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Strategic of Development Bumdes (Case: BUMDES Klaten-Indonesia)

Salman Fatoni[1], Nugroho SBM[2], Mulyo Hendarto R[3]., Fitri Bahari[4]
[1,4]Master of Economics, Diponegoro University.
[2]Professor of Faculty Economics and Business, Diponegoro University.
[3]Lecture of Faculty Economics and Business, Diponegoro University.
Semarang, Indonesia.

Abstract:- **This research aims to determine the priority level of projects built by BUMDes Kemudo. The data comes from in-depth interviews with six key persons representing the government, academia, society, and business. The interviews resulted in alternative projects, criteria, and sub-criteria. Alternative projects implemented by stakeholders are pellets, Kaliworo, feed, and transportation. The criteria are the market, the company's internal, and the environment.**

Meanwhile, the sub-criteria of the market are market demand, availability of raw materials, and market competition. The internal sub-criteria of the company are marketing, technology, management, HR, and finance. Finally, the environmental sub-criteria are economic, social, legal, and environmental. The data was processed using the Fuzzy Analytic Network Process (F-ANP) method. The results show that the priority projects BUMDes Kemudo should implement are the pallet industry with a weight of 0.353, Kaliworo tourism with a weight of 0.3202, a feed factory with a weight of 0.1986, and transportation services with a weight of 0.1285.

Keywords:- *BUMDES, Project Priority, Fuzzy Analytic Network Process, Public Choice, Klaten.*

I. INTRODUCTION

The government has long carried out the development of the village-based economy with various programs. However, many factors cause the lack of success of these programs. One of the most dominant is government intervention that is too large, thus hampering the creativity and innovation of rural communities in managing and running the economy in the village (PKDSP, 2007).

According to Amanda (2013), Village autonomy is a local government policy given to the village government to optimize its potential further to maximize village income for development and the welfare of the community. In encouraging development at the village level, the government gives authority to village governments to manage their regions independently, one of which is through Village-Owned Enterprises. This economic-based institution is one of the programs run by the village as a means to increase Village Original Income (PADes). The role of BUMDes as an instrument for strengthening village autonomy and also as an instrument for community welfare. BUMDes, as an instrument of village autonomy, is meant to encourage the village government to develop the potential of its village following the village's capabilities and authority. BUMDes as an instrument of community welfare by involving the community in the management of BUMDes will encourage the economy and reduce the village's unemployment rate (Budiono, 2015).

According to the Village Ministry & PDT Regulation No. 4 of 2015 explains that the management of Village Owned Enterprises (BUMDes) is carried out by the village government together with the community. Management that directly involves the community can encourage the economy by empowering the community. Community involvement starts from the establishment's beginning to the institution's management. The difference between Village-Owned Enterprises (BUMDes) and other economic institutions is that capital is regulated in the policy, that in terms of capital, Village-Owned Enterprises have a composition of 51% from the village government and 49% from the community.

Considering the involvement of the government and villagers in implementing BUMDes, this is a challenge for the village government in making decisions. Therefore, this public choice can embrace all levels of society, and the purpose of establishing BUMDes can be achieved.

Didik J. Rachbini (2002) explains that the functions of public choice in economic policy are: first, showing how attitudes (behaviors) are interpreted according to the existing cultural and ideological medium. Second, Illustrate the conditions for the success of collective action and show why some interests may be more aggregated and others not. Third, it can guide decision-makers in determining the most effective policy choices.

Arrow sets out four main criteria that a decision-making procedure must meet to be considered strategic-proof. The four criteria are unrestricted domain, non-dictatorship, Pareto efficiency, and independence of irrelevant alternatives (Gibbard, 2014):

1. The unrestricted domain or universality principle states that all preferences of decision-making participants must be taken into account. The decision choices on these preferences are then determined based on a ranked order.
2. The principle of non-dictatorship states that social decisions that have been taken cannot reflect the preferences of one individual as a whole without considering the preferences of other individuals.
3. The principle of Pareto Efficiency is an economic principle that describes a situation in which an increase in the

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allocation of profits by one party from a resource will not reduce the allocation of profits by another party from the same resource.

