

Supply Chain Strategy of Batik Industry in the “New Normal” Era (Case Study: Giriloyo Batik Industry, Indonesia)

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Abstract— COVID-19 has negative impacts on the sustainability of the industrial sector. This is also reinforced by the survey of 30 respondents from Giriloyo batik center, which stated that the pandemic had a negative impact. There was a decrease in income of up to 85%. Because the government takes out policies that restrict the movement of people and close many public areas, it causes decrease in demand for the industries. Nowadays, people are starting to return to mobility such as visiting public spaces and shopping because of the easing of regulations in the “New Normal” era. However, there has not been a significant increase in sales at the center. Therefore, evaluation is needed to be able to improve the strategies to reach an optimal profit. One of strategies is improving supply chain management as best as possible. This study aims to identify the supply chain of Giriloyo center and its challenges, before and during the pandemic. This is to determine whether the center should change its strategy in the “New Normal” and how the strategy is proposed. The analytical technique used in this research is Before-After analysis with qualitative descriptive approach. The analysis shows that the main challenges in the supply chain network during the pandemic are poor technology adoption and conventional marketing system. Based on evaluating several aspects, the center wants to reformulate supply chain strategy in the “New Normal” era. The strategies consist of trying computerized systems, collaborating with other industries to share labor or process, and digital marketing.

Index Terms— Batik Industry, COVID-19, Supply Chain

I. INTRODUCTION

Covid-19 is a virus that originated in China and has spread all over the world quickly. The World Health Organization (WHO) announced Covid-19 (Coronavirus) as a global pandemic on March 11, 2020. Indonesia was one of the countries impacted by Covid-19. The Indonesian government began to declare the COVID-19 pandemic a national disaster on March 14, 2020 [1]. Regarding to this issue, the government takes out policies that restrict the movement of people and close many public areas. The government issued a policy in PP no. 21 of 2020 concerning *PSBB* (Large-Scale Social Restrictions) to break the chain of the spread of the virus [2]. This change happened so fast and must be able to be accepted by Indonesian people which is characterized as a communal society. The Covid-19 pandemic has affected several sectors, ranging from health, economics, education, industry, and many others. The specific impact on the industrial sector is a significant decline in demand and unstable raw material prices [3].

The International Labor Organization (ILO) states that the pandemic’s effects can potentially cause bankruptcy for companies. Especially for small-medium-scale industries, bankruptcy is three times greater than in large-scale industries [4]. One of the small-medium industries in Indonesia affected by the Covid-19 pandemic is batik industries in Giriloyo area, Yogyakarta. Batik is one of the typical Indonesian artworks that have existed for a long time [5]. Batik is a process that applies resistant materials and dyes

repetitively to establish the design of the fabric using traditional tools [6]. Two types of batik are available: handmade (hand-drawn/-written) and stamp batik [7]. Most batik industries are small and medium enterprises (SMEs) that employ the traditional production process, have a limited number of workers, lack organizational management, and are poor in business activity development [8]. Giriloyo area has many batik industries, therefore Giriloyo becomes a center. An SME center is defined as a group of SMEs located in one area/place comprising at least five (5) business units that produce similar products, use similar raw materials, and/or perform the same production process [9]. The Giriloyo batik center is special because only produces written batik type and the motifs are inherited from Ngayogyakarta Hadiningrat kingdom which has been preserved for generations [10]. Based on observations, the Giriloyo batik center consists of 12 SMEs who are members of the center. The establishment of center or association is a strategy to support the batik industry management activities, so that SME actors can optimally manage their industry and can work together with other SMEs for mutual progress [11].

The existence of a pandemic has a negative impact on the sustainability of the batik center. **Figure 1** shows results of a survey of 30 respondents from the center, it shows that all respondents stated that the pandemic had a negative impact. The pandemic has caused a visitor’s decrease at the center. No activities at the center such as batik selling and batik training for visitors/ tourists. During the pandemic, income declined by up to 85%.

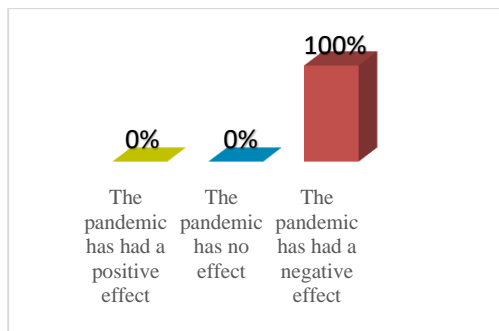


Figure 1. The results of the pandemic effect survey for the center

This condition of declining income has been going on from the beginning of the pandemic until the beginning 2022. It is impossible to limit economic activities continuously because the wheels of the economy must continue to run and involve the economic life of the people [12]. Under these circumstances, the Indonesian government has planned to prevent and control the Covid-19 pandemic. Mitigation efforts and workplace readiness are needed as optimal as possible so that the working community can adapt and make changes to their lifestyle in the ongoing Covid-19 situation, namely by adapting to New Normal [12]. People are starting to return to mobility such as visiting public spaces and shopping because of the easing of regulations in the “New Normal” era. Therefore, there is an increase in sales at the center during May-October 2022 as shown in **Figure 2**. However, there has not been a significant increase in sales at the center.

