Criteria	20	30	60	80	100	* 5 %
2	Advance Criteria	20	30	60	80	100	* 30 %
3	Ability Criteria	20	30	60	80	100	* 20 %
4	Guarantee Criteria	20	30	60	80	100	* 30 %
5	Condition Criteria	20	30	60	80	100	* 15 %

3.4 Data Analysis

Table 2
 Sample Data Assessment Criteria for Housing Loan Application

No	Name	Value					Total Score
		Personality Criteria	Advance Criteria	Ability Criteria	Guarantee Criteria	Condition Criteria	
1	Samsul Abidin	60	30	20	60	20	190
2	Sutrisno Situmorang	100	100	100	100	100	500
3	Leli Ana Harahap	80	80	80	80	80	400



No	Name	Personality Criteria	Advance Criteria	Value			Total Score
				Ability Criteria	Guarantee Criteria	Condition Criteria	
4	Sastra Wandu	80	30	60	20	100	290
5	Jontinus Manullang	60	60	60	80	80	340

4. Result and Implementation

4.1 AHP Method Process

A. Form the AHP hierarchical structure

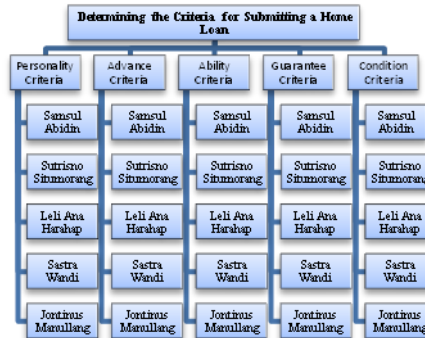


Fig 1. AHP Hierarchy Information Structure

B. The definition of the pairwise comparison matrix

Table 3

Weights Between Value Criteria

	Personality Criteria	Advance Criteria	Ability Criteria	Guarantee Criteria	Condition Criteria
Personality Criteria	1	5	3	5	2
Advance Criteria	0.20	1	0.25	4	0.5
Ability Criteria	0.33	4	1	5	1
Guarantee Criteria	0.20	0.25	0.2	1	0.5
Condition Criteria	0.5	2	1	2	1
Total	2.23	12.25	5.45	17	5

C. Calculate the criteria eigenvalues and test the consistency

1) Normalization of the matrix

Table 4

Comparison Matrix

	Personality Criteria	Advance Criteria	Ability Criteria	Guarantee Criteria	Condition Criteria
Personality Criteria	1 / 2.23	5 / 12.25	3 / 5.45	5 / 17	2 / 5
Advance Criteria	0.20 / 2.23	1 / 12.25	0.25 / 5.45	4 / 17	0.5 / 5
Ability Criteria	0.33 / 2.23	4 / 12.25	1 / 5.45	5 / 17	1 / 5
Guarantee Criteria	0.20 / 2.23	0.25 / 12.25	0.2 / 5.45	1 / 17	0.5 / 5
Condition Criteria	0.5 / 2.23	2 / 12.25	1 / 5.45	2 / 17	1 / 5
Total	1	1	1	1	1



2) Calculate the mean value with the criteria eigenvalues

Table 5
Criteria Eigenvalues

	Personality Criteria	Advance Criteria	Ability Criteria	Guarantee Criteria	Condition Criteria	Average
Personality Criteria	0.45	0.40	0.55	0.29	0.4	0.418
Advance Criteria	0.09	0.08	0.04	0.23	0.1	0.108
Ability Criteria	0.14	0.32	0.18	0.29	0.2	0.226
Guarantee Criteria	0.09	0.02	0.03	0.05	0.1	0.058
Condition Criteria	0.22	0.16	0.18	0.11	0.2	0.174
Total	1	1	1	1	1	1

D. Calculate hierarchy consistency value

1) Value :

$$(A) (W^T) = (n) (W^T)$$

n = 5; RI = 0.90

$$t = \frac{1}{5} \left(\frac{0.42}{0.418} + \frac{0.11}{0.108} + \frac{0.23}{0.226} + \frac{0.06}{0.058} + \frac{0.18}{0.174} \right) = 5.107$$

2) Calculate a consistency index

$$CI = \frac{5.107 - 5}{4} = 0.026$$

3) Compute consistent ratios

$$CR = \frac{0.026}{0.9} = 0.02$$

E. Calculate Alternative Eigenvalues in Sample Samples

1) Normal matrix value

Table 6
Sum of Criteria Values on Alternatives

No	Name	Value					Total
		Personality Criteria	Advance Criteria	Ability Criteria	Guarantee Criteria	Condition Criteria	
1	Samsul Abidin	60	30	20	60	20	190
2	Sutrisno Situmorang	100	100	100	100	100	500
3	Leli Ana Harahap	80	80	80	80	80	400
4	Sastra Wandu	80	30	60	20	100	290
5	Jontinus Manullang	60	60	60	80	80	340
Total		380	300	320	340	380	1720

