SUSTAINABLE VALUE CHAIN STRATEGY FOR TOFU SMEs

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Abstrak

Globalisasi, perdagangan bebas, dan pandemi saat ini dapat menjadi sebuah tantangan sekaligus peluang bagi UKM yang ada di Indonesia. Salah satu peluang yang muncul dari fenomena tersebut adalah semakin meluasnya jaringan supply dan demand. Salah satu UKM bidang makanan yang terdampak dari pandemic adalah UKM Tahu. Saat ini hanya sekitar 36% UKM tahu yang masih bertahan menjalankan proses produksi. Disamping itu UKM Tahu selama ini masih sulit berkembang dan bersaing dengan usaha makanan sejenis, sehingga penelitian tentang peningkatan daya saing UKM perlu untuk dilaksanakan. Pendekatan value chain analisis digunakan dalam penelitian ini untuk memetakan proses operasi pada UKM dan mengidentifikasi aktivitas-aktivitas dan permasalahan yang memberikan kontribusi penting terhadap peningkatan value terhadap proses bisnis UKM. Metode klustering K-means digunakan untuk mengelompokkan level value chain. Kemudian metode AHP digunakan untuk memilih strategi peningkatan level. Kluster 1 memiliki anggota terbanyak yaitu sebesar 62 UKM, untuk cluster 2 memiliki anggota terkecil yaitu sebanyak 1 UKM sedangkan cluster 3 memiliki anggota sebanyak 9 UKM. Strategy value coalition merupakan streategy yang direkomendasikan untuk diterapkan pada kelompok UKM klaster 1.

Kata kunci: *Sustainability, Value chain, UKM, K-Means Clustering, Strategi.*

Abstract

Globalization, free trade, and the current pandemic can be both a challenge and an opportunity for SMEs in Indonesia. One of the opportunities that arise from this phenomenon is the expansion of supply and demand networks. One of the SMEs in the food sector affected by the pandemic is the Tofu SME. Currently, only about 36% of tofu SMEs still survive in carrying out the production process. Most of the SMEs have problems in raw material inventory management, they do not yet have a standard warehouse. This problem minimizes their production capacity. Besides that, Tofu SMEs are still difficult to develop and sustain in the new normal era. For this reason, research on increasing the sustainability of SMEs needs to be carried out. The value chain analysis approach is used in the study to map the operational processes of SMEs and to identify activities and problems that make an important contribution to increasing the value of the SME business processes. K-means clustering method is used to group value chain levels. The Analytical Hierarchy Process (AHP) method is then used to choose a level-up strategy. Cluster 1 has the most members, which is 62 SMEs. Cluster 2 has the smallest member of 1 SME while cluster 3 has 9 SME members. The value coalition strategy is a recommended strategy to be applied to cluster 1 SME groups.

Keywords: *Sustainability, Value chain, Small and Medium Enterprises, K-Means Clustering, Strategy.*

INTRODUCTION

Globalization and free trade today can be both a challenge and an opportunity for SMEs. One of the opportunities that arise from this phenomenon is the expansion of supply and demand networks [1]. However, the challenges faced by SMEs cannot be considered simple and overlooked, especially in the increasingly tight business competition during pandemic Covid-19 outbreak [2]–[4]. Some of SMEs contributions to society are utilizing natural resources and being labor intensive, generally in the fields of food crop agriculture, plantations, food processing and other areas. The concept of sustainability by promoting a green supply chain is also a challenge for business actors [5]. The application of the green supply chain concept can be implemented by mapping the value chain in the SME business process.

Understanding the value chain in the operational process in an industry is very

important to be carried out thoroughly starting from the input process to the output to the process of using the product by consumers. This process is commonly referred to as value chain analysis. The concept of the value chain was first introduced by Porter [6]. Value chain is a method to determine the chain of activities that convert inputs into outputs that are of value to consumers. Value for consumers consists of three basic sources, which are product differentiation, reducing cost activities, and customers' fulfillment needs. A value chain analysis is a process carried out to identify the main activities and supporting activities that can add value to a product. It can be used to analyze the company's internal activities and identify the competitive advantage and the weaknesses of the SMEs. Value chain is suitable method to view part of processes cooperation between small and large enterprises in business chain [7].

Tofu is a processed food product made from soybeans. The production process is carried out by agglomerating the protein content found in soybeans. In East Java, there are several tofu SME centers which are quite important in contributing to the community's economy. Tofu SMEs are still difficult to develop and compete with similar food businesses during pandemic Covid-19 outbreak [8]. The main raw material for tofu is soybeans which are included in materials that are easily damaged or not durable. Likewise, the finished product of Tofu requires a special place for storage if the product is not immediately sold. The management of material flow and finished product storage is still a problem at Tofu SMEs [9]. Most of the SMES do not have warehouses and storage areas for raw materials and finished products that are in accordance with standards. Raw materials procurement is a factor that influence the performance of the SMEs [10]. Activities related to inventory and product handling also require the largest energy consumption in the product life cycle [11]. Knowledge transfer in supply chain systems needs to be implemented to SMEs as a strategy to increase profits [12]. Formerly, most of the tofu marketing is dependent on mobile vegetable traders [13]. E-commerce commonly used as a strategy to cope expand the market in the normal era [14].

