Green supply chain management in the food industry: A case study during COVID-19

J. Laksmanawati

Diponegoro University, Semarang, Indonesia

ABSTRACT: Green supply chain management (GSCM) plays an important role in and contributes to environmental issues. The conceptual pattern of GSCM focuses on multidisciplinary economics and environmental issues arising from green practice management in the field of the supply chain. Therefore, food industries are supposed to plan their operational procedure from the product packaging design process, selection of the source of raw materials, production process, delivery of the products, and waste management when they plan and arrange the supply chain. By employing a qualitative approach, this study investigated how food industries maintain their operations without neglecting the sustainability aspect and health protocol. The findings contribute to the latest perception of green sustainability during COVID-19, and its implication can be used as references by managers.

1 INTRODUCTION

Environmental and social issues have been receiving a lot of attention. One of these issues is global warming, which has become the spotlight of the World Economic Forum on January 21–24, 2020, in Davos, Switzerland. In this regard, the issue of global warming has become world's interest and struggle due to its increasingly critical impacts felt every year (Daily, 2020). In the last few months, the world has faced an outbreak of an infectious disease caused by 2019 coronavirus infection (COVID-19). The World Health Organization (WHO) stated that the disease (Covid-19) firstly appeared in Wuhan, China, at the end of December 2019 (Rume & Islam, 2020). The outbreak has also affected people's lives globally, and policies must be made to control the spread of viruses, which indirectly contribute to environmental changes.

Plastics have become an important component of products and packaging because they are durable, lightweight, and inexpensive. Plastic packaging is considered practical because it is single-use and faster to dispose. However, plastic waste disposal in the landfill is considered unsustainable from an environmental point of view. This causes the capacity of the final disposal site to decrease, and the garbage accumulating in landfills has an impact because it is difficult to harvest in a short time (Febriansyah, 2019).

During the pandemic, the food industry changed rapidly due to consumers' awareness of traceability in the food supply chain, the origin of raw materials and food safety, the environmental impact of products and processes, and other social issues increase. This is because the food industry can be considered as a link between humans and their natural surroundings. This issue is related to processed food products that are friendly to the environment and safe against viral and bacterial contamination. (Topleva & Prokopov, 2019).

In this regard, the food industry must provide food products that are nutritious and safe, of high quality, and has a longer shelf life. As a result, they use various kinds of plastic packaging combined with aluminum, glass, and paperboard. The use of these various materials has resulted in

a multi-component packaging concept that has a major part in the sustainability and social aspects of the society today (Boziaris, 2014). The conceptual pattern of GSCM focuses on multidisciplinary economic and environmental issues arising from environmental management practices in the field of the supply chain. In this case, Lu and Taylor (2016) stated that industries have to consider environmental issues (energy, gas emission, raw material, and waste) when designing and managing their supply chain. This includes the operational stages of the company itself such as product design, selection of raw material sources, production processes, product delivery, and final management of a product. (Cankaya & Sezen, 2019).

2 THEORETICAL BASIS

2.1 *Green Supply Chain Management (GSCM)*

The GSCM concept was first introduced by Michigan State University in 1996 when solving the “environmentally responsible manufacturing” issue. Rooted in supply chain management ideas and development theory, GSCM is considered to be a new subject that has not been studied thoroughly. However, recently, several studies have been carried out to investigate GSCM. According to Rha (2010), green supply refers to how the industries have to consider the environmental context in the field of innovation and purchase. Thus, the system in GSCM is complicated because it is related to suppliers, manufacturers, distributors, retailers, customers, and logistics. GSCM starts with the design of the product and ends in recycling of the final product. Consequently, GSCM covers five aspects, namely, green procurement, green design, green manufacturing, green distribution, green consumption, and recycling.

Integrated green supply chain planning requires the management of the company or organization to determine the inputs, drivers, and initial planning that must be processed for the production, transportation and distribution, packaging, and recycling of green products (Elbaz & Iddik, 2019). Over the last few decades, several innovative practices and technologies have emerged to achieve automation, simplification, optimization, and redesign of the GSCM process. Particularly, the following initiatives have been promoted: (1) raw material procurement, production, re-production, warehouse, supply chain design, and waste management; (2) improving communication and integrating supply chain partners; and (3) supporting the decision-making process at three levels of business (operational, tactical, and strategic) and addressing the needs to identify outputs and impacts obtained socially, financially, and environmentally.

3 METHODOLOGY

In nature, this is a qualitative study that was conducted to explore and obtain empirical evidence about the motivation and implementation of GSCM in the food industry during a pandemic. To investigate the issue, this study employed a case study approach to make comparisons between similarities and differences in cases easier. A case study is a qualitative approach that investigates one or more cases from time to time through detailed data collection involving many sources of information such as observations, interviews, audiovisual materials, documents, and many others. (Creswell, 2007). This approach was chosen because it is an empirical method based on the current phenomena in society, and an in-depth investigation can be conducted when the boundaries between the phenomenon and the environment are less clear. (Yin, 2018). In connection with this statement, Linton et al. (2007) emphasized that a case study is highly recommended for studying sustainable development because it has several advantages including being able to explain the linkages between causal factors and identifying and exploring concepts, core variables, and their meanings. In addition, by implementing this approach, the validity of a study can be improved because the combined data collected can create stronger empirical evidence (Neuman, 2014).

