

## Application of Profile Matching in Determining the Feasibility of Micro, Small and Medium Enterprises

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### Abstract

UMKM is short for Micro, Small and Medium Enterprises. MSME is a productive business that stands alone, whether carried out by individuals or business entities that do not choose a company. SMEs are distinguished based on each type of business, namely micro, small and medium enterprises. The provision of MSME assistance is one of the problems faced by the Office of Cooperatives, UMKM, Industry and Trade of Muaro Bungo in determining who is truly entitled to receive MSME assistance. One of the main problem factors that inhibits the development of MSMEs to become more advanced is limited capital. Based on these problems, it is necessary to have a Decision Support System (DSS) that can overcome these problems by using the Profile Matching method. SPK is the implementation of an information system that is intended to assist leaders in the decision-making process. The profile matching method is a method that compares the actual data value of a profile to be assessed with the expected profile value selected to be applied to a decision support system for determining the eligibility of MSMEs. This method is used as a criterion for rating MSME support in Muaro Bungo. Which has the final result in the form of a ranking obtained from the calculation of the SMART method, namely An Nisaa UKM selected as an alternative based on the sample data obtained, is eligible for MSME assistance in Muaro Bungo. The aim of the research is that the cooperative office can distribute assistance to business actors who really deserve it, so that with a web-based decision support system it determines the eligibility of recipients of MSME assistance according to and objectively.

Keywords: UMKM, Decision Support System, *Profile Matching*, Cooperative, Criteria.

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### 1. Introduction

MSMEs are productive businesses owned by individuals and/or individual business entities that meet the criteria for micro-enterprises as stipulated in the Law. In this case the Cooperative and MSME Integrated Business Service Center as an institution that accommodates the guidance and mentoring of MSMEs in Muaro Bungo needs to have a system to measure the eligibility of MSMEs to be fostered in order to increase product potential and increase the MSMEs class. For this reason, a decision support system is needed that can determine the eligibility of MSMEs quickly, precisely and systematically [1].

Medium Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or branches of companies that are owned, controlled, or become part of either directly or indirectly with Small Businesses or large businesses with total net worth or annual sales proceeds as stipulated in the legislation [2].

Decision support systems are the application of information systems intended to assist leaders in the decision-making process [3]. It is hoped that this system can assist in making decisions on the feasibility of small and medium businesses so that those who require the Profile Matching method.

Decision Support Systems are interactive information systems that provide information, modeling, and data manipulation which have a role in helping humans to make decisions more wisely and carefully by using existing data [4].

Meanwhile, according to defines that in general a Decision Support System or Decision Support System as a system that is able to provide both problem-solving abilities and communication skills for semi-structured problems. Specifically, a Decision Support System is defined as a system that supports the work of a manager or a group of managers in solving semi-structured problems by providing information or suggestions leading to certain decisions [5].

According to Suhartanto, et.al in [6], profile matching is a method that is often used in decision making by assuming that the level of the ideal predictor variable must be met by the subject under study, not the minimum level that must be met. Broadly speaking, the profile matching process is a process of comparing the actual data value of a profile to be assessed with the expected profile value, to find out the difference in competence (GAP), the smaller the resulting gap, the greater the weighted value, which means that there is a greater opportunity for recommended for selection [7].

how many previous studies have been conducted by several researchers including the Profile Matching (PM) method for selecting elective courses [8], the

TOPSIS-PM combination to determine a healthy food menu [9], selecting low-cost housing loans [10], determining new employees in companies [11], giving gifts to customers [12], SMART-PM combination for the selection of delivery service partners [13], employee performance appraisal [14], selection of poor student assistance recipients [15], selection of the best employees [16], selection of graphic design employees [17], performance appraisal of contract employees [18], selection of exemplary teachers [19], admission of new students based on CBT exam results [20], determination of thesis supervisor lecturers [21], and assessment of driver performance [21].

## 2. Research methodology

In conducting this research, the authors used a research framework as a sequence or process with the aim that the research conducted would be more structured. The sequence of steps to be made in research is shown in Figure 1:

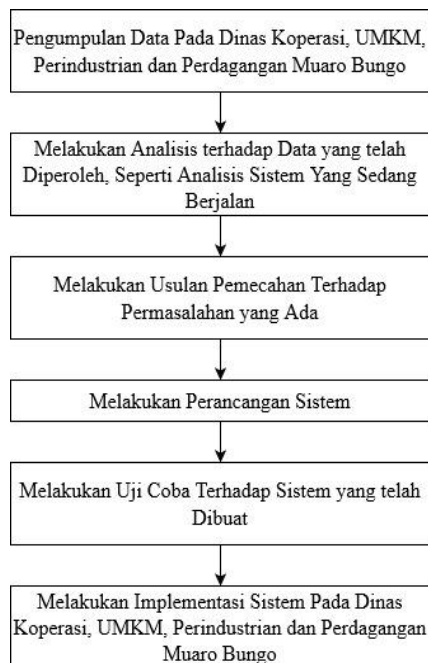


Figure 1. Research Framework

This research phase describes the steps in recording data and collecting several reports needed to be used as guidelines in making this research, as follows:

