USING TWO STEP CLUSTER ANALYSIS TO IDENTIFY PARTNERSHIP ACTIVITIES OF MICRO AND SMALL INDUSTRY (MSI) IN INDONESIA

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Abstract

In economic development in Indonesia, the micro and small industry (MSI) has an important role. The phenomena reflect the ability of the MSI to withstand the economic crisis that Indonesia has experienced. One of the efforts to develop MSI is through a partnership strategy. The partnership in question is mutually beneficial business cooperation between MSI and a larger industry so that it needs, benefits, and strengthens. However, in MSI businesses, the number of businesses that have formed partnerships is still relatively small. The number of MSI businesses that carry out partnership activities is only 8.28%. It means that the partnership activities between Large Industry and MSI, mandated in the Act, have not entirely run as expected. This study aims to map and analyze the characteristics of the MSI partnership pattern in Indonesia based on the economic corridors and partnership activities using the two-step cluster method approach. The data used were the data from the MSI annual survey in all provinces in Indonesia conducted by the Central Statistics Agency in 2019 with a sample of 90,295 industries. The research found that the distribution of three clusters regionally as follows: Cluster 1 consists of the Sumatra Corridor (14.7%) and the Java Corridor (17.7%), Cluster 2 consists of the Sumatra Corridor (5.9%), the Bali - Nusa Tenggara Corridor (8.8%)), and the Maluku-Papua Corridor (11.8%), Cluster 3 consists of the Sumatra Corridor (8.8%), the Sulawesi Corridor (17.7%), and the Kalimantan Corridor (14.7%) of all provinces in Indonesia with the characteristics of a partnership pattern as follows Cluster 1 patterns of operational cooperation between MSI and Large Industries on the fulfillment of raw materials and technology transfer with a focus on improving the quality of raw materials, cluster 2 of the Core Plasma pattern, Sub Contracts, Profit Sharing, Joint Ventures focused on solving capital problems, and cluster 3 of general trading patterns that focused on product marketing as well as increasing partnerships to guarantee the absorption of products.

Keywords: *partnership, micro, and small industry, two-step cluster, Indonesia*

1. Introduction

The industrial sector is one of the contributors to increasing Indonesia's economic growth. The role of the industrial sector in national economic growth can trace through the

contribution of each sub-sector to the rate of national economic growth or gross domestic product.

Additionally, economic policy packages for stages I - XVI in 2015 to support industrialization in the last five decades gave birth to large and medium scale manufacturing industry companies and micro and small processing industries (MSI). The manufacturing sector is a   main driving force for the Indonesian economy because of its contribution to the economy. In 2019 the contribution of the manufacturing sector to the Indonesian economy was 19.70%. This contribution was higher than the trade and agricultural sectors, contributing 13.01% and 12.72%. Apart from contributing through value-added products, the manufacturing industry is also able to provide jobs. In 2019, the processing industry was able to employ a workforce of 14.96% of the total workforce in Indonesia (BPS, 2020)

Meanwhile, in the era of globalization and information also encourages changes in the socio-economic structure in society. Previously, economic policies centered on priority sectors, namely large-scale industries, have now changed to be more inclusive by involving all sectors to develop, including the MSI business. (Hamdani & Wirawan, 2012). The development of a processing industry at the scale of the MSI is important. The 2015-2035 National Industrial Development Master Plan places small-scale industries, in the long run, to contribute to the national economy. Besides, equal distribution of industrial development and industrial estates is developed based on the potential resources of each region.