4. The principle of Independence of Irrelevant Alternatives (IIA) states that if the social choice alternative is between choice x and choice y, then the social choice depends entirely on voter preferences for x and y. Social decisions do not change if there is a third choice alternative, "z."

According to data from the Ministry of Villages & PDT (2016), the development of BUMDes in Indonesia has increased significantly. In 2016, the target set was 5000 units; instead, it exploded to 12,115 BUMDes units. However, the number of BUMDes must be accompanied by the quality and influence on the village's economic development.

Regulations that detail Village-Owned Enterprises are regulated in the Minister of Home Affairs Regulation number 39 of 2010 concerning Village-Owned Enterprises. This policy has encouraged many local governments to form Village-Owned Enterprises in their regions. In 2016, in Central Java Province, out of 1800 villages had 900 active BUMDes. Klaten Regency issued Regional Regulation (Perda) No. 21 of 2013 concerning Guidelines for establishing Village-Owned Enterprises, Klaten. **Until August 2016**, Klaten Regency has 70 Village-Owned Enterprises from 391 villages.

This study takes the case of an Owned Enterprise in Kemudo Village, which was formed in 2016. The reason for choosing this village is because Kemudo Village has excellent potential as there are four large companies, namely PT Sari Husada (SGM milk), PT Multifilling Mitra Indonesia (MMI), and PT Dian Farma Abadi (Natasha skincare), PT IGP, crossed the Kaliworo river which has tourism potential. With such abundant potential, this Kemudo Village-Owned Enterprise has many options in the project or business development to increase Village Original Income, namely wood pallet processing business from PT Sari Husada pallet waste, Kaliworo education and nature tourism, animal feed factory, and the business of providing transportation services to factories in Kemudo Village. However, many project options cannot be implemented simultaneously due to limited funds and talented human resources. Therefore, this case is a challenge for the village government to make public choices in determining the projects to be implemented to create prosperity for the villagers of Kemudo. Therefore, this research aims to determine the priority of projects that provide more significant benefits.

His research uses the Fuzzy Analytic Network Process (FANP) method. This method combines the Fuzzy way with the Analytic Network Process (ANP) method. ANP allows interaction and feedback from elements within the cluster (inner dependence) and between groups (external reliance). ANP is applied to complex, complex decision-making and requires a variety of interactions and dependencies. ANP uses the Pairwise Comparison Judgment Matrices (PCJM) method between similar elements. Pairwise comparisons of ANP are carried out between elements in components or clusters for each interaction in the network (Rusydiana, 2013). While the reasons for using the fuzzy approach (Kusumadewi & Purnomo, 2010):

1. The concept of fuzzy logic is easy to understand because it uses the basis of set theory.
2. Fuzzy logic is very flexible and can adapt to changes and uncertainty.
3. Fuzzy logic has tolerance for inaccurate data
4. Fuzzy logic can model very complex nonlinear functions
5. Fuzzy logic can build and apply the experiences of experts directly without going through the training process
6. Fuzzy logic can work with conventional control techniques
7. Fuzzy logic is based on natural language

Previously, this research was conducted by Manis Oktavia (2013). The aim is to determine the priority of road maintenance in Bangkalan Regency using the Fuzzy Analytical Network Process (FANP) approach. Results show the priority order of road maintenance is Link 222 with a weight of 0.3481, Link 223 with a weight of 0.2548, Link 224 with a weight of 0.2297, and Link 228 with a weight of 0.1674. Nihal Erginel and Sevil Senturk's (2011) research entitled "Ranking of the GSM Operators with Fuzzy ANP" shows that GSM Operators' Ranks in Turkey are A2 with a weight of 0.36, A3 with a weight of 0.35, and A1 with a weight of 0.29.

Research conducted by Metin Dagdeviren, Ihsan Yuksel, and Mustafa Kurt (2008) entitled "A fuzzy analytic network process (ANP) model to identify faulty behavior risk (FBR) in work systems." The weighting results show that organizational factors have the highest weight in the criteria that cause wrong behavior in the working system. The sub-criteria are Task Type, Workflow, and Monotony is the highest weight that causes improper conduct in the operating system.

