Jurnal Mantik, 5 (3) (2021) 1818-1824

Published by:Institute of Computer Science (IOCS)

Jurnal Mantik

Journal homepage: www.iocscience.org/ejournal/index.php/mantik/index

Feasibility Strategy on Giving Capital for Salt Farmers in Increasing Economic Productivity Using KNN Classification Model

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ARTICLEINFO

Article history:

Received: September 15, 2021
Revised: October 17, 2021
Accepted: November 04, 2021

Keywords:

Banking Strategy,
Business Capital,
Clustering K-Means

ABSTRACT

The strategy of increasing the salt business in the development of the marine (coastal) economy is very significant in boosting the productivity of the salt. The business of salt that located on Coastal has very good prospects in the future because it is supported by a lot of potential for vacant land, climate, human resources, market opportunities and abundant raw materials for the manufacture of people's salt. Socio-economic potential is the basic capital in the development of salt production in North Aceh Regency, especially Aceh Province. The current issue for most salt farmers is that the quality of salt is still low which is caused by the existing access to capital by farmers, other problems, lack of capital is one of the causes of the decline in salt productivity so that the salt produced is not in accordance with market demand.Salt farmers experienced the impact of a decrease in the productivity of business capital, which became an obstacle for the investor of capital. This can be resolved by the financier. Then the bank can provide funds to salt farmers according to their needs. Therefore, the importance of research in implementing a banking strategy in increasing the productivity of salt farmers in accordance with the business of the farmer group. It is very important to analyze the productivity of salt farmers after being given capital to assess the success of the capital provided to salt farmers. This research method begins with a survey of strategic information in providing business capital for salt farmers which is useful in increasing the productivity of salt farmers. The results of the analysis are entered into the K-Nearest Neighbor classification model in the feasibility of providing capital using a classification in order to see groups of productive salt farmers after being given capital. The results of the test with the k-means clustering model are in the form of group 2 classification values with a distance value of 0.210 based on the criteria included in the strategy for providing business capital.

1. Introduction

One very important commodity that is often used as industrial raw material is salt, for all elements of society, salt is indispensable for commodity strategies. According to the Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia number PER.07/MEN/2012 concerning the Technical Guidelines for the Empowerment of People's Salt Business (PUGAR) in 2012. As the initial plan for the Launch of the PUGAR Program in 2011, the domestic increase every year, in 2011 the need for salt is 3,251,691 tons. It is estimated that the need for salt will increase along with the increase in population and the development of industry in the country, but the current domestic supply has not been adequately fulfilled so that Indonesia relies on imported salt which increases every year [1]

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With high needs, the income from salt farmers should be very decent, on the other hand salt farmers experience inadequate income in fulfilling their daily lives. This has occurred in various regions in Indonesia which has decreased. [2] . Having these conditions, it is necessary to have economic empowerment carried out for salt farmers. Empowerment of salt farmers can actually be done by forming small groups seasonally as is done in South Africa and getting capital. [3]. The main problem in salt pond farmers is the problem of financing and capital so that the people's salt business has not been able to be resolved [4].

Having these conditions, it is necessary to have economic empowerment carried out for salt farmers. Empowerment of Many salt farmers cannot survive with their choice of business due to lack of capital for business development. In the sense that if the production business runs smoothly starting from capital factors, labor, land / land, raw materials and adequate technology, the business will be productive and the goods produced can be accepted by the community, this will make it easier for salt farmers to generate large profits. This indicates that increasing agricultural productivity will have an impact on increasing the quality of life, welfare, income, and purchasing power of salt farmers in the future. This is supported by the research presented [5]. States that productivity has a positive effect on the income level of supported salt farmers, this means that high productivity affects the income level of salt farmers. Because the more productivity is produced, the income level will also be higher.