The development of the processing industry expects to produce characteristics, one of which is a strong synergy between small, medium, and large industries that play their role as a supply chain. (Sawers, Pretorius, & Oerlemans, 2008). In achieving the vision and mission in the manufacturing sector, the government sets targets, developing small industrial centers. The development aims to increase the contribution of small industries in particular to the national economy

Further, in economic development in Indonesia, the MSI is always described as a sector that has an important role. It reflects in the historical experience that the MSI was able to withstand the economic crisis that Indonesia had experienced several years earlier. Besides, most of Indonesia's population has low education, where entrepreneurship is the right choice in the MSI sector because a person's education level is not an absolute requirement in entrepreneurship. So far, micro and small business activities, both traditional and modern, can absorb much workforce (BPS, 2018)

One of the efforts to develop the MSI business is optimal support from larger entrepreneurs through a partnership strategy. Partnership in question is mutually beneficial business cooperation between the MSI business and a larger business/company accompanied by fostering and development so that it is mutually beneficial, beneficial, and strengthening. However, in MSI businesses, the number of businesses that have formed partnerships is still relatively small. The number of MSI businesses that carry out partnership activities is only 8.28%. It means that the partnership activities between Large Industry and the MSI mandated in Law No. 20 of 2008 and implemented based on Government Regulation No. 17 of 2013 have not fully progressed as expected (BPS, 2020)

The most types of partnerships carried out by MSI businesses in 2019 were partnerships in product marketing, amounting to 37.59%. The second is a partnership in terms of raw material procurement of 37.56%, and the third is a partnership related to capital goods of 16.72%.

Most of the partnership patterns carried out by MSI businesses were general trading, amounting to 45.87%. What is done in the general trade partnership pattern is a larger business helping smaller businesses in the form of product marketing cooperation, providing business locations, receiving supplies from small business partners to meet the needs required by larger businesses following product requirements and quality. That has upon agreed. The second-largest partnership pattern is operational cooperation at 18.22%, namely cooperation in running a temporary business in nature until the work is completing. The profit-sharing partnership pattern is 8.43%, where the MSI business is an executor who runs a business that is financed or owned by a larger business by sharing the profits from its business. Meanwhile, the scheme of nucleus-plasma partnerships, subcontracts, and joint ventures is also conducting MSI businesses but far less than the three partnership patterns above, respectively at 7.42%, 5.40%, and 1.85%. (BPS, 2020).

The Partnership Program believes to positively impact management and increase the productivity of MSI in technology transfer and increasing the efficiency of the MSI. It hopes that these micro benefits will provide more long-term results for Indonesia's economic development.

One of the government's steps inequitable national development is the concept of an Indonesian economic corridor. An economic corridor is an integrated infrastructure network in a geographic area designed to stimulate economic development (Kim, Lee, & Park, 2009). The development of economic corridors in Indonesia is carried out based on the potential and advantages of each region that is spreading throughout Indonesia. As a country consisting of thousands of islands and located between two continents and two oceans, the Indonesian archipelago has a unique constellation, and each archipelago has a strategic role in national development activities. Therefore, considering each region's various potentials and strategic roles, the government has determined Indonesia's economic corridors into 6 (six) parts, namely the Sumatra Corridor, Java Kalimantan Corridor, Sulawesi Corridor, Bali-Nusa Tenggara Corridor, and Corridor. Papua-Maluku Islands (BPHN, 2014).

This study aims to map and analyze the characteristics of micro and small industry partnership patterns in Indonesia based on economic corridors and partnership activities using the two-step cluster method approach.

Two-Step Cluster Analysis is a clustering method designed to uncover natural clusters of previously unseen data sets. The clustering will be carried out based on the partnership activities carried out by MSI. Two-Step Cluster will also explore similarities in natural items or clusters that are not visible from the partnership data set. Another advantage of Two-Step Clusters is that they can process categorical and continuous data (Linassi, Alberton, & Marinho, 2016) to produce more specific clusters as needed.

Two-Step Clusters can also determine the most optimal number of clusters (Li & Sun, 2018). Also, the Two-Step Cluster provides information about the importance of each variable in preparing a particular cluster, which is an additional attractive feature compared to

the traditional clustering method (Soriano, Kozusznik, & Peiró, 2018). This study expects to provide knowledge to stakeholders and provide policy recommendations related to developing the MSI partnership model in Indonesia.