Table 7
Normalize Criteria Value Matrix on Alternatives

No	Name	Value				
		Personality Criteria	Advance Criteria	Ability Criteria	Guarantee Criteria	Condition Criteria
1	Samsul Abidin	60/380	30/300	20/320	60/340	20/380
2	Sutrisno Situmorang	100/380	100/300	100/320	100/340	100/380
3	Leli Ana Harahap	80/380	80/300	80/320	80/340	80/380
4	Sastra Wandu	80/380	30/300	60/320	20/340	100/380
5	Jontinus Manullang	60/380	60/300	60/320	80/340	80/380
Jumlah		1	1	1	1	1

F. Calculate the eigenvalues of the alternative criteria by multiplying the alternative eigen values

One of the personality criteria with the name Samsul Abidin is obtained:

$$\text{Personality Criteria} = 0.418 * 0.157 = 0.065$$

Each member on each criterion is calculated in the same way, resulting in the following values:



Table 8
Alternative Criteria Eigenvalues

No	Name	Value					Total
		Personality Criteria	Advance Criteria	Ability Criteria	Guarantee Criteria	Condition Criteria	
1	Samsul Abidin	0,066	0,011	0,014	0,010	0,009	0,066
2	Sutrisno Situmorang	0,028	0,036	0,071	0,017	0,046	0,028
3	Leli Ana Harahap	0,088	0,060	0,057	0,014	0,037	0,088
4	Sastra Wandu	0,088	0,010	0,042	0,003	0,046	0,088
5	Jontinus Manullang	0,066	0,022	0,042	0,014	0,037	0,066

G. Calculate the final result

By summing the results of the alternative criteria eigen counts

$$\text{Final Result} = 0.06 + 0.011 + 0.014 + 0.010 + 0.009 + 0.06 = 0,110$$

Done in the same way for all members, so that the following results are obtained:

Table 9
Final Result of Criteria Assessment

No	Name	Final Result
1	Samsul Abidin	0,110
2	Sutrisno Situmorang	0,198
3	Leli Ana Harahap	0,255
4	Sastra Wandu	0,189
5	Jontinus Manullang	0,180

H. Recommendation

Table 10
Recommended Assessment Criteria

No	Name	Final Result
1	Leli Ana Harahap	0,255
2	Sutrisno Situmorang	0,198
3	Sastra Wandu	0,189

4.2 Implementation

In order to realize a system that has been designed in an information system, other supporting facilities are needed in principle, commonly referred to as technical aspects, namely:

- A. *Hardware*
- B. *Software*
- C. *Brainware*

1) Main Page



Fig 2. Main Page

2) Criteria Page

Kriteria Kredit Pemilikan Rumah (KPR)		
Tabel Kriteria		
Kategori	Subkategori	Nilai
Keprabadian (C1)	Character (Keprabadian)	20 - 100
	Capital (Uang Muka)	20 - 100
	Capacity (Kemampuan)	20 - 100
	Cultural (Santunan)	20 - 100
	Condition (Kondisi)	20 - 100
Tabel Keprabadian (C1)		
Kriteria	Kriteria Penilaian	Nilai
Keprabadian (C1)	Sangat Kurang	20
	Kurang	30
	Cukup	40
	Baik	50