The problem that occurs is that the provision of appropriate capital determines the success factor of salt farmers. The existence of capital for the business of traditional salt farmers through the bank is now very necessary. To determine the feasibility of providing business capital for a salt farmer group in developing a salt business. Provision of capital in accordance with the ability of each farming group for salt farmers. the availability and access of farmers to sources of financing is still an obstacle faced by farmers in their efforts to develop farming. Systems and procedures for providing working capital credit at the Permata Artha Surya Rural Bank Surabaya by analyzing the existing aspects of internal control [6].

The research problem is how to see the feasibility of providing business capital for the salt farmer group in accordance with the business capabilities of the prospective salt farmer group and the influence of the amount of bank credit, economic growth, farmer exchange rates and population on the growth of the agricultural sector both in the short and long term. along with the effect of farmer group performance in increasing salt productivity after being given business capital by the bank.

2. Method

2.1 Agricultural Sector Growth

The role of the agricultural sector in Indonesia's Gross Domestic Product has decreased for several decades. However, the agricultural sector is still the largest absorber of labor compared to other sectors where in 2017 the agricultural sector was able to absorb labor by 29.68 percent and in 2018 by 28.78 percent. The increase in the number of credits will increase the use of farm labor for agricultural production and will increase the availability of funds in farmer households, thereby increasing the food consumption of family members. Indirectly increased production and income of Arabica coffee farmers increased. This has an impact on the economy will increase [7]. Theoretically the economic structure of a region can be seen from various aspects of the review.

2.2 Salt Productivity

Productivity has a positive effect on the income level of salt farmers, this means that high productivity affects the income level of salt farmers [5]. In addition, it is getting worse by observing the condition of salt farmers in Indonesia that has not increased from year to year, coupled with the quality of the salt produced on average is still low. For this reason, the government intends to improve this situation through the people's salt empowerment program (PUGAR) in 2011 to realize salt self-sufficiency in Indonesia in 2015 [8] .

2.3 Farmers' Access to Credit and Affecting Factors

Micro Credit in its various implementations in several countries has succeeded in becoming a policy that is able to alleviate poverty and increase farm productivity [9]. Microcredit carried out in Iran is not only able to reach farm households experiencing poverty, farm households that are below the poverty line are also more likely to participate in taking microcredit than those who do not. One of the institutions other than banking that provides formal microcredit is a cooperative. Cooperative financing using the Mudharabah system succeeded in improving the welfare of the respondents she studied and had a positive impact on the businesses owned by the respondents. Regarding the comparison of farmers' access to various forms of financial institutions to

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obtain credit [10]. stated that farmers' access to formal institutions (banks) is still low compared to other financial institutions. Salt farmers currently require the provision of capital in the process of farming activities. then the addition of capital can be done with credit at the bank, both formal and informal [11]. Credit is one part of capital formation carried out by financial institutions, namely banks to the public. Credit is one of the efforts to increase capital. This has an impact on the productivity of real businesses carried out by the community and group [12]. Special schemes such as revolving funds, capital strengthening, subsidized interest loans and commercial ones. From time to time this agricultural credit program underwent various changes related to lending procedures, interest rates and repayment periods [13].

2.4 The Influence of Credit on Farmers' Income

Credit is not only seen as a production input but also used as an instrument that allows a person to gain access or expand control over resources. In relation to rural and agricultural development [14]. States that one of the three rural and agricultural development strategies is government support for a system that can create incentives, economic opportunities and access to credit so that small farmers can improve farming. [15]. found that microcredit had a significant impact on farmers' profits. The researcher concludes that the amount of credit determines the increase in farmers' profits, so that in order to increase profits, the amount of credit disbursed also needs to be increased [16]. it is known that the income of farmers who get credit is higher so that it is necessary to increase the amount of credit disbursed in order to increase profits.

2.5 The Effect of Credit on Farming Production Activities

It is assumed that farmers have limited capital so they are unable to use inputs in optimal conditions, so that with credit as additional capital they can increase the use of inputs. From previous studies, the provision of capital through credit gives salt farmers the opportunity to run their business only [17] [10] which in turn will increase production and income [18].