2. Literature Review

The MSI will contribute significantly to a country's economy, both in employment, growth, and economic development (Rodney Turner, Ledwith, & Kelly, 2009). In European Union countries, 99.8% of the MSI in these country accounts for 56% of GDP and absorbs 67% of the workforce (Elford & Daub, 2019). Based on his research, Rodney Turner (2009) shows that 25% of MSI in Ireland can develop their strategy to increase production, 14% of MSI innovates in product development. However, in general, it is not easy for MSI to innovate (Jin & Choi, 2019) because MSI only has limited innovation space, limited capital, knowledge, and skills; besides, the number of sales is limited compared to the cost of innovation (Hermans, Geerling-Eiff, Potters, & Klerkx, 2019). Therefore, one of the crucial things for MSI is to set aside a portion of the capital to innovate to improve MSI's performance (Giang, Trung, Yoshida, Xuan, & Que, 2019).

In Indonesia, there are many business units and businesses in all sectors of the economy with a sizable contribution, especially in increasing employment and increasing income. In this case, the MSI has a reasonably large role in national economic development. During the economic crisis, the MSI was testing that hit the Indonesian economy in 1998 and 2008, when the crisis destroyed the business world, especially the big business world. However, in the past, the MSI has been able to survive and thrive. It is because the MSI is quite flexible and adaptable to the ups and downs of market demand. Besides that, MSI also has diversity in making essential contributions to exports and trade.

However, in its development, MSI is faced with the following problems: lack of capital, difficulties in marketing, intense business competition, difficulty in raw materials, less technical production and expertise, lack of managerial skills, lack of knowledge in management issues, and lack of technology. (Sicily, Peranginangin, Setyorini, & Moeliono, 2015).

MSI's problems are solving through mutually beneficial partnership programs between MSI or MSI and large industries both from within the country and abroad. Thus, MSI will have the internal strength to compete with other business actors, both domestic and foreign. Ongoing partnerships between organizations within the MSI are essential. MSI often partners with other organizations (large industries) to improve their MSI performance. Forms of partnerships can be in the form of joint ventures, strategic alliances, or other forms of partnerships, but the most important thing is that this cooperation can increase the role of MSI.

A partnership is a collaboration between small industry and big industry accompanied by business development and ample business guidance concerning the principles of mutual requirements, mutual reinforcement, and mutual benefit. Partnership patterns are the optimal way to address inequality in the national business world. The prominent industry still dominates because of its high capitalistic capabilities. It exacerbates the imbalance of the downstream and upstream business chains and the MSI's lower

productivity levels. Local governments must facilitate partnerships between cooperatives and local MSIs to exploit local economic potentials with investors.

3. Research Method

This study employed categorical variables to see the industry's partnership activities in each Cluster formed later. It supports the advantages of the Two-Step Cluster method, namely the ability to handle categorical variables (Horn & Huang, 2016). With the adaptation of the categorical variables carried out, in this study, there is one categorical variable, namely the economic corridor and five continuous variables, namely: 1) The frequency of the MSI based on the type of partnership; 2) MSI frequency based on partner institutions; 3) Frequency of the MSI based on the partnership pattern; 4) Frequency of MSI based on the share of the partnership that needs to be improved; 5) BMI frequency based on the difficulties faced.

3.1. Data Source

The research data collected from The Central Bureau of Statistics conducted the annual survey of micro and small industries in Indonesia in 2019 with 90,295 industries in the 2020 Micro and Small Industry Profile report. The micro-industry has a total workforce of no more than four, while the definition of the small industry is an industry with a total workforce of 5 to 19. This study uses company units classified according to the 5-digit level of the Indonesian Standard Industrial Classification Code, which is comparable to the ISIC level (BPS, 2020).

