VALUE OPTIMIZATION STRATEGY FOR MSME CLUSTERS IN EAST JAVA PROVINCE AFTER THE PANDEMIC

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Abstract: *This study aims to provide a model for developing MSME values in Indonesia based on Geography Spatial Supply Chain 4.0. This model seeks to increase effectiveness by optimizing production factors after the COVID-19 pandemic. This study uses a qualitative method with an exploratory approach in compiling the proposed model for MSME development in Indonesia, especially East Java. The data were obtained from the results of a survey of 800 respondents in East Java province, in-depth interviews with experts, and in-depth observations of existing conditions in the field. This research produces a geographic spatial supply chain model that connects farmers (N-1) to processing industries (N) and end consumers (N+1) through a marketplace that is integrated with local government systems. Marketplace does not only cover software procurement and sales systems, but is broader in marketing, quality control and knowledge transfer. This research contributes to the development of MSMEs in Indonesia, especially in the province of East Java. The research results can be the basis for stakeholder policy making in the development of MSMEs in Indonesia, especially in East Java.*

Keywords: *Clustering Supply Chain, Industry 4.0, MSMEs*

1. Introduction

Indonesia is a country with a large number of Micro, Small and Medium Enterprises. MSMEs in Indonesia have reached 99% and are able to help absorb up to 96,9% of the workforce (BPS, 2022). This high percentage makes MSMEs have an important role in the country's economy. In fact, MSMEs contribute to Gross Domestic Product (GDP) of 60,5% (Kementerian Koperasi dan UMKM, 2022). East Java Province is one of the provinces with a high number of business actors. East Java MSMEs also contributed to GDP up to 14,67% (BPS, 2019).
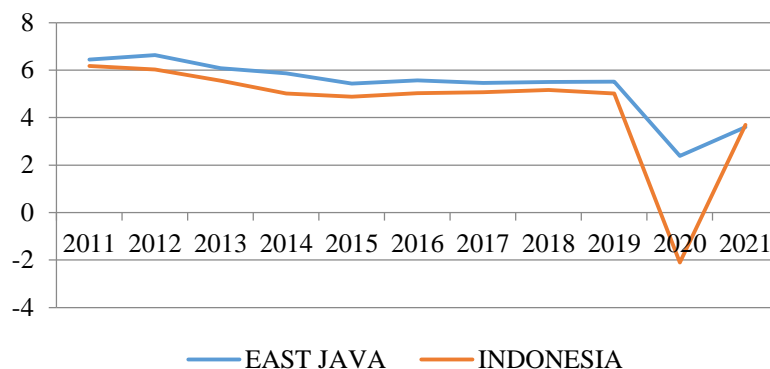
Source: BPS (2022)
Figure 1. Comparison of East Java and Indonesia's Economic Growth

In more detail, the number of micro and small industries in East Java is 862,450 and has been able to absorb up to 5.85% of the entire population of East Java (BPS Jatim, 2019). MSMEs are the largest contributor to East Java's Gross Regional Domestic Product (GRDP), reaching 54% (East Java Office of Cooperatives and SMEs, 2020). However, this percentage is actually a decrease in the contribution of MSMEs to GRDP from the previous year. The decrease in contribution of 3.32% is part of the impact experienced by East Java MSMEs due to the COVID-19 pandemic (East Java Office of Cooperatives and SMEs, 2020).

Table 1. Contribution of MSMEs to East Java's Gross Regional Domestic Product (GRDP)

Year	Contribution
2016	57,52%
2017	54,98%
2018	57,65%
2019	57,32%
2020	54%
2021	57%
2022	57,81%

Source: East Java Office of Cooperatives and SMEs (2020).

March 2020 was the start for Indonesia to get its first case of Corona Virus Disease (COVID-19). The increasing number of cases of transmission requires the government to adopt policies to reduce the rate of transmission of Covid-19. Starting from the policies of Large-Scale Social Restrictions (hereinafter referred to as PSBB), Work From Home (WFH), School From Home (SFH), until recently the Imposition of Restrictions on Community Activities (PPKM). However, these policies also had an impact on the economy. There has been a reduction in the production process in several industrial sectors. As a result, there was a reduction in working hours which was followed by a decrease in the level of wages. In this condition, the demand for goods and services will automatically decrease.