Fig 3. Criteria Page



3) The terms page

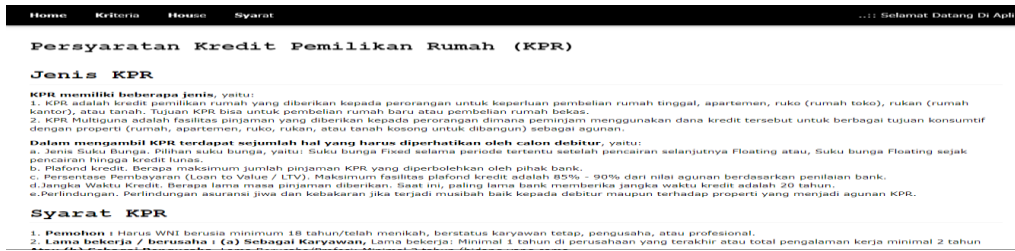


Fig 4. The terms page

4) Login Admin Page

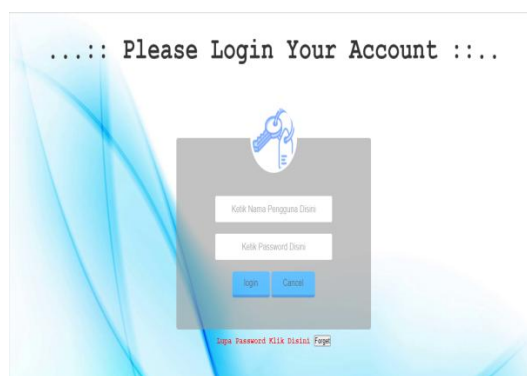


Fig 5. Form Login Admin Page and Admin Page

5) Customer Input Form Page

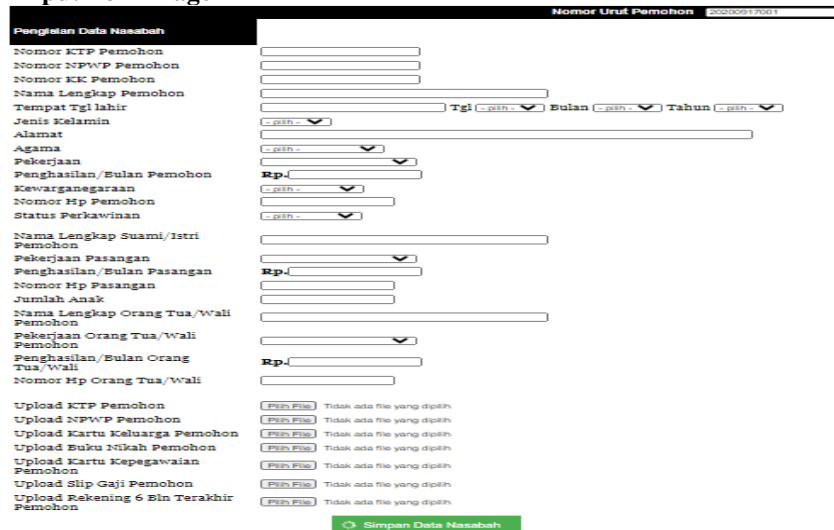


Fig 6. Customer Input Form Page

6) Assessment Criteria Input Form Page

Fig 7. Assessment Criteria Input Form Page and Form Payment Page

7) Home Data Input Page

Fig 8. Home Data Input Page

8) Assessment Criteria List Page and Payment Transaction List Page

Fig 9. Assement Criteria List Page

9) The Home Listing Page and Ranking List Page

Fig 10. The Home Listing Page and Ranking List Page

5. Conclusion

Based on the results of this study, it can be concluded:

- 1) AHP can be used as a tool in making home loan appraisal decisions
- 2) The level of recommendation is determined from the weighting between the criteria shown in the home loan assessment
- 3) Can determine the level of priority between the performance as a guideline for determining the criteria for home loan assessment

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- 3) Bank BRI.
- 4) Family and friend of the researcher

6. References

- [1] Moedjiono, Nuraeni, Aries Kusdaryono. 2016. Sistem Pengambilan Keputusan Promosi Jabatan Dengan Metode Analytical Hierarchy Process Suatu Perusahaan Industri Kimia. ISSN:2338 7718 Konferensi Nasional Teknologi Informasi dan Komunikasi (KNASTIK 2016).Universitas BudiLuhurJakarta.
- [2] Ni Kadek Ayu Sudiani & Ni Putu Ayu Darmayanti. 2016. Pengaruh Profitabilitas,Likuiditas,Pertumbuhan,Dan Investment Opportunity Set Terhadap Nilai Perusahaan.E-Jurnal ManajemenUnud,Vol.5,No.7,2016:4545-4547.
- [3] Radiant V. Imbar, Doro Edi, Kevin Masli. 2016. Sistem Pendukung Keputusan Penerima Beasiswa Dengan Metode Simple Additive Weighting (Studi Kasus di Fakultas Teknologi InformasiU.K. Maranatha). e-ISSN:2443-2229 Jurnal Teknik Informatika dan Sistem Informasi.Volume2Nomor3 Desember 2016. Hal.276. Universitas Kristen Maranatha Bandung.
- [4] Magdalena, Hilyah. 2012. Sistem Pendukung Keputusan Untuk Menentukan Mahasiswa Lulusan Terbaik di Perguruan Tinggi (Studi kasus STMIK Atma Luhur Pangkalpinang). Seminar Nasional Teknologi Informasi dan Komunikasi 2012 (SENTIKA2012). Yogyakarta,10Maret2012.
- [5] Faisal Faruq. 2017. "Aplikasi Informasi Akademik Berbasis Web di SMP Negeri 2 Baleendah "Journal e-Proceeding of Appliedscience. Vol.3. No.3. Desember2017. Universitas Telkom. 6. Saaty, T.Lorie. 1993. Pengambilan Keputusan Bagi Para Pemimpin, Proses Hirarki Analitik untuk Pengambilan Keputusan dalam Situasi yang Kompleks. PustakaBinama Pressindo.
- [6] Saaty, T. L. (2008). Decision Making With The Analytic Hierarchy Process. Int. J. Services Sciences.