IMPLEMENTATION OF THE SAW METHOD AS A DECISION SUPPORT FOR GIVING FEASIBILITY OF KUR ON BANK MANDIRI DRAMAGA BOGOR

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Abstract— Currently, the public's interest is very high to get KUR, but it makes it difficult for banks to determine who is eligible to receive the KUR and in the process of giving credit using the "LOS" system but this system is still quite a time consuming to analyze customer data and the process requires consideration and good analysis from the leader, due to the high number of problem loans. The SAW method used in this study. The SAW method is able to simplify and accelerate the results of credit lending recommendations. The calculation results obtained by debtors who are very worthy given credit as much as 1 debtor (4%), decent debtors with low risk as many as 16 debtors (70%), and worthy of being given with high risk as much as 6 debtors (26%) The purpose of this study to know the process and requirements for granting business credit at Bank Mandiri Dramaga Bogor.

Keywords: KUR, Kredit Usaha Rakyat, SAW Method

Abstrak— Saat ini minat masyarakat sangat tinggi untuk mendapatkan KUR, Namun membuat pihak bank kesulitan dalam menetukan siapakah yang layak menerima KUR tersebut dan pada proses pemberian kredit sudah menggunakan Sistem "LOS" namaun sistem ini masih cukup memakan waktu untuk dianalisa data nasabah dan prosesnya membutuhkan pertimbangan dan analisa yang baik dari pemimpin, dikarnakan tingginya angka kredit bermasalah. Metode SAW yang digunakan pada penelitian ini. Metode SAW ini mampu mempermudah dan mempercepat hasil rekomentasi pemberian kredit. Hasil perhitungan yang didapat oleh debitur yang sangat layak diberikan kredit sebanyak 1 debitur (4%), debitur yang layak dengan risiko rendah sebanyak 16 debitur (70%), dan layak diberikan dengan risiko tinggi sebanyak 6 debitur (26%) Tujuan penelitian ini untuk mengetahui proses dan syarat pemberian kredit usaha rakyat di Bank Mandiri Dramaga Bogor.

Kata Kunci: KUR, Kredit Usaha Rakyat, SAW Method

INTRODUCTION

Kredit Usaha Rakyat (KUR) is a government program that aims to develop or increase viable microbusinesses, increase the competitiveness capacity of MSMEs, encourage economic growth and employment absorption, and reduce poverty. Bank Mandiri, Dramaga Bogor Branch, is one of the most reliable banks in Bogor, which is trusted by the government to provide credit to prospective customers.

Currently, the public's interest is very high to get KUR, but it makes it difficult for banks to determine who is eligible to receive the KUR (R. Febrianti et al., 2018) (Zein, 2014) (Riyandi et al., 2017) and in the process of granting credit already using the system "LOS" but this system is still quite a time consuming to analyze customer data. And the process requires good judgment and analysis from the leader, due to the high number of problem loans (Riyandi et al., 2017) (Riyandi et al., 2017), (Yasdomi & Chandra, 2017)(Kanuru et al., 2018)(Waspodo et al., 2014)(M. Chandra C. Utomo, Wayan Firdaus Mahmudy, 2014) to avoid the possibility of losses to be suffered by banks due to customers who do not fulfill their obligations according to the agreement. Many factors must be considered when making decisions in granting credit strongly influenced by the provisions and policies of the leaders of the Bank Mandiri Branch Dramaga Bogor

In the credit rating process or often also referred to as credit analysis conducted by credit analysis between one official and another credit officer has a different opinion on the request so that credit analysts sometimes have difficulty and require a long time in determining the number of loans to be given to customers based on teaching process The selection process for loan disbursement at PT Bank Mandiri, Dramaga

Branch, Bogor, now the customer has to fill in the form that has been given and starts from the initial selection process to check the suitability of data from prospective customers which includes personal data, business feasibility, income data, and the latest loan data collateral data. Then a check from both BI Checking and the customer's business location visit after a Credit analysis and ability to pay from the customer, then the team of analysts and the Bank's leadership can determine whether or not the customer gets a KUR loan. However, the credit granting system has caused the granting of credit to be subjective (Mulyati & Dwiputri, 2018) and it is not appropriate in determining the granting of credit to customers (Sibyan, 2018).

Decision support with the Simple Additive Weighting (SAW) method (Utomo & Ipmawati, 2016)(Hermawan & Evan, 2019) with the basic concept of finding a weighted sum of the performance ratings on each alternative on all criteria (Sudiarjo & Ruuhwan, 2020), is expected to be able to facilitate and accelerate the process of granting credit that does not yet have a certain mathematical weighting value and calculation and can reduce credit problems. i.e. bad credit. The purpose of this study was to determine the process and conditions for people's business credit at Bank Mandiri Dramaga Bogor, to implement the Simple Additive Weighting (SAW) method in granting credit, and to facilitate the performance of banks in classifying members in debtors and providing effective service processes.