II. LITERATUR REVIEW

According to the Government Regulation of the Republic of Indonesia, Number 43 of 2014 states that Village-Owned Enterprises are business entities whose entire or most of the capital comes from the village through direct participation from village assets which are separated to manage assets, services, and other businesses for as much as - the magnitude of the welfare of the village community.

Furthermore, the Center for the Study of Development System Dynamics (PKDSP) Faculty of Economics, Universitas Brawijaya (2007) revealed that there are six principles in managing BUMDes, namely:

1. Cooperative, the components involved in BUMDes must be able to good cooperation for the development and survival of its business.
2. Participatory. All components involved in the BUMDes must be willing to volunteer or be asked to provide support and contributions that can encourage the progress of the BUMDes business.
3. Emancipatory. All components involved in BUMDes must be treated equally regardless of class, ethnicity, and religion.
4. Transparent. Activities that affect the interests of the general public must be known by all levels of society quickly and openly.

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5. Accountable. All business activities must be accountable both technically and administratively.
6. Sustainable. Business activities must be developed and preserved by the community in the BUMDes containe

The concept of BUMDes is similar to Social Enterprise (SE) or Community Based Companies (CBE). SE is a form of organization that combines the characteristics of a business and a community that focuses on seeking profit for the organization itself (Eversole et al., 2014). Focus on social goals and have a relatively broad scope of governance arrangements (Soviana, 2015). CBE and cooperatives focus on citizen participation and aim to benefit members and local people in a broader sense (Soviana, 2015). However, since the formation of BUMDES Capital from direct investment is separated from village assets, this distinguishes between cooperatives independent from the government and not owned by anyone. Cooperatives and BUMDes have an essential role in the community's economy and are an alternative to traditional business models (Valchovska & Watts, 2016; Wessels & Nel, 2016). Top management of cooperatives can help overcome community problems by empowering local resources that focus on cooperative profits. (Zeuli and Radel, 2005). Several scholars have also identified various potential benefits of successful cooperatives, including income generation, self-ownership, control and empowerment, democratic member control, maximizing local development, improving decision quality, and encouraging technological innovation (Wessels & Nel, 2016).

III. RESEARCH METHODS

The analytical procedure for this study is as follows:

➢ *Preparation Of Network Structure*

Based on interviews with key persons, three criteria and twelve sub-criteria were selected to measure the priority of the BUMDES project in Kemudo village.

TABLE 1. OPERATIONAL DEFINITION

Criteria	Definition	Sub-criteria	Definition
Market	External conditions that are in direct contact with BUMDes in terms of business	Market Demand	Projected buyers of products or services produced by BUMDes.
		Availability of Raw Material	Factors of production are available for consideration of the business to be worked.
		Market Competition	competition in the consumer market.
Internal Company	BUMDes internal condition	Marketing	The Difficulty level in selling products/services produced by BUMDes.
		Technology	Tools and equipment for the production and sales processes.
		Management	Team interaction and collaboration in BUMDes.
		Human Resources	BUMDes employee competence.
		Finance	Capital and financial reports.
Environment	External factors that are not related to the business aspect	Economic	The impact of the BUMDes project on the community's economy.
		Social	The impact of the BUMDes project on social life.
		Legality	The difficulty level of the BUMDes project permit process.
		Environtment	The impact of BUMDes project waste on the environment.

Sources: Benny (2013), Modified.

