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Green Practices in Supply Chain Management: Case Studies

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ABSTRACT

Along with the progress in industry, population growth, the development of international trade relations and the increase in production volume in the world, supply chain networks have expanded. Although all these developments are in favor of human beings, the fact that the resources in the world are not unlimited and the ecological balance will not be able to handle this growth has led to the necessity of protecting the environment and required governments, companies and consumers to take precautions. One of these measures is green practices that aim to make supply chain management environmentally friendly. The aim of this study is to provide information about the development and scope of the concept of green supply chain management within the framework of literature research and to present cases from green supply chain applications of companies in different sectors. Thus, it is to evaluate the environmental, social and economic effects of green practices on companies.

Keywords: Green supply chain, green logistics, sustainability, ecological balance.

1 Introduction

Industrialization has brought about the excessive consumption and destruction of natural resources, the release of harmful gases into the atmosphere, the destruction of forests, the reduction of agricultural areas, the pollution of sea and fresh water resources, and the decrease in air quality (Batı, 2014: 268, Avaner, 2019: 847). With the danger of sustainability and public health in the world, the awareness increased in governments, companies and consumers has enabled them to act more sensitive to the environment and take steps to protect the ecological balance. Thus, environmental management policies were developed, trainings and seminars were organized on the subject, and international collaborations were started (Büyüközkan & Vardaroğlu, 2008: 71). The legal regulations enacted regarding the recovery of consumed resources and the pressures brought by consumer awareness have enabled companies to adopt environmentally friendly, minimum waste and environmental risk principles in their operations (İnce, 2015: 2). Thus, the inclusion of environmentally friendly green practices in supply chain management has revealed the concept of green supply chain management (GSCM). It offers companies the opportunity to carry out environmentally friendly production, packaging and distribution activities. With green supply chain (GSC) practices, companies increase their efficiency, provide cost

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advantage, gain an advantageous position against their competitors, and most importantly, they can continue their activities without harming the nature (Güzel, 2011: 14).

There are various studies on GSCM in the literature. In the study conducted by Roarty (1997), it is stated that some companies approach GSC practices reactively and are forced to switch to green practices due to legal obligations. Companies that adopt the proactive approach take a more sensitive approach toenvironmental issues and lead the transformation by voluntarily implementing green practices. In their study, Zhu and Sarkis (2004) report that there is a directly proportional relationship between the ecological performance of companies that take care of environmental issues and put them into operation, and their economic performance. In another study, Shecterle and Senxian (2008) report that companies that prefer GSCM have reduced operating costs for logistics, operation and supply activities. In their study, Zhu et al. (2008) states that while GSC practices provide various advantages for companies, investments in these applications are costly and that while large-scale companies can ignore these costs, small-scale companies have difficulties and by means of the driving forces of large-scale companies, small-scale companies also gain environmental awareness. Azavedo et al. (2011) states that GSC activities increase customer satisfaction, work quality and production capacity. Saydam and Al-Smairat (2015) stated in their study that the factors affecting the GSC are environmental or financial performance-related factors, internal or external organizational factors, globalization, governmental factors and industrial factors. In his study, Baki (2018) evaluated the obstacles encountered in the transition and implementation process of GSCM and mentioned that the reasons may have originated from the internal dynamics of the companies, customers, vendors and governments. Cengiz et al. (2019) emphasized the importance of reducing the environmental impacts of material-related activities in the GSC in the construction industry, both at the design and construction stages, and suggested an Life Cycle Assessment decision support approach to reduce cost and carbon emissions in the production, transportation and application stages of building materials. Nguyen and Lee (2020) stated in their study that GSCM has a positive effect on companies' global cooperation and performance. Desticioğlu (2021) evaluated the concepts of GSCM and green logistics within the scope of literature review, taking into account current developments. In their study, Rupa and Saif (2021) evaluated the impact of GSCM practices on business performance and environmental sustainability of Bangladesh, a developing country. According to the results, GSCM applications have a statistically significant effect on cost, waste disposal, resource consumption and greenhouse gas emissions. Allen et al. (2021) investigated theories about sustainable supply chain management and circular economy linkage. The contribution of this study has been the interpretation and synthesis of the theories on the subject. Li and Sarkis (2022) review the application of product eco-design in GSCM studies. This study enables practitioners to evaluate current eco-design management issues and includes relevant recommendations for improving international eco-design performance.