The solution for MSMEs to deal with pandemic conditions is to utilize information and communication technology (Wibowo & Azizah, 2022). In fact, by 2020, electronic commerce has reached US$ 130 billion (Soetjipto, 2020). However, several media have reported that almost 100% of East Java MSMEs have suffered losses. This is because for several types of MSMEs in East Java, the use of information and communication technology is still very difficult.

In order to put together a sustainable effort to improve East Java MSMEs that have been affected by the Covid-19 pandemic, MSMEs need to fix the root of the problem first. MSMEs need to improve the supply chain model to meet aspects of production efficiency in the midst of a pandemic (Dewi Restu et al., 2019; Setiawan et al., 2022). An improved supply chain model by using information and communication technology can be a solution to maximize the efficiency of MSMEs in East Java.

A good supply chain must be able to ensure that industrial operations are well integrated, from suppliers to customers by taking into account cost and inventory factors. Kimbal (2015); Syahbudi & MA (2021) argue that "clusters can be a solution for different industrial sectors so that they can still use some of the same components together". The application of clusters can reduce the cost of goods consumed by each industry and help products to be more competitive with easy distribution. This can create an efficient, innovative and collaborative supply chain for MSME players. Imbalance of sources of competitive power between industries can be resolved properly.

The existence of digitalization has created a new trend. Customers expect increased service and more detailed order combinations or customization. MSMEs need to develop this trend by leveraging the use of technology to create supply chain digitization. Therefore, this study aims to determine the geography spatial supply chain 4.0 model for MSME actors in East Java and to contribute to the development of MSMEs in East Java so that they can be managed effectively and efficiently.

2. Literature Review

2.1. Supply Chain Management

According to Arif (2018), "Supply chain is a network between companies that work together to create and then deliver these products to the hands of end users or consumers". In simple terms, the network consists of suppliers, manufacturers, warehouses or distribution centers, and end users. There are three things that must be managed properly in the supply chain, namely:
1) The flow of goods from upstream to downstream, such as raw materials sent.
2) The flow of money or the like in detail from upstream to downstream.
3) The flow of information from upstream to downstream, or vice versa. (Arif, 2018)

In contrast to the supply chain, according to Anwar (2013), "supply chain management is an integrated application that provides support to management in the form of an information system in terms of procurement of goods or services, as well as managing relationships between companies in the supply chain network so that the availability of the products and services needed remains optimal". Hence, it can be concluded that the supply chain is the physical network of the companies involved, starting from supplying raw materials, production activities, to delivery to end users. Meanwhile, supply chain management is a method, tool, or management approach.

Initially, the supply chain was a purely operational logistics function that reported sales or production activities and focused on ensuring the supply of production and delivery to customers. Currently, the supply chain has become an independent supply chain management function in several companies, even led by an expert as a CSO (Chief Supply-chain Officer). The focus of the supply chain management function has evolved into advanced planning processes, such as analytical demand planning or integrated sales and operations planning (S&OP). Meanwhile, today's operational logistics are often outsourced to third-party logistics providers. The function of supply chain management is to ensure that operations are seamlessly integrated, from supplier to customer, with decisions about cost, inventory, and customer service made from an integrated end-to-end perspective (Kaihatu, 2016).

Every industrial organization always pays attention to the problem of controlling operational costs. The increase in market volatility, as well as the variability of demand and increased risk of disruption of supply flows has driven the emergence of more effective and efficient supply chain management designs. Uncertain conditions have made many industries switch from an efficient approach to an integrated approach, so that they can achieve the maximum level of efficiency and effectiveness.