2.6 Clustering Techniques Eligibility of Providing Business Capital

The feasibility of providing business capital for salt pond farmers is determined by the KNN model, the results of the model provide a solution for whether or not to be given business capital. With this model, the funds provided are targeted and targeted. granting business capital to salt farmers, namely determining whether or not it is feasible to provide business capital to prospective salt farmers. The results of this study indicate that the team for determining the feasibility of the head of the department can quickly and easily determine the prospective recipient of the feasibility of providing business capital for salt farmers, so that the funds are targeted and directed. [19]. Classification of data to determine the negative status of infected viruses using classification techniques in clustering. [20]. The importance of technology in collecting data on salt farmers in developing a business. The technology used can be in the form of RFID, this technology is to make it easier for anyone who has not received business capital. [21]. The classification model technique is knn to be able to see the delay in the study period in students and the data used are in the form of attributes so that the data can be analyzed which can be used for campus achievement. [22].

2.7 Research Design

This study focuses first on the analysis of clustering K-means and the feasibility of providing venture capital. Furthermore, the focus of the two banking strategies and analysis of the performance of the salt farmer group and the analysis of the performance of the salt farmer group to increase supply productivity and the effect of lending on economic sector growth for salt farmers in the province of aceh. KNN clustering analysis and data mining clustering observed were farmers' income (C1), required business capital (C2), land area (C3), number of workers (C4) and guarantees provided (C5) and business model (C6). While the alternative data variables will be in the data as shown in the criteria that will be used, while the alternative data (A1) is the business capital of the farmer group, namely determining whether or not it is feasible to provide salt farmers' business capital and the type of capital provided.

2.8 Population and Sample

Based on the above analysis, several research results show that the accessibility of the importance of the availability of capital for farmers has not been fully supported by the existence of financing sources, especially from formal institutions. The research begins by identifying farmers who have access to formal sources of financing (cooperatives) and informal sources. The variables in the study influence the growth of the agricultural sector both in the short and long term. The variables for the feasibility of being given capital observed were farmer's income (C1), required business capital (C2), land area (C3), number of workers (C4) and guarantees provided (C5) and business model (C6). Furthermore, the number of recipients of venture capital is considered to influence each other in the long and short term for the growth of the agricultural sector

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in Aceh province. A cluster is a collection of data that is similar to other or dissimilar data in other groups [23]. The steps in the K-Means algorithm are as follows:

a. Determine K where K is the number of clusters to be formed.
b. Choose K data pieces randomly from the data as the center of the initial group ().
c. Determine the distance of each data with each centroid. Here it will be seen that the data will be a member of the k-th cluster.

$$D_{L2}(\mathrm{X}_2, \mathrm{X}_1) = \sqrt{\sum_{J=1}^{P} (\mathrm{X}_{2\mathrm{j}} - \mathrm{X}_{1\mathrm{j}})^2} \quad (2.1)$$

d. Perbaharui pusat-pusat kelompok

$$m_i = \frac{\sum C_i}{n_i} \quad (2.2)$$

Note:

m_i = *Centroid* ke-I dan n_i = Total data per Ist cluster and $\sum C_i$= The sum of the values of the i-th cluster

2.9 Research Design Diagram

The following Research Design Diagram of Feasibility Strategy on Giving Capital for Salt Farmers in Increasing Economic Productivity Using KNN Classification Model are as follows :

