

# Green Supply Chains and Sustainable Maritime Transportation in Covid-19 Pandemic

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# Green Supply Chains and Sustainable Maritime Transportation in Covid-19 Pandemic

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**Abstract** - In this pandemic period, not many new companies have emerged in the maritime industry which will lead to increasingly fierce business competition. Today's business competition is not just ordinary competition, but has reached competition between supply chains by providing added value to products and services. During the pandemic, environmental friendliness is a factor that affects the company's economic performance. The company is no longer focused on achieving cost savings, but has also been aiming to increase sales, market share, and take advantage of new market opportunities to generate better profit margins, all of which contribute to the company's economic performance. Green Supply Chain Management (GSCM) is a traditional supply chain management concept with integrated environmental aspects. The goal of GSCM is to eliminate or minimize waste (energy, gas emissions, hazardous chemicals and other wastes) along the supply chain network. GSCM components include Green Purchasing, Green Manufacturing/Material Management, Green Distribution/Marketing and Reverse Logistics. The research method used in this paper is literature study and observation. And the result achieved is that the Company faces obstacles to implementing GSCM starting from upstream to downstream activities that require top management commitment and good collaboration by every actor involved in supply chain management.

**Keywords** - Covid-19 pandemic, Green supply chain management, Maritime transportation.

## INTRODUCTION

When the new corona virus entered its initial phase, namely when the outbreak was still engulfing Wuhan and China, the impact on the logistics sector and the economy in general was already felt. Wuhan is on the Yangtze River which is quite busy with the flow of goods. More than 80% of China's river traffic moves through the Yangtze River, i.e. there is a cargo volume of around 1.5 million containers from Wuhan alone. The surrounding area is a supplier of important commodities such as coal, steel, crude oil, and fertilizers. The implication is that the distortion of economic activity in this city alone is enough to disrupt the supply chain which then affects the Chinese economy. Furthermore, with China's very strong dominance in the global economy, its impact on the world economy will be felt very quickly. The transportation sector is one of the front lines affected by this economic turmoil. The delay of various logistics activities during the pandemic has reduced the volume of container cargo at several ports. This sluggishness is estimated to have an impact on the acceptance of global container shipping companies with many blank sailings due to the absence of cargo.

During the pandemic, which until today has not been able to completely handle it, countries in various parts of the world are experiencing an endless economic crisis. The Indonesian government on March 2, 2020 confirmed that there were two cases of Covid-19 in Indonesia, the spread of the virus continued to increase. Many countries around the world implement several preventive strategies and policies in an effort to minimize the risk of spreading the Corona Virus. Social distancing policies issued in several countries are expected to minimize the level of spread of this corona virus.

In the supply chain strategy to deal with the polemic of the Covid-19 pandemic, it is necessary to map the supply chain, both demand and supply, so that planning and preparation are needed, namely by minimizing the frequency of purchases by increasing the quantity ordered for an item. The supply chain process has changed over time. In every aspect of the supply chain, there are various information exchange activities, fund transactions, goods management, logistics management, and reporting processes.

Currently, many companies in various parts of the world are working hard to find solutions or handling strategies to overcome disruptions in supply chain management. To ensure the continuity of supply chain availability, the company requires a new supply chain mapping study, both demand and supply. One of the things that can be done in ensuring the continuity of the supply chain is to build a new logistics system, in this case it requires careful planning and preparation as well as large funding, so this effort should be accompanied by the use of an existing distribution system. The logistics system in question must be able to minimize the arrivals, gatherings, and crowds that must be carried out during this pandemic. The ordering and payment process are done online. The impact of the pandemic is very influential on the economic performance of companies in various countries, the environmentally friendly aspect is something that during this pandemic began to be implemented by companies. Green Supply Chain Management (GSCM) is a traditional supply chain management concept applied with an integrated environmental aspect. The goal of GSCM is to eliminate or minimize waste (energy, gas emissions, hazardous chemicals and other wastes) along the supply chain network.