2.2. Clustering Supply Chains

Cedillo-Campos (2014) developed the Clustering Supply Chain method by organizing a global economic network and playing a logistics platform as a capital exchange point. This can increase the efficiency of logistics flows as a tool in regional economic development. Several points that must be considered according to Cedillo-Campos (2014) include "increasing innovation, infrastructure, and streamlining business processes so that all processes can run effectively and efficiently".

The model developed by Cedillo-Campos (2014) as shown in Figure 2 shows that the Clustering Supply Chain is measured by the Cluster and Global Supply Chain matrix scales. This merger produces a model framework in determining how inter-cluster supply chain processes can work with each other.
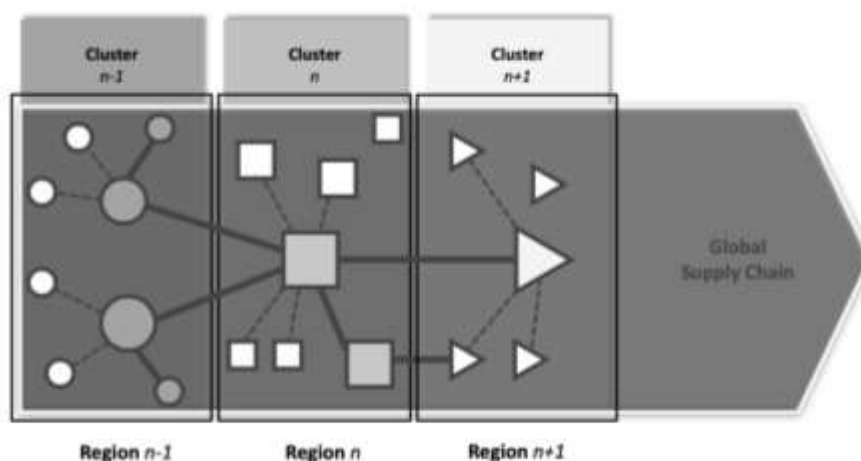
Source: Campos 2014

Figure 2. Integrated Structure of Industrial Cluster and Supply Chain

Cedillo-Campos (2014) gives an example of supply chain clustering in the management of raw materials and other resources for the aerospace industry, the automotive industry, information systems, and agriculture as shown in Figure 2. The drawing integrates the same raw materials for several different industries so as to create harmony and production efficiency.
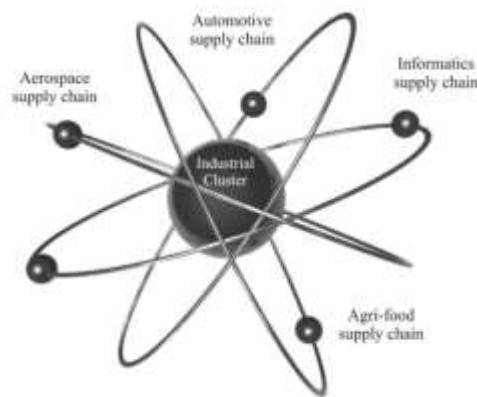
Source: Campos (2014)
Figure 3. Clustering Supply Chain

3. Research Method

This study used a qualitative method with an exploratory approach to develop a MSME development model based on Clustering Supply Chain 4.0. The exploratory approach requires primary data to dig deeper and solve problems (Lietz, 2010). Primary data was collected from the results of in-depth interviews, field observations, and surveys conducted on 788 MSMEs in East Java Province. The steps in this research can be seen in Figure 4:
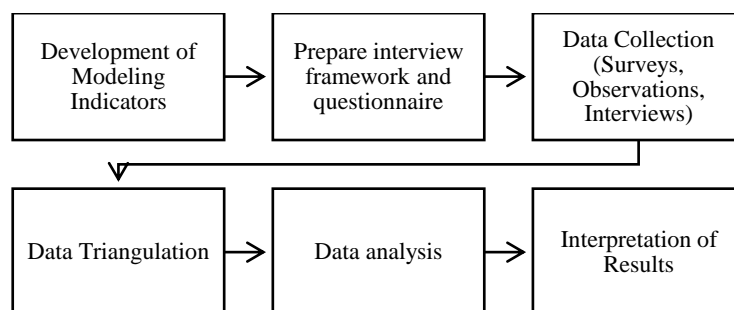