In this study, as a complement to previous studies, the development of the concept of GSC, the components of the system, the basic standards in practice, the reasons that lead companies to GSCM are evaluated within the framework of the literature, and it is aimed to reveal the economic, social and environmental effects of green practices on companies with application examples from different sectors.

2 Development of the Green Supply Chain Management Concept

Supply chain management is the planning and management of all procurement, purchasing, transformation and logistics management processes. It also includes the coordination and collaboration of channel partners consisting of suppliers, intermediaries, third-party service providers and customers. Supply chain management integrates supply and demand management within and between businesses

(Vitasek, 2006: 139). GSCM is the integration of sustainable environmental processes and supply chain structure. It includes the management of supplier evaluation, purchasing, product design, production and reverse logistics activities with a sustainability and green perspective (Koç & Erden, 2021: 3).

The problem of environmental pollution has increased exponentially since the 1960s, and the absence of specially designed laws to manage environmental risks and damages at that time increased concerns about this issue (Saada, 2020). Production-related environmental pollution was first addressed in the 1970s and waste management processes were established in the 1980s (Ergülen & Büyükkeklik, 2008, p.38). In this period, the concept of sustainability emerged. The concept of sustainability was first mentioned in the final report of the UN meeting in 1983. In this report, sustainability was defined as efforts to meet the needs of the present without compromising the ability of future generations to meet their own needs. Since the 1990s, the joint evaluation of sustainability, environment and supply chain issues has been the starting point of the concept of GSCM (Intravaia & Viana, 2016). The concept of GSC was first proposed for the Environmental Responsibility Generation (ERM) study in 1996, inspired by the concept of green purchasing introduced by Webb in 1994 (Shan & Wang, 2018: 2). This process, which evaluates supply chain management in terms of environmental impacts as well as resource allocation, is shown in Figure 1.

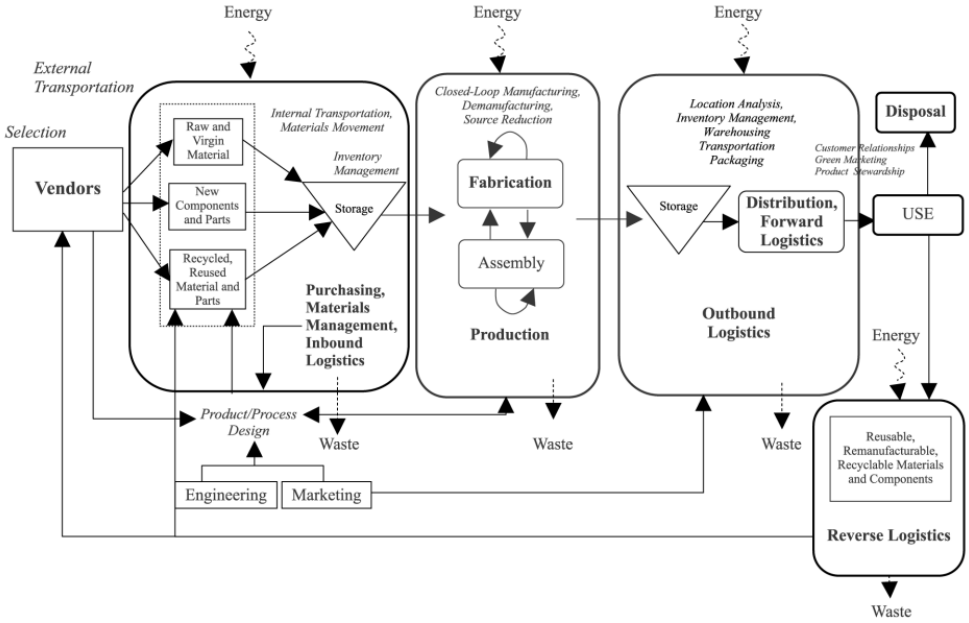

Figure 1: Green supply chain management structure (Hervani et al., 2005)

GSCM is the effective implementation of eco-efficiency, the use of renewable energy sources and sustainable actions in the supply chain. In this way, environmental and economic objectives are integrated into the supply chain management as a whole (Herrman et al., 2021: 1). GSCM starts with the procurement of raw materials from the supplier and ends with the steps of stock management, production, storage, distribution, use and recycling or disposal. The energy used and the waste generated during these steps are included in the process (Hervani et al., 2005: 334). It also focuses on the function of technology in recycling processes (Sahar et al., 2020: 2).