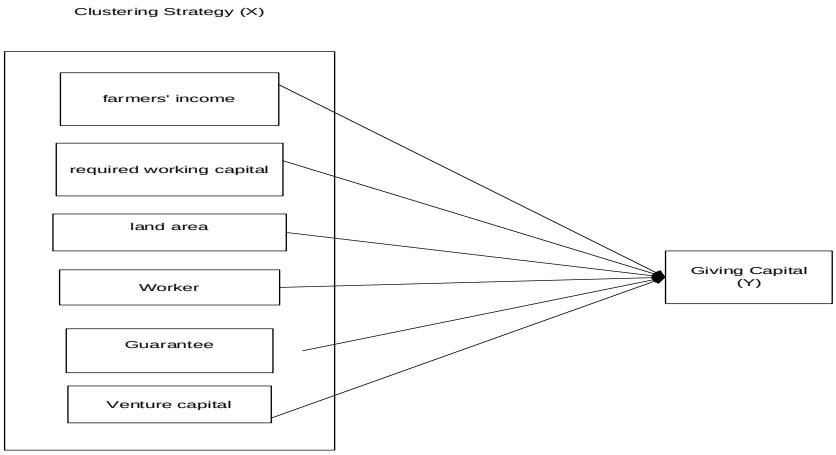

Fig 1. Research Design Diagram

3. Results and Analysis

3.1 Descriptive Analysis

As for the training data for the K-NN classification model in the performance analysis of the clustering model in the strategy of providing capital to salt farmers for increasing salt productivity in North

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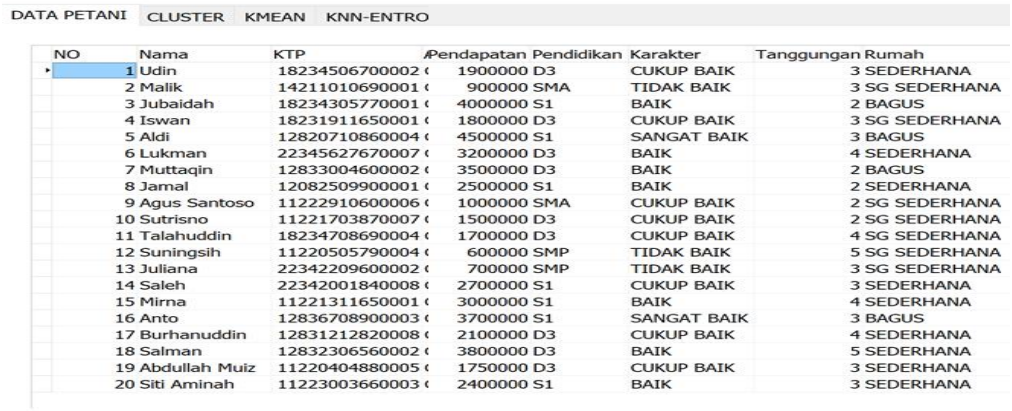
Aceh Regency, it can be seen in the following figure:



NO	Nama	KTP	Pendapatan	Pendidikan	Karakter	Tanggungan	Rumah
1	Udin	18234506700002	1900000	D3	CUKUP BAIK	3	SEDERHANA
2	Malik	14211010690001	900000	SMA	TIDAK BAIK	3	SG SEDERHANA
3	Jubaidah	18234305770001	4000000	S1	BAIK	2	BAGUS
4	Iswan	18231911650001	1800000	D3	CUKUP BAIK	3	SG SEDERHANA
5	Aldi	12820710860004	4500000	S1	SANGAT BAIK	3	BAGUS
6	Lukman	22345627670007	3200000	D3	BAIK	4	SEDERHANA
7	Muttaqin	12833004600002	3500000	D3	BAIK	2	BAGUS
8	Jamal	12082509900001	2500000	S1	BAIK	2	SEDERHANA
9	Agus Santoso	11222910600006	1000000	SMA	CUKUP BAIK	2	SG SEDERHANA
10	Sutrisno	11221703870007	1500000	D3	CUKUP BAIK	2	SG SEDERHANA
11	Talahuddin	18234708690004	1700000	D3	CUKUP BAIK	4	SG SEDERHANA
12	Suningsih	11220505790004	600000	SMP	TIDAK BAIK	5	SG SEDERHANA
13	Juliana	22342209600002	700000	SMP	TIDAK BAIK	3	SG SEDERHANA
14	Saleh	22342001840008	2700000	S1	CUKUP BAIK	3	SEDERHANA
15	Mirna	11221311650001	3000000	S1	BAIK	4	SEDERHANA
16	Anto	12836708900003	3700000	S1	SANGAT BAIK	3	BAGUS
17	Burhanuddin	12831212820008	2100000	D3	CUKUP BAIK	4	SEDERHANA
18	Salman	12832306560002	3800000	D3	BAIK	5	SEDERHANA
19	Abdullah Muiz	11220404880005	1750000	D3	CUKUP BAIK	3	SEDERHANA
20	Siti Aminah	11223003660003	2400000	S1	BAIK	3	SEDERHANA