MATERIALS AND METHODS

1. Data Collection Methods

Data collection methods relate to how to collect data, who is the source, and what tools are used.

a. Observation, this activity does direct observation in Bank Mandiri Dramaga Bogor unit on the workflow that is carried out and recorded systematically and then studied so that it gets the materials needed.
b. Interview, this activity held a question and answer session with Mr. Nisan as the head of the Bank Mandiri Micro Dramaga unit in Bogor to get more specific material.
c. Literature study, this activity collects researcher data from various sources that already exist.

2. Research Population

Population research, this activity is collecting data at Bank Mandiri Dramaga Bogor unit by sampling. The population in this study were debtors who borrowed credit loans in 2019 Bank Mandiri Dramaga. All items in the population have the same opportunity (probability) to be selected as sample items. The sampling technique that I use is simple random sampling. In determining the sample of the population the writer uses the Slovin formula:

$$n = \frac{N}{1+ Ne^2} \quad \text{..... (1)}$$

Where: n = sample; N = Population; e = Estimated level of 10%

Where the population of credit borrowers in March 2019 at Bank Mandiri Dramaga is 30 Debtors, with an estimated error rate of 10%, thus the calculation of the sample according to the Slovin formula is as follows:

$$n = \frac{30}{1 + \ 30 \cdot (10\%)^2} = 23$$

The required number of samples is 23 debtors at Bank Mandiri Dramaga in March 2019.

Table 1 Data of Bank Mandiri KUR Debtor Candidates for Dramaga Branch in the January - March 2019 Period

NO	No PK	Name
1	XXXXXXXX555XX	TATANG MIHARJA
2	XXXXXXXX393XX	ISHAK
3	XXXXXXXX392XX	MUMUN
4	XXXXXXXX250XX	MOCH. HASIM
5	XXXXXXXX505XX	LUKMAN HAKIM
6	XXXXXXXX390XX	HERMAN
7	XXXXXXXX230XX	MUHAMAD CECEP SUPRIANA
8	XXXXXXXX225XX	ARYATI SAPARTINAH
9	XXXXXXXX225XX	SADI
10	XXXXXXXX347XX	DEDE RODIAH ALMAIDAH
11	XXXXXXXX203XX	AGUSTIN
12	XXXXXXXX342XX	KASMAN
13	XXXXXXXX318XX	SITI NURYANTI
14	XXXXXXXX158XX	TATANG
15	XXXXXXXX157XX	WAHADI
16	XXXXXXXX318XX	SITI KARIMAH
17	XXXXXXXX317XX	EVA LASTRINA
18	XXXXXXXX278XX	ANI
19	XXXXXXXX135XX	RENA HIDAYAT
20	XXXXXXXX261XX	SITI MARIYAM
21	XXXXXXXX417XX	LINDA DWIYANTI YUNIAR
22	XXXXXXXX439XX	ANGGRAENI MOHAMAD
23	XXXXXXXX440XX	NAZMUDDIN

Source: (Bank Mandiri, 2019)

1. Data Analysis Method

To achieve the research objectives, the analysis used is quantitative data analysis. Where quantitative data is data in the form of numbers. In accordance with its shape, quantitative data can be processed or analyzed using statistical calculation techniques (Siyoto & Sodik, 2015). The analytical method used for decision support is Simple Additive Weighting (SAW) (Hasugian et al., 2018)

Determining the provision of credit to Bank Mandiri Dramaga Bogor is determined by using several criteria to facilitate data processing. In selecting the Mandiri Dramaga Bogor loan application, criteria, and weighting criteria are needed to do the calculation so that the best alternative will be obtained. The loan criteria that have been determined are as follows:

Table 2 Criteria Table

Criteria C	Description
C_1	*Character*
C_2	*Capital*
C_3	*Capasity*
C_4	*Collateral*
C_5	*Condition*

Source: (Setiyawan & Frieyadie, 2019)

Based on table 2 of these criteria, a level of importance of criteria is determined based on the predetermined weight value into fuzzy numbers. Matching rating of each alternative for each criterion is shown in Table 3 below:

Table 3 Fuzzy Numbers

Fuzzy Numbers	Score
Very Low (VL)	1
Low (L)	2
Enough (E)	3
Height (H)	4
Very High (VH)	5

Source: (Setiyawan & Frieyadie, 2019)

Based on the criteria in Table 2 above the matching rating of each alternative (Ai) on each predetermined criterion (Cj), then the translation of the weight of each criterion (Cj) that has been converted to fuzzy numbers

a. Character

Character / Personality Research consists of data about the personality of the prospective customer such as personal traits, daily habits, ways of life, conditions, and family background as well as his liking. Character values can be seen in Table 4 below. If all indicators meet the requirements, they will get maximum points. Indicators assessed include a) Can be cooperative; b) Good economic conditions; c) Can keep the promise of how the assessment of local residents.