Previously, still few research conducted on increasing productivity and competitiveness of Tofu SMEs. Therefore, research on increasing the sustainability of Tofu SMEs needs to be carried out. This study uses a value chain approach to map the operational processes of tofu SMEs and identify activities and problems that create an important contribution to increase the value of the SMEs business processes.

The research was conducted at a center of tofu SME in East Java. The number of SMEs registered at the center is more than 200 SMEs. However, during the pandemic Covid-19 outbreak, only 72 SMEs still survive and conduct the production process. Results of the initial study, the SMEs center consisted of several SMEs classes. Therefore, it is necessary to conduct a cluster analysis to determine the value chain characteristics of each SME as a step in aiding the Tofu SME center to improve its competitiveness. The cluster method used was the K-means method because with this method the researcher can determine in advance the number of clusters to be formed. Three clusters are determined based on the maturity value chain level of the SME operating system, namely low, medium, and high levels. Next, a strategy is chosen to help increase the maturity value chain level for SMEs with low clusters.

RESEARCH METHOD

The study uses a questionnaire to measure the maturity value chain level. Questions on the questionnaire refer to the variables in the value chain, as shown in Table 1. These variables will be used as the basis for making questions in the questionnaire. The questions are divided into two parts. The first part contains a company profile with 11 questions, such as the name of the company, the address of the number of employees, turnover and

profit per year. While the second part is a questionnaire for value chain analysis with questions obtained from the variables and attributes of the value chain. The second questionnaire is about value chain analysis of MSME business processes. The questionnaire contains 42 questions, where respondents answer the questionnaire by comparing the variables in the value chain with real conditions in MSMEs using a Likert scale of 1 to 5. Score 1 = Very unsuitable for MSME conditions, Score 2 = Not in accordance with MSME conditions, Score 3 = Not suitable for MSME conditions, Score 4 = In accordance with MSME conditions, and a score of 5 = Very in accordance with MSME conditions.

Table 1. Research Variables

Variable	Attribute	Component
Inbound Logistics Processes related to storing, receiving and distributing internal inputs	Receiving Raw Materials	Raw materials received are directly stored in the warehouse
	Raw material storage	Raw materials are checked before entering the warehouse or storage area
	Raw material inventory control	SME has raw material storage warehouse The warehouse used is in accordance with the established standards. Dry Food Warehouse Standard, such as: - Adequate room temperature, dry air with good circulation - The room is clean, dry and the floor and walls are not damp - Minimum shelf distance of 15 cm from the floor wall and 60 cm from the ceiling Using shelves that are easy to clean and move - Using the First in First Out system, the first item entered must be removed first. - Raw materials that come from suppliers are placed on the production floor Always check raw materials as a whole and on a schedule and in the warehouse or storage area
Operation Input to output transformation activities that will be sold to customers who pay attention to environmental sustainability	The production process pays attention to environmentally friendly principles in the use of raw materials and the disposal of industrial waste	Soaking is carried out at a certain controlled time to facilitate the milling process Milling is done by a certain method (manual, semi-automatic machine, or automatic machine) to get soybean pulp Cooking is conducted at a certain temperature and time (unmeasured, 30 minutes, or 45 minutes) over low or high flame Filtering is done to separate the dregs or solid waste from soybean pulp Clumping is done to get a tofu precipitate Shaping and pressing are carried out with certain controlled methods to produce the desired shape. SME has a special pool to collect raw material waste
	Product quality	Tofu doesn't have a strong smell Tofu doesn't taste sour
	Production failure	The soaking process is not long enough There are no milling activities because of a blackout
	Product Innovation	The importance of tofu maker creativity
Outbound Logistics Activities to distribute products or services to consumers	Finished product storage	SME has finished product storage Cleanliness of the storage area is very important
	The distribution of finished products by paying attention to saving time and energy	Tofu producers deliver products to consumers