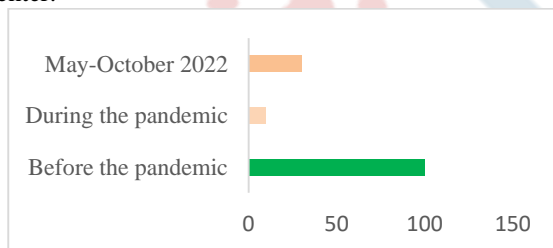


Figure 2. Average sales at the center

One strategy to optimize profit is to improve supply chain management as best as possible [13]. Supply chain is integration of material procurement activities, converting raw materials into final products, and delivery to customers [14]. This study aims to identify the supply chain flow of Giriloyo batik industry center and its challenges, before and during the pandemic. This is to determine whether a change in business strategy is needed that can be applied by the center in the “New Normal” era. Supply chain is related to the flow of distribution of goods or services from the producer to the final stage until it reaches the consumer. Efficient and responsive supply chain management can improve the competitiveness of the industry. Several studies analyzed industrial supply chains, in small-, medium-, and large- scale industries. Supply chain study on SMEs was conducted by

[13] to analyzed the supply chain in agriculture with descriptive and quantitative analysis to increase marketing. Agility, adaptability, and alignment factors are considered in the study of Rini & Budiani [15] as factors that affect the supply chain performance in food and beverage SMEs in Yogyakarta area. Meanwhile, analysis of supply chain strategies in large industries has also been carried out, such as in these research [16][17][15][18], who analyzed the supply chain network of industries, and propose the suitable strategy for their business.

This study focuses on evaluating the Giriloyo batik center (SMEs center) to improve supply chain strategies in the “New Normal” era. The analytical technique used in this research is Before-After analysis with qualitative descriptive approach.

II. METHODS

The aims of this study according to the background are:

- (1) Identify the supply chain flow of the Giriloyo batik center;
- (2) Analyze the challenges in the supply chain network of the Giriloyo batik center before and during the COVID-19 pandemic;
- (3) Determine whether the Giriloyo batik center should change the supply chain network strategy in the “New Normal” era and how the strategy is proposed.

The object of this research is the Giriloyo batik center and the SMEs which are members of the center. The number of the respondents are 30, which were selected based on the following requirements:

- Joining as the management of the center;
- Being the owner of one of the SMEs in the center;
- Knowing the process of management and cooperation in the center.

The analytical technique used in this research was Before-After analysis with a qualitative descriptive approach. Before-After analysis can be applied to studies comparing tests of people before and after being subjected to a treatment [19]. Therefore, in this study, a survey was conducted on respondents to find out their views before and during the Covid-19 pandemic (New Normal) to increase the competitiveness of the Giriloyo batik center.

III. RESULTS AND DISCUSSIONS

3.1 Overview of the supply chain flow at the Giriloyo center

The supply chain framework of Giriloyo center can be seen in **Figure 3**. The center and each SMEs generally order raw materials from distributors for convenience and speed in obtaining the material. It despite the higher price than direct purchase from suppliers. Ordering raw materials in the center is only conducted during events like tourism activities.

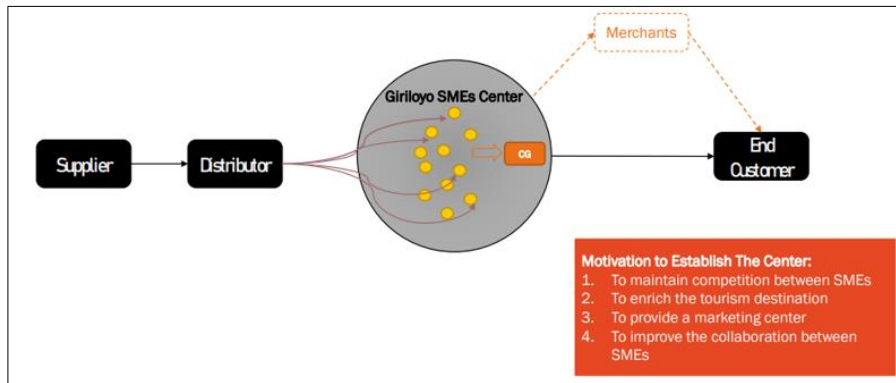


Figure 3. Supply chain flow at Giriloyo center

There is no storage of raw materials available at the center. The production process and storing raw materials for production are centralized in each SMEs. However, customers can order batik through the center or each SME. If the customer order comes from the center, it will be distributed to the SMEs. The management of the center will arrange for it. The center has a centered gallery for selling the products from all of SMEs (joint sales), but it has limited capacity. Therefore, each SMEs will have the store for sales

respectively. Figure 3 also shows several reasons why batik SMEs build and maintain the center. First, to maintain competition between SMEs; Second, to enrich the tourism destination; Third, to provide a marketing center; Fourth, to improve the collaboration between SMEs