### 2.1 Identifying Problems

Problem identification is carried out by analyzing the problems that existed in the old system so that it can provide convenience to the cooperative service in determining suitable MSMEs, assisted especially in determining the eligibility of MSMEs. The system at the Office of Cooperatives, Umkm, Industry and Trade of Muaro Bungo is currently still being carried out manually, so there are still errors and inaccuracies in data when determining which MSMEs deserve assistance.

### 2.2 Data collection

Data collection was carried out by observing and conducting interviews with the authorities at the research site and providing questions according to the needs of the creation of the system at the Office of Cooperatives, Umkm, Industry and Trade of Muaro Bungo.

### 2.3 Analysis

In the analysis process there are three stages that must be carried out. The three stages include :

#### 1. Data analysis

Data analysis was obtained from the results of interviews and field observations at the Office of Cooperatives, Umkm, Industry and Trade of Muaro Bungo, where the author analyzed the ongoing system data, namely regarding determining the eligibility of MSMEs which still use manual calculation methods. .

#### 2. Process Analysis

At this stage of process analysis, the author analyzes the old system which still uses the manual method in the process of determining the eligibility of MSMEs and still uses logic in determining MSMEs, so it is necessary to propose a new website-based system as a tool in producing a system that is suitable for use in the Cooperative Office . , Umkm, Industry and Trade of Muaro Bungo.

#### 3. System analysis

System analysis is carried out so that the writer can describe and implement it in PHP and MySQL. With the analysis of this system is expected to facilitate the use of the system.

### 2.4 System design

At the design stage of the decision support system using the web-based Profile Matching method as the output of the system to be executed.

### 2.5 System Implementation

System implementation is the stage of laying the system so that it is ready to operate. Implementation aims to confirm design modules, so that users can provide input to application development. At this stage the application design is carried out using the PHP programming language and MySql database

### 2.6 Testing

System testing is carried out in order to monitor system applications before they are implemented later. This test also focuses on the permanent employee assessment system on the eligibility of MSMEs at the Muaro Bungo Cooperative, Umkm, Industry and Trade Service which includes errors from databases, interfaces, functions, and the final results of the system.

### 3. Results and Discussion

#### 3.1 Profile Matching Method

##### 1. weighting

At this stage, the weight of the value of each aspect will be determined using the gap weight.

##### 2. Core and Secondary Factor Grouping

After determining the weight of the required criterion gap value, each criterion is grouped into two groups, namely the core factors and secondary factors.

To determine the value of the core factor the formula presented in Equation (2.1) is used.

$$NCF = \frac{\sum NCF}{\sum ICF} \quad (2.1)$$

Where  $i = 1, 2, \dots, n$  and NCF is the total value of the core factor and ICF is the number of core factor items.

Meanwhile, to determine the secondary factor value the formula presented in Equation (2.2) is used.

$$NSF = \frac{\sum NSF}{\sum ISF} \quad (2.2)$$

Where  $i = 1, 2, \dots, n$  and NSF is the total number of secondary factor values and ISF is the number of secondary factor items.

##### 3. Calculation of the total value

To determine the total value of each aspect, the formula presented in Equation (2.3) is used.

$$N = [X]\% NCF + [X]\% NSF \quad (2.3)$$

Where x is the percent value entered.

##### 4. Ranking

To determine the ranking, the formula presented in Equation (2.4) is used.

$$\text{Rank} = [X]\% NK1 + [X]\% NK2 \quad (2.4)$$

Where  $nk = 1, 2, \dots, n$  and x are the percent values entered (Diaz & Sulindawaty, 2020).

The steps to solving a problem using the *Profile Matching method* are

##### 1. Determine GAP weight

Stage beginning on method Profile Matching that is determine GAP weights can be seen in Table 1.

Table 1. GAP Value Weight

Difference (Gap)	Value Weight	Information
0	5	Competence as required
1	4.5	Competency <i>profile</i> excess of 1 level
-1	4	Competency <i>profile</i> lacks 1 level
2	3.5	Competency <i>profile</i> excess 2 levels
-2	3	Competency <i>profile</i> lacks 2 levels
3	2.5	Competency <i>profile</i> excess 3 levels

##### 2. Grouping of Core and Secondary Factors

You can see what criteria and sub-criteria are used as guidelines in determining the eligibility of MSMEs on Table 2.