➢ *The weighting of each element*

This stage aims to determine the weight of each criterion, sub-criteria, and dependencies between criteria and alternatives. The weighting of elements here uses a fuzzy membership function in the form of a triangle.

$$f(x,a,b,c)\begin{cases} 0, & x < a \\ \dfrac{x-a}{b-a}, & a \le x \le b \\ \dfrac{c-x}{c-b}, & b < x \le c \\ 0, & x > c \end{cases} \qquad (2.1)$$

Equation 2.1 is shown in Figure 1

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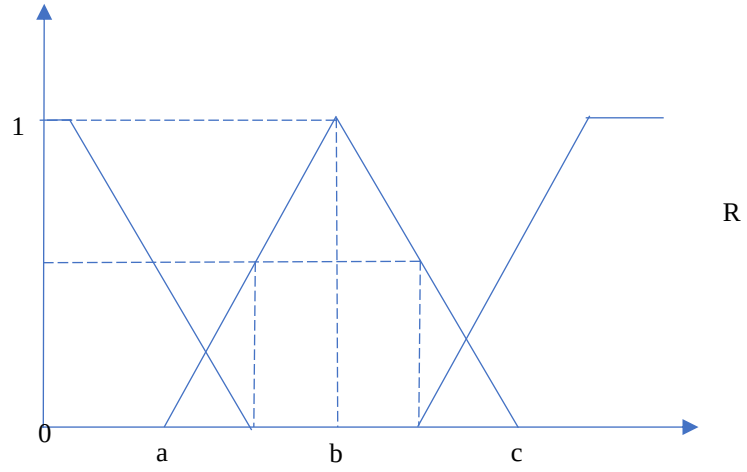
Fig 1. Function of Triangle Membership



Based on the fuzzy membership function in the form of a triangle, the data from the key-person assessment is in the form of numerical values, according to Table 2.

Table 2. Numerical Scale and Linguistic Scale for Level of Importance

Scale of Numerical	Scale TFN	Invers of Scale TFN	Definition of Variables Linguistic
	(1, 1, 1)	(1,1,1)	The same two criteria
1	(0.5, 1, 1.5)	(1/1.5, 1, 1/0.5)	same interests
2	(0.75, 1.25, 1.75)	(1/1.75, 1/1.25, 1/0.75)	
3	(1, 1.5, 2)	(1/2, 1/1.5, 1)	a little more important
4	(1.25, 1.75, 2.25)	(1/2.25, 1/1.75, 1/1.25)	
5	(1.5, 2, 2.5)	(1/2.5, 1/2, 1/1.5)	more important
6	(1.75, 2.25, 2.75)	(1/2.75, 1/2.25, 1/1.75)	
7	(2, 2.5, 3)	(1/3, 1/2.5, 1/2)	Very more important
8	(2.25, 2.75, 3.25)	(1/3.25, 1/2.75, 1/2.25)	
9	(2.5, 3, 3.5)	(1/3.5, 1/3, 1/2.5)	absolutely more important

Sources : Oktavia (2013), Modified.

Furthermore, each assessment needs to be tested for consistency by finding the value of λmax, Consistency Index, and Consistency Ratio.

$$\lambda_{max} = \frac{\sum_{i=1}^{n} \frac{c_{i1}}{ar_{i1}}}{n} \qquad (2.2)$$

Estimate of CI

$$CI = \frac{\lambda_{max} - n}{n - 1} \qquad (2.3)$$

Estimate of CR

$$CR = \frac{\text{CI}}{\text{IR}} \qquad (2.4)$$

where:
λ_{max} : Eigen value maximum
n : Number of elements compared
c_{il} : Element I-th from matrixs C
ar_{i1} : I-th element of row-average matrix of normalized matrix
CI : Consistency Index
CR: Consistency Ratio
IR : Index Random
Value of Random Index on Table 3. as below:

Table 3. Value Random Index

Measure Matrixs	3x3	4x4	5x5	6x6	7x7
IR	0.58	0.9	1.12	1.32	1.41

Sources: Wain (2008)

The matrix is considered consistent when the Consistency Ratio (CR) value is below 0.1 or 10% (CR 10). After the key-person assessment matrix is constant, the value is converted to the TFN value according to Table 2.

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The results of key-person pairwise comparisons are combined with the calculation of the geometric mean through the aggregation of key-person assessments (Mardhikawarih,2012):

$$l_{ij} = \left(\prod_{k=1}^{K} l_{ij}\right)^{\frac{1}{K}},$$

$$m_{ij} = \left(\prod_{k=1}^{K} m_{ij}\right)^{\frac{1}{K}},$$

$$u_{ij} = \left(\prod_{k=1}^{K} u_{ij}\right)^{1/K} \quad (2.5)$$

A consistency test is needed in decision making, namely, to determine how good the consistency of the pairwise comparison matrix derived from the assessment of human perception is. The consistency test can be done by looking at the values of l, m, and u. For example, the value of ≤ shows a consistent fuzzy assessment (Paramita, 2012).