Figure 4. Research Steps

Interviews were conducted with experts in their fields such as the leaders of the Association of Farmers Groups (also known as *Gapoktan*), wholesalers, small traders, processing industry players, accommodation industry players, and consumers of these products. Field observations were carried out in districts and cities in Surabaya. Interviews were conducted in the period December 2022. Meanwhile, field surveys were carried out in the period November 25 to

December 31, 2022, with 800 respondents from various business sectors such as Agriculture, Processing Industry, Accommodation and Hospitality Industry, and Large and Small Trade.

The data collected was triangulated to maintain research objectivity. The triangulation process was carried out by matching the results of interviews, observations, and field surveys. The results of data triangulation form the basis for modeling which presented in this study. The results of the compiled model will then be tested in a Focus Group Discussion by inviting several parties such as Academics, Practitioners, and Regulators to obtain improvement and legitimacy for the proposed model. The last stage was the implementation of the model into the business world so that it can be run properly by MSME actors.

4. Results and Discussion

4.1. Results

In conducting MSME research, researchers took 810 samples with 22 incomplete data samples so they had to be eliminated from the list of data samples being analyzed. Details of the MSME samples taken can be seen in Table 2.

Table 2. Sample Data Distribution

Business Group	Total	Percentage
Trade (T)	189	24%
Manufacturing (M)	205	26%
Service	189	24%
Agriculture and farming	205	26%
	788	100%

Based on the sample that has been prepared, the survey results on the condition of MSMEs are as follows:

Table 3. MSME Technical Efficiency Before and During the Pandemic in East Java

	N	Average	Min	Max	Standard Deviations
TE-DEA VRS Before Pandemic	788	0,766	0,032	1	0,294
TE-DEA VRS During Pandemic	788	0,733	0,047	1	0,259

Information:
Variables used:
1) Output Variable
   a. Sales Volume (O_1)
2) Input Variables
   a. Initial Capital (I_1)
   b. Number of Labor (I_2)
   c. Communication Fee (I_3)

    d. Raw Material Cost (I_4)
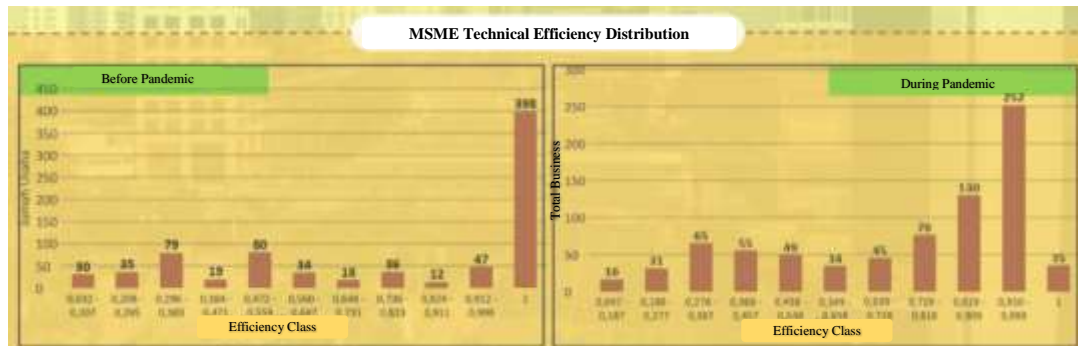   e. Auxiliary Material Cost (I_5)

Figure 5. Distribution of MSME Technical Efficiency before and during the COVID-19 Pandemic

In general, the condition of MSMEs in East Java Province experienced a shift in the level of efficiency. The production efficiency of SMEs as shown in Figure 5 shows the previous level of efficiency with a score of 1 (one) shifting one level to a range of 0.910 – 0.999. This is caused by constraints in the distribution of purchases of raw materials and the distribution of sales of goods produced by MSMEs.