Continued Table 1. Research Variables

Variable	Attribute	Component
Marketing and sales The process used to lure consumers to buy the product being sold	Promotion	Using social media as a promotional medium. SME knows and understands its use but doesn't know how to use it
Service Activities to maintain product value to customers after purchasing the product	Complain	Consumer complaints often, rarely, or never occur
	Returns of goods from agents or consumers	Finished product returns are frequent, rare, or never occur
Procurement Organizational activities to obtain the resources needed to run the business	Purchase of raw materials	The importance of Raw Material Prices The importance of Raw Material quality The importance of Raw Material quantity Importance of service (continuity and speed of supply of raw materials)
	Purchase of fuel and cooking oil for production	Considering the price of firewood Considering the quality of firewood Considering the quantity of firewood Considering the price of cooking oil Considering the quality of cooking oil Considering the importance of cooking oil quality
Technological Development Activities related to managing and processing information and protecting the company's knowledge bases	Utilization of technology	Utilization of steam technology to reduce production costs
Human Resource Management How well a company recruits, trains, motivates, rewards and retains its employees	Recruitment	Employee recruitment is carried out openly. The company recruits employees who care about the environment
	Training	The importance of production process training and occupational health and safety for all employees
Company support systems and functions that enable it to maintain day-to-day operations such as accounting, law, administration and management	Information Systems	Application of information systems in business operation processes
	Planning	Production schedule planning is arranged according to the inventory of raw materials in the storage area

The K-Means method [15] is used to determine the grouping of SMEs based on the characteristics of the sustainable value chain. Three types of clusters were determined, those are low, medium, and high levels. The Analysis of Variance method is used to identify the variables that are thought to have an influence in grouping the SME into each cluster.

The hypotheses proposed in this study are:

H_0 = Variable X has no effect on cluster formation

H_1 = Variable X has an influence on the formation of clusters

Decision-making:

If Sig $\leq \propto (0, 05)$ then reject H_0

If Sig $> \propto (0, 05)$ then accept H_0

After understanding and analyzing the three clusters that were formed, then a strategic plan was chosen for SMEs that are in the lowest cluster. Alternative strategies and criteria were obtained from a literature study which then selected the best strategy using the Analytical Hierarchy Process method[16]. The results will become recommendations for alternative solutions to problems found in SMEs.

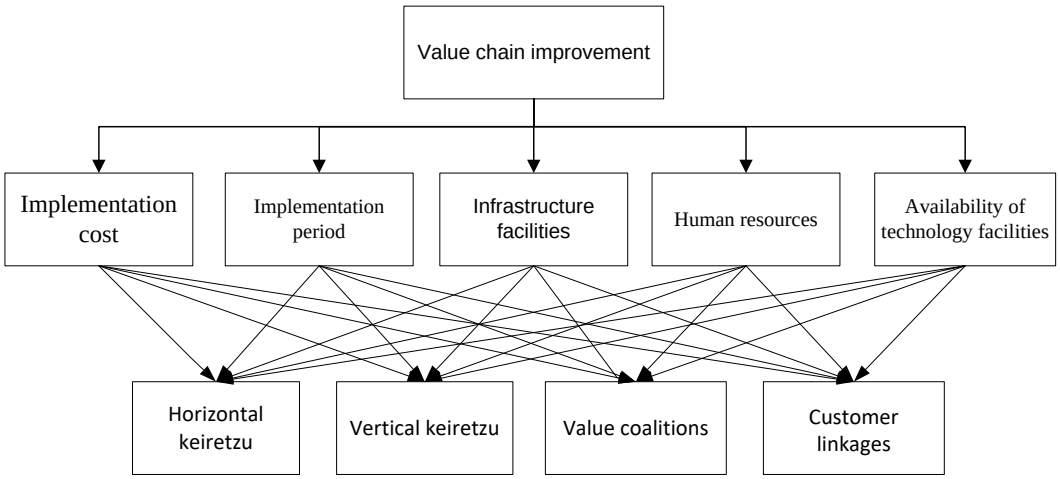

Figure 1. Value Chain Improvement Hierarchy

Figure 1 is a hierarchical model of value chain improvement with alternative strategies and selection criteria to determine the best strategy. The criteria level consists of implementation costs, implementation period, infrastructure facilities, human resources and availability of technological facilities. Each criterion has its own intensity value. While the alternatives consist of *horizontal keiretzu*, *vertical keiretzu*, value coalitions and customer linkages. *Keiretzu horizontal* is a network consisting of companies engaged in the same business. *Keiretzu vertical* is a network consisting of one company and its suppliers. Value coalitions are simultaneous relationships of several support units within the organization to produce a product. Customer linkages establish relationships with distributors to customers to increase the competitive advantage of SMEs (Widarsono 1999). Calculation with the Analytical Hierarchy Process method is carried out to determine the best alternative seen from the final total of each alternative.