Using data from 34 provinces of Indonesia, the preparation stage consists of two processes - data transformation and variable standardization. The data transformation process began with cleaning the database according to clustering needs. The next stage was to classify provinces based on six economic corridors, namely the Sumatra Corridor, consisting of 10 provinces: Aceh, Bangka Belitung, Jambi, Riau, Riau Islands, Lampung, Bengkulu, West Sumatra, North Sumatra, and South Sumatra. The Java Corridor consisted of 6 Provinces, including Banten, Special Capital Region DKI Jakarta, West Java, Special Region DI Yogyakarta, Central Java, and East Java. The Bali-Nusa Tenggara corridor consists of 3 provinces including: Bali, West Nusa Tenggara and East Nusa Tenggara. The Sulawesi Corridor consists of 6 provinces including: Gorontalo, West Sulawesi, South Sulawesi, North Sulawesi, Central Sulawesi and Southeast Sulawesi. Kalimantan Corridor consists of 5 provinces including: West Kalimantan, East Kalimantan, Central Kalimantan, North Kalimantan and South Kalimantan. While, Maluku-Papua corridor consisted of 4 provinces, including Maluku, North Maluku, Papua, and West Papua.

3.2. Two-Step Cluster Method

The two-step cluster method aims to handle many objects, especially on objects with mixed, continuous, and categorical variables (Şchiopu, 2010). The definition of distance between two clusters is the distance between the centers of each of these clusters. The center of a cluster is a vector of the mean of each variable. (Li & Sun, 2018) The distances used in the two-step cluster method are the Log-Likelihood distance (Trifković, 2017) and the Euclidean distance. The grouping procedure using the two-step cluster method has two stages: the clustering stage (initial grouping) of objects into small sub-clusters and the final grouping

stage (Horn & Huang, 2016). The following is the log-likelihood distance formula (Li & Sun, 2018).

$$d(i,j) = \varepsilon_i + \varepsilon_j - \varepsilon_{(i,j)} \tag{1}$$

$$\varepsilon_i = -n_i \left(\sum_{K=1}^{K} \frac{1}{2} \log \left(\widetilde{\sigma}_{ik}^2 + \widetilde{\sigma}_k^2 \right) \right) \tag{2}$$

$$\varepsilon_j = -n_j \left(\sum_{K=1}^{K} \frac{1}{2} \log \left(\widetilde{\sigma}_{jk}^2 + \widetilde{\sigma}_k^2 \right) \right) \tag{3}$$

$$\varepsilon_{(i,j)} = -n_{(i,j)} \left(\sum_{K=1}^{K} \frac{1}{2} \log \left(\widetilde{\sigma}_{i,jk}^2 + \widetilde{\sigma}_k^2 \right) \right) \tag{4}$$

Equation (1) is the distance between Cluster i and j, where the index represents the combination of clusters i and j. In equations (2), (3), and (4), K is the total of continuous variables, and is an estimate of the variance of the entire data set, so, and is an estimate of the variance of the continuous variable k in clusters i, j (Li & Sun, 2018). The next process is the formation of a data structure using the Cluster Feature (CF) Tree. CF-Tree consists of node levels, and each node has many entries. The root node is recursively clustered into the closest entries to find the closest child node, then descends along the CF-Tree. If an approach a leaf node, it will look for the closest leaf entry. Leaf entry is the final of the sub-cluster (Zenina, Romanovs, & Merkuryev, 2016).

The pre-clustering result data is used as input to search for clusters. Two-Step Cluster uses a hierarchical method in the clustering process. This study uses Schwarz's Bayesian Information Criterion (BIC) indicator to determine the forming number of clusters, and this study uses the Schwarz's Bayesian Information Criterion (BIC) indicator. BIC is used to find the estimated number of clusters with a distance ratio, where BIC is accurate (Mooi & Sarstedt, 2011). The BIC formula is seeing in equation (5) (Li & Sun, 2018)

$$BIC(j) = -2 \sum_{j=1}^{j} \xi_j + m_j \log(N) \tag{5}$$

Equation (5) shows the number of clusters, where K is the number of continuous-variable clusters, and N is the number of observations. Where *mj = 2Kj*. Combining sub-clusters result from pre- clustering step according to existing distance criteria until all data are incorporating into a cluster after knowing the cluster number.

The optimal solution for the number of clusters is the one with the smallest BIC value, but there are several cases in the grouping where BIC will continue to increase in value as the number of clusters increases. In this situation, the ratio of BIC changes and the ratio of distance measure changes are used to identify the optimal number of cluster solutions. The solution for the number of optimal clusters will have a large BIC changes ratio and distance measure ratio (Mooi & Sarstedt, 2011).