2.1 Components of Green Supply Chain Management

GSCM activities are classified as green purchasing, green production and materials management, green marketing, green design, green logistics and reverse logistics (Duarte et al., 2011: 521; Sahar et al.,

2020: 2). Green purchasing means taking environmentally sensitive decisions in the purchasing processes from the design stage of the products to the final product (Zsidisin & Siferd, 2001: 69). It is also the use of products that are recovered from production processes or that are reusable. In this way, as a result of reducing purchasing activities, less resources will be used and emissions will be reduced by saving on transportation services (Ninlawan et al., 2010).

Green production is a concept that aims to use raw materials and natural resources efficiently and effectively, to reduce harmful wastes such as emissions, polluted water and solid waste that occur during the production process, and to reuse the wastes if possible (Liu et al., 2017: 183). It is the production strategies implemented by companies to create products/systems that consume less materials and energy, to use non-toxic and renewable input materials, to reduce unwanted outputs and to convert outputs into inputs (Deif, 2011: 27).

Green strategies are also applied in marketing activities, which have an important place in the value chain. The definition of green marketing, which was first made by the American Marketing Association in 1975, has entered the literature as a concept that deals with the positive or negative effects of marketing actions on public health, environmental pollution, and the use of resources (Erbaşlar, 2012: 95). Green marketing can also be used with labels such as sustainable marketing, social marketing, ecological marketing, environmental marketing (Chamorro & Banegil, 2006: 11). For green marketing to be actively applied in a company, it is necessary to design green products, adopt green strategies, stop the use, production and marketing of existing non-environmentally friendly products, and create social responsibility awareness in employees and society (Denruyter, 2011: 5). The strategies followed within the framework of green marketing are to differentiate products by choosing green products, to turn to an environmentally friendly target group, to design environmentally friendly packaging, to prefer an environmentally friendly distribution system, and to conduct product life cycle analysis (Singh, 2012: 170-171).

Design practices made with the aim of making the product environmentally friendly in all processes from the creation of a product to its recycling are called green design. It is the realization of the design by considering factors such as resource use, waste generation, and the effects of the product on public health in the life cycle of a product (Vijayvargy, 2017: 303). Green design is not only about the environment, but also covers issues such as product safety, occupational health and safety, and environmental risk management (Srivastava, 2007: 55).

The increase in industrialization also increases logistics activities, and the greenhouse gases that emerge as a result of logistics activities cause global warming and harm the environment. In addition, it creates various other problems such as noise, waste and pollution (Korucuk & Mert, 2017: 867-868). Green logistics can be defined as the execution of all logistics-related processes such as transportation, storage, packaging and stocking within an environmental approach (Nakıboğlu, 2017: 148). The aim of green logistics is to reduce the environmental externalities of logistics operations such as greenhouse gas emissions, noise and waste due to environmental concerns and to provide a balanced development between economy, society and environment (Wang et al., 2018: 3).

The activities that cause the most damage to the environment in the supply chain network and have the highest emission generation worldwide are transportation activities (Pazirandeh, 2013: 892). Green transportation, which can also be called sustainable transportation, is defined as transportation that is safe, causes the least harm to the environment and public health, makes an effort to use renewable resources, minimizes the use of existing resources, protects the quality of life of future generations, and

also considers the benefits of companies (Morgan, 2010). Improvements that can be made in the destruction and maintenance processes of vehicles used for transportation is another step that can be taken within the scope of green transportation. With proper vehicle maintenance, the risk of accident can be reduced, fuel, oil, etc. harmful substance leaks can be prevented, and the life of the vehicle can be extended. Extending the life of the vehicle contributes to the protection of the environment by reducing the destruction processes and the wastes that will occur due to destruction, and it also reflects positively on the company costs (Wu & Dunn, 1995: 26-27). In addition, the damage to the environment in the construction of transportation networks should also be evaluated in this context (Mc Kinnon et al., 2010: 31-32).