4 RESULTS AND DISCUSSION

4.1 *Green procurement*

Green procurement is the purchase process of raw materials involving suppliers and logistics. Various aspects of both the supplier and logistics must be considered by the company to ensure that the whole process of the supply chain can be implemented successfully and cleanly. Based on the interview results, the food industry players conducted a strict food ingredients selection from suppliers who had obtained business licenses during the pandemic and had implemented health protocols before sending raw materials to be processed.

4.2 *Green design*

Several studies have revealed that 70% to 80% of product performance is determined at the design stage. Meanwhile, the design process generally costs only about 10% of production. Therefore, companies have to consider the ecological and environmental impacts of the product design stage. The product design is expected to minimize energy consumption and environmental pollution. Benson in 1992 stated that the green design includes studies on standard, modular, removable, and retractable designs, as follows:

1. Design standards make structural members relatively fixed so that production difficulties and energy consumption are reduced. In addition, standard designs can reduce the complexity of technological equipment.
2. The modular design is intended to meet the requirements for the rapid development of environmentally friendly products, so that they are easy to install, dismantle, and maintain.
3. The detachable design means that all parts of the structure design are reasonable, accessible as a separate structure, and can be easily removed without damaging the components, thereby reducing environmental pollution.
4. Recyclable designs are designs that can be used repeatedly to its maximum usage. The findings show that several business actors have implemented reusable packaging designs, even though the packaging material is still made from plastic. This method is conducted to reduce the spread of viruses that can be transmitted through the use of non-plastic packaging.

4.3 *Green distribution*

Green distribution is based on logistical processes. With a dramatic increase in the number of logistics and increased traffic flow, the atmospheric environment is highly contaminated. This mainly consists of an evaluation of centralized distribution and consumption of resources and planning of reasonable transportation routes. During the pandemic, several cities have implemented large-scale social restrictions that impact the distribution of food to consumers. As a result, to keep business operations running, industries have used online transportation services that have complied with the requirements of the health protocol (using masks, checking temperatures, etc.). It was done so that the consumers will feel safe without having to leave their home.

4.4 *Recycling*

Since the increase of technological development, products have become complex and their life cycle has become shorter. As a result, they produce consumer waste that is a significant source of environmental pollution. Therefore, a green recycling system is needed to solve this issue. After the “stay at home” campaign was issued by the government several months ago, industry players have been competing to create unique food packaging creations and participating in reducing solid waste. For example, one of the study objects stated that they are using 1-liter bottles as packaging to sell their beverage product.

5 CONCLUSION

Based on the results of the interview with several informants, it can be concluded that the key to successfully implementing GSCM amid the Covid-19 outbreak is the willingness of industry players to be strict in selecting and sorting raw materials from suppliers to comply with the health protocol during the pandemic. In addition, business actors are also required to be creative in creating environmentally friendly packaging (which can be used repeatedly) and to make consumers feel safe with the quality of the products offered.

REFERENCES

- Arvanitoyannis, I. S. (2008). *Waste Management for the Food Industries*. London: Elsevier Inc.
- Bauman, B. (2019, August 20). *Yale Climat Connection*. Retrieved from The Yale Center for Enviromental Communaction Website: <https://yaleclimateconnections.org/2019/08/how-plastics-contribute-to-climate-change/>
- Bozialis, I. S. (2014). *Seafood Processing Technology, Quality, and Safety*. West Sussex: John Wiley&Sons, Ltd.
- Cankaya, S. Y., & Sezen, B. (2019). Effects of Green Supply Chain Management Practices on Sustainability Perfomance. *Journal of Manufacturing Technology Management*, 30(1), 98–121.
- Creswell, J. W. (2007). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (2nd ed.). United States: Sage Publications, Inc.
- Daily, I. (2020, January 23). *Investor.id*. Retrieved from Investor Daily Indonesia Web site: <https://investor.id/editorial/pemanasan-global>
- Elbaz, J., & Iddik, S. (2019). Culture and Green Supply Chain Management: A Systematic Literature Review and A Proposal of a Model. *Management of Environmental Quality: An International Journal*, 483–504.
- Febriansyah. (2019, December 6). *Tirto.id Sosial Budaya*. Retrieved from Tirto.id: <https://tirto.id/penyebab-perubahan-iklim-fakta-dan-solusinya-emYU>
- Kosseva, M. R., & Webb, C. (2013). *Food Industry Wastes: Assesment and Recuperation Commodities*. San Dieso, USA: Elsviere Inc.
- Linton, J., Klassen, R., & Jayaraman, V. (2007). Sustainable Supply Chains: An Introduction. *Journal of Operations Management*, 1075–1082.
- Lu, W. B., & Taylor, M. E. (2016). Which Factors Moderate the Relationship between Sustainability Perfomance and Financial Perfomance? A Meta-analysis Study. *Journal of International Accounting Research*, 1–15.
- Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches*. Essex: Pearson Education Limited.
- Rha, J. S. (2010, July 20). The Impact of Green Supply Chain Practices on Supply Chain Performance. Lincoln, Nebraska: Digital Commons University of Nebraska – Lincoln.
- Rume, T., & Islam, S. D.-U. (2020). Environmental effects of COVID-19 pandemic and potential strategies of sustainability. *US National Library of Medicine*.
- Shafy, H. I., & Mansour, M. S. (2018). Solid Waste Issue: Sources, Composition, Disposal, Recycling, and Valorization. *Egyptian Journal of Petroleum*, 1275–1290.
- Topleva, S. A., & Prokopov, T. V. (2019). Integrated Business Model for Sustainability of Small and Medium-sized Entreprises in the Food Industry. *British Food Journal*.
- Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods*. California: Sage Publications, Inc.