Table 2. Criteria and Sub Criteria

Criteria	Subcriteria	Criteria Type
Venture capital	Very good	CF ( <i>core factor</i> )
	Enough	CF ( <i>core factor</i> )
	Bad	SF ( <i>secondary factor</i> )
Net worth	Very good	CF ( <i>core factor</i> )
	Enough	SF ( <i>core factor</i> )
	Bad	SF ( <i>secondary factor</i> )
Net income	Very good	SF ( <i>secondary factor</i> )
	Enough	CF ( <i>core factor</i> )
	Enough	SF ( <i>secondary factor</i> )

##### 3. Result Calculation

Calculation of the ranking value for each alternative with the provisions of Muaro Bungo CRF, namely 30% for the business capital aspect, 30% for the net worth aspect, 40% for the net income aspect. Then the value of each of these aspects is added up and the results can be seen in table 4.19, here is a description of how to do it:

##### a. Alternative : K101

$$N = 0.3(4.725) + 0.3(3.6) + 0.4(4.2) = 4.37$$

##### b. Alternative : K102

$$N = 0.3(4.45) + 0.3(5) + 0.4(4.4) = 4.71$$

##### c. Alternative : K103

$$N = 0.3(5) + 0.3(5) + 0.4(5) = 4.54$$

Table 4. 1Calculation of Final Results

No	Alternative	N1	N2	N3	N
		NT	NT	NT	
1	K101	4,725	3,6	4,2	3.7775
2	K102	4,45	5	4,4	4.595
3	K103	5	5	5	5

##### 4. Ranking

Then the ranking value that meets the requirements is obtained in the alternative with the MSME code, namely K103 with a score of " 5" which can be seen from Table 4. This helps the Office of Cooperatives, SMEs, Industry and Trade of Muaro Bungo in determining the feasibility of SMEs.

Table 4. Ranking Results

No	Alternative	Final score	Rank
1	K103	5	First
2	K102	4.595	Second
3	K101	3.7775	Third

From Table 4 above it can be concluded that the ranking results obtained the highest results in alternative K103 with a value of 5, rank 2 by alternative K102 with a value of 4.595 and third rank by alternative K101 with a value of 3.7775.

### 3.2 Testing System Interfaces

#### 1. Login Page Display

The login page is the page that will be displayed for the first time when accessing this application. The login page is used by the admin to perform data processing to determine the eligibility of MSMEs and see the results of processing MSME eligibility data can be seen in Figure 2 below:

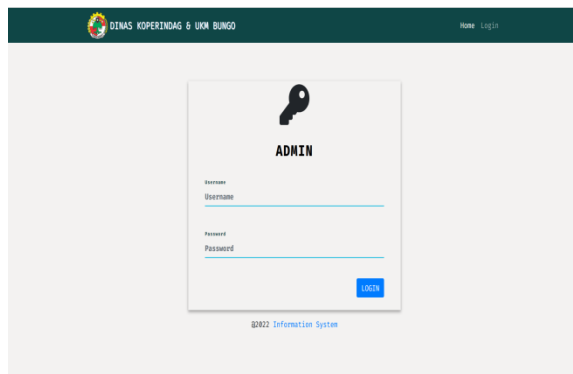


Figure 2 Login Page

#### 2. Main Page Display

The main page is the appearance of the admin's initial page after the *login process*. This page will later display menus of options that will be used to process data for determining the eligibility of MSMEs.



Figure 3 Display Main Page

#### 3. Display of Criteria Data Input Form

Display added criteria data can only be accessed by the admin. This page is used to add criteria data.

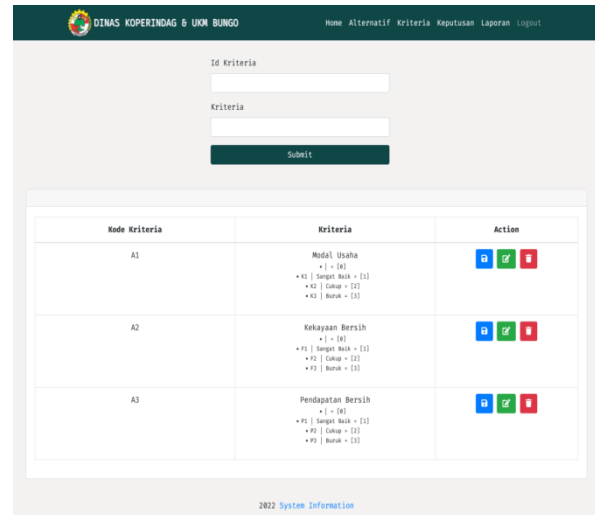


Figure 4 Criteria Data Input Form

#### 4. Display of Sub Criteria Data Input Form

The display of added sub-criteria data can only be accessed by the admin. This page is used to add sub-criteria data.