4. Result and Discussion

The following is the calculation result with the BIC indicator. In addition to determining the estimated number of clusters, criteria were also determining changes in BIC, a ratio of changes in BIC, and the ratio of distance measures, as shown in Table 1.

Table 1. Estimated Number of Samples

Number of Clusters	Schwarz's Bayesian Criterion (BIC)	BIC Change	The ratio of BIC Changes	The ratio of Distance Measures
1	194.826			
2	169.366	-25.460	1.000	1.508
3	163.174	-6.192	.243	1.589
4	171.040	7.866	-.309	1.573
5	187.602	16.563	-.651	1.397
6	208.477	20.875	-.820	1.444
7	232.692	24.215	-.951	1.818
8	260.292	27.600	-1.084	1.563
9	289.381	29.089	-1.143	1.054
10	318.607	29.225	-1.148	2.861
11	349.466	30.859	-1.212	6.416
12	381.066	31.600	-1.241	1.282
13	412.697	31.630	-1.242	3.334
14	444.402	31.705	-1.245	1.223
15	476.113	31.711	-1.246	1.043

Table 1 is the estimation result of the Cluster formed using the BIC indicator. There were 15 indicators with detailed changes in distance and distance calculations. Determination of the number of clusters in BIC sees at an immense ratio distance. Based on existing data, the best number of clusters is 3 clusters. One of the advantages of Two-Step Clusters is finding the most optimal number of clusters according to the existing data set (Li & Sun, 2018).

Furthermore, the number of members in each Cluster can be seen in Table 2, as follows:

Table2.Cluster Distribution

Cluster	N (Amount)	Percentage (%)
1	11	32.4
2	9	26.5
3	14	41.2

Table 2 showed the number of frequencies and the percentage combination of each Cluster. Cluster 1 consists of 11 provinces, figuring 32.4% of the entire province, while in cluster 2,

there are nine provinces with a percentage of 26.5% of the entire province. As for cluster 3, there are 14 provinces with 41.2% of the entire province. The list of members for each Cluster based on economic corridors is showing in Table 3.

Table 3. Distribution of Clusters Based on Economic Corridors

Economic Corridor	Cluster 1		Cluster 2		Cluster 3	
	N	%	N	%	N	%
Sumatera	5	14.7	2	5.9	3	8.8
Java	6	17.7	-	-	-	-
Bali-Nusa Tenggara	-	-	3	8.8	-	-
Sulawesi	-	-	-	-	6	17.7
Kalimantan	-	-	-	-	5	14.7
Maluku - Papua	-	-	4	11.8	-	-
Amount	**11**	**32.4**	**9**	**26.5**	**14**	**41.2**

Table 3 showed the number of frequencies and combination presentations of each Cluster based on Economic Corridors. Cluster 1 consists of the Sumatra Corridor (14.7%) and the Java Corridor (17.7%) of the entire province, while cluster 2 consists of the Sumatra Corridor (5.9%), the Bali - Nusa Tenggara Corridor (8.8%), and the Maluku-Papua Corridor (11.8%) of the entire province. Cluster 3 consists of the Sumatra Corridor (8.8%), the Sulawesi Corridor (17.7%), and the Kalimantan Corridor (14.7%) of the entire province. While the list of members for each Cluster based on economic corridors is showing in Table 4.

Table 4. Cluster Membership

Economic Corridor	Cluster 1	Cluster 2	Cluster 3
Sumatera	1.Bengkulu, 2.Jambi, 3.Lampung, 4.West Sumatera, 5.South Sumatera	1.Aceh, 2.Kepulauan Riau	1.Bangka Belitung, 2.Riau, 3.North Sumatera
Java	1.Banten, 2.DI Yogyakarta, 3.DKI Jakarta, 4.West Java, 5. Middle Java 6. East Java		
Bali-Nusa Tenggara		1.Bali, 2.NTB, 3.NTT	
Sulawesi			1.Gorontalo, 2.West Sulawesi