One of the critical activities of the logistics service process is warehousing. Therefore, the environmental impact caused by storage operations is also important. In the 2016 World Economic Forum, emission reduction in warehouse operations and its importance for a more sustainable logistics operation were emphasized (Wahab et al., 2018: 383). The goal of green storage is to create a sustainable storage system that reduces the negative effects on the environment without reducing profit margin and customer satisfaction by maintaining or even improving existing standards (Tan et al., 2009: 2). In this context, green storage is warehouse systems that integrate and implement environmentally friendly operations in order to minimize the energy consumption, energy cost and harmful emissions of a warehouse (Bartolini et al., 2019: 244).

Another component is packaging. Green packaging, also called sustainable packaging, is the packaging process using reusable, recyclable or environmentally friendly materials (Zhang & Zhao, 2012: 902). Due to increasing consumer awareness and government sanctions in recent years, companies have been revising their supply chain structures on green packaging. Laws enacted by state administrations and European Union directives provide for sustainability in packaging activities (Zheng, 2013: 78). The correct packaging contributes to reducing the amount of products to be shipped, thus reducing the energy loss, cost increase and most importantly environmental pollution that will occur due to transportation. For this reason, the products should be packaged and loaded in a way that occupies the least volume (Kuduz & Zerenler, 2013: 155-156).

Reverse logistics activities are also important in terms of GSC. Reverse logistics is defined by the logistics council as the activities in which the transfer of used materials from the destination point to the starting point is organized in order to be evaluated, reused or destroyed through recycling methods (Mounir et al., 2011: 37). Reverse logistics activities are carried out due to reasons such as quality errors in the production process, excess production, incorrect or damaged delivery in the distribution process, incorrect stock adjustments, and returned products resulting from customers' failure, damage, etc. In addition, if the packaging materials are reusable, these materials are also included in the reverse logistics processes (Nakıboğlu, 2007: 183-184). Reverse logistics activities are implemented in many sectors such as food, textile and electronics (Şengül, 2011: 408; Fleischmann et al., 1997: 5-6). Due to the limited resources but unlimited demand, the raw materials used decrease over time and this imbalance is tried to be eliminated by reverse logistics methods (Baki, 2003: 25). It includes reuse, repair or disposal, refurbishment, product removal, recycling and remanufacturing (Thierry et al., 1995: 118-119; Sarkis, 1998: 170; Beamon, 1999: 335; Bulut & Deran, 2008: 334). Increasing consumer awareness, cost reduction efforts, recycling possibilities and legal regulations enable companies to cooperate in reverse logistics activities (Blumberg, 2005: 22).

2.2 Basic Standards in the Green Supply Chain

Companies that can only meet the expected standards in international trade survive in destructive

competition (Özkaya, 2010: 248). In this context, processes for GSC applications should be regulated in accordance with environmental management systems standards. Environmental management systems are systems used to protect natural resources within the framework of legal regulations, to enable companies to review their recycling and consumption activities, and to contribute to sustainable development (Salim et al., 2018: 646). It also includes procedures to establish a continuity in the effort to protect the environment (Ertuğrul & Şavlı 2013: 225).

Increasing environmental pollution and the threat of public health lead companies to environmental management systems, while at the same time, consumers' expectation for companies to submit documents provides companies to gain awareness (Campos, 2012: 141). In addition, creating a common language in import and export processes and maintaining trade within the framework of standard procedures is only possible with environmental management systems (Orkos et al. 2018: 850). Environmental management systems consist of evaluation, planning and activation steps. For the environmental management systems to be put into practice correctly and efficiently, the employees should be included in the process and the activities should be supported by the senior management (Tatar, 2017: 41).

The first environmental management system was published in the UK in 1992. In this standard, which is called BS7750, the objectives, activities and future plans of companies in environmental management are included. BS7750 standards, which were repealed in 1997, have been the basis of ISO standards, which are valid in many countries around the world today (Irmak, 2021: 43). Within the scope of GSCM activities, ISO standards are ISO 14000 environmental management system and ISO 50000 energy management system (Quazi et al., 2001: 526).

The ISO 14000 environmental management system standards series can be defined as an international standard that directs companies to analyze their processes and eliminate activities that disrupt the ecological balance, which are detected as a result of the analysis (Madar, 2016: 196). The ISO 14000 environmental management standards series guides companies in the fields of environmental management systems, environmental audit, environmental performance evaluation, environmental labeling, life cycle assessment, environmental product standards (Montabon et al. 2000: 5). ISO 50000 energy management system is a guide about using energy resources efficiently, providing transparent and correct energy management behavior in the management of resources, determining a roadmap, reducing greenhouse gas emissions, turning to new and efficient technologies, ensuring integration with other management systems such as environment, health and safety (ISO, 2011: 3).