Chang's steps are as follows (Dagdeviren,2008):

Step 1: Calculate the fuzzy synthesis value of object I, which is defined as follows:

$$S_i = \sum_{j=0}^{m} M_{gi}^{j} \otimes \left[\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gi}^{j}\right]^{-1} \quad (2.6)$$

The aims M_{gi}^{j}, the fuzzy synthesis value addition operation, is performed on the pairwise comparison matrix.

$$\sum_{k=0}^{n} M_{gi}^{j} = \left(\sum_{k=0}^{n} li\,,\ \sum_{k=0}^{n} mi,\ \sum_{k=0}^{n} ui\right) \quad (2.6.1)$$

To aims, $\left[\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gi}^{j}\right]^{-1}$ carried out the fuzzy addition operation of the value of M_{gi}^{j} (j = 1, 2, … , m):

$$\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gi}^{j} = \left(\sum_{k=0}^{n} li\,,\ \sum_{k=0}^{n} mi,\ \sum_{k=0}^{n} ui\right) (2.6.2)$$

To calculate the inverse of equation (2.6), namely:

$$\left[\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gi}^{j}\right]^{-1} = \left(\frac{1}{\sum_{i=1}^{n} u_i}, \frac{1}{\sum_{i=1}^{n} m_i}, \frac{1}{\sum_{i=1}^{n} l_i}\right) (2.6.3)$$

Step 2: Calculate the probability degree of $M_2 = (l_2, m_2, u_2) \geq M_1(l_1, m_1, u_1)$ which is defined as follows:
$V(M_2 \geq M_1) = hgt(M_1 \cap M_2)$

$$\mu_{M2}(d) \begin{cases} 1, & jika\ m_2 \geq m_1 \\ 0, & jika\ l_1 \geq u_2 \\ \dfrac{l_1 - u_2}{(m_2 - u_2) - (m_1 - l_1)}, & lain \end{cases} \quad (2.7)$$

Where d is the ordinate of the highest point of intersection of D between μ_{M1} and μ_{M2}, for comparison, both $V(M_2 \geq M_1)$ and $V(M_1 \geq M_2)$) are calculated.

Step 3: if the degree of probability for the convex fuzzy number is greater than the k convex fuzzy number M_i = (i = 1,2, …,k), then the vector value can be defined as follows:

$$V(M \geq M1, M2, \dots, Mk) = V[(M \geq M1) \text{ dan } (M \geq M2) \text{ dan } \dots \text{ dan } (M \geq Mk)] = \min V(M \geq Mi), i = 1,2, \dots, k \quad (2.8)$$

Assume that

$$d'Ai = \min V(Si \geq Sk) \text{ untuk } k = 1,2, \dots, n;\ k \neq i \quad (2.9)$$

Obtained vector weight value

$$W' = \left(d'(A_1),\ d'(A_2), \dots,\ d'(A_n)\right)^T (2.10)$$

Where A_i = 1,2, … , are n decision elements.

Step 4: Normalize the vector weight value so that the normalized vector weight value is obtained as follows:

$$W = \left(d(A_1),\ d(A_2), \dots,\ d(A_n)\right)^T (2.11)$$

W is a non-fuzzy number

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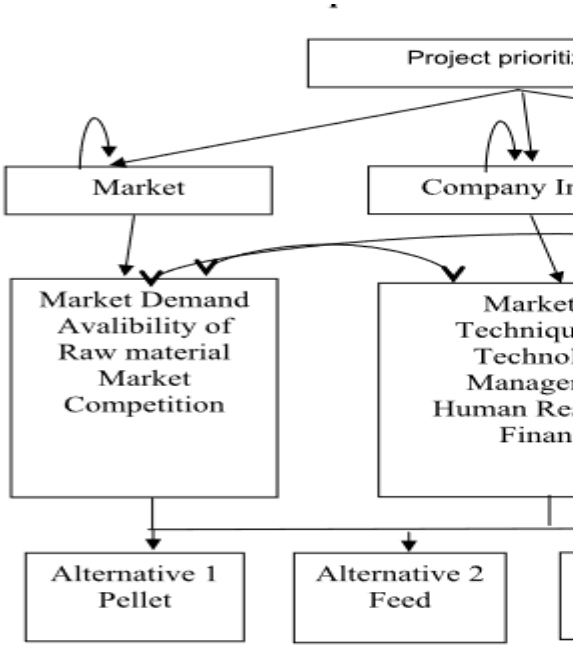

Fig 2. Structure of ANP
Sources : Zhou (2012) , modified.

IV. RESULT

This study analyzes using three stages, namely the calculation of the consistency of the matrix, the weighting of the matrix, and the determination of the final priority weight. The results of this study are as follows:

A. Matrix Consistency Calculation

Before converting the Triangular Fuzzy Number, it is necessary to calculate the consistency of the matrix. In calculating the consistency of the matrix that is sought is the Consistency Ratio (CR) in estimating the CR required eigenvalue (λ) and Consistency Index (CI). Table 4 shows the results of the eigenvalue, consistency index, and consistency ratio from key-person interviews, which are converted into a matrix:

TABLE 4. EIGENVALUE, CONSISTENCY INDEX DAN CONSISTENCY RATIO

Matrix's	Aggregation		
	Λ	**CI**	**CR**
Criteria	3.000	0.000	0.000
Sub-criteria Market	3.000	0.000	0.000
Sub-criteria Company's Internal	5.004	0.001	0.001
Sub-criteria Environment	4.002	0.001	0.000
Alternative of Market Demand	4.001	0.000	0.000
Alternative of Market Competition	4.003	0.001	0.001
Alternative of Availibility of Raw Material	4.001	0.000	0.000
Alternative of Marketing	4.001	0.000	0.000
Alternative of Tecnology	4.001	0.000	0.000
Alternative of Management	4.002	0.001	0.001
Alternative of Human Resources	4.001	0.000	0.000
Alternative of Finance	4.001	0.000	0.000
Alternative of Economy	4.020	0.007	0.006
Alternative of Social	4.000	0.000	0.000
Alternative of Legality	4.001	0.000	0.000
Alternative of Environment	4.003	0.001	0.001

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Table 4 shows that all matrices resulting from in-depth interviews with key persons after aggregation are relatively consistent because the Consistency Ratio (CR) value is below 0.1 or 10% (CR 10%).

B. Matrix Weighting

➢ *Weighting Between Criteria*

a. Matrix Aggregation

The level of importance between criteria from six key persons. Finally, expert judgments are converted into Triangular Fuzzy Numbers and combined using the aggregation method shown in Table 5 as below :

TABEL 5. MATRIX OF INTEREST AGGREGATION BETWEEN CRITERIA

	P			IP			L		
	L	**M**	**U**	**L**	**M**	**U**	**L**	**M**	**U**
P	1.0000	1.0000	1.0000	0.7211	1.0772	1.5183	0.8094	1.2331	1.7042
IP	0.6586	0.9283	1.3867	1.0000	1.0000	1.0000	0.6818	1.1394	1.6566
L	0.5868	0.8110	1.2354	0.6036	0.8777	1.4667	1.0000	1.0000	1.0000