Table 4 Character Values

Criteria	Applicant Criteria	Crips Value
Character (Personality)	Very less	1
	Less	2
	Enough	3
	Good	4
	Very good	5

Source: (Setiyawan & Frieyadie, 2019)

b. Capasity

The indicators used in determining loan recipients are based on capacity criteria, as in Table 5 below:

Table 5 Capacity Criteria

Criteria	Applicant Criteria	Crips Value
Capacity (Length of Effort)	Length of Effort < 2 Tahun	1
	Length of Effort >= 2 Tahun	2
	Length of Effort >= 3 Tahun	3
	Length of Effort >= 4 Tahun	4
	Length of Effort >= 5 Tahun	5

Source: (Setiyawan & Frieyadie, 2019)

c. Capital

The indicators used in determining loan recipients are based on capital categories, as in table 6 below:

Table 6 Capital Criteria

Criteria	Applicant Criteria	Crips Value
Capacity (Amount of venture capital other than loans)	0%	1
	<=10%	2
	<=20%	3
	<=30%	4
	>30%	5

Source: (Setiyawan & Frieyadie, 2019)

d. Collateral

The indicators used in determining loan recipients are based on collateral categories, as in Table 7 below:

Table 7 Collateral Criteria

Criteria	Applicant Criteria	Crips Value
Collateral (Loan size = collateral value)	>130% From the Guarantee Value	1
	>=110% From the Guarantee Value	2
	>=100% From the Guarantee Value	3
	>=80% From the Guarantee Value	4
	<80% From the Guarantee Value	5

Source: (Setiyawan & Frieyadie, 2019)

e. Condition

The indicators used in determining loan recipients based on the condition category are determined in the following table 8:

Table 8 Condition Criteria

Criteria	Applicant Criteria	Crips Value
Condition	Very influential	1
	Take effect	2
	Sometimes	3
	No effect	4
	Very no effect	5

Source: (Setiyawan & Frieyadie, 2019)

The evaluation criteria conducted by Bank Mandiri Bogor were carried out with 5C. The criteria outlined above, the decision-maker gives a weight value (W), based on the level of importance of each criterion needed. The weight values of each criterion in table 9 are as follows:

Table 9 Importance of Criteria

Criteria C	Description	Weight
C_1	*Character*	35
C_2	*Capital*	15
C_3	*Capasity*	25
C_4	*Collateral*	15
C_5	*Condition*	10

Source: (Riyandi et al., 2017)

The parameter of the feasibility of prospective debtors at an independent bank can be seen in table 10 below.

Table 10 Feasibility Parameters

Alternative Values(Vi)	Description
<=50	Not feasible
50-<=70	Worth the Big Risk
70-<=90	Worth the small risk
90-100	Very decent

Source: (Riyandi et al., 2017)

RESULTS AND DISCUSSION

Match Rating Value each alternative for each criterion is determined for a match rating for each alternative for each criterion specified above, in table 11 below:

Table 11 Alternative Match Ratings

Alternative (debtor)	Criteria				
	Character C1	*Capital C2*	*Capasity* C3	*Collateral* C4	*Condition C5*
A1	4	5	4	3	3
A2	4	4	2	5	4
A3	3	4	3	4	3
A4	4	3	4	3	4
A5	4	4	4	3	4
A6	4	4	3	3	5
A7	3	4	4	4	4
A8	4	3	5	3	3
A9	5	4	4	3	4
A10	4	3	4	5	4
A11	4	3	5	4	3
A12	2	3	4	3	4
A13	3	4	3	4	3
A14	4	3	4	5	3
A15	5	4	5	4	4
A16	4	5	4	3	5
A17	4	3	5	4	4
A18	3	3	3	4	3
A19	4	5	3	4	4
A20	2	3	4	3	5
A21	4	4	3	4	4
A22	3	3	4	5	3
A23	4	3	3	2	4

Source: (Setiyawan & Frieyadie, 2019)

Decision Matrix

After the alternative rating values for each criterion are determined, the next is to make a decision matrix (X) formed from the match rating table of each alternative for each criterion. The X value of each alternative (Ai) for each

predetermined criterion (Cj), can be seen as figure 1 below.