3.2 Challenges in the supply chain network

Figure 4 shows the challenges in the supply chain network at Giriloyo batik center.

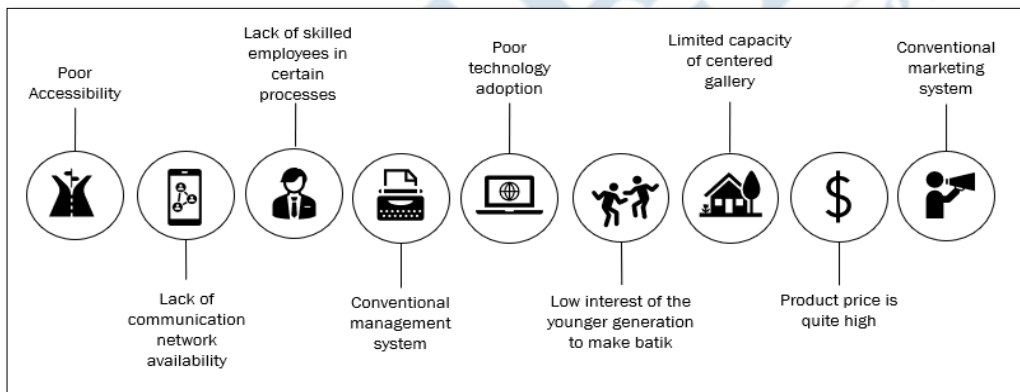


Figure 4. Challenges in the supply chain network at Giriloyo

Based on observations, surveys, and interviews, obtained nine (9) factors that becomes challenges, include poor accessibility; lack of communication network; lack of skilled employees in certain production process; conventional management system; poor technology adoption; low interest of the younger generation to make batik; limited capacity of

the centered gallery; product price is quite high; and conventional marketing system. Some of these challenges are getting more serious with the onset of pandemic. Figure 5 shows the highlight of the factors that have more pay attention during the pandemic.

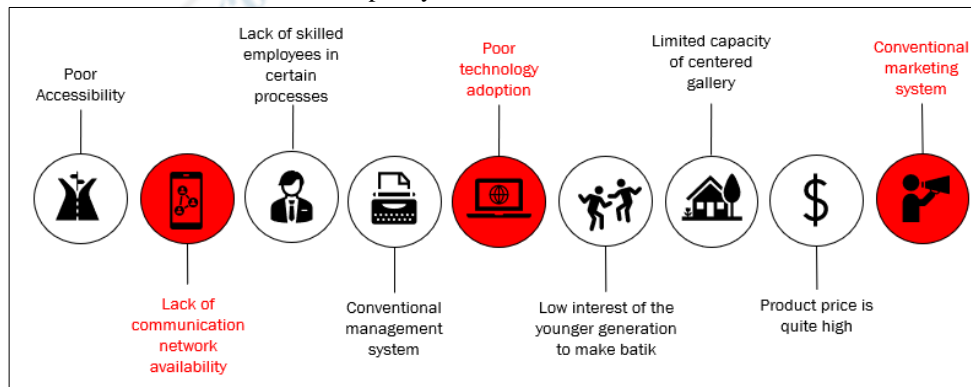


Figure 5. Challenges that have more pay attention during the pandemic

The location of Giriloyo is far from the city center and difficult to reach by public transportation. Therefore, it will affect the delivery of materials and the ease of visitors' access to the location. The geographical condition is in a mountainous area and lacks telecommunication towers, so it will affect everything related to communication, both to distributors and customers, even to the internal center. Another challenge that is concerned during pandemic is poor technology adoption. Supply chain industries globally have used emerging technology like advanced analytics, internet of things, and artificial intelligence. Most of these technologies have not been fully adopted in Giriloyo. Even a simple technology like computerized system, Giriloyo hasn't implemented it yet. It affects the important activities of an industry, which is the marketing system. The Giriloyo center depends on offline or direct sales in the gallery. Online sales exist but are minimal and undeveloped. This is also related to the limited capability of human resources.