Economic Corridor	Cluster 1	Cluster 2	Cluster 3
			3.South Sulawesi 4.Middle Sulawesi 5. North Sulawesi 6. Southeast Sulawesi
Kalimantan			1. West Kalimantan 2. South Kalimantan 3. Central Kalimantan 4. East Kalimantan 5. North Kalimantan
Maluku - Papua		1.Maluku, 2.North Maluku 3.Papua, 4.West Papua	

Based on table 4 can be seen that Sumatra Corridor is distributing across all clusters, all members of the Java Corridor, including cluster 1, the Bali-Nusa Tenggara Corridor, all members enter cluster 2, Sulawesi and Kalimantan Corridor, all members including cluster 3 and Maluku-Papua Corridor, all members including cluster 2.

Table 5. Cluster Center Values by Type of Difficulty MSI

Types of difficulties	Cluster 1		Cluster 2		Cluster 3	
	mean	standard deviation	Mean	standard deviation	mean	standard deviation
Raw materials	**27.6184**	7.45419	22.5308	8.77374	25.1520	6.17976
Capital	38.0031	8.70090	**43.8406**	11.60700	35.7542	8.27042
Marketing	26.3652	3.49324	28.6571	8.70233	**29.8134**	8.21920
Energy	10.1556	1.76305	**14.2487**	7.63667	12.2241	1.94913
Infrastructure	2.6437	1.51943	3.9026	3.64310	**4.7904**	2.82551
Labor	**7.6550**	2.26681	4.9204	3.29880	6.2352	1.82857
Competitor	4.1120	.88360	3.8590	2.77019	**5.4479**	3.34502

There are various problems and difficulties faced by MSI when running its business. Table 5 explains that based on MSI's types of difficulties, cluster 1 has the characteristics of MSI difficulties on raw material and labor issues, while cluster 2 is the type of difficulty on capital and energy problems. Meanwhile, cluster 3 owns types of difficulties in marketing, infrastructure, and competitors.

Table 6. Cluster Center Values by Type of Partnership

Partnership Patterns	Cluster 1		Cluster 2		Cluster 3	
	mean	standard deviation	mean	standard deviation	mean	standard deviation
Capital	7.0938	4.57250	**18.3541**	18.04378	16.5388	13.80414
Raw material	**40.0244**	13.55799	19.0198	13.15308	16.0109	11.69076
Marketing	36.6765	13.23186	58.2941	14.83521	**69.1925**	11.36937
Technology	**15.6054**	11.68295	9.3900	12.57378	11.0883	11.07046

There were several types of partnerships carried out by MSI, namely related to partnerships in terms of capital, partnerships in the fulfillment of raw materials, partnerships in product marketing development, and partnerships in technology for capacity building through improving equipment and machine technology. As shown in Table 6, cluster 1 has characteristics based on the type of partnership on raw materials and technology, while Cluster 2 is on capitalization and cluster 3 is on marketing.

Table 7. Cluster Center Values Based on Partnership Institutions

Partnership Institutions	Cluster 1		Cluster 2		Cluster 3	
	Mean	Standard	Mean	Standard Deviation	Mean	Standard Deviation
State-Owned Enterprises or Regional-Owned Enterprises	5.5636	9.76111	**10.4980**	14.67343	3.5467	2.98071
Large Private Industry	**32.0820**	12.03158	27.8097	20.74975	22.4138	17.53945
Banking's	2.6842	3.35959	2.8313	3.56871	**3.0597**	6.49978
Regional government	1.1654	1.03315	**3.9605**	4.18226	1.4001	2.17221

Besides, the main partners of MSI in partnership activities are, State-Owned Enterprises or Regional-Owned Enterprises, Large Private Industry, Banking, and Regional Government. The detailed explanation in Table 7 regarding the characteristics of the clusters based on the institutions that form partnerships, for cluster 1 of the institutions that form partnerships are large private industries, the 2 clusters of institutions that form partnerships are State-Owned Enterprises or Regional-Owned Enterprises as well as local governments and cluster 3 of institutions that establish banking partnerships.