4	5	4	3	3
4	4	2	5	4
3	4	3	4	3
4	3	4	3	4
4	4	4	3	4
4	4	3	3	5
3	4	4	4	4
4	3	5	3	3
5	4	4	3	4
4	3	4	5	4
4	3	5	4	3
2	3	3	3	4
3	4	3	4	3
4	3	4	5	3
5	4	5	4	4
4	5	4	3	5
4	3	5	4	4
3	3	3	4	3
4	5	3	4	4
2	3	4	3	5
4	4	3	4	4
3	3	4	5	3
4	3	3	2	4

Source: (Setiyawan & Frieyadie, 2019)

Figure 1 Decision Matrix

Decision Matrix Normalization (X)

The process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative ratings (Purnama et al., 2019).

$$R_{ij} = \frac{X_{ij}}{Max\, X_{ij}} \quad \text{..... (2)}$$

The results of matrix normalization (Rij) form a normalized matrix (R) as Figure 2 below.

0.8	1	0.8	0.6	0.6
0.8	0.8	0.4	1	0.8
0.6	0.8	0.6	0.8	0.6
0.8	0.6	0.8	0.6	0.8
0.8	0.8	0.8	0.6	0.8
0.8	0.8	0.6	0.6	1
0.6	0.8	0.8	0.8	0.8
0.8	0.6	1	0.6	0.6
1	0.8	0.8	0.6	0.8
0.8	0.6	0.8	1	0.8
0.8	0.6	1	0.8	0.6
0.4	0.6	0.6	0.6	0.8
0.6	0.8	0.6	0.8	0.6
0.8	0.6	0.8	1	0.6
1	0.8	1	0.8	0.8
0.8	1	0.8	0.6	1
0.8	0.6	1	0.8	0.8
0.6	0.6	0.6	0.8	0.6
0.8	1	0.6	0.8	0.8
0.4	0.6	0.8	0.6	1
0.8	0.8	0.6	0.8	0.8
0.6	0.6	0.8	1	0.6
0.8	0.6	0.6	0.4	0.8

Source: (Setiyawan & Frieyadie, 2019)

Figure 2 Normalized Matrix

Preference Value (Vi)

Next, calculate the final result of the preference value (Vi) obtained from the sum of the multiplications of normalized matrix row elements (R) with preference weights (W) corresponding to the matrix column elements (R). Preference Weight: 35,1 5, 25, 15, 10. Table 12, test results where the initial value of students is processed using the SAW method and get the final result value in the calculation of preference values.

Table 12 Testing Results

Alternative (Debtor)	Criteria					
	C1	*C2*	C3	C4	*C5*	Total
A1	28	15	20	9	6	78
A2	28	12	10	15	8	73
A3	21	12	15	12	6	66
A4	28	9	20	9	8	74
A5	28	12	20	9	8	77
A6	28	12	15	9	10	74
A7	21	12	20	12	8	73
A8	28	9	25	9	6	77
A9	35	12	20	9	8	84
A10	28	9	20	15	8	80
A11	28	9	25	12	6	80
A12	14	9	15	9	8	55
A13	21	12	15	12	6	66
A14	28	9	20	15	6	78
A15	35	12	25	12	8	92
A16	28	15	20	9	10	82
A17	28	9	25	12	8	82
A18	21	9	15	12	6	63
A19	28	15	15	12	8	78
A20	14	9	20	9	10	62
A21	28	12	15	12	8	75
A22	21	9	20	15	6	71
A23	28	9	15	6	8	66

Source: (Setiyawan & Frieyadie, 2019)

The results of the calculation of the value of preferences in each alternative prospective debtor, then to see who is the highest-ranking debtor, makes Table 13 a ranking table based on the final results of the ranking calculation from highest to lowest value, and will be explained in the following table:

Table 13 Ranking Results from Highest to Lowest Value

Alternative Data	Total	Rank
A15	92	1
A9	84	2
A16	82	3
A17	82	4
A10	80	5
A11	80	6
A1	78	7

Alternative Data	Total	Rank
A14	78	8
A19	78	9
A5	77	10
A8	77	11
A21	75	12
A4	74	13
A6	74	14
A2	73	15
A7	73	16
A22	71	17
A3	66	18
A13	66	19
A23	66	20
A18	63	21
A20	62	22
A12	55	23

Source: (Setiyawan & Frieyadie, 2019)