## RESEARCH METHODS

The method used in this research is a literature study, where the effort made by researchers to obtain information relevant to the problems in the supply chain during this pandemic are obtained from scientific books, research reports, scientific articles, regulations, statutes, and other written or printed sources. Or in other words, this literature study is a study whose object of research is in the form of literature works in the form of journals, book articles in the mass media, and statistical data. The literature will be used to answer the research problems posed by the author, which in this case is how the impact of Coronavirus COVID-19 on the supply chain and maritime industry. And to support the literature study used, the researcher also made observations to see the phenomena that occurred related to the problems that will be discussed in this paper.

## RESULTS

The outbreak of the corona virus has proven how high the dependence of the shipping industry on the global economy is. If industrial activities in several countries stop operating, the shipping industry will be stuck, not only in the global supply chain sector, but will also have a serious impact on manufacturing, transportation, shipping, and port activities.

### 1. *The Impact of the Pandemic on the Maritime Industry*

The service sector is facing formidable challenges along with the outbreak of the Covid-19 pandemic. There are at least 4 aspects that are affected in the shipping sector business due to the outbreak of the corona virus (<https://insa.or.id/category/insa-insight/>).

The first is the decrease in export and import cargo volume. The decrease in cargo volume, both in affected exports and imports, such as to China, which decreased by 14-18 percent and had an impact on other destination countries, such as Singapore and South Korea. Likewise, domestic cargo, especially cargo supporting exports, imports and national distribution, which fell by 5-10 percent.

The second is about clearance process at port. The clearance process at the port is longer due to the spraying of ship disinfectants, health checks on ship crews and inspection of ship's travel history. This has an impact on increasing ship operating costs.

The third is the decreased performance as impact of physical distancing and Work from Home (WFH). The policy of physical distancing and work from home also has an impact on the performance of agencies on land because many do limit working hours, including operational personnel within shipping companies.

The fourth is about ship docking problems. National shipping also experienced ship docking problems. This is due to a number of shipyards reducing the number of workers in the field to minimize the spread of Covid-19. As a result, the maintenance work for the ships that are docking has been hampered for some time, and other ships have had to queue for a long time for docking in the last two months. In addition, ship spare parts imported from China are constrained so that they take longer and are more expensive. Conditions that severely hit the national shipping sector at this time will also have an impact on the decline in the performance of other related industries, such as the performance of logistics, insurance, shipyards, the ship's spare part industry to the marine human resources education agency.

### 2. *International Maritime Organization (IMO) Recommendations*

The International Maritime Organization (IMO) issued a number of recommendations, following the World Health Organization's (WHO) declaration of a "Global Emergency" over the outbreak of the Corona Virus. WHO on January 30, 2020 declared the outbreak of the Corona Virus as a global emergency situation or Public Health Emergency of International Concern (PHEIC). The Global Emergency situation referred to by WHO is an extraordinary event that poses a risk to the public health of other countries through the transmission of disease across national borders and requires a coordinated international response. However, WHO does not recommend restrictions on travel or trade between countries, based on the most current information available.

IMO then issues recommendations to all IMO Member States, seafarers and shipping companies in two circular letters. These IMO recommendations have been prepared with reference to the recommendations developed by (WHO) and the United Nations Division of Occupational Health and Safety and Health Management (DHMOOSH). The IMO recommendations include Circular No. 4203 Novel Coronavirus and Circular No. 4204 Novel Coronavirus. The first contains information and guidance on precautions to be taken to minimize risks to delegates attending meetings at IMO following the recent outbreak of the coronavirus, while the latter contains information and guidance on precautions to be taken to minimize risks to seafarers, passengers and others on board. IMO also recommends following additional suggestions, including international Maritime Health Association (IMHA) advice for shipping companies and US Coast Guard (USCG) Novel Coronavirus Precautions.

IMO Member States are advised to urge all stakeholders in their country (companies, managers, crew agents, etc.) to get involved in disseminating the above IMO circular. IMO wants to ensure that the entire maritime community of the world receives accurate and relevant information about the Corona virus outbreak Covid-19 and steps to reduce the risk of exposure to the virus, especially those on ships sailing between ports in countries that contracted the Coronavirus.

The Covid-19 pandemic has had a real impact, both on global shipping which affects supply chain conditions in general, as well as on the maritime industry in other parts of the world. Anticipating the handling of COVID-19 in all parts of the world, will have an impact on sustainable maritime transportation in overcoming disruptions in supply chain management.