3 Reasons Driving Companies to Green Supply Chain Management

As a result of rapidly increasing consumption habits and accordingly increasing production need, environmental problems have gained a dangerous dimension day by day and companies put into action GSC practices in order to comply with legal regulations, increase performance and profitability by reducing costs, fight environmental problems and protect natural resources, sustain development, take part in international trade, respond to consumer pressure, and gain competitive advantage and prestige (Gökbunar, 1995: 14; Azavedo et al. 2011: 862).

Although the activation of GSC practices is sometimes carried out voluntarily by companies, the driving force of legal sanctions on companies cannot be ignored. Fines imposed on companies that do not comply with legal obligations both cause financial damage to companies, and being subject to criminal sanctions due to an environmental issue undermines the prestige of companies (Srivastava, 2007: 72).

In order to reduce the carbon footprint in the name of environmental protection, laws and protocols are published by various institutions and organizations, governments or non-governmental organizations all over the world. These laws concern not only companies but also countries (Yüksel & Okumuş, 2003: 290). It is seen that the laws with the highest applicability by companies are those that impose sanctions on waste. Because of these sanctions, manufacturers design their products as recyclable or reusable (Routroy, 2009: 26).

Having environmental awareness does not only make companies preferable because they are sensitive, but also provides companies with financial income through ways such as productivity increase, cost reduction, energy efficiency and waste reduction. While this cost advantage increases the performance and profitability of companies, it also indirectly brings competitive advantage (Nidumolu et al., 2009: 60).

While various legal measures are taken to protect the environment, companies also carry out voluntary protection activities with GSCM approaches (Gökbunar, 1995: 14). Thus, ensuring the ecological balance is considered (Van & Remko, 1999: 129). The main reason for this is that although the world has provided many reserves and resources for human beings, these resources are not unlimited and non-renewable energy resources such as coal, oil and natural gas have started to run out (Yelok, 2017: 55). Due to the aforementioned problems, companies use GSC practices to redesign products in a way that does not cause pollution, production processes are optimized to reduce resource use and environmental pollution, efforts are made to reduce material and energy input, wastes are reused or destroyed if possible, and if not, destroyed in a correct way and efforts are made to use the distribution systems effectively and efficiently (Ener, 1997: 327).

According to the concept of sustainability, while providing economic development, concerns about environmental pollution and public health should be eliminated (Mengi & Algan, 2003: 1). By means of sustainability, companies carry their productivity to the future, protect the ecological balance and ensure that the system function efficiently (Yavuz, 2010: 64). Sustainability in businesses is mostly ensured in line with the strategies of the production departments. Sustainable production is carried out in the production departments, taking into account issues such as correct resource use, minimum waste generation, and reusability. Thus, while the needs of the current society are met, the opportunities of future generations to meet their needs are not taken away (Ron, 1998: 99).

In terms of international trade, non-governmental organizations such as the World Trade Organization or similar economic groups work to establish certain procedures for the protection of the environment and to carry these procedures to the international level, as well as to ensure that all institutions and organizations that are members of them carry out their activities in line with the determined procedures. For example, China, which was included in the World Trade Organization in 2001, has carried out many studies on environmental protection after its inclusion in the organization, and Chinese scientists have made many contributions to the literature on GSC (Zhu et al., 2007: 182).

One of the reasons why companies turn to GSCM practices is customer pressures (Rahman et al., 2014: 1). Companies respond to customer pressure on environmental requirements in the supply chain by collaborating for environmental performance. If a company aims to improve financial performance, it needs to establish more collaborative relationships with customers to achieve environmental goals (Laari et al., 2016: 1960).

Today, environmental problems have reached a dangerous level and companies have realized that they cannot maintain their existence by just production, but also they need to be sensitive to the environment

and society. This requirement is only possible with GSC practices, and these practices not only enable companies to fulfill their environmental responsibilities, but also provide companies with a competitive advantage (Nemli, 2000: 72; Nemli 2001: 214). In a study conducted in Taiwan, green products, green processes and green management provide competitive advantage. Also, it was found that being sensitive to the environment also adds value to the company (Chiou et al., 2011: 830).