In accordance with the information on the distribution of business groups, the details of efficiency results for MSMEs in several sectors can be seen in Table 4. The illustration contains some information such as:

a. The agricultural sector is the strongest sector in dealing with the pandemic. This is because during the pandemic, agricultural production is still needed by the community as a fulfillment of basic needs. Even though people's movements are limited, it doesn't make people reduce their consumption of agricultural products.

b. Farmers are not affected by the distance restriction rules, because farmers in carrying out their activities have kept their distance according to the land they own.

c. The manufacturing industry sector is a type of business that has experienced an increase in efficiency during the pandemic. This is supported by the condition of the processing industry in East Java Province which is closely related to the agricultural industry. Hence, it can be concluded that the supply chain route in East Java Province tends to be safe from the upstream sector.

d. Meanwhile, from the downstream sector, MSMEs in the in the accommodation and food & beverage industry sector and wholesale/retail trade are worried. The downstream sector is the party that suffers the most from the impact of restrictions on human movement to deal with the impact of COVID-19. This is evidenced by the reduced level of efficiency in East Java Province, both in the accommodation and food & beverage industry and wholesale/retail trade.

Table 4. Distribution of MSME Technical Efficiency

		TE-DEA VRS Before the Pandemic	TE-DEA VRS During a Pandemic
Agriculture, Forestry and Fishery Sectors	**N**	224	224
	Average	0913	0913
	Min	0.261	0.261
	Max	1	1
	Standard Deviations	0.192	0.192
Processing industry	**N**	151	151
	Average	0.889	0879
	Min	0.333	0.333
	Max	1	1
	Standard Deviations	0.223	0.226
Wholesale and Retail Trade	**N**	233	233
	Average	0.858	0.771
	Min	0.2	0.167
	Max	1	1
	Standard Deviations	0.250	0.296
Provision of Accommodation and Food and Drink	**N**	180	180
	Average	0.863	0.846
	Min	0.05	0.03
	Max	1	1
	Standard Deviations	0.275	0.296

Meanwhile, in the context of business resilience, MSMEs

Table 5. Effect of Independent Variables on Business Resilience during the COVID-19 Pandemic

Independent Variable	Dependent Variable					
	Low Resilience - High Resilience			Moderate business resilience - high business resilience		
	B	**Exp(B)**	**Sig.**	**B**	**Exp(B)**	**Sig.**
The long establishment of MSMEs	0.010	1.010	0.609	-0.004	0.996	0.809
[Type of MSME Business Field = 0]	5.180	177.699	0.000*	4.901	134.457	0.000*
[Type of MSME Business Field = 1]	5.139	170.538	0.000*	5.031	153.084	0.000*
[Type of MSME Business Field = 2]	3.959	52.389	0.000*	3.207	24.697	0.000*

[Type of MSME Business Field = 3]	0^b	-	-	0^b	-	-
[Origin of raw materials=0]	1.212	3.361	0.000*	0.550	1.734	0.050*
[Origin of raw materials=1]	0^b	-	-	0^b	-	-
[Production system used=0]	1.182	3.260	0.001*	0.178	1.195	0.548
[Production system used=1]	0^b	-	-	0^b	-	-
[Consumer origin=0]	0.102	1.107	0.805	-0.015	0.985	0.961
[Consumer origin=1]	0^b	-	-	0^b	-	-
[Following economic group=0]	-0.939	0.391	0.009*	-0.060	0.942	0.850
[Following economic group=1]	0^b	-	-	0^b	-	-
[Mechanism of payment for raw material transactions from suppliers=0]	-0.431	0.650	0.387	-0.021	0.979	0.955
[Mechanism of payment for raw material transactions from suppliers=1]	0^b	-	-	0^b	-	-
[Product selling activity mechanism=0]	0.422	1.525	0.203	-0.295	0.744	0.217
[Product sales activity mechanism=1]	0^b	-	-	0^b	-	-