3.3 Plans to face "New Normal" era

In the "New Normal" era, there has not been a significant increase in profit. Therefore, further analysis is carried out related to supply chain aspects to create an optimal strategy for improving tourism and profit sales. The result of the survey is shown in **Table 1**. The problem for the raw materials item is that the price is higher than before the pandemic. Moreover, there is a limitation of transportation flexibility as an effect from pandemic regulations. As many as 50% respondents will try to collaborate with other SMEs to fulfillment of raw materials in the center or even with another center to get optimized price. While 33% of respondents stay in recent condition. Not only collaborate in raw materials, most of them also want to try collaborating in the process such as labor or process to improve limited human resource and facilities. For increasing the sales, more over 60% of respondents want to try computerized system such as digital marketing. They are aware that most businesses fail due to the lack of innovation and technology adoption. Meanwhile around 30% of respondents choose to stay to recent conditions.

Table 1. Result of survey to face pandemic

| Question Item | Alternative answers | Answer (respondents) | Percentage |
|--------------------|---|----------------------|------------|
| Raw materials [20] | Stay to recent condition | 10 | 33% |
| | Finding other suppliers | 5 | 17% |
| | Looking for other raw materials | 0 | 0% |
| | Collaborate with other SMEs to fulfillment of raw materials | 15 | 50% |
| System Management | Stay to recent condition | 10 | 33% |

Table 1. Result of survey to face pandemic (cont.)

| Question Item | Alternative answers | Answer | Percentage |
|----------------|---|--------|------------|
| Process [20] | Try computerized system | 20 | 67% |
| | Stay to recent condition | 5 | 17% |
| | Looking for other employees | 0 | 0% |
| | Collaborate with other SMEs to share labor or processes | 13 | 43% |
| | Innovating products | 12 | 40% |
| Marketing [20] | Stay to recent condition | 8 | 27% |
| | Find another market partner | 2 | 7% |
| | Digital marketing/ online | 18 | 60% |
| | Expand marketing location | 2 | 7% |
| Facilities | Stay to recent condition | 11 | 37% |
| | Looking for ways to develop facilities to increase tourist attraction | 19 | 63% |

3.4 Before -After analysis

Before-After technique describes analytically the real condition of a variable before and after the Covid-19 pandemic. **Table 2** shows the before-after analysis and the strategy recommendation for the variable to optimize the profit in current condition of pandemic. This description is derived from survey data on 30 respondents in the center. The recommendation is necessary to develop full collaboration in the center to optimize the management of SMEs in the center.

Table 2. Before-after analysis

| No | Variable | Before | After | Recommendations |
|----|---------------|--|--|---|
| 1 | Raw materials | Easy to get any time Fast responses from distributors | Constrained by pandemic regulations of transportation Fast responses, but the price is higher | Purchasing collaboration to get optimal price |

| | | | | |
|---|-----------|---|--|--|
| | | Ordering is carried out by each SME | Ordering is carried out by each SME | Using the certain methods for management of purchasing |
| 2 | Products | Level of demand is high | Demand decrease significantly, customers are selective in choosing the products needed during pandemic | Product innovation |
| | | Many tourism activities | No tourism activities because of pandemic regulations | |
| 3 | Marketing | Depends on offline sales in the centered gallery & each gallery of SMEs | Offline marketing is the main of sales, but start to develop online sales through website | Improve the online sales |
| | | Limited capacity of centered gallery (max 5 products of each SMEs) | Limited capacity of centered gallery (max 5 products of each SMEs) | Optimization of centered gallery capacity |

Table 2. Before-after analysis (cont.)

| No | Variable | Before | After | Recommendations |
|----|----------|--|--|--|
| 4 | Process | Maximum production capacity | Production decrease significantly | Full collaboration of SMEs in the center (sharing facilities, labor, process, order, etc.) |
| | | Partial production collaboration of SMEs in the center | Partial production collaboration of SMEs in the center | |

IV. CONCLUSIONS

In response to the Covid-19 pandemic, the Indonesian government has implemented social distancing and movement restrictions to control spread of the virus. These policies have impacted to the supply chain through changing in delivery and consumer behavior as well as buying patterns. One of the small-medium industries in Indonesia affected by the Covid-19 pandemic is batik industries in Giriloyo area, Yogyakarta. No activities at the center such as batik selling and batik training for visitors/ tourists. During the pandemic there was a decline in income of up to 85%. Therefore, evaluation is needed to be able to improve the strategies to reach an optimal profit. One of strategies is improving supply chain management as best as possible. The analysis shows that the main challenges in the supply chain network during the pandemic are poor technology adoption and conventional marketing system. Based on evaluating several aspects, the center wants to reformulate supply chain strategy in the "New Normal" era. The strategies consist of trying computerized systems, collaborating with other industries to share facilities, labor, process, and digital marketing.

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