### 3. *Supply Chain Management in the Midst of the Covid-19 Pandemic*

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Supply Chain Management or better known as supply chain management starting from raw materials from suppliers, operational activities in the company continue to distribution to consumers. Integration of supply and demand management that are interconnected with the movement of products and services from suppliers to customers. The first thought of the supply chain is that practically every product that reaches the end user is a collection of efforts from various organizations (Alfatiyah, 2020).

These organizations are collectively considered the supply chain. In the physical flow of materials involves the transformation, movement, storage of goods, raw materials, recycling, waste and disposal. The strategy in supply chain management consists of five things.

The first is that many suppliers, in this strategy, play between one supplier and another and charge suppliers to meet buyer demands. The second is that for those who only have few suppliers. In this strategy, the company maintains long-term relationships with committed suppliers. Because in this way, suppliers tend to better understand the broad goals of the company and end consumers. Poor supplier performance is one of the risks faced by 28ers so that buyers must pay attention to the trade secrets of suppliers who do business outside the joint business. The third is vertical integration, meaning the development of the ability to produce goods or services previously purchased, or by actually buying suppliers or distributors. The fourth is Kairetsu network, namely in this strategy most manufacturing companies take 31iddle way between buying from a few suppliers and vertical integration by means of, for example, financially supporting suppliers through ownership or loans. The supplier then becomes part of a coalition of companies better known as Kairetsu. Its membership in a long-term relationship is therefore expected to serve as a partner, transmitting technical expertise and stable production quality to manufacturing companies. Kairetsu members can operate as chain subcontractors of smaller suppliers. The fifth is virtual companies, namely virtual companies relying on various supplier relationships to provide services when needed. Virtual companies have organizational boundaries that are not fixed and mobile, allowing the creation of a unique company that can meet changing market demands. The relationship formed can provide services including salary payments, employee appointments, product design or distribution. Relationships can be short-term or long-term, genuine partners or collaborations, suppliers or subcontractors.

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In the midst 43 he Covid-19 Pandemic, the logistics supply chain is expected to minimize gatherings and crowds of buyers. To suppress the spread of the Covid-19 outbreak, the movement of goods and people must indeed be limited and controlled, both in areas that have a disaster 6 emergency response status and those that have not.

#### 4. Evolution to Green Supply Chain Management

The development of industry and increasing consumer concern for the environment as well as issues regarding the concept of an environmentally sound industry 45 have forced the industry to adapt to the concept of green industries in every business process, which later developed into Green Supply Chain Management (GrSCM).

Green supply chain management requires many companies to continuously improve their company's production performance by complying with environmental regulations. Companies have various reasons for implementing green supply chain management, ranging from reactive policies to proactive approaches to gain competitive advantage, namely increasing their competitiveness through improving their environmental performance. As a result, companies can improve their brand image for their concern for the environment. In addition, Green Supply Chain Management has become an industry trend that is growing rapidly in multinational giant companies.

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Green Supply Chain Management as a process of using environmentally friendly inputs and converting these inputs into outputs 36 that can be reused at the end 37 their life cycle so as to create a sustainable supply chain (Penfield, 2007). Meanwhile, according to Srivastava (2007), defines green supply chain management as the integration of environmental thinking into Supply Chain Management, including product design, material purchasing and supplier selection 35, manufacturing processes, delivery of final products to consumers and also product management after its useful life. Management involves traditional supply chain management practices, which integrate environmental criteria, or issues of purchasing decisions for goods or services and long-term relationships with suppliers (Gilbert, 2001). An eco-friendly Supply Chain aims to limit waste in industrial systems 17 order 46 save energy and prevent the dissipation of hazardous materials into the environment.

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Conventional Supply Chain Management and Green Supply Chain Management differ in several ways. First, Conventional Supply Chain Management often concentrates on economic goals and values, while Green Supply Chain Management in addition to achieving economic and value goals also gives significant consideration to ecological ones. Conventional Supply Chain Management only considers the effects of human toxicological considerations, and leaves the impact on the environment. Furthermore, they often concentrate more on controlling the final product, while allowing negative effects to occur during the production process.