*) Significant at alpha = 10%

Table 6. Details of Dependent and Independent Variables

Information	
Dependent Variable	
Variable	**Information**
High Resilience (3)	Maximum decrease in turnover of 25%
Moderate Resilience (2)	Decrease in turnover between 26-50%
Low Resilience (1)	Decrease in turnover of more than 50%
Independent Variable	
Variable	**Information**
The long establishment of MSMEs	Year Unit
Types of MSME business fields	0 Accommodation 1 Wholesale, Retail, and Services 2 Processing industry 3 Agriculture and farming
Origin of raw materials	0 Out of town 1 In the city
The production system	0 By order

used	1	Direct sales
Origin of consumers	0	Out of town
	1	In the city
Join the economic group	0	No
	1	Yes
Payment mechanism for raw material transactions from suppliers	0	Payment by advance
	1	Payment in cash
Mechanism of product sales activity	0	Offline sales
	1	Online and offline sales

Table 7. Factors affecting the level of technical efficiency of MSMEs during the COVID-19 Pandemic

Variable	Code	dy/dx	Probability
Constant	C	0.66796	0.000
Business Owner Education	X_1	-0.09764	0.000
Age of Business Owner	X_2	0.00348	0.000
Business Owner Experience	X_3	-0.00483	0.000
Credit	X_4	-0.06204	0.001
Sales Locations	X_5	0.12759	0.000
Social Groups	X_6	0.06517	0.001
Business Place Status	X_7	0.00807	0.729
LR			0.0000

*) Significant at alpha = 10% (0.1)

Factors affecting Technical Efficiency:
1) Dependent Variables:
   a. MSME Technical Efficiency Level (Y)
2) Independent Variable
   a. Business owner education level (X_1)
   b. Age of business owner (X_2)
   c. Business experience (X_3)
   d. Credit Capital (X_4)
   e. Point of sale (X_5)
   f. Social group (X_6)
   g. Status of place of business (X_7)

The variables of business owner's education, credit capital, sales location, social group and place of business status are dummy variables.

From the aspect of production input, it shows that many people (33%) buy raw materials 2-3 times a month and the majority of MSMEs buy themselves from vendors by 51%. Almost all raw material purchase transactions are made with cash payments of 91% and the majority of raw materials are purchased from wholesalers by 46%. After being purchased, MSME actors still choose the purchased raw materials themselves by 74% on the grounds that if they choose to send raw materials using a courier or expedition it will be expensive by 53% and long delivery of goods by 33%.

Whereas in terms of raw material storage, almost all MSMEs still keep their inventory in their own warehouses by 99%. This is because warehouse costs are quite expensive and accessibility is limited when using external warehouses.

From the sales aspect, 65% of MSMEs reprocess purchased raw materials into semi-finished goods (35%) and finished goods (34%). The average profit margin for each product is 20%-50% of the COGS (41%). This is relatively large because the majority of raw materials are purchased from within the city/regency. This is evidenced by the frequency of purchasing raw materials from outside the city indicating that MSMEs never do it (46%) and sometimes (43%). Of course, this is not enough to confirm that MSMEs buy raw materials from outside the city.

The characteristics of buyers who are the target of sales are still focused on buyers who buy individually (51%) compared to group purchases (24%), loyal consumers (19%), rational consumers (7%), and consumers who are not adaptive to technology (1%). All sales are made at the respective store (66%) and at the local market (25%). Therefore, the majority of sales are made offline (Table 19, 65%).

The MSME sales scale is still focused on retail sales (by 66%). Products produced by MSMEs are distributed by meeting customers directly (94%). The consumer marketing system is still constrained by low product quality (74%) and poor service (13%). Therefore, it is necessary to improve product quality and service quality to buyers and prospective buyers. While the majority of external constraints are due to changes in central/regional government policies that affect the MSME business. The lack of literacy regarding business licenses (40%) and the confusion of MSMEs about taxes (17%) provide a clear picture that business licenses should be made easier and tax incentives maintained.