RESULT AND DISCUSSION

Table 2. Profile of the SMEs

Variables	Range	Number	Percentage (%)
Company age	18-24	12	16.67%
	25-34	12	16.67%
	35-44	27	37.50%
	45-54	21	29.16%
Number of employees	1-4 people	0	0
	5-19 people	72	100%
Company start-up capital	20.000.000	24	33,33
	25.000.000	24	33,33
	35.000.000	24	33,33
Total turnover per year	Less than 300 million	0	0
	300 million – 2,5 Billion	72	100%
	More than 2.5 billion	0	0
Total profit	Less than 10 million	23	31.94%
	10 – 15 million	19	26.38%
	More than 20 million	5	6.94%

Table 2 shows the profile of Tofu SME which has been established for more than 15 years. From the results of the analysis of the number of employees, it can be seen that all tofu SMEs belong to the middle classes industry with the number of employees between 5 to 18 people. Likewise, the total annual turnover shows that all SMEs are in the medium-

sized business category. Nevertheless, from the total profit, it is still very small when compared to the category for medium-sized businesses.

Table 3. Cluster of the SMEs

Cluster	Number
1	62
2	1
3	9
Total	72

Table 3 shows the number of members in each cluster. Cluster 1 has the most members, which is 62 SME. Cluster 2 has the smallest member of 1 SME while cluster 3 has 9 SME members. From the results of clustering, it is known that cluster 1 has the lowest average sustainable value chain. Therefore, it is necessary to have a strategy that can be used to improve the competitive quality of the tofu company.

Table 4 is a table of the results of the analysis using the ANOVA method to identify variables that have a sig $\leq$ 0,05 value, which means that the above variables affect the cluster formation process. Among all the variables used there are several variables that have a major influence on the formation of clusters, including the age of the company, number of employees, annual turnover, X1, X3, X4, X5, and X6, X25 and X26 variables.

These variables are used as a reference in determining the criteria in the Analytical Hierarchy Process Method for making strategic decisions which are the best and recommended for SMEs in solving the existing problems. The AHP method can assist the SMEs management in determining the priority of the criteria and alternative strategies [17].

Table 4. Variables influence the cluster forming

Symbols	Variables	Sig
Company Age	Company age	0.009
Number of employees	Number of employees	0.004
Per year turnover	Per year turnover	0.006
X1	Raw materials received are directly stored in the warehouse	0.00
X3	SME has raw material warehouse	0.000
X4	The warehouse used is in accordance with the established standards	0.000
X5	Raw materials are directly placed on the production floor	0.000
X6	Raw material checking is always done in the storage area	0.000
X25	Importance of raw material prices	0.004
X26	Importance of raw material quality	0.022

Table 5. Selection of sustainable strategy

Strategy	Implementation Cost	Implementation Period	Infrastructure Facilities	Human Resources	Availability of Technology Facilities	Final
Keiretzu Horizontal	0.004	0.044	0.013	0.136	0.032	0.229
Keiretzu Vertical	0.013	0.036	0.025	0.078	0.097	0.250
Value Coalitions	0.064	0.133	0.097	0.035	0.042	**0.371**
Customer Linkages	0.142	0.063	0.097	0.028	0.031	0.361

Based on the calculation results between the alternatives against the criteria multiplied by the criteria, the results are shown in Table 5. From the final total value of the strategy selection results, it can be concluded that the best and recommended alternative strategy for SME Tofu is the value coalition strategy. SMEs are expected to improve their business and operational relationships with their supporting units, including consumers, suppliers and distributors, and society in order to optimize material flow management and reduce impact of waste [18]. For example, the application in the process of purchasing raw materials must have an agreement or contract so that SME can manage raw material inventory, because most SMEs do not yet have a raw material warehouse. In the digital

transformation era, the SMEs could implement an e-purchasing system to simplify the management process for purchasing raw materials from suppliers and minimize raw material inventory costs [19]. To improve relationships with consumers, SMEs must identify the tofu products that consumers want. Innovation in the development of new products with tofu raw materials can be carried out to open new market opportunities.

CONCLUSION

Based on the results of the research and data processing that has been carried out, it can be concluded that the characteristics of SME are divided into 3 clusters. The division of clusters is based on the economic level. Cluster 1 is known to have 62 SME members. This characteristic of cluster 1 is that it has the lowest value chain from other clusters. In addition, cluster 1 has an average company age of 36 years with an average annual income of seven hundred million and an annual turnover of nine million. Cluster 2 is known to have 1 SME member. The characteristic of cluster 2 is that it has the highest value chain among the other two clusters and has a company age of 18 years with an annual turnover of eleven million. Meanwhile cluster 3 is known to have 9 SME members. The characteristic of cluster 3 is that it has a value chain that tends to be moderate because it is between two other clusters. In addition, cluster 3 has an average company age of 36 years with an average annual income of seven hundred million and an annual turnover of nine million. Based on the results of the Analytical Hierarchy Process calculation to determine the best alternative recommended as a strategy to improve competitive competence, it is known that the alternative with the largest final value is the alternative value coalitions with a value of 0.371.

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