In contrast to Green Supply Chain Management which is integrated with ecology, optimizing the scope of the Supply Chain is not only for human toxicological effects, but also for negative ecological impacts on the natural environment, as well as added value throughout the process, so that 24 ecological impact is low during the process stages in the supply chain. Ecological requirements are considered as the main criteria for products and production, and at the same time companies must ensure economic sustainability by remaining competitive and profitable.

The criteria for selection of buyers and suppliers in Conventional Supply Chain Management, the dominant standard used is price. In Green Supply Chain Management, ecological objectives are part of the supplier selection criteria. Establishing ecological criteria in practice requires careful evaluation of suppliers, based on long-term oriented relationships. Coaching of suppliers usually takes a long time and only a very limited number of suppliers that meet the established criteria are selected.

One of the initial perceptions about introducing environmentally friendly products to the market was that the products would result in higher production costs compared to conventional products. However, recent findings suggest that innovation and optimal planning can dramatically reduce costs in most cases.

TABLE I

DIFFERENCES BETWEEN SUPPLY CHAIN MANAGEMENT AND GREEN SUPPLY CHAIN MANAGEMENT

| Characteristics             | Supply Chain Management                               | Green Supply Chain Management                             |
|-----------------------------|---|---|
| Aim                         | Economy   | Ecology and economy                                       |
| Ecological Impact           | High ecological impact                                | Low ecological impact                                     |
| Supplier Selection Criteria | Considering the price aspect, short-term relationship | Considering the ecological aspect, long term relationship |

Source: Beamon (1999) and Verma (2014)

### Green Supply Chain Management with Total Logistics Cost

Logistics costs are formed from activities that support the logistics process, namely customer service, transportation, warehousing, inventory storage, and logistics administration. Based on the condition of logistics infrastructure during a pandemic like this, the logistics costs are not sufficient. Company leaders are required to think more creatively in increasing the efficiency of logistics activities. Efficiency opportunities can be carried out by companies by implementing Green Supply Chain Management, namely developing innovations in consuming fewer resources, producing minimum waste, and reducing adverse environmental impacts. An innovation that benefits the environment requires a new combination of knowledge about product characteristics, process and material characteristics, and technology.

Various methods can be used by companies to streamline total logistics costs by implementing green supply chain management.

The first is to understand the importance of Green Supply Chain Management by saving resource use, eliminating waste, increasing productivity, green purchasing, green 3PL, green transportation (optimization of routes/quantity/capacity/fuel, green mode of transportation), green warehousing (optimization of quantity /capacity/layout/material handling), green inventory (quantity optimization/reorder point/forecasting, collaboration with suppliers and retailers), properly handling returned products, and implementing ISO 14000 series in collaboration with suppliers who prepare green materials packaging will facilitate the preparation of goods, can reduce the use of materials, increase the utilization of warehouse space and transportation equipment, and reduce the amount of handling required.

The second is designing environmentally friendly products (green design) by designing products that treat environmental attributes as a design goal and not as a constraint. It aims to combine these attributes without compromising the performance, quality, functionality and useful life of the product. Perform value engineering on product designs that use hazardous materials or processes with the aim of improving product functionality and lowering costs, in collaboration with suppliers and customer feedback. This value engineering method can be combined with the Quality Function Deployment method to design products according to customer expectations and meet the demands of being environmentally friendly.

The third is to integrate remanufacturing with the company's internal operations (green operations). Green manufacturing and remanufacturing by minimizing the consumption of energy and resources to reduce the use of non-renewable resources. Reusing and recycling by changing the characteristics of materials including physical and chemical properties of used goods (automotive, electronics, paper) into new products to prevent waste, reduce consumption of new materials, reduce energy use, reduce air pollution and pollution water. Re-production / reconditioning (remanufacturing), i.e. used goods are reconditioned by changing some parts or dismantling so that they can be reused according to their functions. Designing a Reverse logistics network that coordinates with supply chain partners related to the uncertainty of damage to goods, storage locations, delays and speculation of goods.