In terms of technology that supports product operations and marketing, MSMEs still use manual techniques such as banners, billboards, etc. Instruments such as websites are not used by MSMEs (96%) because they still think that marketing effectiveness via the web is no longer effective (97%). MSMEs also innovate, but are still limited to marketing innovations (by 48%) and production innovations (by 38%). The results of the innovation had an impact on the findings of observations and in-depth interviews. The researchers divided the farmers into small, medium and large farmers. This division of farmer types is based on the production scale of several sample farmers. The division of the farmers will then be referred to as the farmer cluster. The farmer cluster in the current supply chain model acts as the main entity that will provide the main raw materials to be further processed into finished products.

The current supply chain model uses three types of intermediaries that act as transactional clusters, namely collectors, wholesalers, and retailers. Individuals involved in transactional clusters do not need special knowledge in terms of production because they only act as transactional intermediaries. In the transactional cluster, wholesalers do not only rely on

domestic farmers to supply the main raw materials. Wholesalers also obtain supplies of raw materials from importers, most of whom come from Vietnam and Brazil.

After passing through the transactional cluster, products from farmers will reach the well knowledge cluster. Mapping of well knowledge clusters is based on actual conditions, where the processing industry, modern market, and end consumers have been well educated, so they have their own specifications in producing and enjoying production results. Production from the processing industry will also be sent to exporters, especially Europe and America.
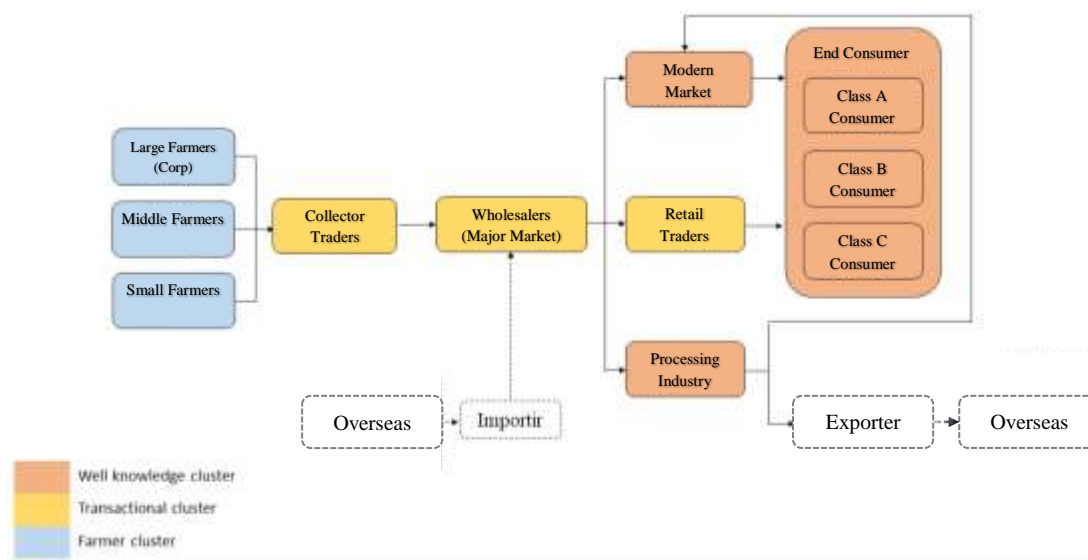

Figure 6. MSME Supply Chain Model in East Java Province (Existing)

4.2. Discussion

Based on the results of the analysis of the current supply chain model, this study proposes a new supply chain model to cut distribution chains to make it more efficient to get to the end consumer. The proposed supply chain model creates an entity that acts as an intermediary, namely a marketplace that is developed in a more comprehensive manner. Marketplace will be software that has an integrated warehouse as a means of storage and distribution center for the products of farmers. This warehouse will be equipped with a quality control team that will ensure that the products being marketed are in accordance with the actual condition of the goods and in accordance with the specifications expected by consumers.