Fig 2. Farmer's data

3.2 Value Clustering Strategies (X)

The value of the clustering strategy (x) in the capital allocation strategy for salt farmers is as follows:

Table 2.
Clustering strategy value criteria (x)

Value	Daily Income	Weekly Income	Monthly Income	Highest Education	Customer character	Number of family dependents	House's condition
1	0-10.000	50.000-100.000	500.000-1000.000	No education	Bad	0-1	Very poor
2	11.000-20.000	110.000-200.000	1100.000-1500.000	Elementary School	Less good	02-Mar	poor
3	21.000-30.000	210.000-300.000	1600.000-2000.000	Junior High School	Quite good	04-May	Quite poor
4	31.000-40.000	310.000-400.000	2100.000-2500.000	Senior High School	Good	06-Jul	Rich
5	41.000-50.000	410.000-500.000	2600.000-3000.000	Diploma	Very good	>8	

3.3 K-NN Classification Model Clustering Testing Analysis

a. Help Beneficiary Testing Input Data

As for the training data for the K-NN classification testing model in the performance analysis of the clustering model in the strategy of providing capital to salt farmers for increasing salt productivity in North Aceh Regency, it can be seen in the following figure:

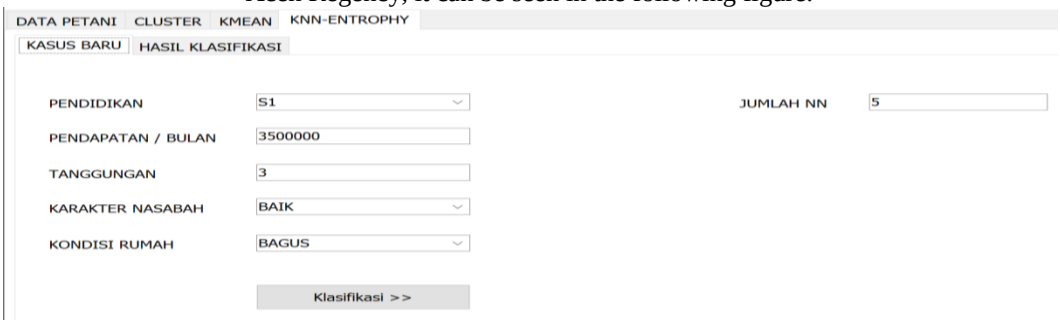


Fig 3. Data test of recipient

b. Data result of recipient

As for the data on the training results of the K-NN classification testing model in the analysis of the performance of the clustering model in the strategy of providing capital to salt farmers for increasing salt productivity in North Aceh Regency, it can be seen in the following figure:

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DATA PETANI | CLUSTER | KMEAN | KNN-ENTROPHY

KASUS BARU | HASIL KLASIFIKASI

NO	PENDIDIKAN	PENDAPATAN	TANGGUNGAN	KARAKTER	RUMAH	CLUSTER	JARAK
2	0.6	0.03	0.3	0.25	0.25	C2	0.56
4	0.8	0.09	0.3	0.5	0.25	C2	0.61
11	0.8	0.08	0.4	0.5	0.25	C2	0.62
10	0.8	0.07	0.2	0.5	0.25	C2	0.62
14	1	0.15	0.3	0.5	0.5	C2	0.71

Fig 4. Data result of recipient

4. Conclusion

1. The test results from the analysis are entered into the Clustering K-means model in the feasibility of providing business capital. The clustering iteration occurs 4 iterations from the center point of each cluster and iterations do not change to other clusters. Therefore, the value of criterion (x) has been grouped with the average grouping of capital grants being 70% feasible while 30% is not feasible.
2. Applying this test model, it is possible to determine the feasibility of providing business capital for the salt farmer group in accordance with the business capabilities of the prospective salt farmer group.

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