Where:
P : Market
IP : Company's Internal
L : Environtment

b. Fuzzy Synthesis Value

The value of the weighted fuzzy synthesis between criteria is obtained through equation 2.6, then the results of the fuzzy synthesis value between criteria are obtained, namely:

$$S_P = (2.5306, 3.310323, 4.222522)$$

$$\left(\frac{1}{11.96803}, \frac{1}{9.066645}, \frac{1}{7.061397}\right) = (0.211443, 0.36511, 0.597973)$$

$$S_{IP} = (2.340432, 3.06767, 4.04337)$$

$$\left(\frac{1}{11.96803}, \frac{1}{9.066645}, \frac{1}{7.061397}\right) = (0.195557, 0.338347, 0.572602)$$

$$S_L = (2.190405, 2.688652, 3.702139\ )$$

$$\left(\frac{1}{11.96803}, \frac{1}{9.066645}, \frac{1}{7.061397}\right) = (0.183021, 0.296543, 0.524279)$$

c. Calculation of Vector Weight Value

Calculating the vector weight value between criteria begins with the search for the probability degree value through equation 2.7. Then the vector value calculation is carried out through equation 2.8. The value of the degree of probability and the value of the weighting vector between criteria are presented in Table 6.

Table 6. Value of Degree of Probability and Value of Weighting

	Value Degree Possible	**Value Vektor**
$V(S_P \geq S_{IP})$	1.071245	1
$V(S_P \geq S_L)$	1.19795	1
$V(S_{IP} \geq S_P)$	0.931009	0.931009
$V(S_{IP} \geq S_L)$	1.120202	1
$V(S_L \geq S_P)$	0.820224	0.820224
$V(S_L \geq S_{IP})$	0.887178	0.887178

Furthermore, to calculate the weighting ordinate value between criteria, it is assumed that d' A_i = min $V(S_i \geq S_k)$ k = 1,2, … , n ; $k \neq i$ Then the following results are obtained:
d'(S_P) = min (1, 1) = 1
d'(S_{IP}) = min (0.931009, 1) = 0.931009
d'(S_L) = min (0.820224, 0.887178) = 0.820224

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The vector weight value (W_k') is obtained from the resulting ordinate value through the following equation:

$$W' = \left(d'(A_1),\ d'(A_2), \dots,\ d'(A_n)\right)^T$$

Where:
A_i = 1,2, … ,
n is n decision element,

Then the value of the vector weights between criteria are:
$W_k' = (1, 0.931009, 0.820224)^T$

d. Normalization of Vector Weight Value

The normalization of the vector weight values is obtained through the equation.

$$W = \left(d(A_1),\ d(A_2), \dots,\ d(A_n)\right)^T.$$

Each vector weight value is divided by the number of vector weight values so that a normalization of the vector weight values between criteria can be obtained, namely:

$W_k = (0.363473, 0.338397, 0.29813)^T$

➢ *Weighting Between Subcriteria*

Each sub-criteria is in the same criteria compared to the level of importance. So that the resulting weighting between sub-criteria according to Table :

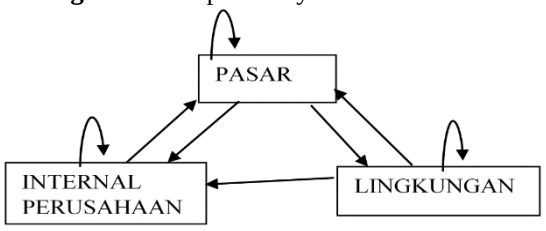
TABLE 7. WEIGHTING BETWEEN SUB-CRITERIA

Criteria	Sub-criteria	Weight
Market	Market Demand	0.373894
	Market Competition	0.249596
	Availibility of Raw Material	0.37651
Company's Internal	Marketing	0.180836
	Tecnology	0.133944
	Management	0.237343
	Human Resources	0.234751
	Finance	0.213126
Environment	Economy	0.295842
	Social	0.287605
	Legality	0.203047
	Environment	0.213506

➢ *WEIGHTING DEPENDENCIES BY CRITERIA*

Dependence between criteria explains the effect of one criterion on another criterion. Figure 1 shows the dependencies between criteria and within criteria. First, market criteria are influenced by the company's internal, environmental, and market criteria. Next, the company's internal criteria are influenced by market criteria, environmental criteria, and the company's internal criteria. Finally, environmental criteria are influenced by market criteria, internal company criteria, and environmental criteria themselves.