4 Case Studies of Green Supply Chain Practices

In this study, case analysis from qualitative research methods was conducted. Case study allows exploration and understanding of topics through reports of past studies and is considered a robust research method when holistic, in-depth research is required (Tellis, 1997). In this context, a collective case study was conducted to evaluate the economic, social and environmental effects of green supply chain practices in different sectors on companies. In this type of study, a topic is selected and the researcher evaluates more than one case study to explain the topic (Creswell, 2007:74). The companies that are the subject of the case study are given in Table 1.

Table 1: *Companies subject to the case study*

Company Name	Industry	Position in the Supply Chain
NIKE	Sportswear	Manufacturer
IKEA	Furniture	Manufacturer
CMA CGM Group	Logistics	Service Provider
LÖFBERGS	Food	Manufacturer
BOEING	Aviation	Manufacturer
FORD OTOSAN	Automotive	Manufacturer

Taking part in sustainability projects in continuous cooperation with its consumers and suppliers, Nike has restricted the use of chemicals that threaten human and environmental health, both in its own production and in the production phase of its suppliers. At the same time, it uses renewable energy in its production facilities and encourages its suppliers in this direction. With the technology they call Flyknit, they create sixty percent less waste, while not compromising on quality. At the same time, it has included the recycling of plastic bottles in its production and reused the shoes that it produces, which have expired. This practice, which produces 60% less waste than traditional cut and vertical methods, has reduced 3.5 million pounds of waste between 2012 and 2015. (Nike, Inc, 2016). Within the scope of the 2020 targets set in 2015, the company reduced the use of fresh water by textile dyeing and finishing suppliers by 30%. This resulted in a cumulative savings of 40 billion litres of fresh water by suppliers from 2016 to 2020. More than 47 million kg of production waste has been recycled into new footwear products since 2015. Renewable energy use for processes owned and operated globally stood at 48%. Since 2015, shoe suppliers have achieved a reduction of approximately 10% in energy consumption per pair produced. With the year 2020, the company announced its 2025 targets and the roadmap to reach these targets (Nike 2020).

IKEA, a multinational company that designs and sells furniture, kitchen appliances and home accessories, carries out many projects for the GSC process. Climate roadmaps prepared for the company to reduce the climate footprint of materials are integrated into every IKEA process. According to the 2021 sustainability report published by the company, it is stated that the climate footprint is 26.2 million tons of CO2 equivalent, and 1.6 million tons of CO2 equivalent reduction was achieved compared to 2016. However, it is estimated that there will be a 5.7% increase in climate footprint in 2021 compared

to 2020, due to the diminishing effects of the pandemic. The main objective of the company is to reduce greenhouse gas emissions from the value chain by at least 15% in absolute terms compared to fiscal year 2016 by 2030. To this end, the company sets a new target for the phasing out of remaining plastics in consumer packaging by 2028 and takes supporting actions. Circular pathways are developed to ensure that the life of their products is extended. Products that have become unusable are recycled into secondary raw materials for new products and are designed to last as long as possible. For example, A KLIPPAN sofa cover from recycled denim has been developed in partnership with MUD Jeans. Each cover contains 40% recycled denim (approximately two jeans). This reduces the carbon footprint of the cover by 67% and saves 27,000 litres of water during production. In 2021 55.8% of procured materials are renewable and 17.3% are recycled materials. It works to achieve 100% renewable electricity for all IKEA factories and component packaging and distribution units. It is thought that all these actions also affect customer preferences. The company's sales increased by 5.8% in 2021 compared to the previous year (IKEA, 2021).

CMA CGM Group provides transportation, storage and port services in the logistics sector with its companies. The group has a target of achieving carbon neutrality by 2050, announced in June 2020. The group's approach to sustainable development is based on three pillars: acting for people, for the planet, and for responsible business. The Group has built its lasting success on strong and humanitarian values. In this framework, it allocates resources for both the safety of its employees and the development of its human resources. In 2020, the Group's fleet reduced its global CO2 emissions by 4% compared to 2019, namely to 23.3 million tonnes. The Group has reduced its CO2 emissions by 49% per TEU-km since 2008, in line with its voluntary target of 50% reduction in greenhouse gas emissions by 2030. This has used newer, energy-efficient vessels equipped with the latest eco technology, optimized asset use through growing alliances, a more efficient fleet operating policy that helps energy savings. The Group acts in accordance with ethical standards in its commercial processes. It strictly abides by applicable laws and regulations and promotes responsible international trade with its suppliers and customers (CMA CGM, 2020).