The final result obtained from the calculation by the SAW method is the alternative that gets the most basic or feasible value in A15 that is as much as 1 debtor, and the feasible value with small risk is A1, A2, A4, A5, A6, A7, A8, A9, A10, A11, A14, A16, A17, A19, A21, A22 as many as 16, and the last value worthy of great risk is A3, A12, A13, A18, A20, A23 which is as many as 6. Decision making based on the results of the processing is carried out on the condition:

a. If Preference Value < 50 Then the debtor is not eligible
b. If Preference Value 50 & < 70 Then the debtor is Eligible with high-risk
c. If Preference Value 70 & < 90 Then the debtor is Eligible with low risk
d. If Preference Value 90 - 100 Then the debtor is very feasible

From this table 13 to determine the feasibility parameters, the alternatives must be grouped according to their respective positions can be seen in table 14, table 15, and table 16 below:

Table 14 Debtors are very feasible

Alternative (Debtor)	Criteria						
	C1	*C2*	C3	C4	*C5*	Total	Rank
A15	35	12	25	12	8	92	1

Source: (Setiyawan & Frieyadie, 2019)

Based on table 14, the debtor who is eligible to be given credit is 1 debtor, namely A15.

Table 15 Eligible with little risk

Alternative (Debtor)	Criteria						
	C5	*C2*	C3	C4	*C5*	Total	Rank
A9	35	12	20	9	8	84	2
A16	28	15	20	9	10	82	3
A17	28	9	25	12	8	82	4
A10	28	9	20	15	8	80	5
A11	28	9	25	12	6	80	6
A1	28	15	20	9	6	78	7
A14	28	9	20	15	6	78	8
A19	28	15	15	12	8	78	9
A5	28	12	20	9	8	77	10
A8	28	9	25	9	6	77	11
A21	28	12	15	12	8	75	12
A4	28	9	20	9	8	74	13
A6	28	12	15	9	10	74	14
A2	28	12	10	15	8	73	15
A7	21	12	20	12	8	73	16
A22	21	9	20	15	6	71	17

Source: (Setiyawan & Frieyadie, 2019)

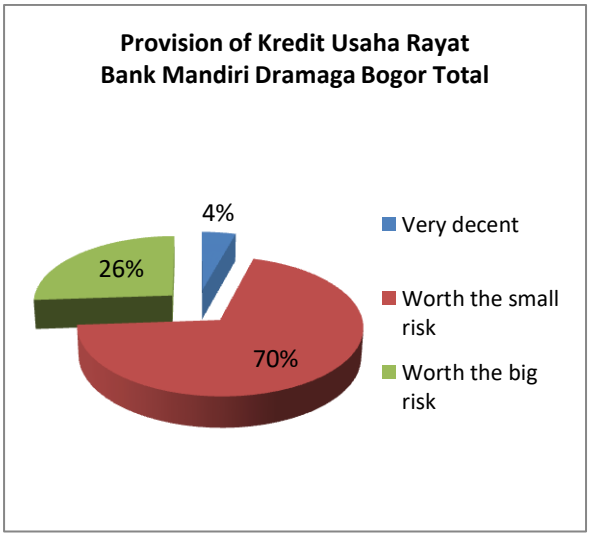
Whereas based on table 15 above there are decent debtors with a small risk to be given a credit of 16 debtors.

Table 16 Eligible with great risk

Alternatif (Debitur)	Kriteria						
	C1	*C2*	C3	C4	*C5*	Total	Rangking
A3	21	12	15	12	6	66	18
A13	21	12	15	12	6	66	19
A23	28	9	15	6	8	66	20
A18	21	9	15	12	6	63	21
A20	14	9	20	9	10	62	22
A12	14	9	15	9	8	55	23

Source: (Setiyawan & Frieyadie, 2019)

Based on table 16, there are 6 eligible debtors with high risk. For the percentage results obtained for granting credit to 23 debtors, can be seen in Figure 3 below.



Source: (Setiyawan & Frieyadie, 2019)

Figure 3 Provision of Kredit Usaha Rayat Bank Mandiri Dramaga Bogor Total

CONCLUSION

Based on the results of research conducted, it can be concluded that the decision

support at Bank Mandiri Dramaga Bogor is expected to help give consideration in determining lending based on criteria determined by 5C, namely Character, Capability, Capital, Collateral and Condition quickly and the output consists from appraisal evaluation. The results of calculations obtained by debtors who are very feasible given credit as much as 1 debtor (4%), decent debtors with low risk as many as 16 debtors (70%), and worthy of being given with high risk as many as 6 debtors (26%). Decision Supporters who can avoid bad credit and can reduce mistakes made by human error in processing data and improve the performance and process of getting debtors.

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