Figure 3.1. Dependency Between Criteria



The result of weight of each criterion shown on Table 8. As below:

Table 8. The Weight of Each Criterion in Controlling Criteria

Criteria	Weight		
	Control of market	**Control of the Company's Internal**	**Control of The Environment**
Market	0.3875	0.3151	0.3188
Company's Internal	0.3456	0.408	0.3052
Environment	0.2668	0.2768	0.376

➢ *Alternative Weighting*

The planned project options will be compare with priority levels based on alternative weights against each sub-criteria. Alternative weighting for each subcriteria is shown in Table 9

Table 9. Value of Alternative Weighting by Sub-criteria

	Pellet	Feed	Kaliworo	Transportation
Market Demand	0.381228	0.21235	0.2997543	0.106667292
Market Competition	0.232416	0.23768	0.3338834	0.196020741
Availibility of Raw Material	0.400074	0.17296	0.3640432	0.062922958
Marketing	0.335099	0.254841	0.3005747	0.109485164
Tecnology	0.351193	0.117747	0.3403158	0.190744516
Management	0.430912	0.152524	0.2649225	0.151641234

Human Resources	0.393022	0.235838	0.2186757	0.152464552
Finance	0.380992	0.24945	0.2803548	0.089203008
Economy	0.299686	0.228444	0.3562876	0.115582288
Social	0.342654	0.19727	0.3460952	0.113981589
Legality	0.372171	0.207886	0.2810221	0.138921091
Environment	0.28293	0.083146	0.4413627	0.192560788

C. Determination of Priority Final Weight

➢ *Criteria Final Weight*

The final weight of the criteria is obtained by multiplying the weight matrix of the dependence between criteria and the weight of the criteria with the assumption that there is no dependence between criteria so that the final weight of the requirements is obtained, namely:

$$W = \begin{pmatrix} 0.3875 & 0.3151 & 0.3188 \\ 0.3456 & 0.4080 & 0.3052 \\ 0.2668 & 0.2768 & 0.3760 \end{pmatrix} \begin{pmatrix} 0.3164 \\ 0.3864 \\ 0.2972 \end{pmatrix}$$

$$= \begin{pmatrix} 0.3391 \\ 0.3577 \\ 0.3031 \end{pmatrix} = \begin{pmatrix} Market \\ Internal\ Companny \\ Environment \end{pmatrix}$$

➢ *Sub-criteria Global Weight*

The global weight of the sub-criteria is obtained by multiplying the final weight of the criteria by the weight of the sub-criteria for each measure. Therefore, the global weight of the sub-criteria is obtained as below:

Table 10. Value of Sub-criteria Global Weight

Subkriteria	Global Weight
Market Demand	0.135900381
Market Competition	0.090721555
Availibility of Raw Material	0.136851487
Marketing	0.061194436
Tecnology	0.045326376
Management	0.080315974
Human Resources	0.079438921
Finance	0.072121153
Economy	0.088199196
Social	0.085743622
Legality	0.060534466
Environment	0.063652434

➢ *Priority Final Weight*

The final priority weight is obtained by multiplying the global weight of the sub-criteria and the alternative weight of each sub-criteria.

Table 11. Alternative Priority Final Weight

Alternative	Weight
Pellet	0.3526525
Feed	0.198598135
Kaliworo	0.320234
Transportation	0.128515

V. CONCLUSION

The results showed that the priority of the projects carried out were pellet industry with a weight of 0.3526525, Kaliworo tourism with a weight of 0.320234, a feed factory with a weight of 0.198598135 and transportation services with a weight of 0.128515.

Kemudo Village-Owned Enterprises, which are relatively new, need to be aggressive in socializing the program with village officials and RT and RW officials. The Kemudo Village-Owned Enterprises can carry out the following methods by reporting the performance of BUMDes in regular RT/RW meetings. In addition to socializing BUMDes, it is also a means of transparency and accommodating aspirations. In addition, in carrying out its business activities, it not only focuses on financial benefits but also considers the usefulness factor for the people of Kemudo Village by choosing labor-intensive businesses or businesses that provide a spread effect.

For future research, this F-ANP model can be used in a broader scope, such as sub-districts/districts, so that the perceived impact can be more comprehensive.

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