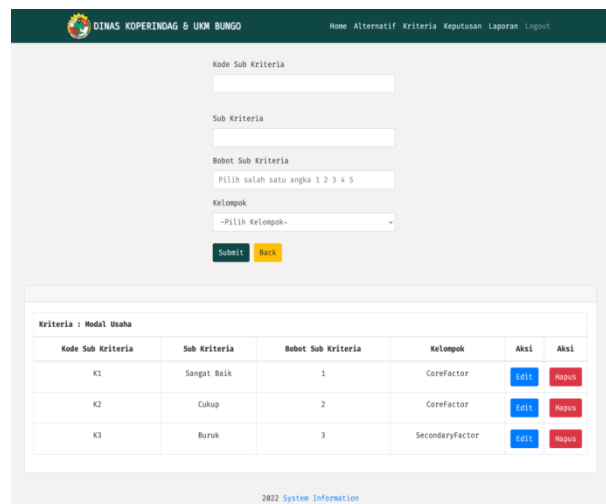


Figure 5 Sub Criteria Data Input Form

#### 5. Display of Alternative Data Input Form

Display added alternative data can only be accessed by the admin. This page is used to add alternative data.

Figure 6 Alternative Data Input Form

## 6. Display of Final Results Report

The display of the final result report page is used to display data for determining the eligibility of UMKM.

DINAS KOPERASI, UMKM, PERINDUSTRIAN DAN PERDAGANGAN MUARO BUNGO

SISTEM PENDUKUNG KEPUTUSAN METODE PROFILE MATCHING

PENENTUAN KELAYAKAN USAHA MIKRO KECIL MENENGAH

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Tabel Nilai Untuk Kriteria : Modal Usaha								
Kode Alternatif UMKM	C1a	C1b	C1c	C1d	C1e	Core Factor NCF=2Ncp / 3IC	Secondary Factor NCF=2Ncp / 3IS	N total N=(80%NCF)+(80%SF)
A1	4C	4C	4C	4C	3.55	4	3.5	3.8
A2	4C	4C	4C	4C	3.55	4	3.5	3.8
A3	4C	3C	5C	5C	1.55	4.25	1.5	3.15

Tabel Nilai Untuk Kriteria : Kelayakan Bersih								
Kode Alternatif UMKM	C2b	C2c	C2d	C2e	Core Factor NCF=2Ncp / 3IC	Secondary Factor NCF=2Ncp / 3IS	N total N=(80%NCF)+(80%SF)	
A1	3C	3C	5S	3.55	3	4.25	3.5	
A2	4C	4C	4S	4S	4	4	4	
A3	4C	4C	4S	4S	4	4	4	

Tabel Nilai Untuk Kriteria : Pendapatan Bersih								
Kode Alternatif UMKM	C3b	C3c	C3d	C3e	Core Factor NCF=2Ncp / 3IC	Secondary Factor NCF=2Ncp / 3IS	N total N=(80%NCF)+(80%SF)	
A1	4C	4C	3S	2.55	4	2.75	3.5	
A2	3C	3C	5S	2.55	3	3.75	3.3	
A3	4C	4C	4S	4.55	4	4.25	4.1	

Tabel Nilai Untuk Kriteria : Pendapatan Kotor								
Kode Alternatif UMKM	C4b	C4c	C4d	C4e	Core Factor NCF=2Ncp / 3IC	Secondary Factor NCF=2Ncp / 3IS	N total N=(80%NCF)+(80%SF)	
A1	3C	3C	3S	3.55	3	3.25	3.1	
A2	3C	3C	3.55	5S	3	4.25	3.5	
A3	5C	3C	5S	5S	4	5	4.4	

Tabel Nilai Untuk Kriteria : Aset								
Kode Alternatif UMKM	C5b	C5c	C5d	C5e	Core Factor NCF=2Ncp / 3IC	Secondary Factor NCF=2Ncp / 3IS	N total N=(80%NCF)+(80%SF)	
A1	3C	3C	4.55	4S	3	4.25	3.5	
A2	4C	3C	3S	3.55	3.5	3.25	3.4	
A3	5C	4C	4S	4S	4.5	4	4.3	

Hasil Akhir						
	total N (C1)	total N (C2)	total N (C3)	total N (C4)	total N (C5)	Hasil Akhir
K101	3.8	3.5	3.5	3.1	3.5	3.7775
K102	3.8	4	3.3	3.5	3.4	4.595
K103	3.15	4	4.1	4.4	4.3	5

Figure 1 Display of the Final Results Report

## 4. In conclusion

By designing an expert system for diagnosing cataracts using the forward chaining method, it can help diagnose cataracts. This expert system is also expected to be able to recognize the symptoms that are owned and know how to treat cataracts in the community. By collecting existing symptoms first, they are processed into output in the form of information needed by the user. With this system, it is hoped that it will make it easy for system users to find solutions and treatments for cataracts suffered by the community.

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