In the 2020/2021 report of LÖFBERGS, a coffee roastery company, it is stated that the company contributed to the conversion to organic production on an area at the size of 11,771 football fields without the use of any artificial fertilizers and pesticides. The company works on recyclable packaging. Together with a supplier, it has developed a prototype of a coffee pack that can be reused and recycled many times. On July 1, 2021, it opened its facility, which produces all its energy from renewable sources and received the Environmental Building Silver certificate. Thus, the company's impact on the climate was reduced by 42% compared to the previous year. With all these investments, the company's operating profit for the period 2020/2021 was 39.9 million Swedish Kronor (LÖFBERGS 2021).

BOEING is a company that conducts business processes with a global network of approximately 12,000 suppliers every day. It cooperates with suppliers that comply with sustainable environmental policies in supplier review, selection and support. In 2018, the company carried out the world's first commercial airplane flight using 100% sustainable fuels as part of the ecoDemonstrator program. In 2020, the target of net zero carbon emissions at its factories and construction sites has been achieved. The company contributes to reducing waste by reusing and recertifying aircraft parts. Parts that meet quality standards are recertified. These parts are obtained by dismantling decommissioned aircraft. According to the company's 2021 sustainability report, it has reduced energy consumption by 12%, water use by 23%, solid waste by 44% and hazardous waste by 34%. The company also partners with community organizations to advance racial equality in terms of social responsibility, promote academic achievement, and train workforces for economic stability (BOEING, 2021).

FORD OTOSAN aims to reduce carbon emissions per vehicle by 50-55% in 2030 compared to 2017 and to be carbon-neutral in 2050. In order to produce affordable products while reducing its carbon footprint, the company started to produce battery boxes from recycled plastic for use in light commercial vehicles in 2020. By means of the project, carbon emissions were reduced by 82 tons on an annual basis by using 50% recycled plastic per product. In addition, mitigation efforts for vehicles both have a positive effect on fuel economy and reduce greenhouse gas emissions. Projects and applications are developed to reduce operational energy consumption and to supply electrical energy from renewable sources. By reducing the cycles of the pumps used in the paint shop, the daily consumption of the pumps was reduced by approximately 24%, thus saving energy. With the project, which saves on air consumption, 1,440 GJ of electrical energy was saved annually. The automatic systems in the dyehouse were examined and the processes were optimized, thus saving 14,749 GJ of energy annually and reducing the greenhouse gas emissions by 1,286 tons (FORD OTOSAN, 2020).

5 Conclusions

Although GSC applications require additional investment for companies, they reduce costs, increase efficiency and provide an advantage against competitors in the market in the long run. The GSC cannot be created with the awareness or investments of only one company. It is necessary to work with all stakeholders in order for the GSC to be formed and to function without breaking. Hence, companies evaluate the suppliers they will work with within the framework of sustainability goals; they determine common goals and quality standards, and develop training programs. Large-scale companies adapt more easily to GSC practices, owing to their ability to transfer necessary resources, considering their financial structures. Top management support is of great importance for the effective implementation of GSC practices. Awareness and compliance processes accelerate in companies that receive senior management support. Recycling activities are also important in relation to the subject, and it is seen that the recycling activities carried out correctly reduce the resource usage to a large extent. In addition to all these, GSC practices enable companies to take place in higher number of markets in international trade. National and international standards and legal regulations applied in different sectors require companies to carry out their activities by taking these regulations into account in order to enter different markets in foreign trade.

Within the framework of all these evaluations, GSC practices are important in order to leave a liveable world to future generations. However, sustainability activities are the responsibility of all individuals, not just governments or companies, and it is recommended that production and consumption activities be carried out with this awareness. In this study, literature research was conducted and the practices of companies operating in different sectors were evaluated by taking into account the sustainability reports. The environmental and social effects of GSC practices can be seen directly as a result of the studies carried out to reduce harmful gases, the use of fossil fuels and wastes, and of the decisions taken for ethical principles. However, clear results on its economic effects could not be reached. In this framework, studies can be conducted to reveal the direct effects on the economic structure of companies by evaluating the GSC practices in the future quantitatively.

6 Declaration

6.1 Conflict of Interest

There is no conflict of interest in this study.

6.2 Authors' Contributions

The authors stated that they contributed equally to the study.

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