Table 8. Cluster Center Values Based on Partnership Patterns

Partnership Patterns	Cluster 1		Cluster 2		Cluster 3	
	mean	standard deviation	Mean	standard deviation	Mean	standard deviation
Plasma core	2.1044	2.51343	**3.3620**	8.73718	.6012	1.81760
Subcontracts	5.8638	5.41005	**9.1429**	14.68489	2.9811	2.09646
General Trading	38.2460	10.78795	47.7360	22.01323	**67.3113**	10.76749
Profit-sharing	9.3876	6.22388	**21.4649**	14.71797	7.1995	6.05263
Joint Ventures	**25.6230**	14.39863	9.7434	7.86594	11.0660	8.80175
	1.8622	1.30788	**5.0509**	9.27608	.6600	.78654

MSI has six partnership patterns: Plasma Core, Sub-Contract, General Trading, Profit Sharing, Operational Cooperation, and Joint Ventures. As for the partnership pattern, cluster 1 is dominant in operational cooperation; cluster 2 is in the core plasma, sub-contract, profit sharing, and joint ventures, cluster 3 is dominant in general trading.

Table 9. Cluster Center Value Based on Partnership Section that needs to be improved

Partnership Section that Needs to be Enhanced	Cluster 1		Cluster 2		Cluster 3	
	Mean	Standard deviation	mean	standard deviation	Mean	standard deviation
The proportion for Profit Sharing	10.2532	15.04136	**31.7368**	42.58340	**32.2374**	36.30587
Raw Material Quality Assurance	**12.9421**	19.07717	11.9938	27.28030	6.6651	14.02860
Guaranteed on Time Payment	**33.2463**	36.27920	17.5710	29.15971	12.1267	14.42850
Guarantee of Absorption of Production results	15.6675	16.31447	12.9330	32.16422	**27.2717**	38.78154

In the partnership activities carried out by MSI, several parts still need to be improved, such as the proportion of production sharing, Assurance of the quality of raw materials, guarantee of timely payment, and the guarantee of absorption of production results. Table 9 is based on the partnership characteristics that need to be improved, and cluster 1 still needs an increase in the quality assurance of raw materials and guarantees of payment on time; cluster 2 still needs an increase in the proportion of profit sharing. In contrast, cluster 3 is dominant in the proportion of profit sharing and guaranteed absorption of results production.

Table 10. Cluster characteristics

Characteristics	Cluster 1 (Java Corridor, Part of the Sumatra Corridor close to Java)	Cluster 2 (Bali-Nusa Tenggara Corridor, Maluku - Papua Corridor, part of Sumatra Corridor: Aceh and Kep Riau)	Cluster 3 (Sulawesi Corridor, Kalimantan Corridor, Part of Sumatra Corridor: Bangka Belitung, Riau and North Sumatra)
Types of difficulties	1.Raw materials 2.Labors	1. Capital 2.Energy	1.Marketing 2.Infrastructure 3.Competitor
Types of partnerships	1.Raw materials 2.Technology	1.Capital	1.Marketing
Partnership Institutions	1.Big Private Industry	1.State-Owned Enterprises or Regional-Owned Enterprises 2.Regional Government	1.Bankings
Partnerships Partner	1.Operational cooperation	1.Plasma core 2.Subcontract 3.Profit sharing 4.Joint ventures	1.General trading
Partnership Section that Needs to be Enhanced	1.Quality Assurance Raw material 2. Guarantee Correct Payments Time	1. Proportion Divide Result	1. Proportion Divide Result 2. Guarantee Absorption Results Production

Two-step cluster results figuring each item according to a category as follows the type of difficulty, the type of partnership, the partnership institution, the partnership pattern, and the part of the partnership that still needs to be improved. The categories of each Cluster are describing below:

Cluster 1: Operational Cooperation Partnership Patterns on Raw Materials and Technology
The characteristics of cluster 1 in the operational cooperation pattern were: between Micro or Small Businesses with Medium or Large Businesses running a temporary business until the job is completed (Sapti, 2019). The institutions that partner with MSI in this Cluster are

dominated by large private industries with partnerships to fulfill raw materials and technology transfer. In developing MSI, they face various problems such as lack of capital, difficulties in marketing, fierce business competition, difficulty in raw materials, deficiencies in production processes and technical expertise, lack of managerial skills, lack of knowledge in management, and lack of technology development. (Setyaningrum, et al., 2019). Besides, there is a consistency between the difficulties faced, one of which is a raw material, the type of partnership for the fulfillment of raw materials, and the part of the partnership that needs to be improved is the quality assurance of raw materials. So that the partnership in cluster 1 is more focused on improving the quality of raw materials.

Cluster 2: Core Plasma Partnership Patterns, Sub Contracts, Profit Sharing, Joint Ventures on Capital

Unlike the other clusters, cluster 2 has the characteristics of a partnership focusing on capital. The dominant difficulties are hard to obtain capital, and the type of partnership related to capital and partnerships that need to be improved is the proportion of profit sharing. It is in line with the partnership pattern, namely plasma nucleus, sub-contracts, profit sharing, and joint ventures with State-Owned Enterprises or Regional-Owned Enterprises partner institutions. And local government. In general, the source of funding for capital assistance from the government is more consistent despite experiencing changes in national and regional leadership, from the era of the Soeharto government to the present. The government still has a funding assistance program for micro and medium enterprises (Septa Rinawati & Sri Sadewo, 2019(Ghofur et al., 2021; Muhtarom & Haryanto, 2018; Muhtarom1 et al., 2018)).

Cluster 3: General Trading Partnership Patterns on Marketing

The characteristics of cluster 3 in the general trade partnership pattern are that the partner industry is the recipient of the goods, while MSI is the supplier of goods, and MSI is the supplier of goods-producing goods or services for its trading partners. (Sapti, 2019). Business partnerships with a general trading pattern, running in various forms such as marketing cooperation, providing business locations, or receiving MSI supplies by Partner Industries. All of the activities are conducting openly and meeting the needs for goods and services needed by Partner Industries is carried out by prioritizing the procurement of MSI products and meeting the standards of quality of goods and services required. Payment system arrangements in general trade partnership cooperation are conducting without harming either party (Sapti, 2019). In this Cluster, the general trade partnership pattern is more focused on product marketing. It is in line with the desire to increase partnerships in guaranteeing the absorption of production products.

4. Conclusion

The development of the MSI in various studies has made a decisive contribution to reducing the number of unemployed and improving the economy of local communities. With this contribution, the big industry has a significant interest. There are several reasons; first: large industries are more capital intensive than labor-intensive. That is, the big industry needs few workers. The criteria for workers are often limited to particular skills and skills in handling

the machines. Second, if the product is for the local market share, then the local community must be prosperous so that its absorption is high. If not fulfilled, it will cause social inequality and, in turn, hit the company back. Therefore, many laws require large industries to enter into partnerships with MSI. Large industries have carried out various kinds of partnership patterns with MSI in Indonesia. This study found three clusters with different partnership patterns between MSI and partner industries in Indonesia, regionally distributed. As follows: cluster 1 consisted of the Sumatra Corridor (14.7%) and the Java Corridor (17.7%) of the whole province, while cluster 2 consists of the Sumatra Corridor (5.9%), the Bali - Nusa Tenggara Corridor (8.8%), and the Maluku-Papua Corridor (11.8%) of the entire province. Cluster 3 consists of Sumatra Corridor (8.8%), Sulawesi Corridor (17.7%), and the Kalimantan Corridor (14.7%) of all provinces in Indonesia with the following characteristics of the partnership pattern cluster 1: the pattern of operational cooperation between MSI and Large Industries on fulfillment. Raw materials and technology transfer with a focus on improving the quality of raw materials, cluster 2: nucleus plasma pattern, subcontracts, production sharing, joint ventures that are focusing on overcoming capital problems, and Cluster 3 general trading patterns that are focused on product marketing and increased partnerships on guarantees absorption of products.

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