Farmers can send products in the form of semi-finished or finished products to the marketplace warehouse. Products that arrive at the warehouse will go through a quality control process. Products whose quality has been guaranteed will begin to be marketed, both to domestic and foreign consumers. Marketing activities will utilize the internet to make it easier to reach consumers from various locations. In simple terms, the third supply chain model can be illustrated by the following model.
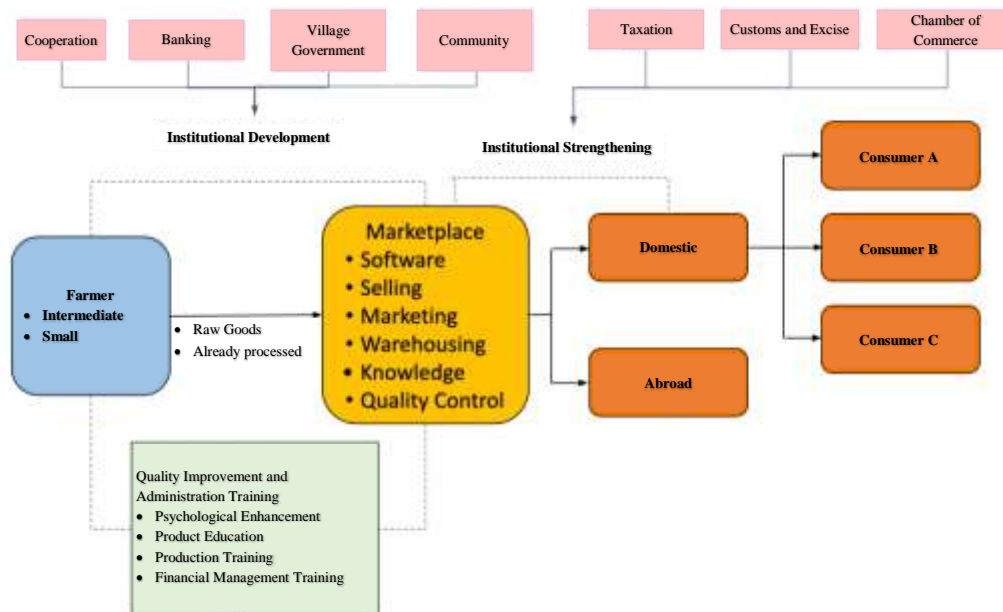
Figure 7. Geographic Spatial Supply Chain Model

The third supply chain model will make it easier for consumers to buy products from farmers, as well as provide better product quality assurance. With a marketplace that will be developed in a more comprehensive manner, consumers can make purchases in small or large quantities. Therefore, the third supply chain model is relevant for application to business to business, business to government, and business to consumer.

However, this model is the final output that must be achieved by the business so that its operational activities can run effectively and efficiently. To get to the ideal model there are several processes to educate the public. It is necessary to adopt new habits such as getting used to buying online so that the distribution process becomes more effective. The steps that must be taken are as follows:

Figure 8. Mechanism of Transformation Towards Supply Chain 4.0

5. Conclusion

The COVID-19 pandemic that has swept through Indonesia has had a very wide-ranging effect, one of which has been felt in the MSME sector. The results of research conducted in East Java stated that the MSME agricultural sector was the pillar that was most resistant to the COVID-19 pandemic, while the accommodation sector was the most affected. Hence, changes are needed in the supply chain for East Java MSMEs so that they are strong in facing business uncertainty due to the COVID-19 pandemic.

We analyze how the supply in East Java Province and the supply chain processes that apply in each region have their own uniqueness with their respective problems. Therefore, this research gave rise to a geography-spatial supply chain scheme based on increasing local MSMEs. The proposed supply chain model requires the existence of a marketplace that is integrated with the government system so that local governments can monitor and analyze any problems experienced by MSME players. The proposed Marketplace does not only contain points of sale but goes further to Marketing, Warehousing, Knowledge, and Quality Control.

However, this research is limited because it focuses only on mountainous and oceanic regions. As such, further research can be carried out with other geographical aspects such as location and local culture.

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