### 6. Implementation of Green Supply Chain Management

The factors that encourage companies to implement Green Supply Chain Management, in order to keep moving with the current pandemic conditions are green purchasing, green manufacturing, green distribution and reverse logistics. The driving factors in the implementation of green purchasing are government policy, environmentally conscious consumer behavior and global environmental issues. According to Chan et al. (2018) and Djunaidi et al. (2018), the inhibiting factors in implementing green purchasing are lack of proper guidelines in implementing green procurement, expensive, time consuming and administration burden to implement green procurement and low supplier commitment.

In term of green manufacturing, the biggest driving factors for the implementation of green manufacturing include to build a corporate image, improving competitiveness, improving the quality of the products produced, as well as to gain recognition from the general public. Meanwhile, some of the factors that hinder companies from implementing green manufacturing are that the company's organizational structure is weak in supporting the implementation of green manufacturing and does not have a structured environmental management and the knowledge of the owner of the company regarding the practice of green



manufacturing is not realized into the practice of green manufacturing because of the assumption that the practice of green manufacturing will only require large costs without providing significant benefits for the company.

In term of green distribution, Macchion et al. (2018) conducted a case study to see the effect of green distribution on GSCM which can be categorized as an advantage to encourage the application of green distribution, including some green activities. In this case, green packaging activities have a positive and significant impact on the company's environmental performance. The finding implies an increase in green packaging practices such as using recycled materials for packaging, using standardized packaging materials and using reusable materials leading to significant improvements in the environmental performance of manufacturing companies. Green transportation has also a positive and significant correlation with the environmental performance of the company. This means that increasingly green transportation practices such as using vehicles that have fuel efficiency, using vehicles that have vehicle emission controls and supporting proper route planning lead to significant environmental improvements in the company's performance. This study also concludes that green storage has a positive and significant correlation with the company's environmental performance. This implies that the adoption of such green storage practices as increasing the flexibility of storage facilities, using efficient methods of running storage facilities and proper design and construction of storage facilities to less space leads to significant environmental performance improvements of enterprises. It was also concluded that eco labeling has a positive and significant correlation with the environmental performance of the company, implying that the adoption of environmentally friendly labeling practices such as having hazard symbols, disposal labels, and distributed content declarations leads to a significant improvement in the environmental performance of companies.

According to Kumar (2015), the factors driving companies to implement green distribution are because green distribution brings benefits, including improved customer satisfaction, good relationship with stakeholders, green image, higher delivery reliability through optimized route planning and less downtime, higher productivity through higher motivation from employees and improved financial performance.

Lastly, in term of reverse logistics, Susanty et al. (2016) stated that one of the inhibiting factors for the implementation of reverse logistics is the difficulty of collecting and transporting waste for the recycling process. A number of obstacles related to reverse logistics according to Priyono (2008) include that most inventory systems are not equipped with facilities that can handle product movement from downstream to upstream properly, and the cost of reverse distribution reaches 9 times compared to distributing the product normally. Moreover, product returns are often not shipped by means of transportation, stored, or distributed as is the case in the normal distribution channels as usual. This reverse logistics transportation is usually more complex which is up to 14 times longer than the normal distribution channel. The encouragement that comes from environmentally conscious customers supported by government regulations are two external factors that play an important role in encouraging companies to be environmentally friendly.

## CONCLUSION

In times of pandemic like this, business companies have created and implemented better strategies in line with the best interests of protecting the environment. This is because every link in the Traditional Supply Chain can cause pollution, waste, and other hazards to the environment. To overcome the occurrence of pollution, waste, and other hazards to the environment due to the impact of activities in the Supply Chain, Green Supply Chain Management is currently being promoted.

Green Supply Chain Management (GSCM) consists of components of green purchasing, green manufacturing, green distribution and reverse logistics. Companies that implement green supply chain management have superior values and good competitiveness. Companies face obstacles to implementing GSCM starting from upstream to downstream activities that require top management commitment and good collaboration by every actor involved in supply chain management.

The pandemic has had a real impact, both on global shipping which affects supply chain conditions in general, as well as on the maritime industry in other parts of the world. With the effective handling of COVID-19, it will have an impact on sustainable maritime transportation in overcoming disruptions in supply chain management.

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